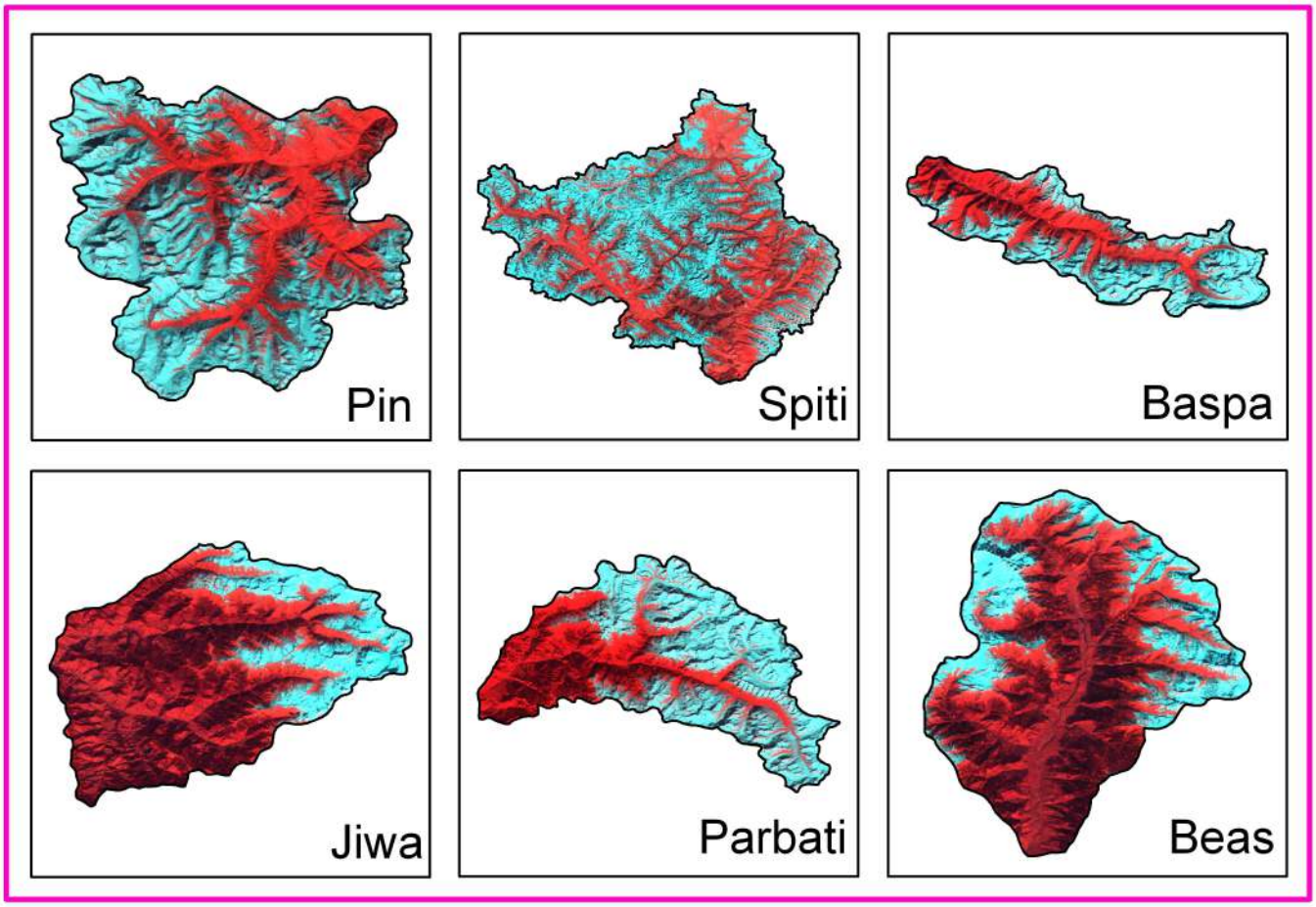
SNOW COVER ATLAS OF SATLUJ BASIN

Sub basins: Pin, Spiti, Baspa, Jiwa, Parbati and Beas

(A Joint Project of Indian Space Research Organisation and Ministry of Environment and Forests, Govt. of India)

Year : 2011-12



State Centre on Climate Change
(State Council for Science Technology & Environment, Shimla), Himachal Pradesh
and
Space Applications Centre (ISRO)
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Originating Unit	Geo Sciences Division, Marine, Geo and Planetary Sciences Group, Earth, Ocean, Atmosphere, Planetary Sciences and Applications area, Space Applications Centre (ISRO), Ahmedabad-15
Abstract	This atlas gives subbasin-wise distribution of snow cover in the Satluj basin from October 2011 to June 2012. The subbasins included in this report are Pin, Spiti, Baspa, Jiwa, Parbati and Beas. The areal extent of snow cover was estimated in fully automatic mode using Normalized Difference Snow Index (NDSI) based algorithm. For this purpose AWiFS sensor of Resourcesat satellite was used. This atlas gives snow cover products, statistics and seasonal snow depletion curves. It is expected that this data will be useful for hydrological and climatological applications.
Key words	Snow cover, NDSI, AWiFS, depletion curve, Pin, Spiti, Baspa, Jiwa, Parbati and Beas basins.
Security Classification	Unrestricted
Distribution	As per list

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1. **Introduction**

Snow covers almost 40 per cent of the Earth's land surface during Northern Hemisphere winter. This makes albedo and areal extent of snow as important component of the Earth's radiation balance (Foster and Chang, 1993). In addition, large areas in the Himalayas are also covered by snow during winter. Area of snow can change significantly during winter and spring. This can affect stream flow for rivers originating in the higher Himalayas. All the rivers originating from higher Himalayas receive almost 30-50 % of annual flow from snow and glacier melt run off (Agarwal et al., 1983). In addition, snow pack ablation is highly sensitive to climatic variation. Increase in atmospheric temperature can influence snowmelt and stream runoff pattern (Kulkarni et al., 2002). Therefore, mapping of the areal extent and reflectance of snow are important parameter for various climatological and hydrological applications. In addition, extent of snow cover can also be used as input for numerous other applications.

Mapping and monitoring of seasonal snow cover using field methods are normally very difficult in a mountainous terrain, like the Himalayas. Therefore, remote sensing techniques have been extensively used for snow cover monitoring. Snow cover monitoring using satellite images were started by using the TIROS-1 satellite from April 1960 (Singer and Popham 1963). Since then, the potential for operational satellite-based mapping has been enhanced by the development of higher temporal frequency and satellite sensors with higher spatial resolution. In addition, satellites with better radiometric resolutions, such as NOAA have been used successfully for snow mapping (Hall et al., 1995). This is possibly due to the distinct spectral reflectance characteristics of snow in visible and near infrared regions. India has launched series of Indian Remote Sensing satellite (IRS) to study the different earth resources. Previously launched satellites have flown with many sensors having different spatial, temporal and spectral resolutions. Recently launched RESOURCESAT-1 satellite has three different sensors namely LISS III, LISS IV & AWiFS with different spatial, temporal and spectral resolutions as desired for different applications. AWiFS (Advanced Wide Field Sensor) is an advanced version of earlier Indian satellite sensor WiFS (Wide Field Sensor) with improved spectral and spatial resolutions maintaining the same repetivity. There are a series of other polar orbiting satellites, like Landsat, NOAA and MODIS etc., which have provided information on different aspects of

snow. Geo-stationary satellites also proved their utility in mapping/monitoring the snow-covered regions. Information generated from satellite observations has been extensively used for snowmelt runoff modeling (Kulkarni et al., 1997).

2. Study Area:

The study area comprises of distribution of snow cover in Pin, Spiti, Baspa, Jiwa, Baspa, Parbati and Beas sub basins of Satluj basin. The location map of these sub basins is as per Figure 1.

3. Data used:

AWiFS data from October 2011 to June 2012 was used in this study.

4. Normalised Difference Snow Index (NDSI):

In general, the reflectance of snow is high at the red end of the visible spectrum. It tends to decline in the near-infrared region until 1090 nm, where slight gain in reflectance occurs and gives a minor peak at approximately 1090 to 1100 nm. One of the important difficulties in snow cover monitoring is the presence of cloud cover. Cloud has strong reflectivity in visible, NIR and SWIR regions while snow absorbs in SWIR, and this difference can be utilized for snow/cloud discrimination. Normalized Difference Snow Index (NDSI) utilize the normalized ratio of green and SWIR and is used as an automated approach for snow mapping addressing the shadow and cloud problems in snow bound areas.

Normalized Difference Snow Index was calculated using the ratio of green wavelength (band 2) and SWIR (band 5) of AWiFS sensor:

$$Normalized\ Difference\ Snow\ Index(NDSI) = (band2 - band5)/(band2 + band5) \quad ..(1)$$

To estimate NDSI, DN numbers were converted into reflectance. This involves conversion of digital numbers into the radiance values, known as sensor calibration, and then estimation of

reflectance from these radiance values. Various parameters needed for estimating spectral reflectance are maximum and minimum radiances and mean solar exo-atmospheric spectral irradiances in the satellite sensor bands, satellite data acquisition time, solar declination, solar zenith and solar azimuth angles, mean Earth-Sun distance etc. (Markham and Barker, 1987; Srinivasulu and Kulkarni, 2004).

5. Snow cover monitoring algorithm

An algorithm is developed to provide changes in the areal extent of snow (Kulkarni et. al., 2006). Snow extent is estimated at an interval of 5-days and 10-days, depending upon availabilities of AWiFS data. In 5-daily product, snow extent is generated scene-wise. In this product, snow and cloud extents are given. Estimate of cloud is important because, at times, snow is covered by cloud and this may be classified as non-snow area, leading to erroneous conclusions. In 10-daily product, three scenes are analyzed, if available. For example, 10 March product data of 5, 10 and 15 March was used. If any pixel is identified as snow on any one date then this pixel will be classified as snow on final product. This provides snow cover at an interval of 10 days, an important requirement in hydrological applications. Therefore, this product is generated basin-wise. Since this product is using three scenes, probability becomes high that at least in one scene, pixel may be cloud-free and this helps in overcoming problem associated with snow under cloud cover. If three consecutive scenes are not available, then all available scenes in 10 days window was used in the analysis. Differentiation between water and snow is difficult using NDSI image. In addition, separation of snow and water pixels is also difficult based on reflectance due to mountain shadow. Therefore, in the present algorithm, water bodies are marked in pre-winter season and are masked in the final products during winter. Flow diagram of the algorithm is given in Figure 2.

6. Results and discussions

In this atlas, basin-wise snow cover statistics, maps, and seasonal depletion curve is given from October 2011 to June 2012. Snow ablation pattern varies from basin to basin, depending on area altitude distribution in the basins. For example, in the Jiwa river basin, which is located in lower altitude zone and contains few glaciers has shown and ablation of snow through out the winter season. However, in case of Pin & Baspa basins, located in high altitude region and large area is covered by glaciers has shown little or no ablation from January to April. For a period between October to December, snow ablation was observed in all basins.

Acknowledgements

This investigation was carried out under Snow and Glacier Studies Project, a joint initiative of Ministry of Environment and Forest (MoEF) and Department of Space (DOS). The authors are grateful to Shri A. S. Kiran Kumar, Director, Space Applications Centre, Ahmedabad for continuous guidance and encouragement during the investigation. Authors would like to thank Dr. J. S. Parihar, Deputy Director, EPSA, SAC for their suggestions and comments on the manuscript. The authors are also thankful to Sh. Sudripta Roy, IAS, Additional Chief Secretary (Env. S&T) Government of Himachal Pradesh and Dr. Nagin Nanda, IFS ,Secretary –cum-Director (Environment) and Member Secretary (SCSTE) for their guidance from time to time and permission to undertake the study.

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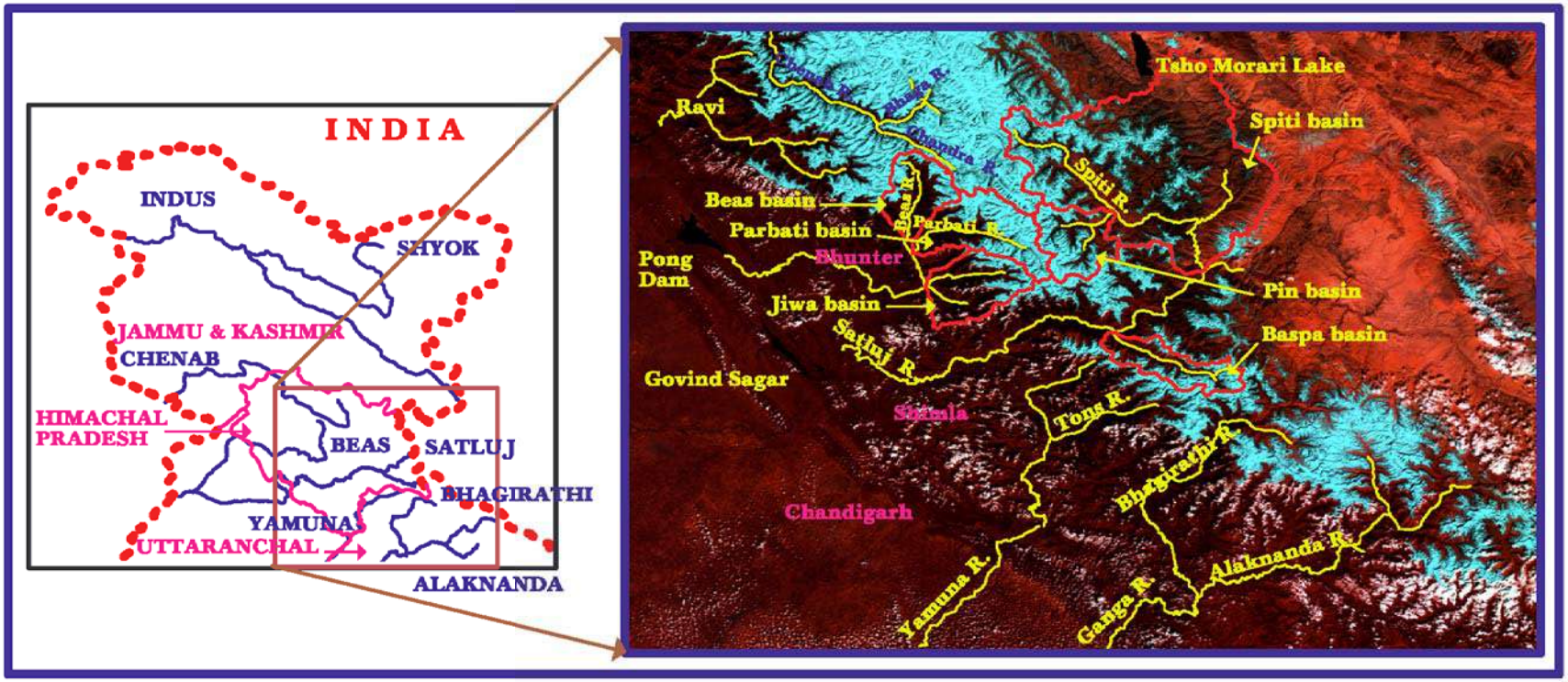


Figure 1: Location map of Pin, Spiti, Baspa, Jiwa, Parbati and Beas sub-basins (Part of Satluj basin)

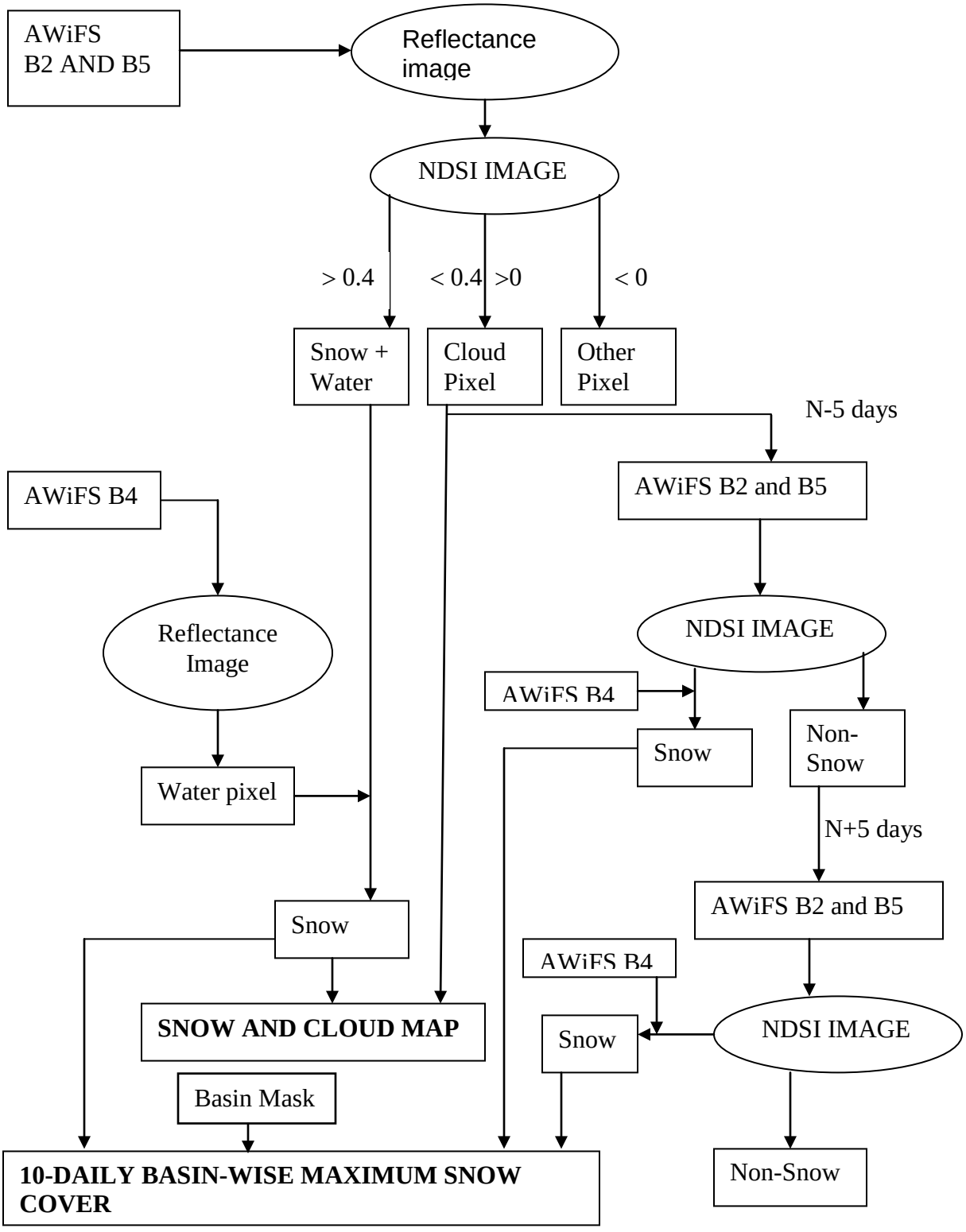


Figure 2: Algorithm for snow cover mapping using AWiFS data

PIN BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: PIN **BASIN AREA: 1266 sq km**

S. No	Date	Snow cover (sq. km)	Snow cover (%)	Cloud cover	S. No	Date	Snow cover (sq. km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	197	16	Clear	3.	23 Oct 2011	182	14	Clear
2.	18 Oct 2011	285	23	Clear	4.	27 Oct 2011	386	31	Clear
November 2011									
1.	20 Nov 2011	284	22	Clear					
December 2011									
1.	04 Dec 2011	225	18	Clear	6.	19 Dec 2011	654	52	Clear
2.	10 Dec 2011	1164	92	Clear	7.	19 Dec 2011	664	52	Clear
3.	14 Dec 2011	854	67	Clear	8.	21 Dec 2011	775	61	Clear
4.	16Dec 2011	891	70	Clear	9.	22 Dec 2011	746	59	Clear
5.	17 Dec 2011	862	68	Clear	10.	28 Dec 2011	509	40	Clear
					11.	31 Dec 2011	533	42	Clear
January2012									
1.	02 Jan2012	526	42	20%	8.	19 Jan2012	1273	100	<5%
2.	03 Jan2012	419	33	10%	9.	21 Jan2012	1257	99	Clear
3.	10 Jan2012	1272	100	Clear	10.	24 Jan2012	1272	100	Clear
4.	12 Jan2012	1264	100	Clear	11.	29 Jan2012	1272	100	Clear
5.	12 Jan2012	1271	100	>50%	12.	29 Jan2012	1270	100	Clear
6.	14 Jan2012	1270	100	Clear	13.	31 Jan2012	1266	100	Clear
7.	17 Jan2012	1271	100	Clear					
February 2012									
1.	02 Feb 2012	1272	100	20%	6.	26 Feb 2012	1272	100	Clear
2.	10 Feb 2012	1273	100	Clear	7.	27 Feb 2012	1272	100	Full cloud
3.	12 Feb 2012	1272	100	Full cloud	8.	27 Feb 2012	1272	100	Clear
4.	17 Feb 2012	1272	100	Clear					
5.	22 Feb 2012	1272	100	Full cloud					
March 2012									
1.	02 March 2012	1272	100	Clear	6.	12 March 2012	1272	100	Clear
2.	07 March 2012	1272	100	Clear	7.	15 March 2012	1270	100	Clear
3.	10 March 2012	1272	100	Clear	8.	15 March 2012	1271	100	Clear
4.	12 March 2012	1272	100	Clear	9.	21 March 2012	1271	100	25%
5.	12 March 2012	1270	100	Clear	10	22 March 2012	1270	100	Clear

					11.	31 March 2012	1252	99	Clear
S. No	**Date**	**Snow cover (sq. km)**	**Snow cover (%)**	**Cloud cover**	**S. No**	**Date**	**Snow cover (sq. km)**	**Snow cover (%)**	**Cloud cover**
April 2012									
1.	05 April 2012	1213	96	Clear	3.	20 April 2012	1156	91	5%
2.	15 April 2012	1209	96	5%	4.	24 April 2012	1131	89	Clear
May 2012									
1.	04 May 2012	1074	85	Clear	5.	14 May 2012	1017	80	Clear
2.	08 May 2012	1083	86	Clear	6.	18 May 2012	958	76	10%
3.	09 May 2012	1035	82	Clear	7.	23 May 2012	946	75	Clear
4.	13 May 2012	1007	80	Clear	8.	28 May 2012	895	71	Clear
June 2012									
1.	01 June2012	876	69	Clear	5.	09 June2012	669	53	5%
2.	02 June2012	841	66	5%	6.	14 June2012	473	37	10%
3.	04 June2012	530	42	40%	7.	18 June2012	667	53	Clear
4.	09 June2012	670	53	5%	8.	19 June2012	544	43	5%
					9.	23 June2012	570	45	Clear

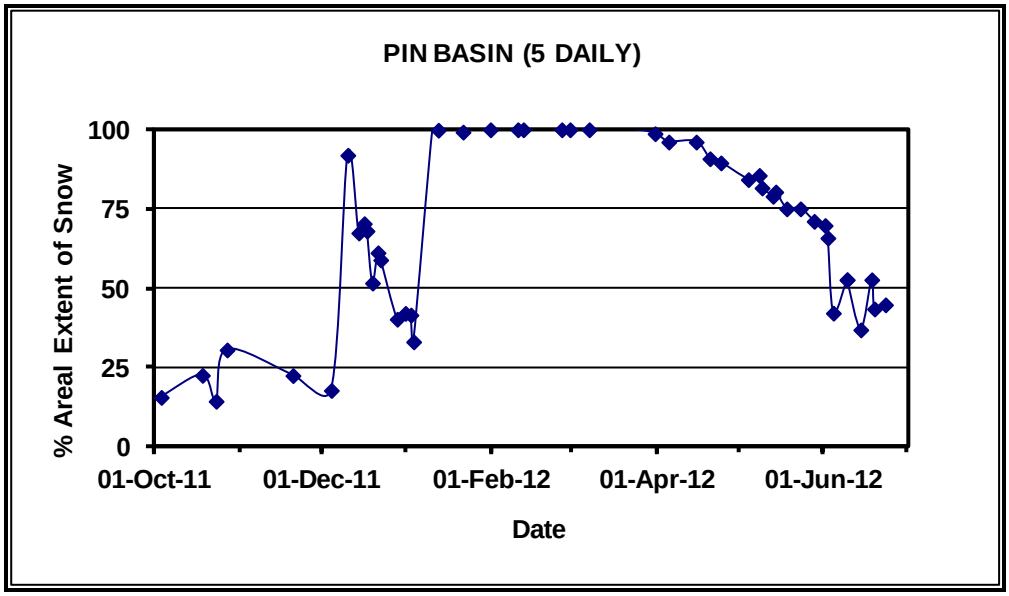
AREAL EXTENT OF SNOW (10 DAILY)

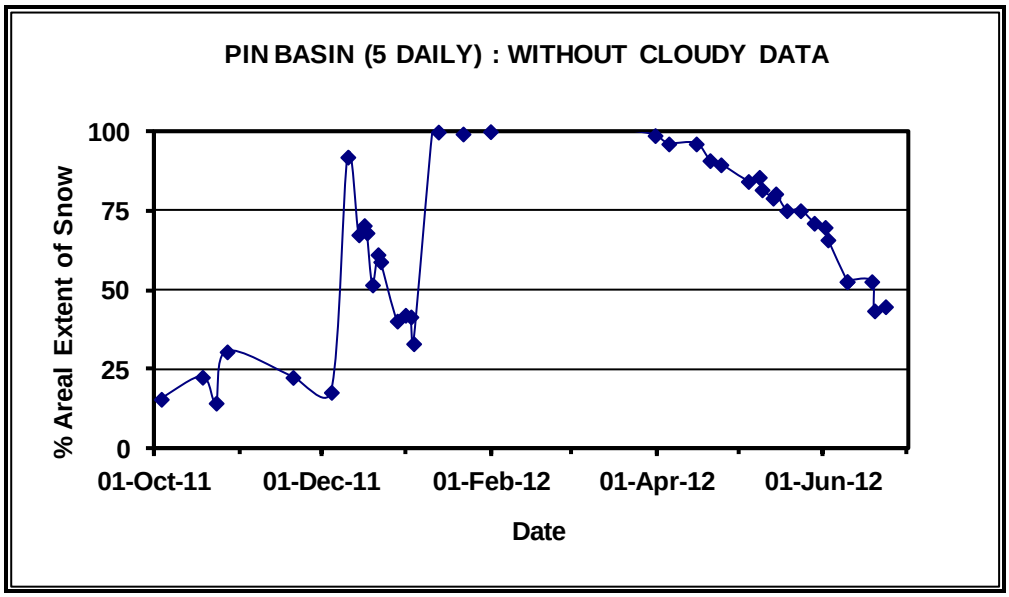
BASIN NAME: PIN **BASIN AREA: 1266 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	197	16	Clear	3.	23 Oct 2011	343	27	Clear
2.	18 Oct 2011	285	23	Clear	4.	27 Oct 2011			Clear
November 2011									
1.	20 Nov 2011	284	22	Clear					
December 2011									
1.	05 Dec 2011	265	21	Clear	5.	21 Dec 2011	535	42	Clear
2.	10 Dec 2011			Clear	6.	28 Dec 2011			Clear
3.	14 Dec 2011	916	42	Clear	7.	31 Dec 2011			
4.	17 Dec 2011			Clear					
5.	19 Dec 2011			Clear					
January 2012									
1.	02 Jan 2012	447	35	20%	4.	21 Jan 2012	1272	100	Clear
2.	03 Jan 2012			10%	5.	29 Jan 2012			Clear
3.	10 Jan 2012			Clear	6.	31 Jan 2012			Clear
4.	12 Jan 2012	1271	100	Clear					
5.	17 Jan 2012			Clear					
6.	19 Jan 2012			<5%					
February 2012									
1.	02 Feb 2012	1273	100	20%	4.	26 Feb 2012	1272	100	Clear
2.	10 Feb 2012			Clear	5.	29 Feb 2012			Clear
3.	17 Feb 2012	1272	100	Clear					
March 2012									
1.	02 Mar 2012	1272	100	Clear	4.	12 Mar 2012	1272	100	Clear
2.	07 Mar 2012			Clear	5.	15 Mar 2012			Clear
3.	10 Mar 2012			Clear	6.	19 Mar 2012			15%
					7.	22 March 2012	1270	100	Clear
					8.	31 March 2012			Clear
April 2012									
1.	05 April 2012	1213	96	Clear	4.	24 April 2012	1131	89	Clear
2.	15 April 2012	1213	96	5%					
3.	20 April 2012			5%					

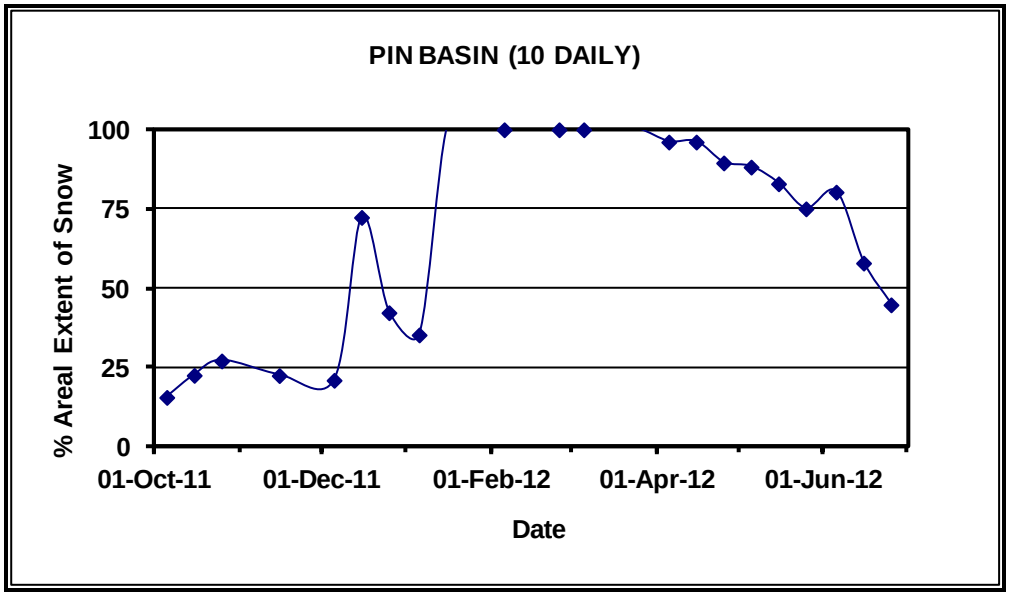
S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
May 2012									
1.	04 May 2012	1110	88	Clear	4.	13 May 2012	1055	83	Clear
2.	08 May 2012			Clear	5.	14 May 2012			Clear
3.	09 May 2012			Clear	6.	23 May 2012	950	75	Clear
					7.	28 May 2012			Clear
June 2012									
1.	01 June2012	1011	80	Clear	4.	14 June2012	728	58	10%
2.	02 June2012			5%	5.	18 June2012			Clear
3.	09 June2012			5%	6.	19 June2012			5%
					7.	23 June2012	570	45	Clear

Snow cover depletion curve



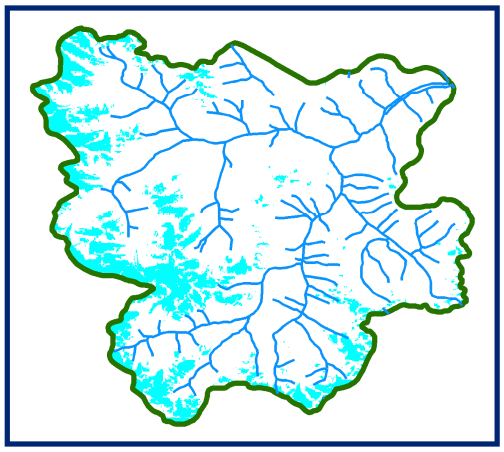


Snow cover depletion curve

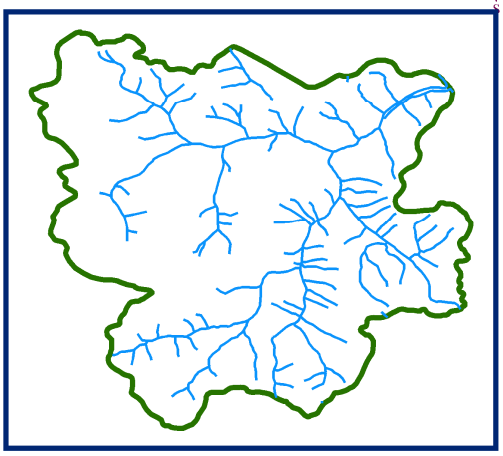


SNOW COVER MAPS

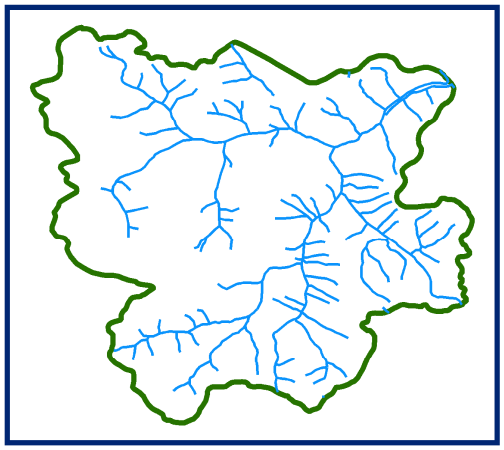
SNOW COVER MAP : PIN BASIN



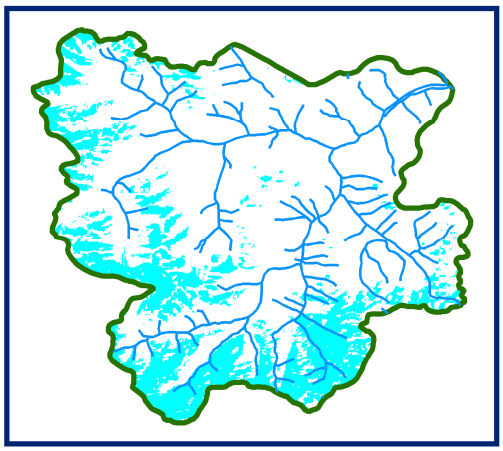
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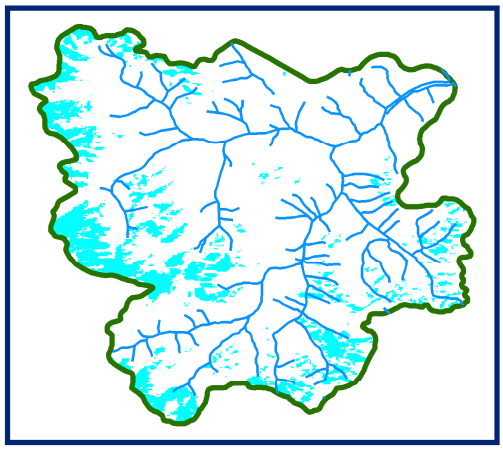
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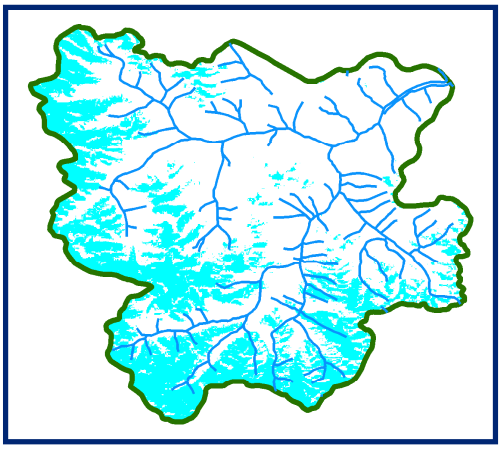
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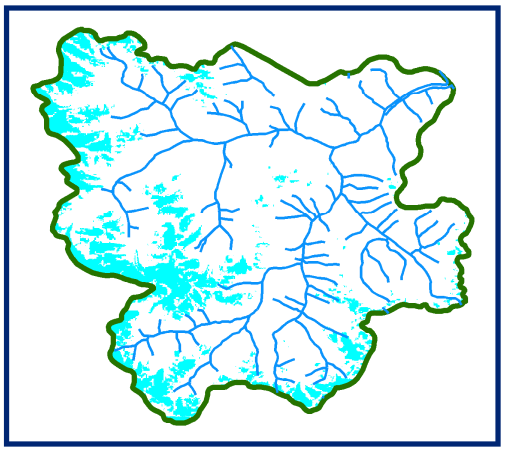
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SNOW

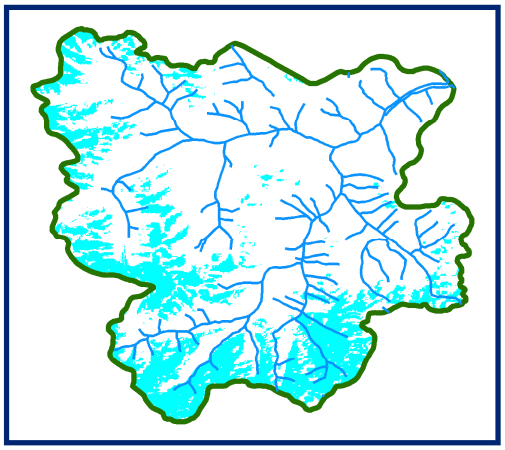
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Kilometers

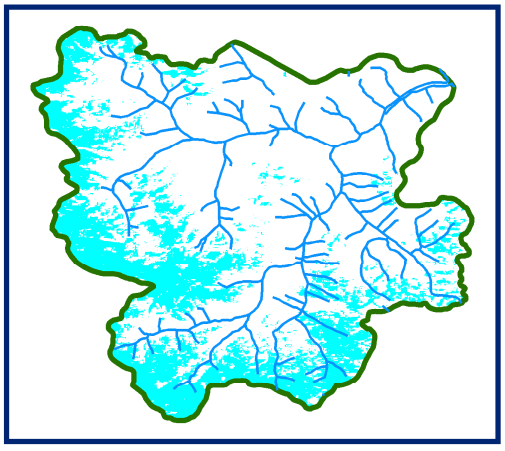
10 DAILY SNOW COVER MAP: PIN BASIN



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DATA USED
18 OCT 2012

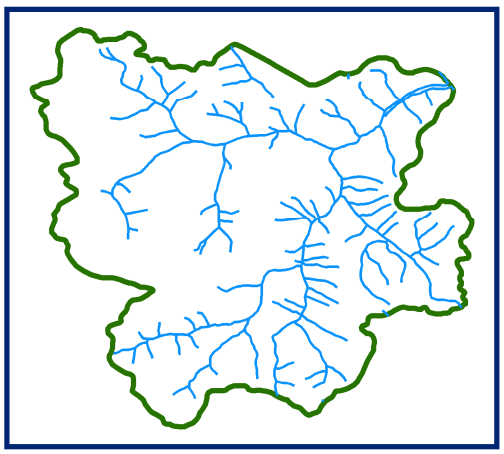


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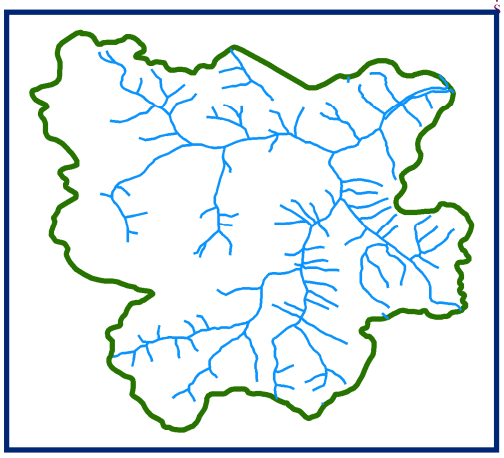
SNOW

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Kilometers

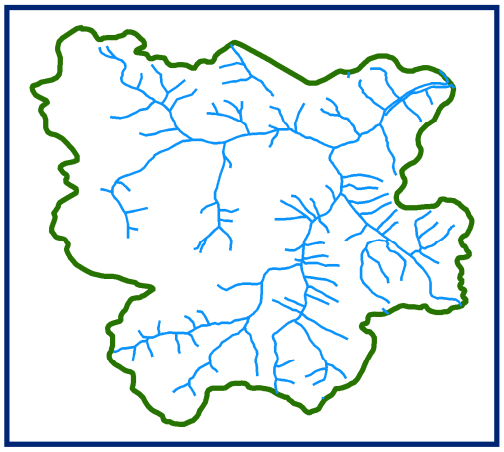
SNOW COVER MAP : PIN BASIN



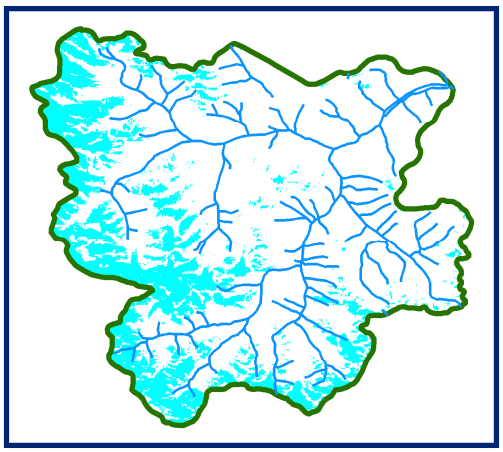
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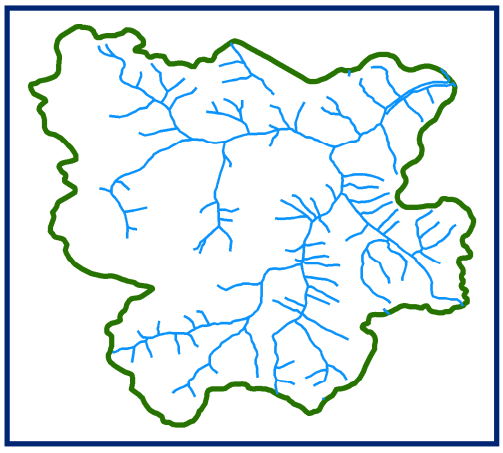
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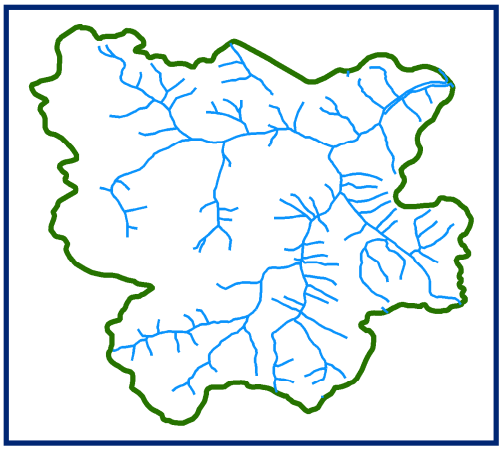
DATA NOT AVAILABLE



20 Nov 2011



DATA NOT AVAILABLE



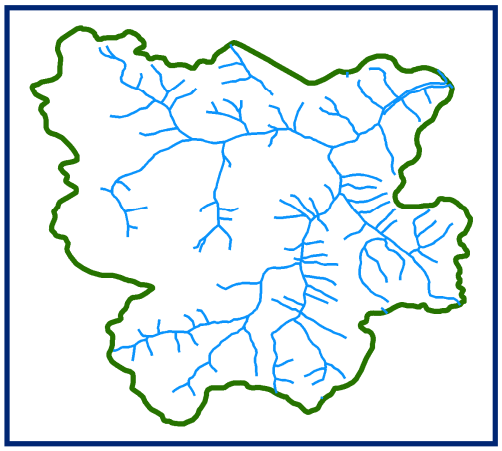
DATA NOT AVAILABLE

SNOW

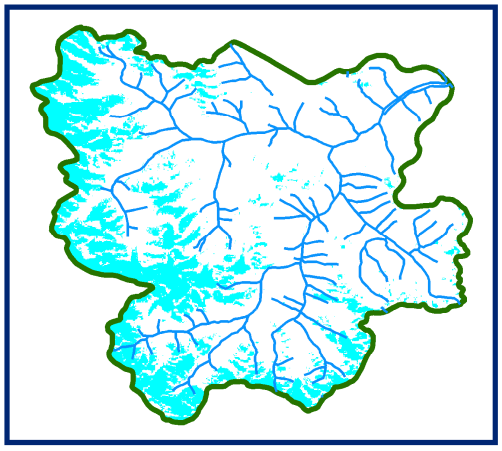
0 3 6 9 12

Kilometers

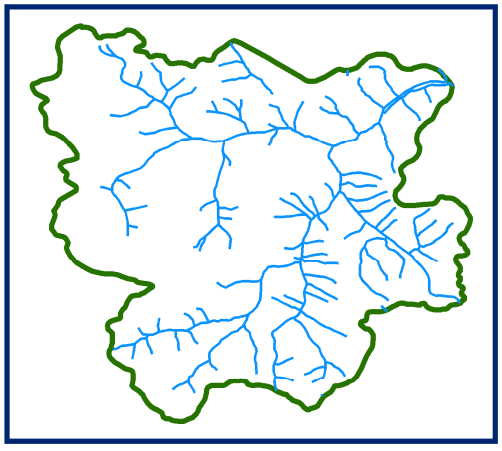
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
DATA NOT AVAILABLE



DATA USED
20 NOV 2012

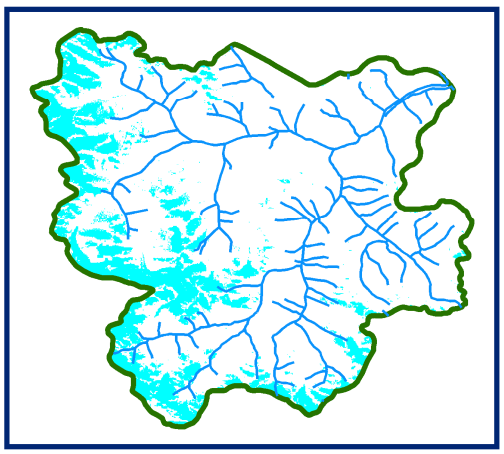


DATA USED
DATA NOT AVAILABLE

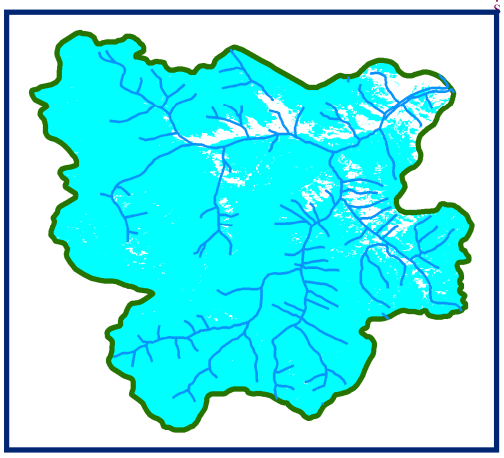
SNOW

0 2 4 8 12 16
Kilometers

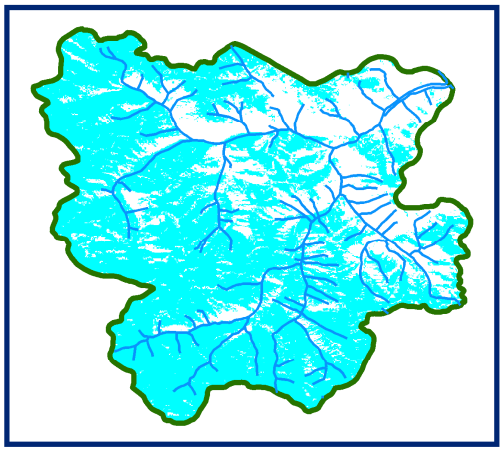
SNOW COVER MAP : PIN BASIN



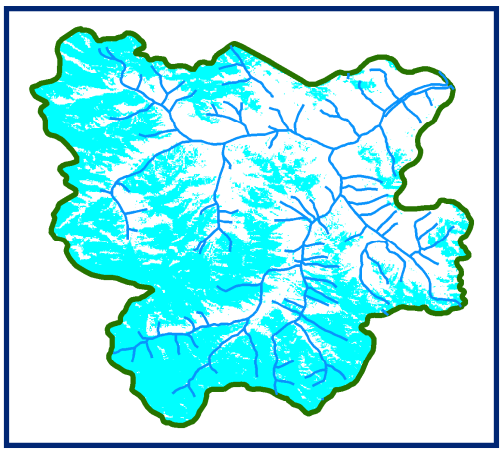
04 Dec 2011



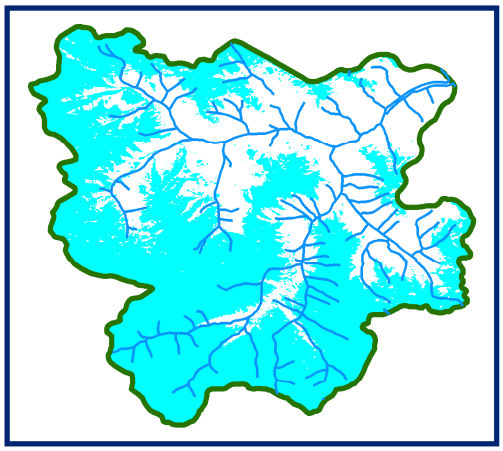
10 Dec 2011



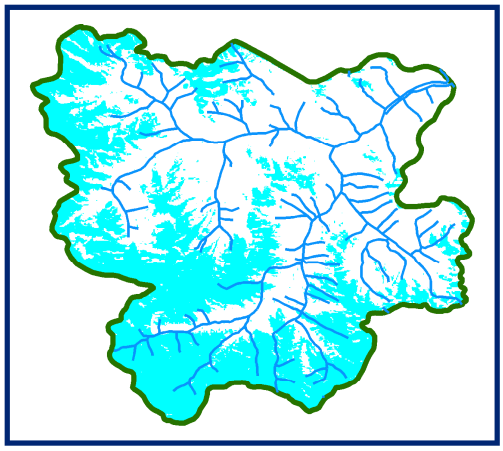
14 Dec 2011



19 Dec 2011



21 Dec 2011



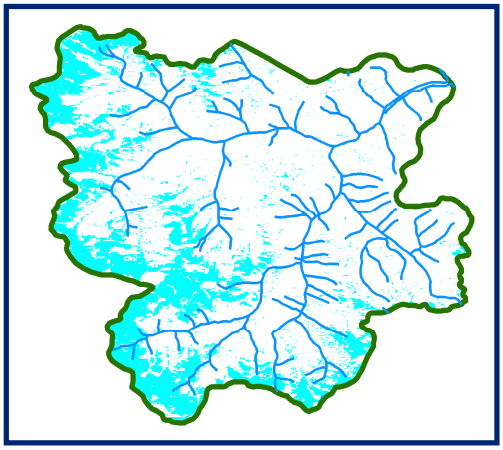
31 Dec 2011

SNOW

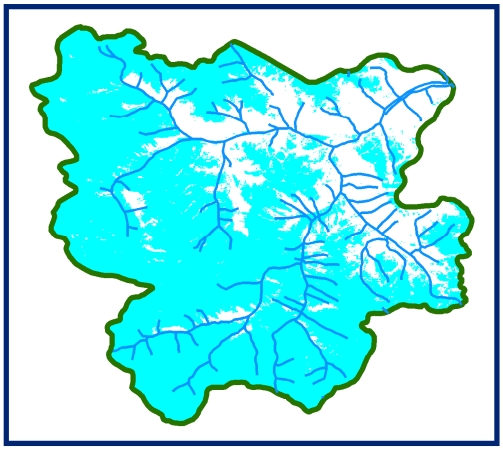
0 3 6 9 12

Kilometers

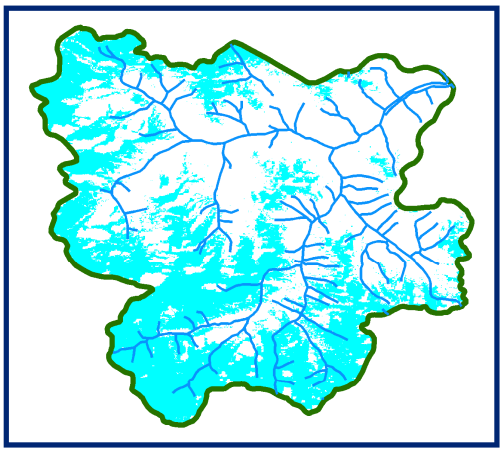
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
04 DEC 2011
10 DEC 2011



DATA USED
14 DEC 2011
17 DEC 2011
19 DEC 2011

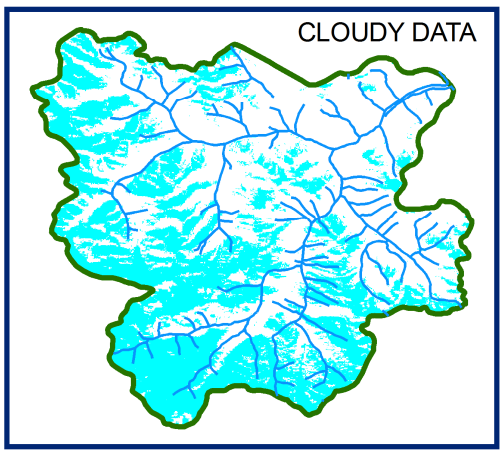


DATA USED
21 DEC 2011
28 DEC 2011
31 DEC 2011

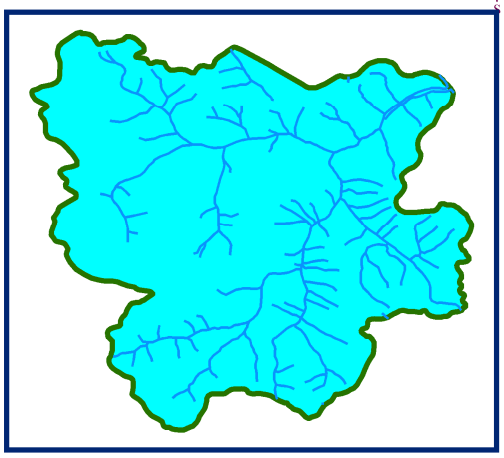
SNOW

0 2 4 8 12 16
Kilometers

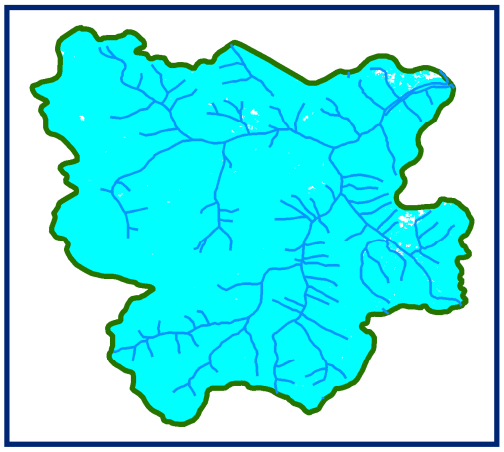
SNOW COVER MAP : PIN BASIN



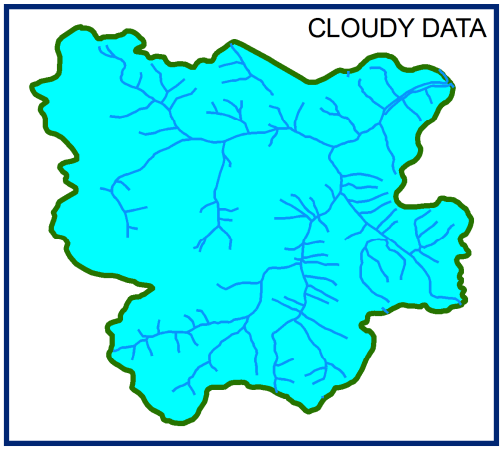
02 Jan 2012



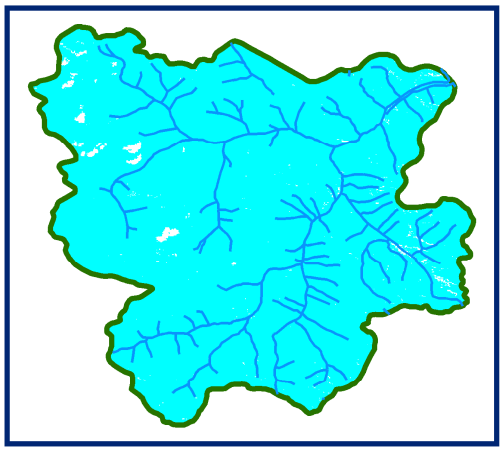
10 Jan 2012



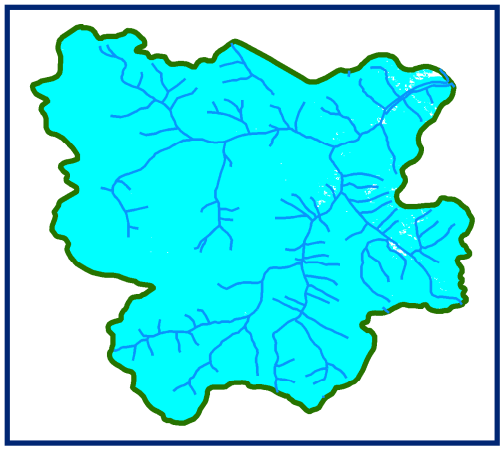
12 Jan 2012



19 Jan 2012



21 Jan 2012



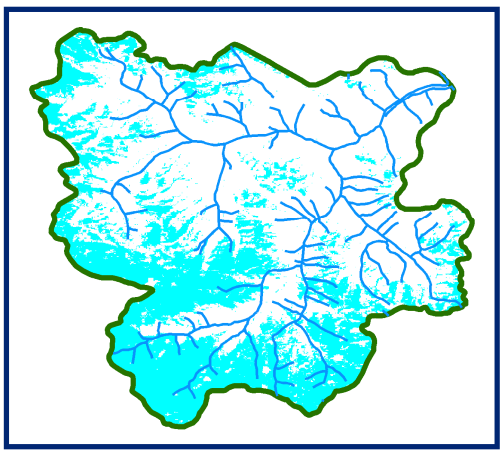
31 Jan 2012

SNOW

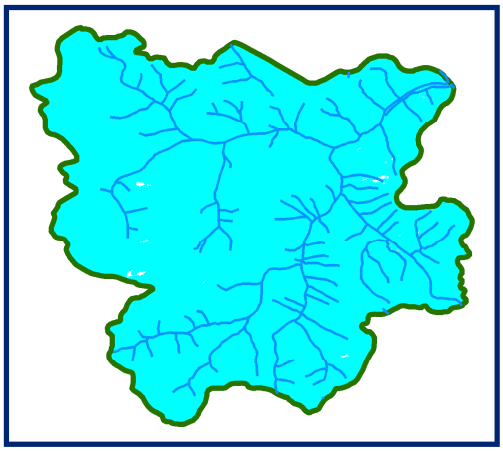
0 3 6 9 12

Kilometers

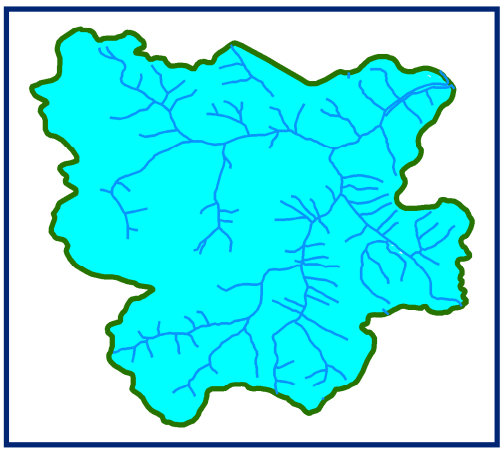
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
02 JAN 2012
10 JAN 2012



DATA USED
12 JAN 2012
17 JAN 2012
19 JAN 2012

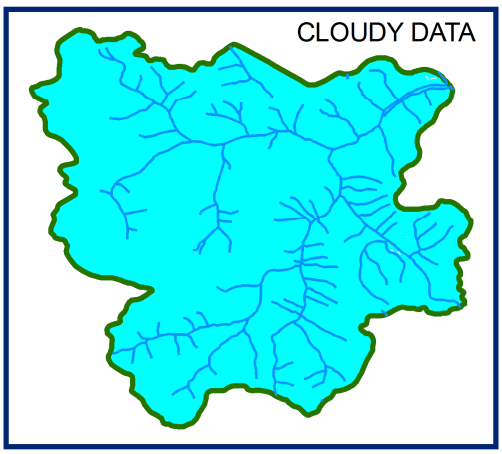


DATA USED
21 JAN 2012
29 JAN 2012
31 JAN 2012

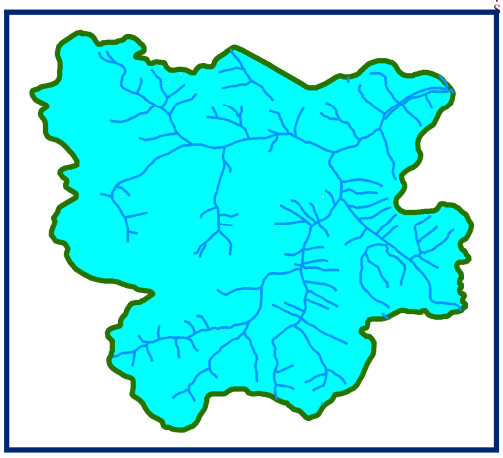
SNOW

0 2 4 8 12 16
Kilometers

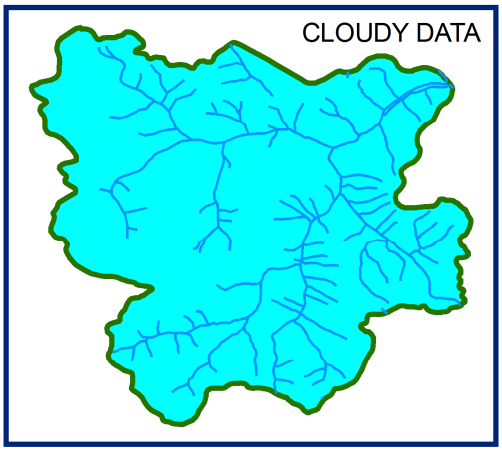
SNOW COVER MAP : PIN BASIN



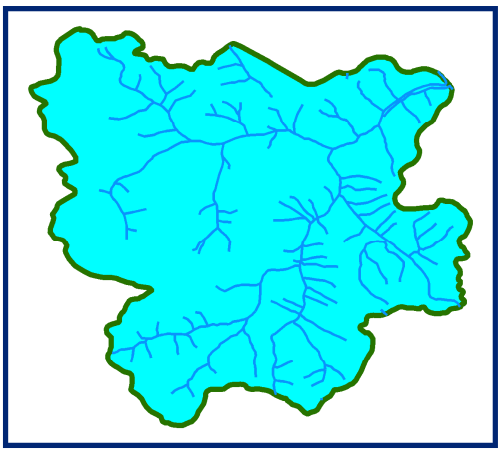
02 Feb 2012



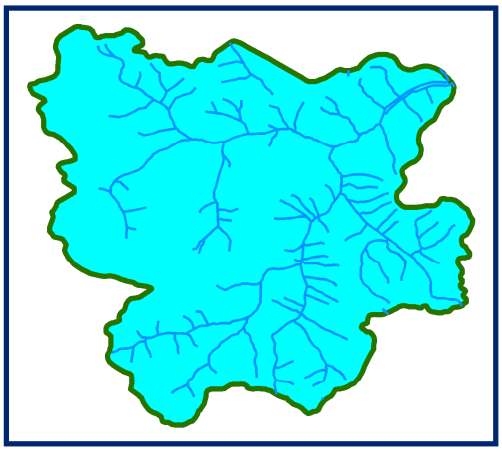
10 Feb 2012



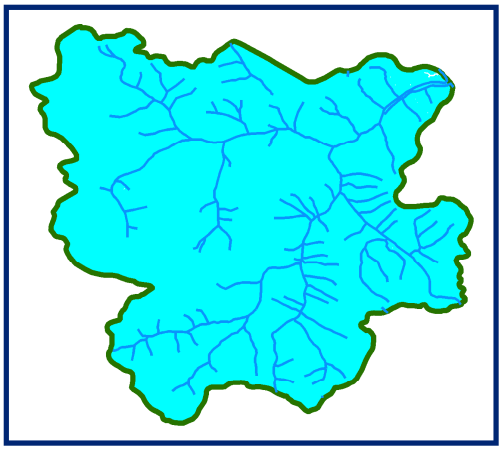
12 Feb 2012



17 Feb 2012



26 Feb 2012



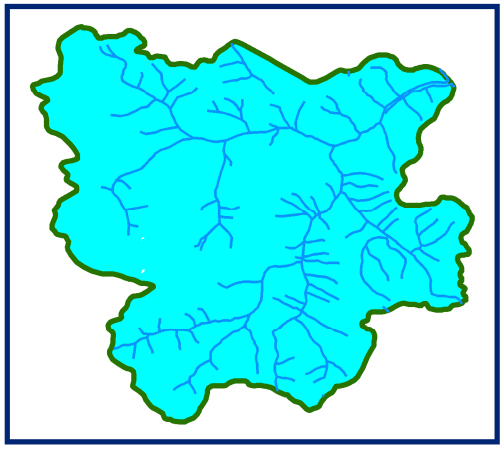
29 Feb 2012

SNOW

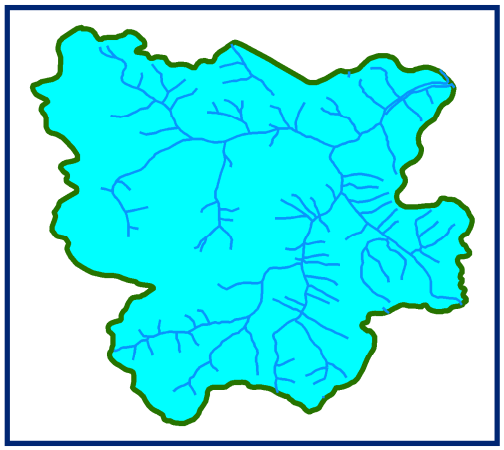
0 3 6 9 12

Kilometers

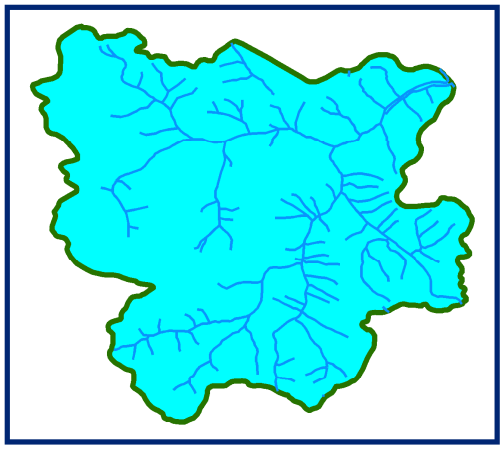
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
02 FEB 2012
10 FEB 2012



DATA USED
17 FEB 2012

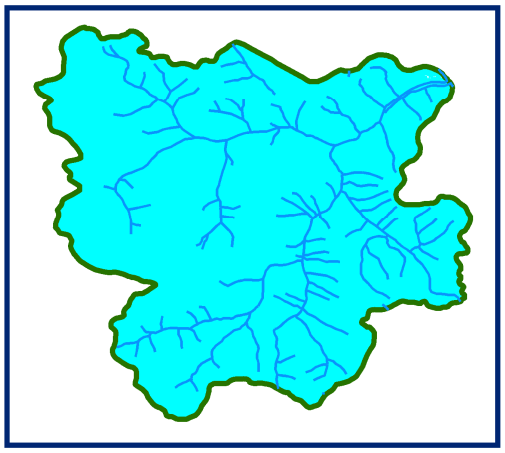


DATA USED
26 FEB 2012
29 FEB 2012

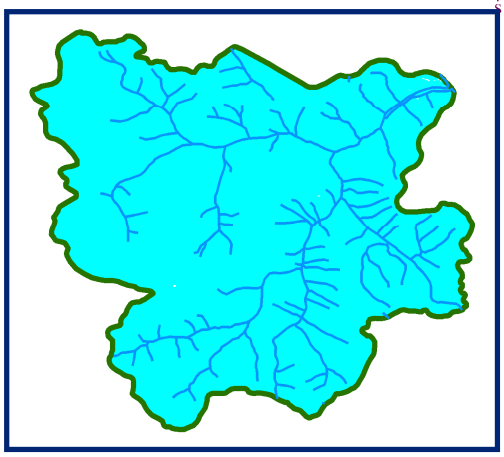
SNOW

0 2 4 8 12 16
Kilometers

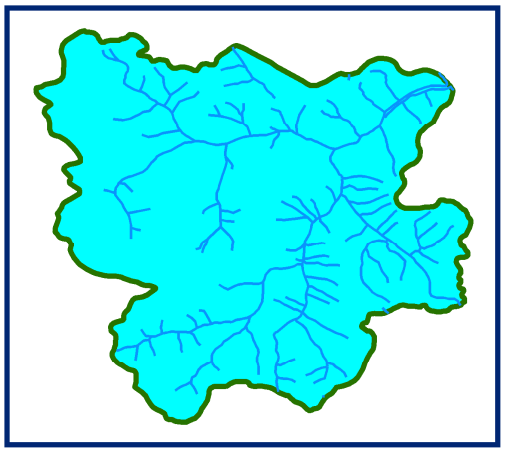
SNOW COVER MAP : PIN BASIN



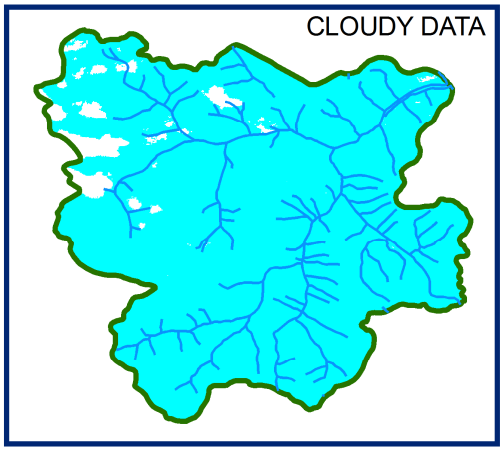
02 March 2012



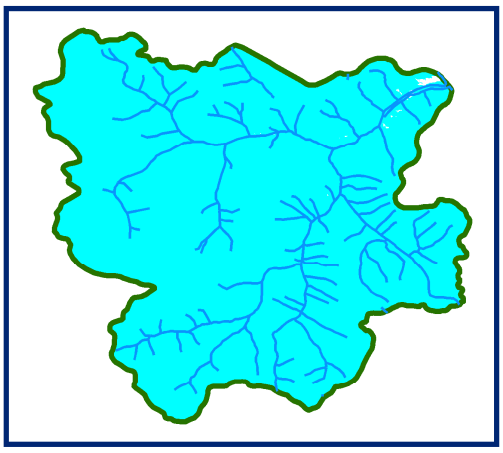
10 March 2012



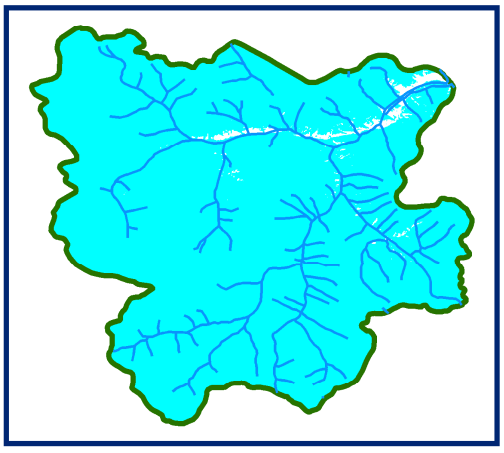
12 March 2012



19 March 2012



22 March 2012



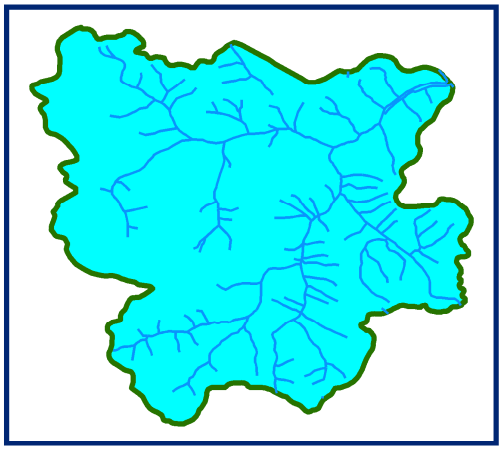
31 March 2012

SNOW

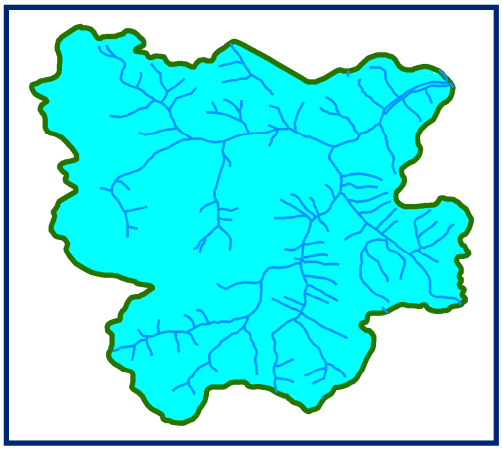
0 3 6 9 12

Kilometers

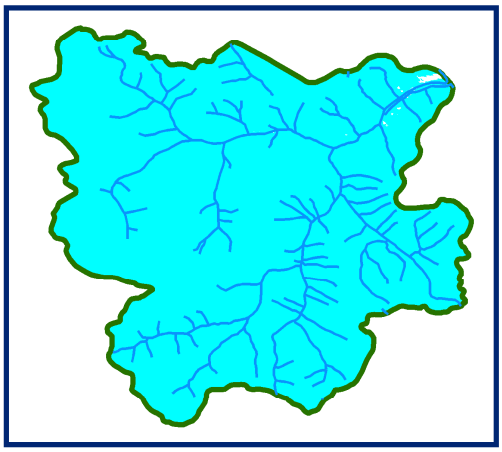
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
02 March 2012
07 March 2012
10 March 2012



DATA USED
12 March 2012
15 March 2012
19 March 2012

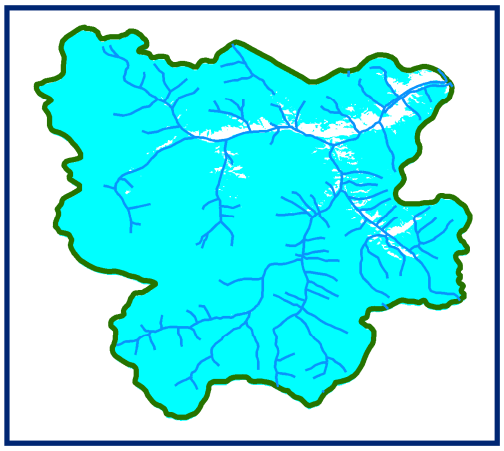


DATA USED
22 March 2012
31 March 2012

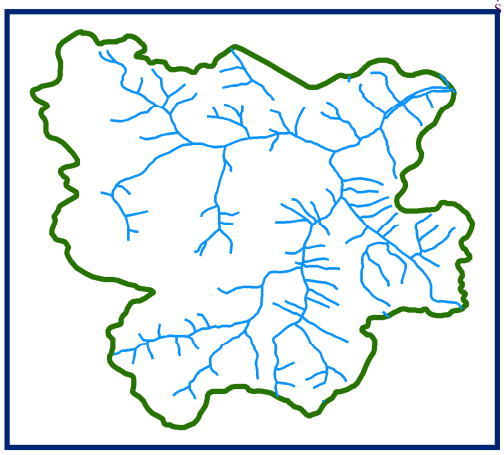
SNOW

0 3 6 9 12
Kilometers

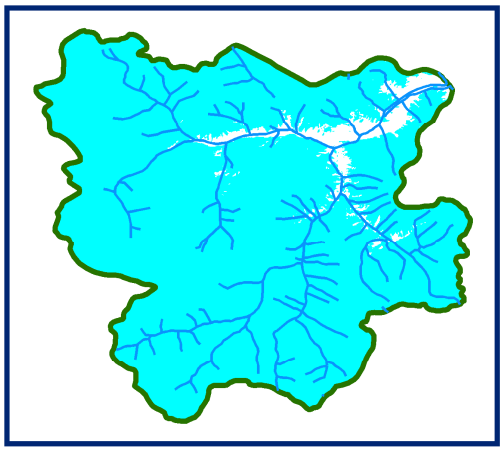
SNOW COVER MAP : PIN BASIN



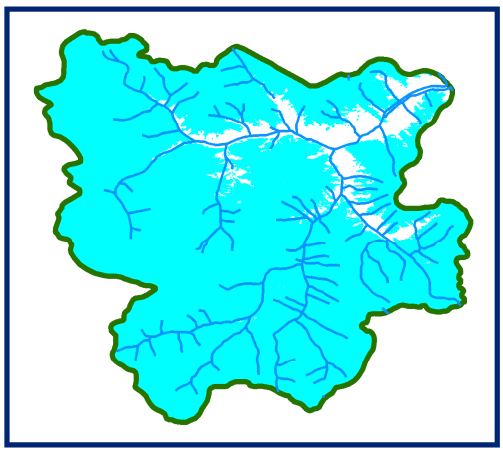
05 April 2012



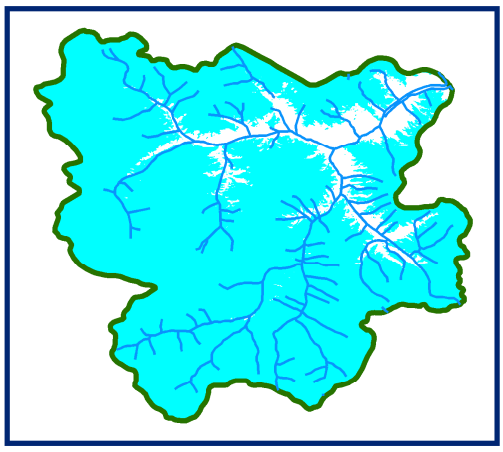
DATA NOT AVAILABLE



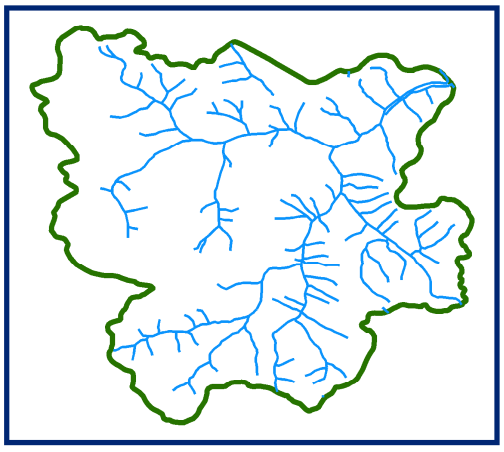
15 April 2012



20 April 2012



24 April 2012



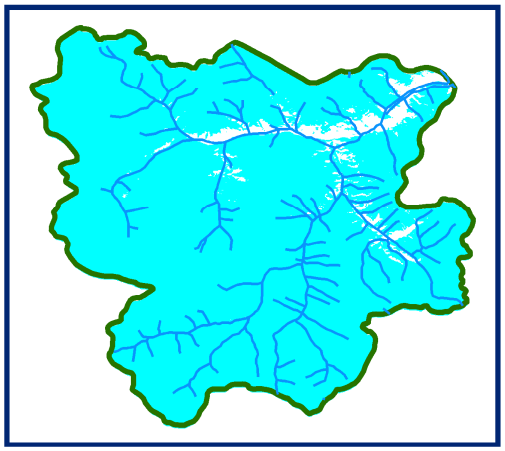
DATA NOT AVAILABLE

SNOW

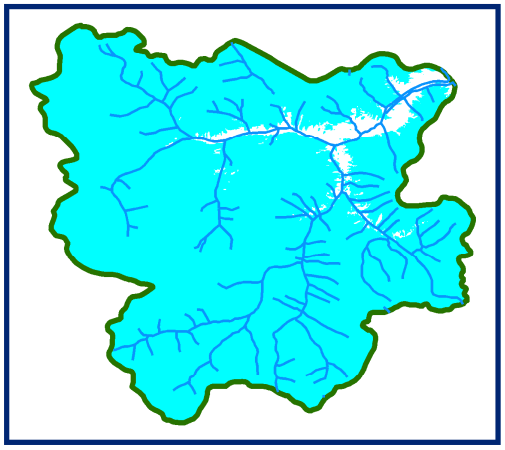
0 3 6 9 12

Kilometers

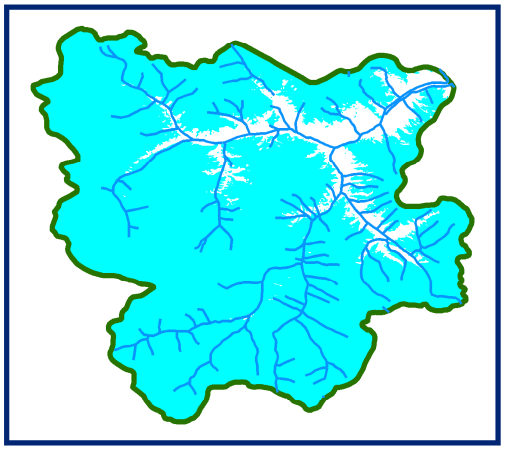
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
05 April 2012



DATA USED
15 April 2012
20 April 2012

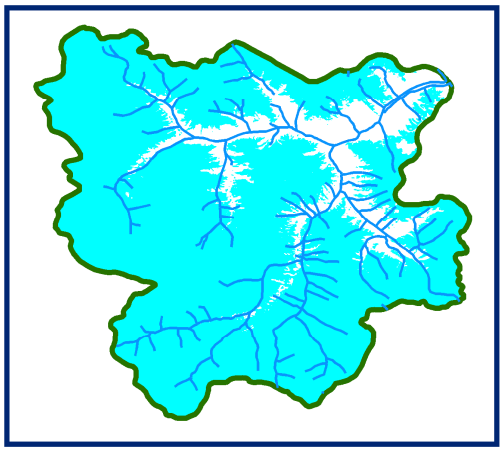


DATA USED
24 April 2012

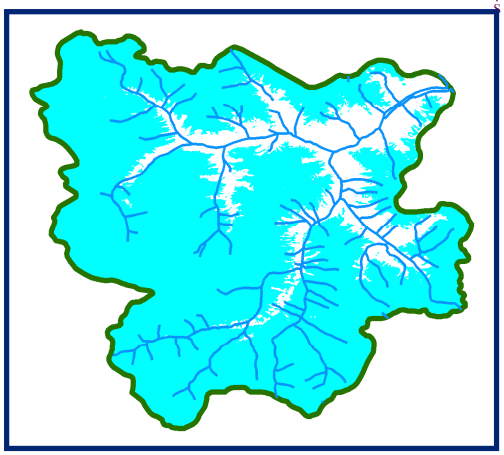
SNOW

0 3 6 9 12
Kilometers

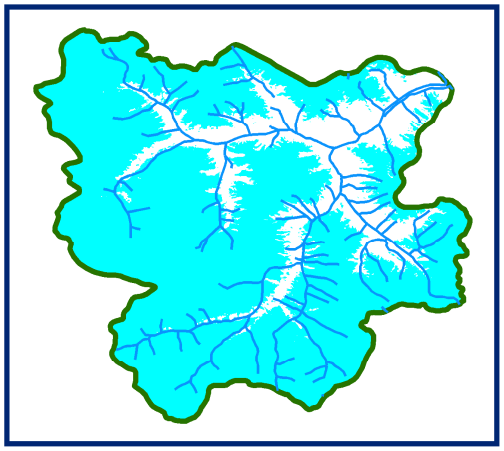
SNOW COVER MAP : PIN BASIN



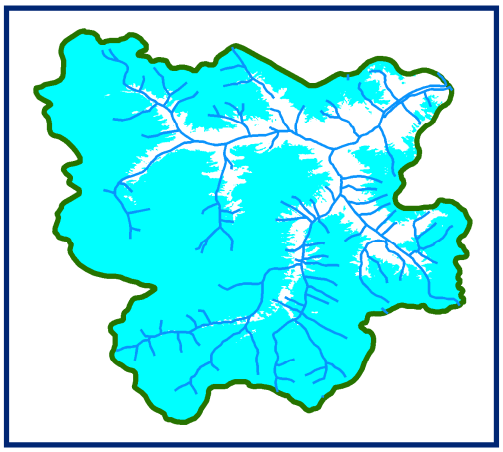
04 May 2012



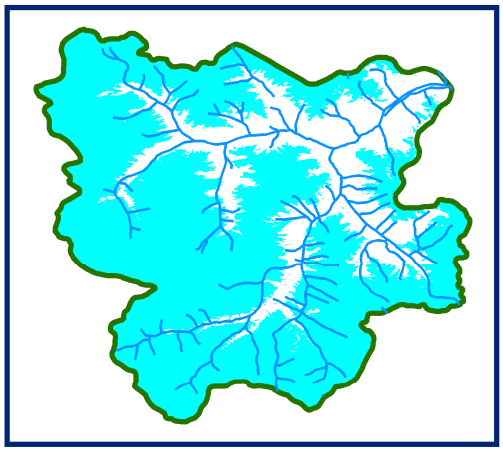
09 May 2012



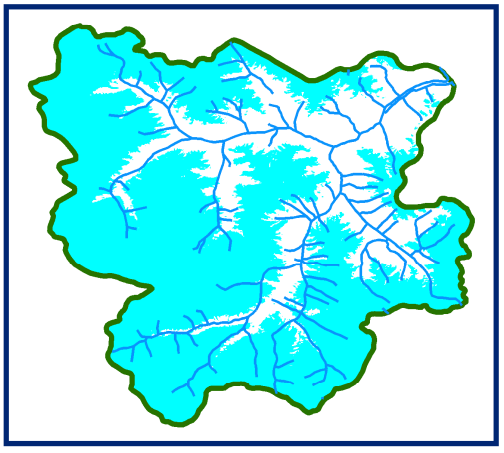
13 May 2012



14 May 2012



23 May 2012



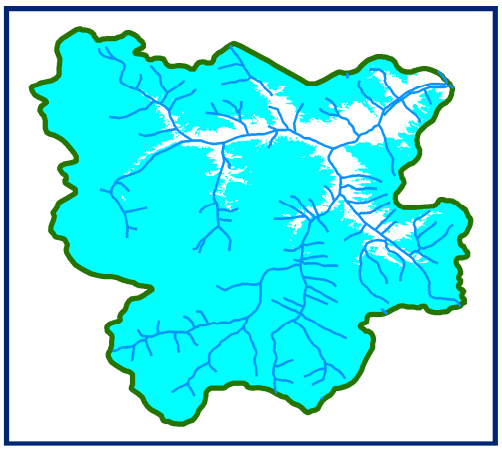
28 May 2012

SNOW

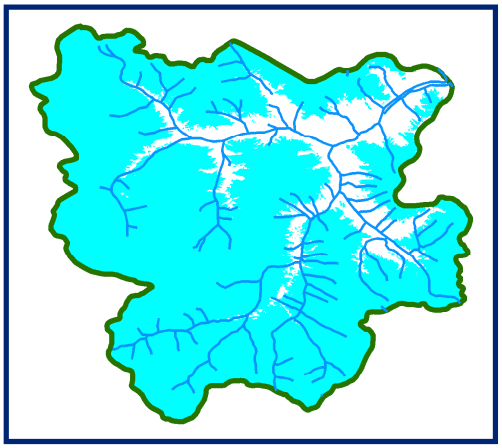
0 3 6 9 12

Kilometers

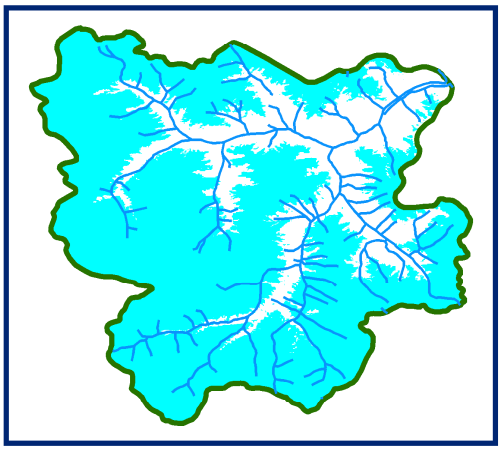
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
04 May 2012
08 May 2012
09 May 2012



DATA USED
13 May 2012
14 May 2012

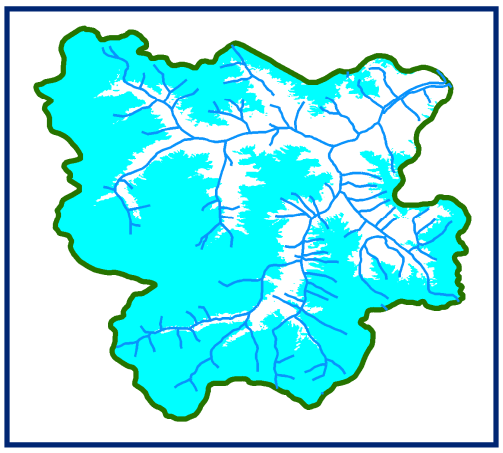


DATA USED
23 May 2012
28 May 2012

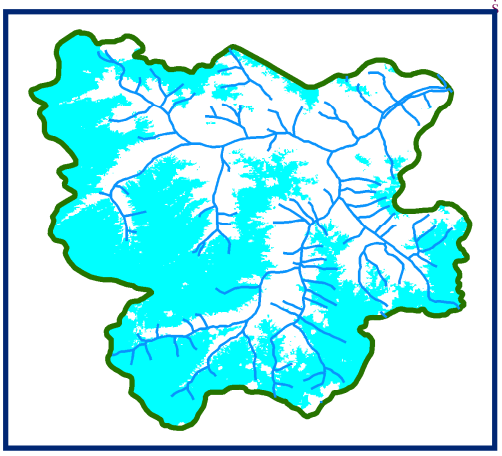
SNOW

0 3 6 9 12
Kilometers

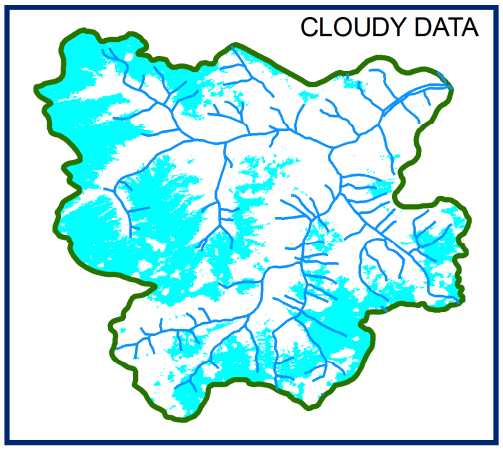
SNOW COVER MAP : PIN BASIN



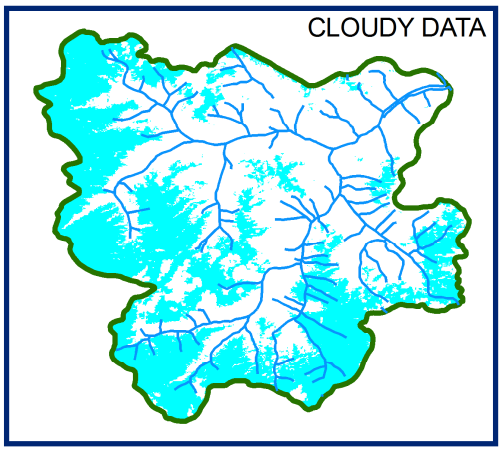
01 June 2012



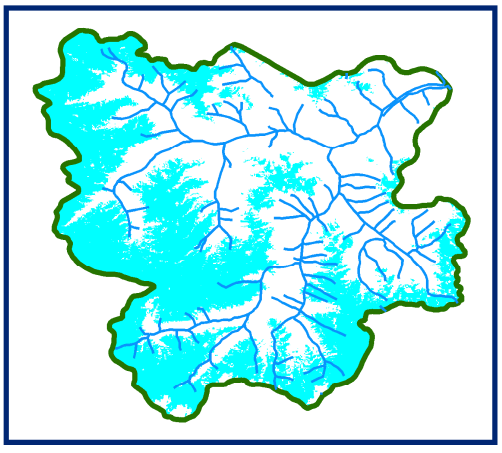
09 June 2012



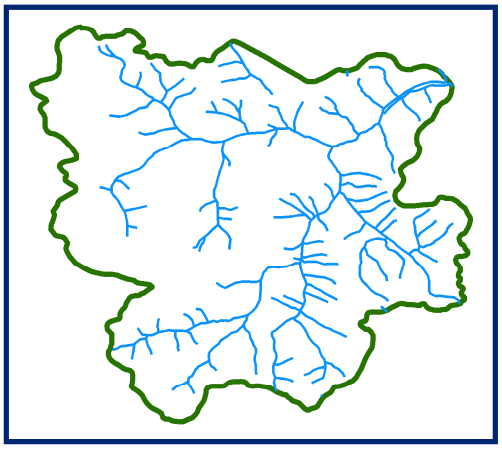
14 June 2012



19 June 2012



23 June 2012



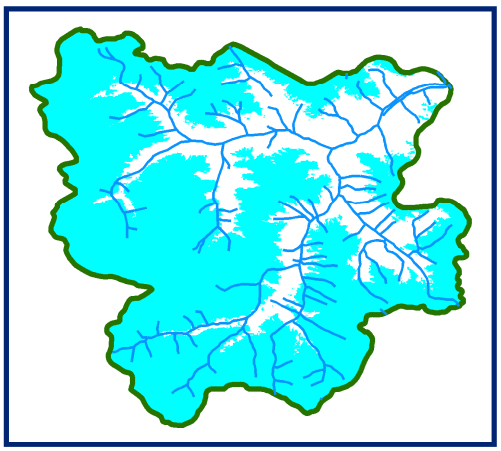
DATA NOT AVAILABLE

SNOW

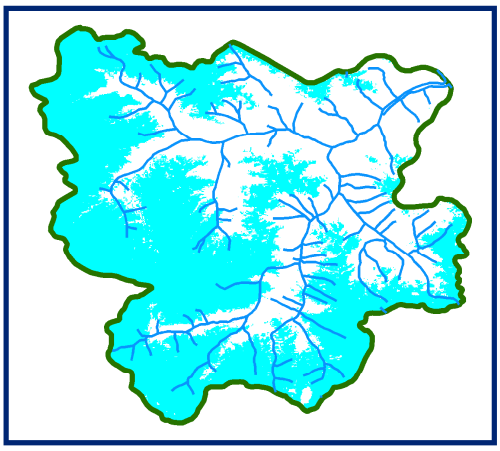
0 3 6 9 12

Kilometers

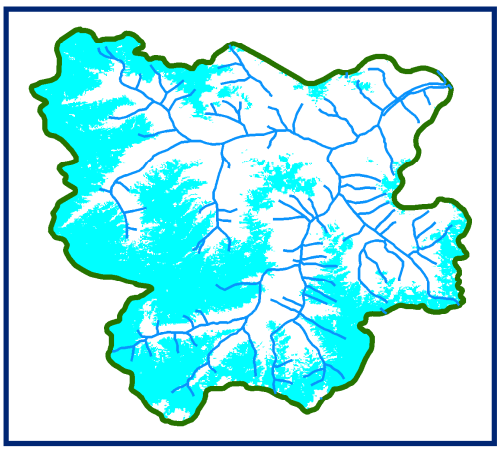
10 DAILY SNOW COVER MAP: PIN BASIN



DATA USED
01 June 2012
02 June 2012
09 June 2012



DATA USED
14 June 2012
18 June 2012
19 June 2012



DATA USED
23 June 2012

SNOW

0 3 6 9 12
Kilometers

SPITI BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: SPITI **BASIN AREA: 8871 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	516	6	Clear	3.	27 Oct 2011	842	9	Clear
2.	18 Oct 2011	531	6	Clear					
November 2011									
1.	20 Nov 2011	817	9	Clear					
December 2011									
1.	04 Dec 2011	578	7	Clear	6.	19 Dec 2011	1574	18	Clear
2.	10 Dec 2011	4493	51	Clear	7.	19 Dec 2011	1600	18	Clear
3.	14 Dec 2011	228	3	Clear	8.	21 Dec 2011	1837	21	Clear
4.	16Dec 2011	2394	27	Clear	9.	22 Dec 2011	1613	18	Clear
5.	17 Dec 2011	2219	25	Clear	10.	28 Dec 2011	1174	13	Clear
					11.	31 Dec 2011	1227	14	Clear
January2012									
1.	02 Jan2012	1118	13	Clear	8.	19 Jan2012	7992	90	5%
2.	03 Jan2012	842	9	Clear	9.	24 Jan2012	7587	86	Clear
3.	10 Jan2012	8311	94	Clear	10.	21 Jan2012	6812	77	Clear
4.	12 Jan2012	6955	78	5%	11.	29 Jan2012	7509	85	Clear
5.	12 Jan2012	6893	78	5%	12.	29 Jan2012	7503	85	Clear
6.	14 Jan2012	7503	85	Clear	13.	31 Jan2012	6428	72	Clear
7.	17 Jan2012	7895	89	Clear					
February 2012									
1.	02 Feb 2012	8374	94	40%	6.	26 Feb 2012	8067	91	Clear
2.	10 Feb 2012	8650	98	Clear	7.	27 Feb 2012	8480	96	50%
3.	12 Feb 2012	8831	100	80%	8.	29 Feb 2012	6905	78	Clear
4.	17 Feb 2012	8664	98	Clear					
5.	22 Feb 2012	8873	100	100%					
March 2012									
1.	02 March 2012	7333	83	Clear	6.	15 March 2012	7704	87	Aoi not completed
2.	07 March 2012	8692	98	Clear	8.	19 March 2012	6538	74	20%
3.	12 March 2012	8438	95	Clear	9.	21 March 2012	7944	90	Clear
4.	12 March 2012	8436	95	Clear	10.	22 March 2012	7501	85	Clear
5.	12 March 2012	7501	85	Clear	11.	31 March 2012	6694	75	Clear

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
April 2012									
1.	05 April 2012	6069	68	5%	3.	20 April 2012	5248	59	20%
2.	15 April 2012	6794	77	25%	4.	24 April 2012	5352	60	15%
May 2012									
1.	04 May 2012	5704	64	25%	5.	14 May 2012	4425	50	Clear
2.	08 May 2012	4595	52	Clear	6.	18 May 2012	3667	41	5%
3.	09 May 2012	4348	49	Clear	7.	23 May 2012	3561	40	Clear
4.	13 May 2012	4237	48	Clear					
June 2012									
1.	01 June 2012	2990	34	25%	6.	14 June 2012	1510	17	10%
2.	02 June 2012	2716	31	Clear	7.	18 June 2012	1614	18	5%
3.	04 June 2012	987	11	70%	8.	19 June 2012	1124	13	10%
4.	09 June 2012	1469	17	25%	9.	23 June 2012	1141	13	10%
5.	09 June 2012	1482	17	25%					

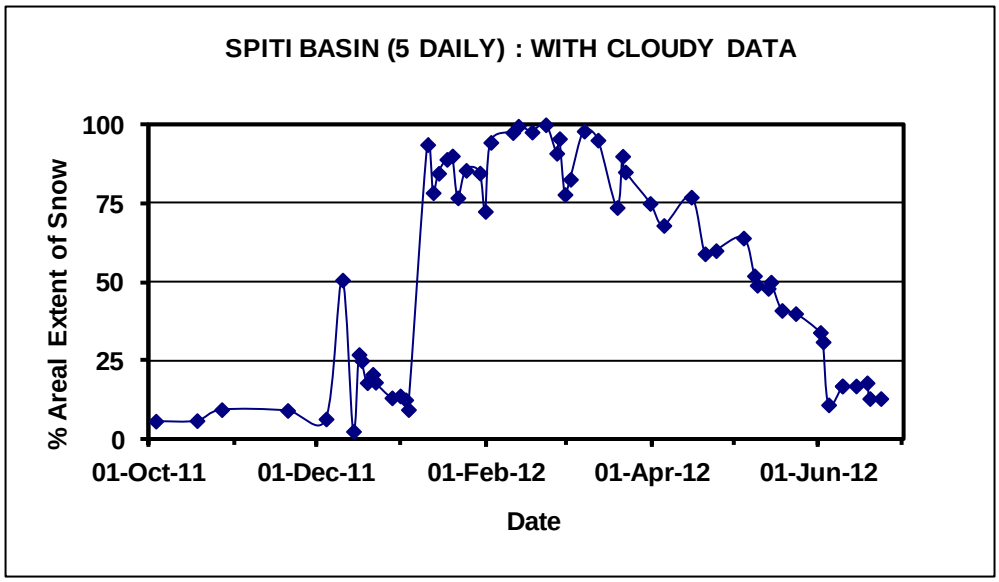
AREAL EXTENT OF SNOW (10 DAILY)

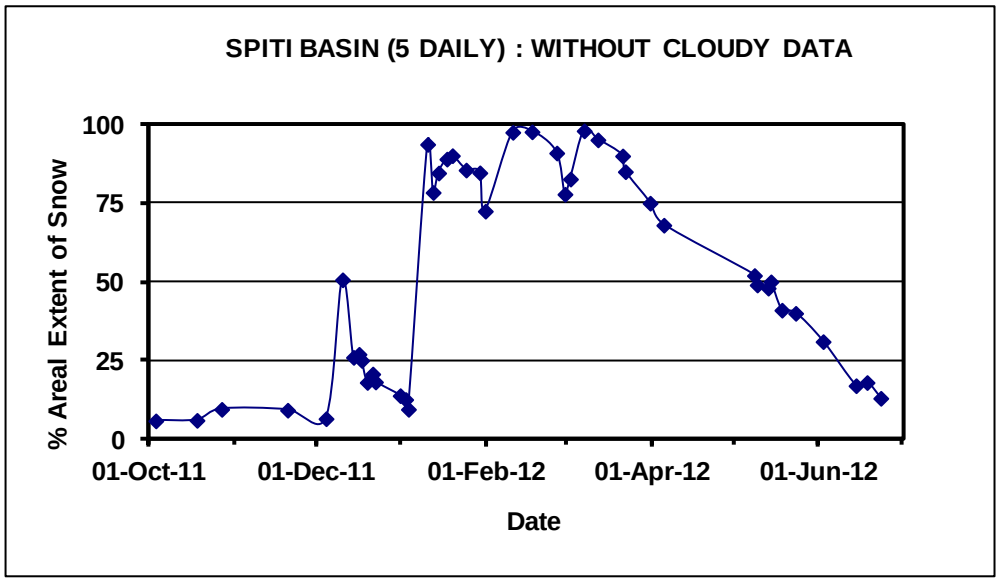
BASIN NAME: SPITI **BASIN AREA: 8871 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Snow cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Snow cover
October 2011									
1.	03 Oct 2011	516	6	Clear	3.	27 Oct 2011	842	9	Clear
2.	18 Oct 2011	531	6	Clear					
November 2011									
1.	20 Nov 2011	817	9	Clear					
December 2011									
1.	04 Dec 2011	903	10	Clear	6.	21 Dec 2011	1230	14	Clear
2.	10 Dec 2011			Clear	7.	28 Dec 2011			Clear
3.	14 Dec 2011	2547	29	Clear	8.	31 Dec 2011			Clear
4.	17 Dec 2011			Clear					
5.	19 Dec 2011			Clear					
January 2012									
1.	02 Jan 2012	851	10	Clear	7.	24 Jan 2012	7690	87	Clear
2.	03 Jan 2012			Clear	8.	21 Jan 2012			Clear
3.	10 Jan 2012			Clear	9.	31 Jan 2012			Clear
4.	12 Jan 2012	7812	88	5%					
5.	14 Jan 2012			Clear					
6.	17 Jan 2012			Clear					
February 2012									
1.	02 Feb 2012	8814	99	40%	5.	26 Feb 2012	7910	89	Clear
2.	10 Feb 2012			Clear	6.	29 Feb 2012			Clear
3.	12 Feb 2012	8846	100	80%					
4.	17 Feb 2012			Clear					
March 2012									
1.	02 Mar 2012	8691	98	Clear	5.	21 March 2012	8008	90	Clear
2.	07 Mar 2012			Clear	6.	22 March 2012			Clear
3.	12 Mar 2012	8553	96	Clear	7.	31 March 2012			Clear
4.	19 Mar 2012			20%					
April 2012									
1.	05 April 2012	6069	68	5%	4.	24 April 2012	5352	60	15%
2.	15 April 2012	6937	78	25%					
3.	20 April 2012			20%					

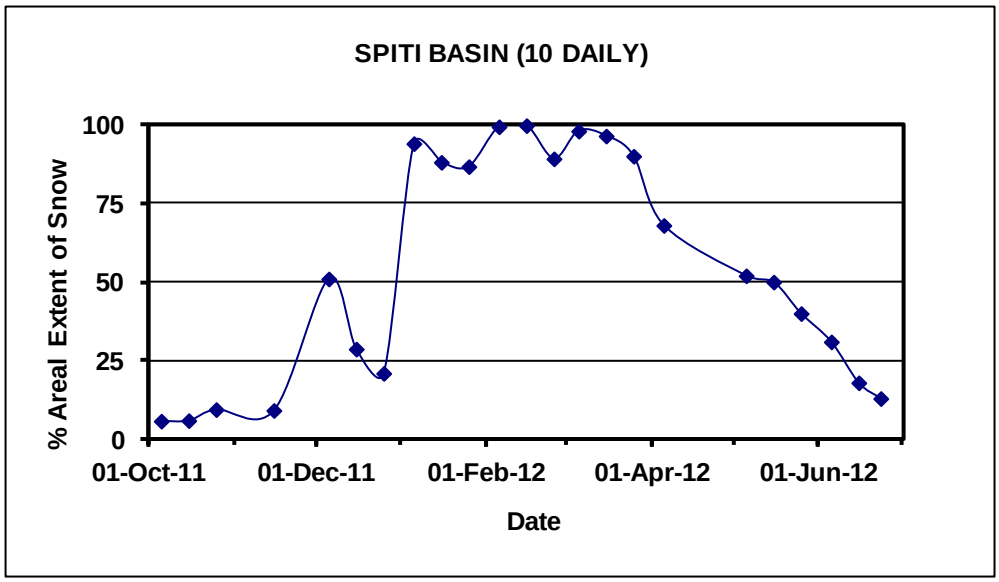
S. No	Date	Snow cover (sq. km)	Snow cover (%)	Snow cover	S. No	Date	Snow cover (sq. km)	Snow cover (%)	Snow cover
May 2012									
1.	04 May 2012	5906	67	25%	4.	13 May 2012	4442	50	Clear
3.	09 May 2012			Clear	5.	14 May 2012			Clear
2.	08 May 2012			Clear	6.	18 May 2012			5%
					7.	23 May 2012	3561	40	Clear
June 2012									
1.	01 June 2012	3433	39	25%	4.	14 June 2012	1948	22	10%
2.	02 June 2012			Clear	5.	18 June 2012			5%
3.	09 June 2012			25%	6.	19 June 2012			10%
					7.	23 June 2012	1141	13	10%

Snow cover depletion curve



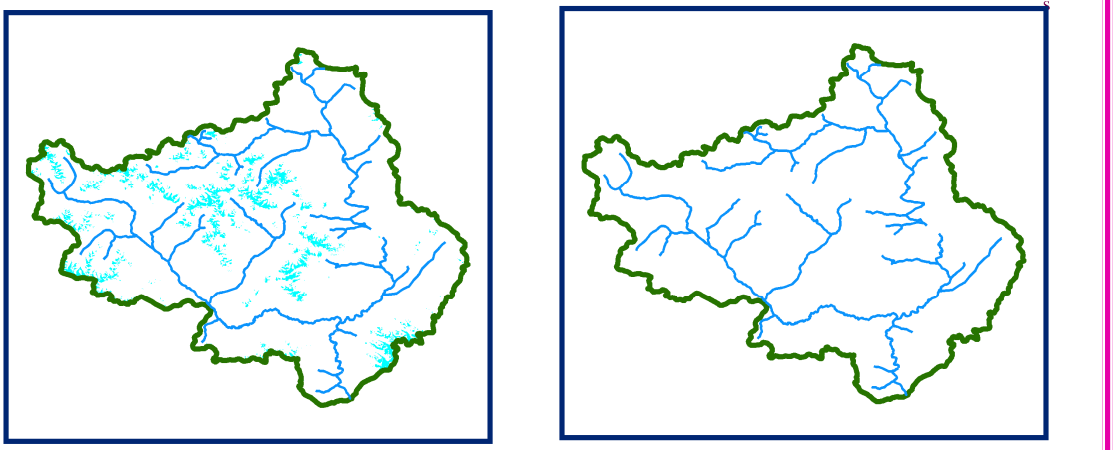


Snow cover depletion curve



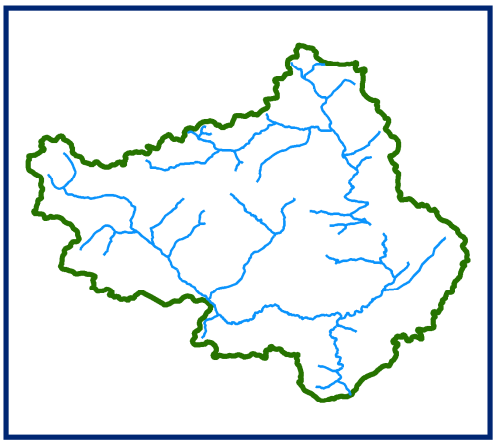
SNOW COVER MAPS

SNOW COVER MAP : SPITI BASIN

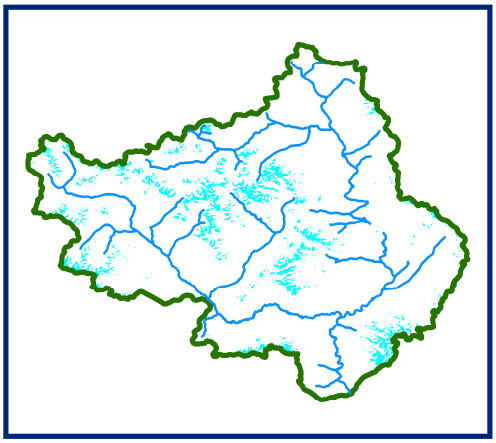


03 Oct 2011

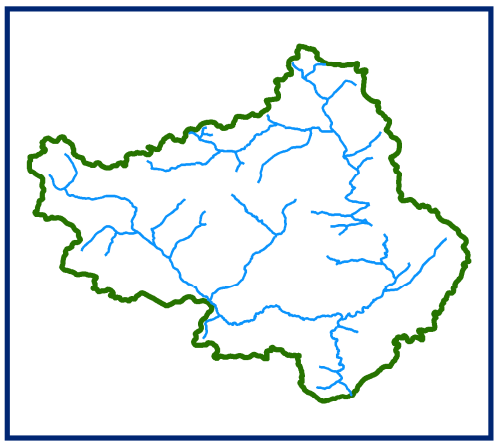
DATA NOT AVAILABLE



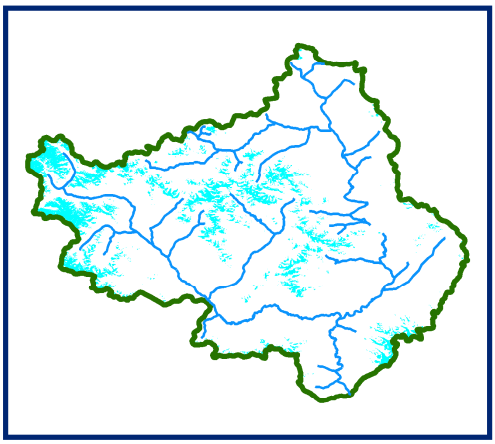
DATA NOT AVAILABLE



18 Oct 2011



DATA NOT AVAILABLE



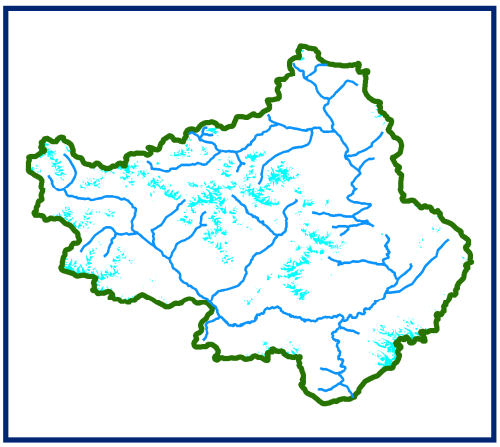
27 Oct 2011

SNOW

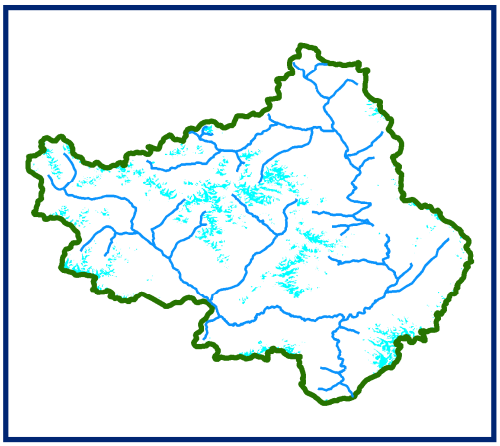
0 5 10 20 30 40

Kilometers

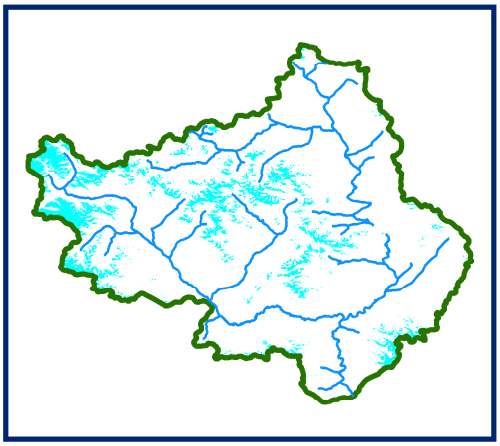
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
03 OCT 2011



DATA USED
18 OCT 2011

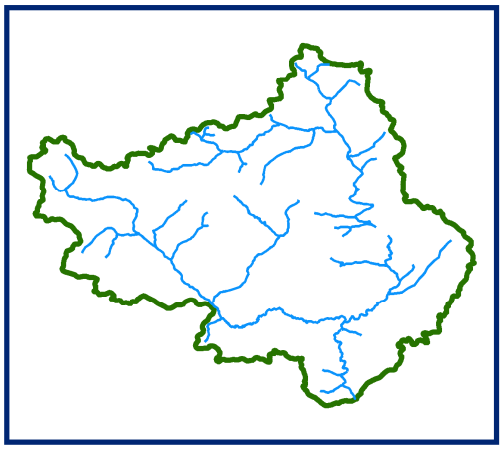


DATA USED
27 OCT 2011

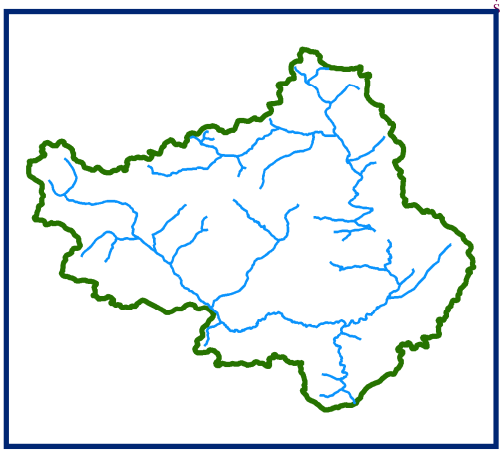
SNOW

0 4.5 9 18 27 36
Kilometers

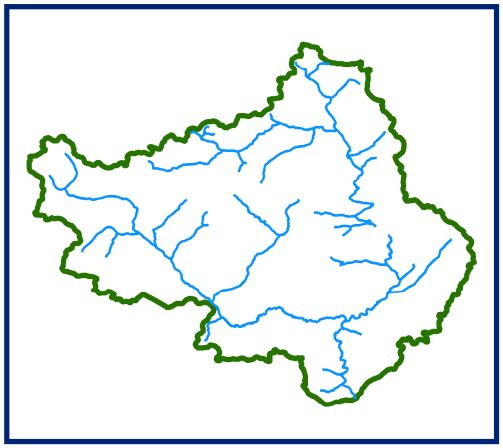
SNOW COVER MAP : SPITI BASIN



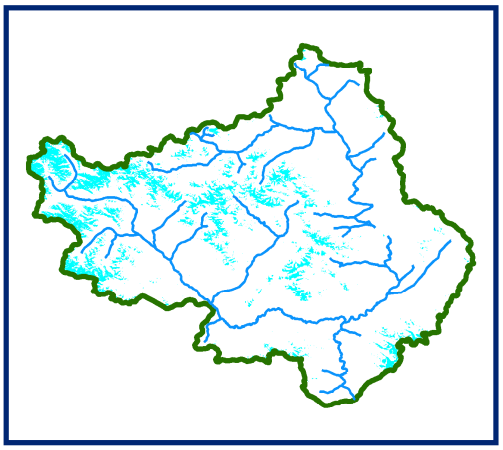
DATA NOT AVAILABLE



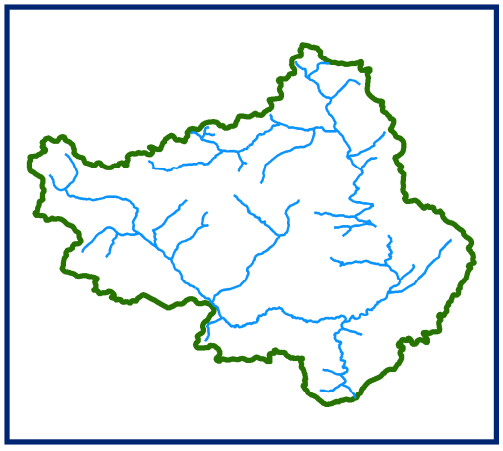
DATA NOT AVAILABLE



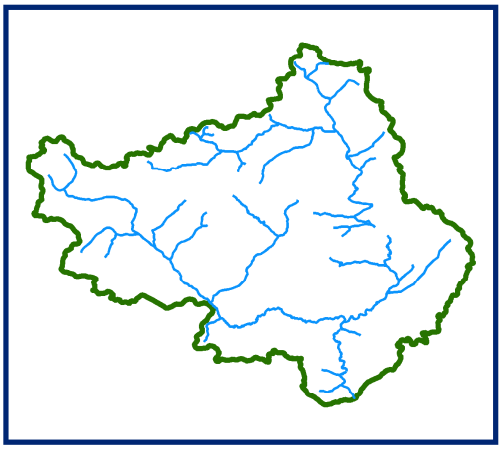
DATA NOT AVAILABLE



20 Nov 2011



DATA NOT AVAILABLE

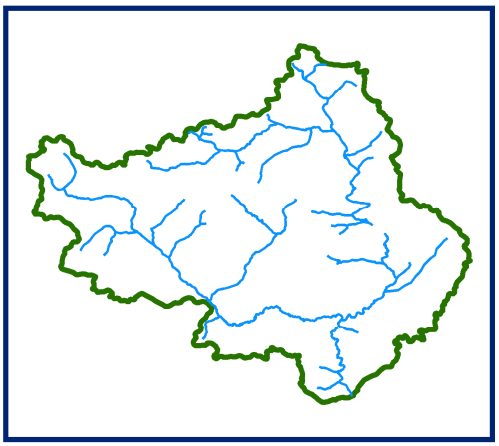


DATA NOT AVAILABLE

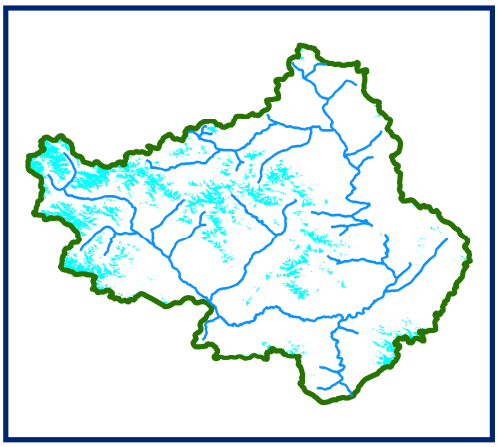
SNOW

0 0.5 1 2 3 4 Kilometers

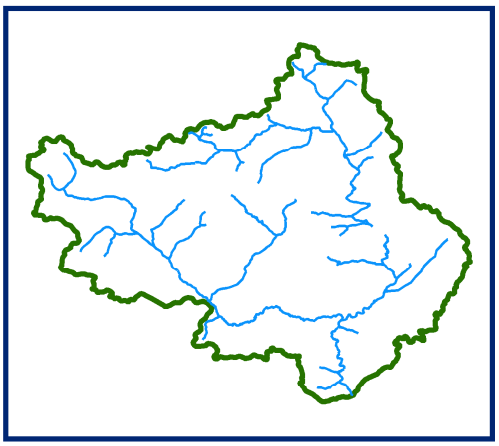
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
DATA NOT AVAILABLE



DATA USED
20 NOV 2011

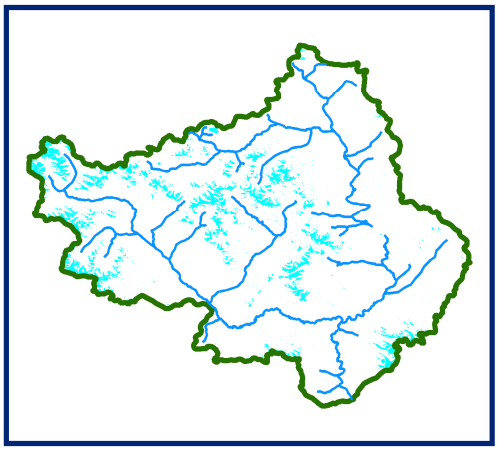


DATA USED
DATA NOT AVAILABLE

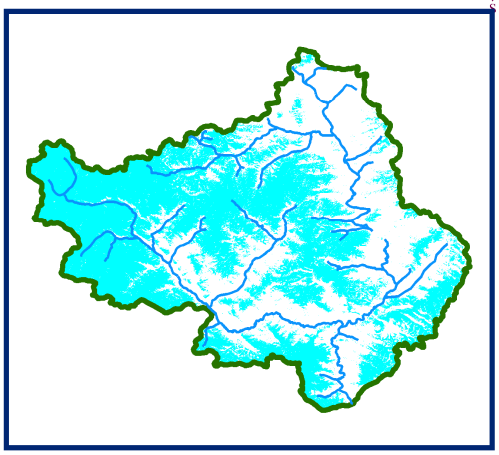
SNOW

0 4.5 9 18 27 36
Kilometers

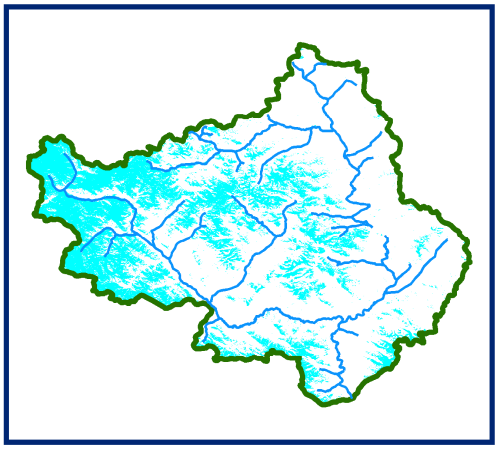
SNOW COVER MAP : SPITI BASIN



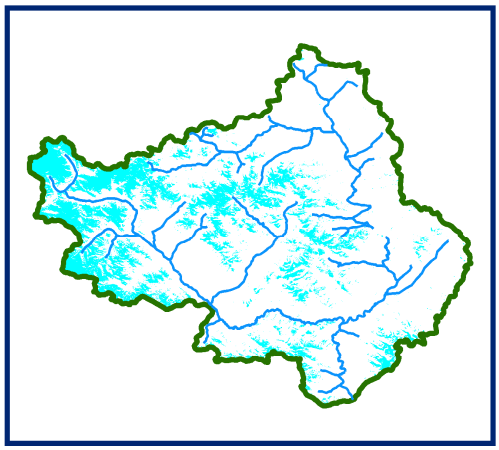
04 Dec 2011



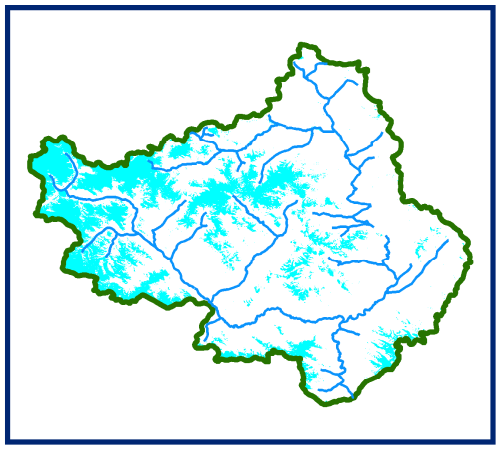
10 Dec 2011



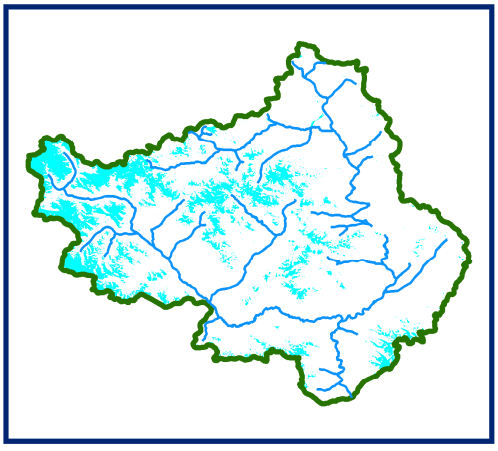
14 Dec 2011



19 Dec 2011



21 Dec 2011



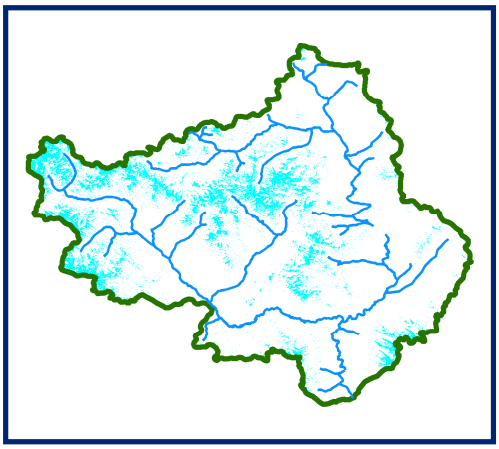
31 Dec 2011

SNOW

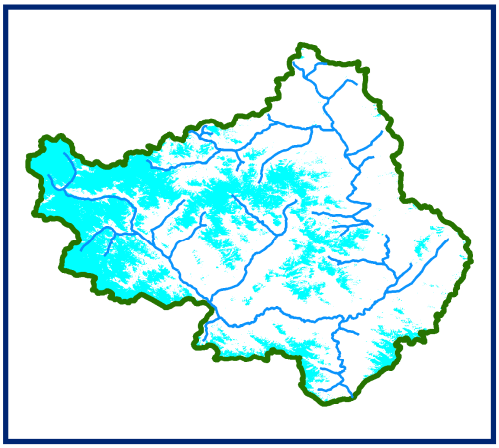
0 5 10 20 30 40

Kilometers

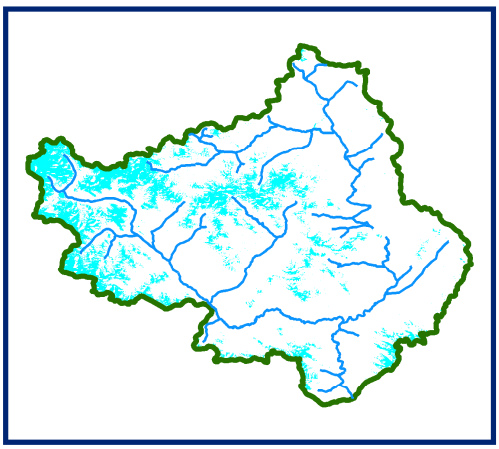
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
04 DEC 2011
10 DEC 2011



DATA USED
14 DEC 2011
17 DEC 2011
19 DEC 2011

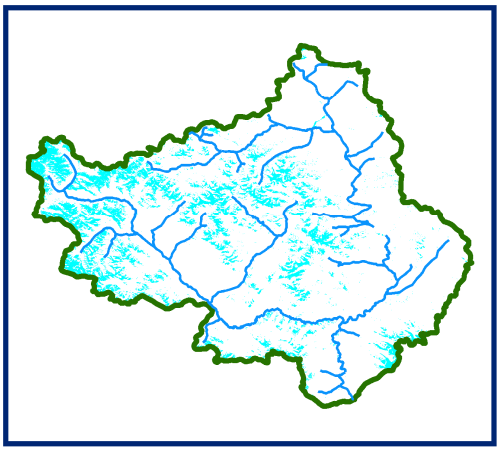


DATA USED
21 DEC 2011
28 DEC 2011
31 DEC 2011

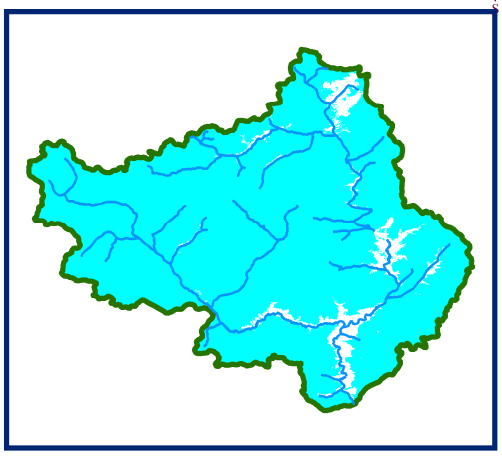
SNOW

0 4.5 9 18 27 36
Kilometers

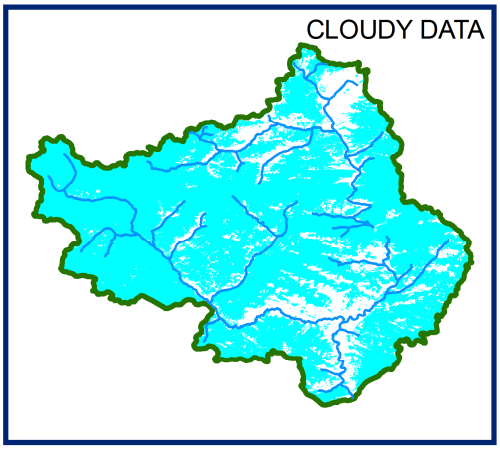
SNOW COVER MAP : SPITI BASIN



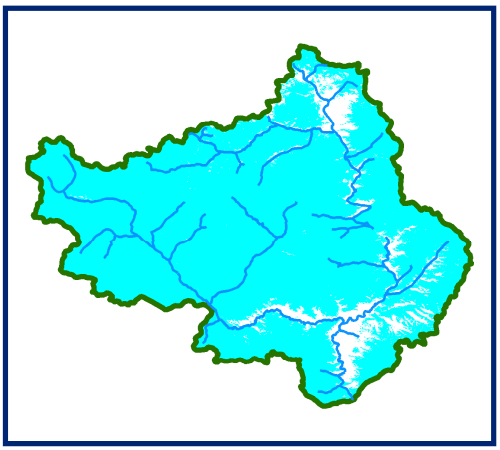
02 Jan 2012



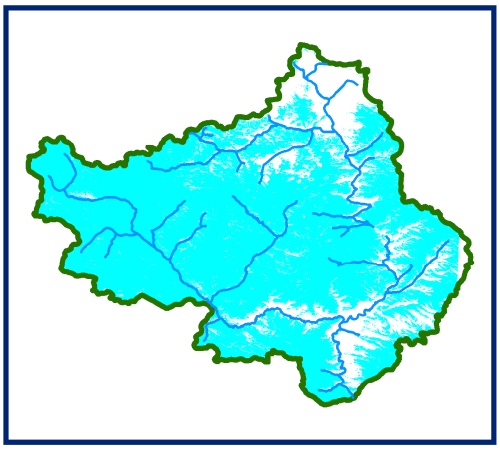
10 Jan 2012



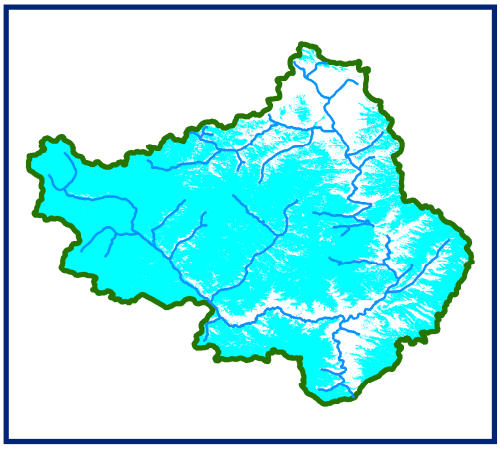
12 Jan 2012



19 Jan 2012



21 Jan 2012



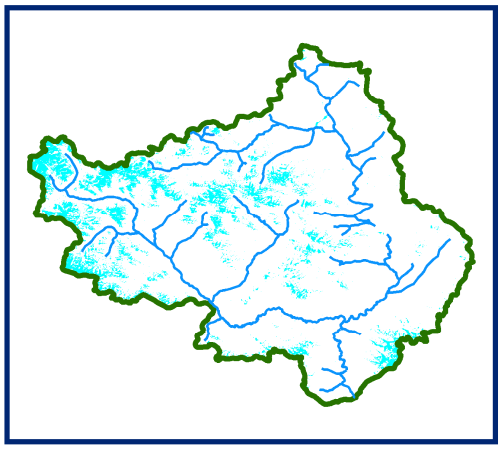
31 Jan 2012

SNOW

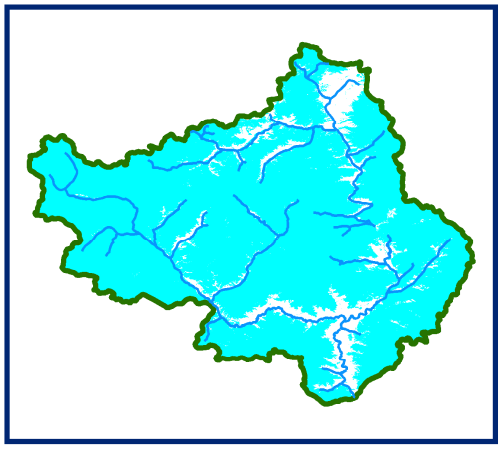
0 5 10 20 30 40

Kilometers

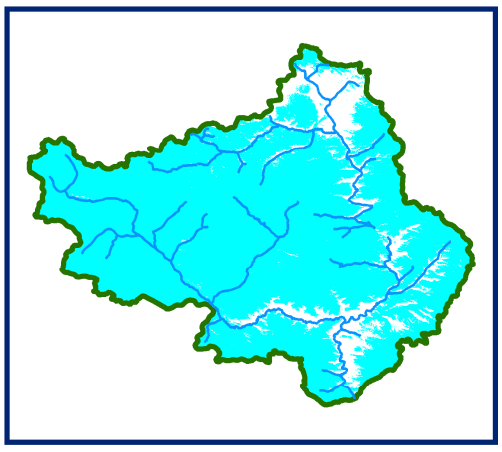
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
02 JAN 2012
03 JAN 2012
10 JAN 2012



DATA USED
12 JAN 2012
14 JAN 2012
17 JAN 2012

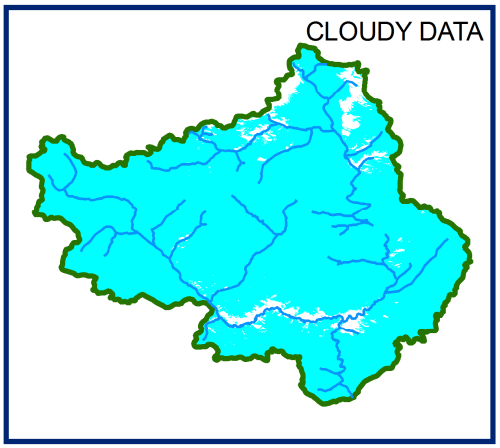


DATA USED
21 JAN 2012
24 JAN 2012
31 JAN 2012

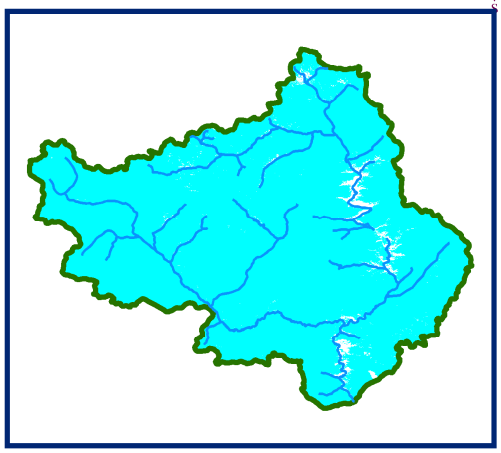
SNOW

0 4.5 9 18 27 36
Kilometers

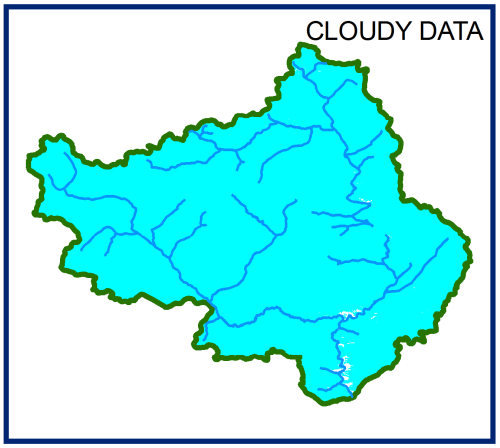
SNOW COVER MAP : SPITI BASIN



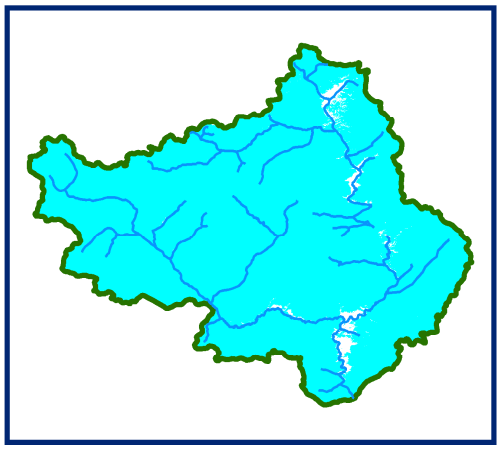
02 Feb 2012



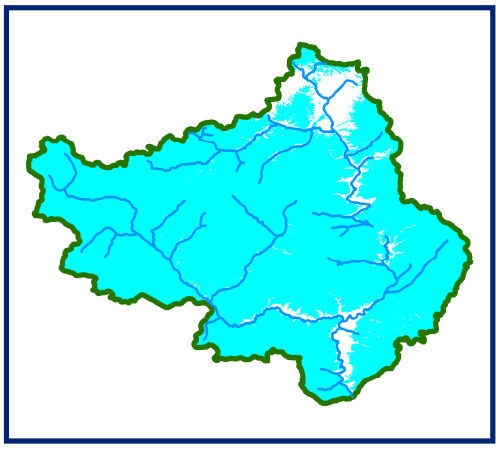
10 Feb 2012



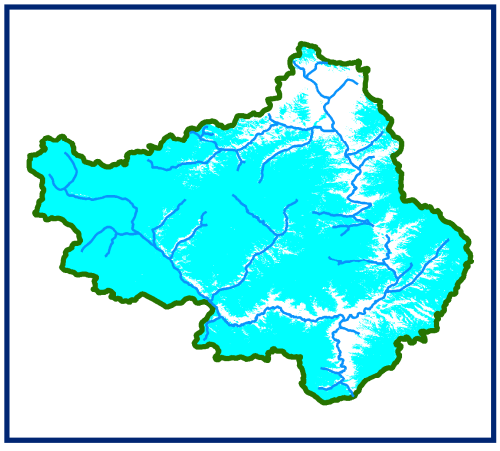
12 Feb 2012



17 Feb 2012



26 Feb 2012



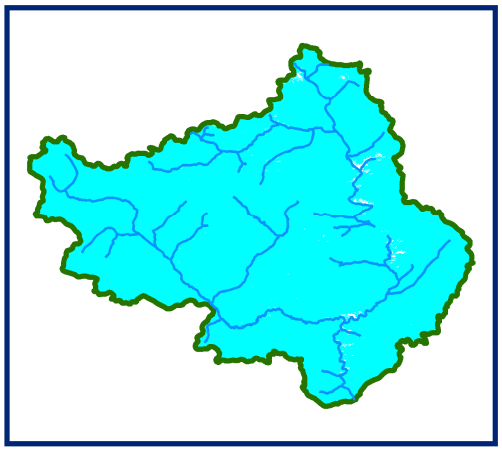
29 Feb 2012

SNOW

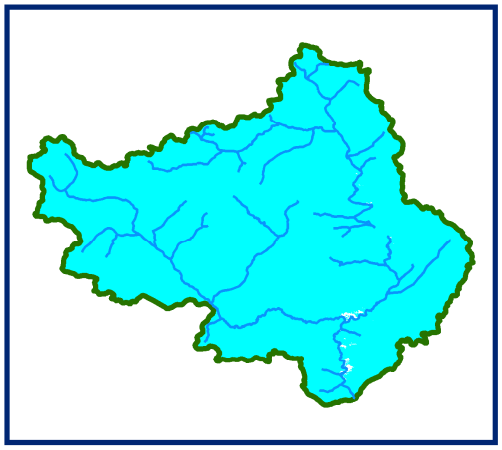
0 5 10 20 30 40

Kilometers

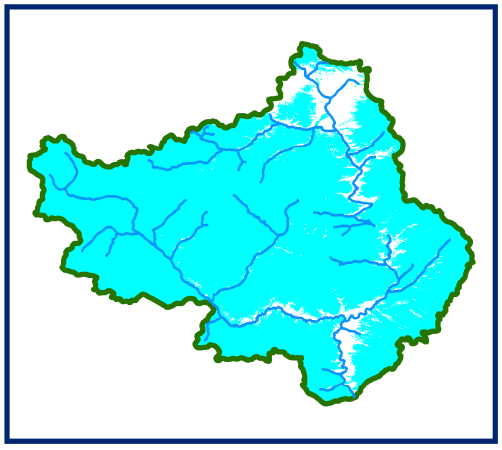
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
02 FEB 2012
10 FEB 2012



DATA USED
12 FEB 2012
17 FEB 2012

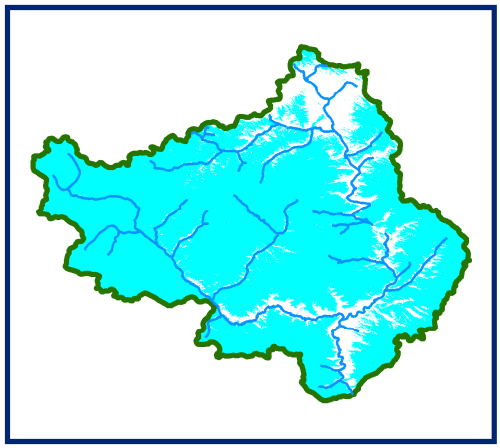


DATA USED
26 FEB 2012
29 FEB 2012

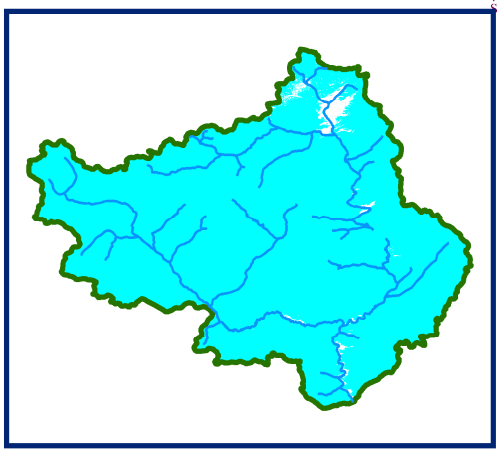
SNOW

0 4.5 9 18 27 36
Kilometers

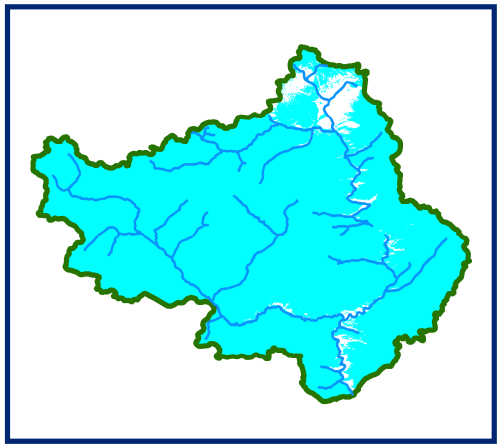
SNOW COVER MAP : SPITI BASIN



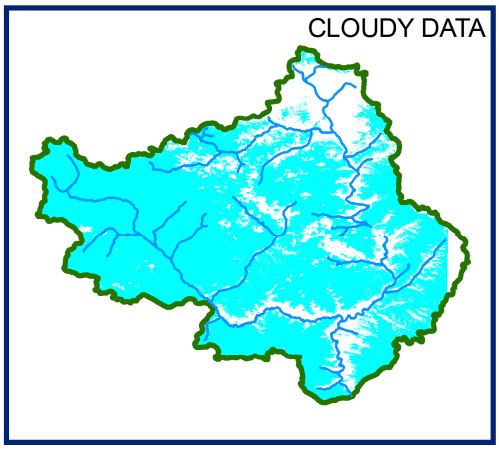
02 March 2012



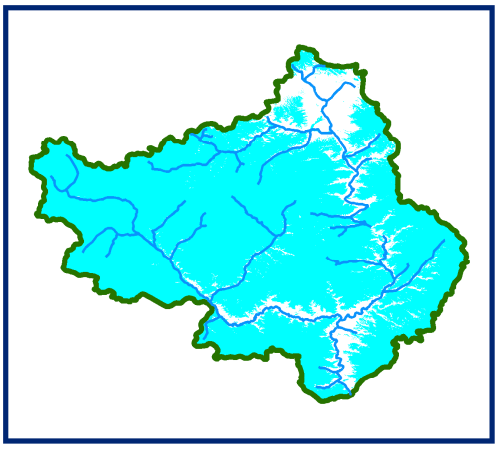
07 March 2012



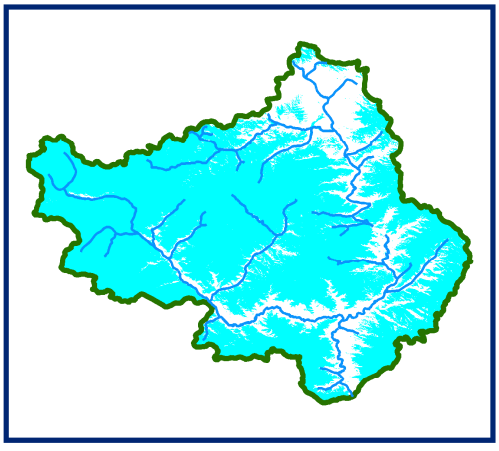
12 March 2012



19 March 2012



22 March 2012

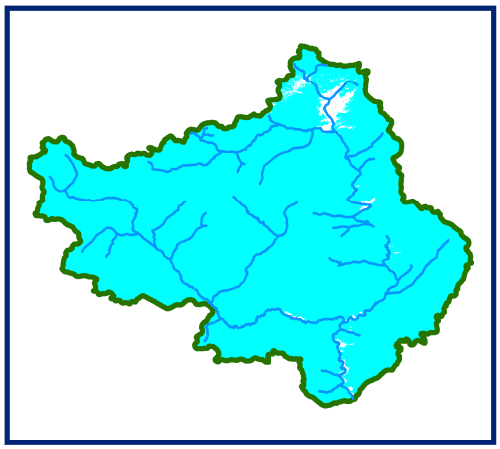


31 March 2012

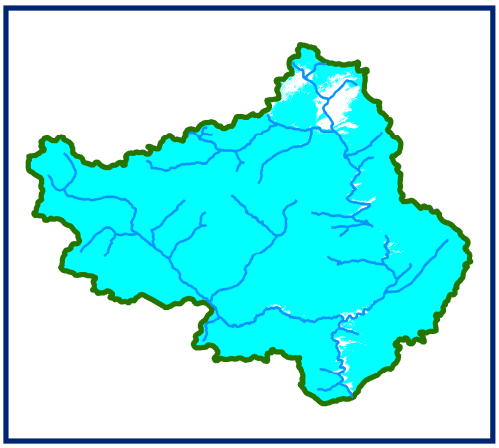
SNOW

0 0.5 1 2 3 4
Kilometers

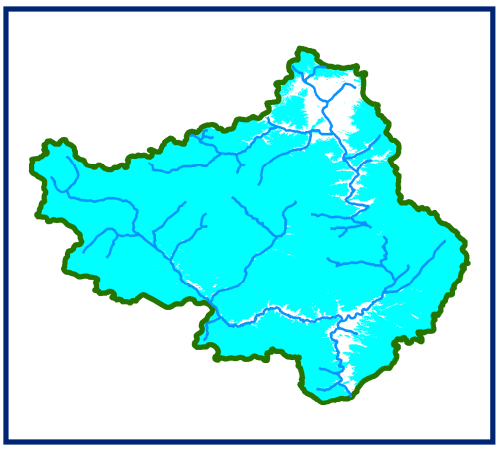
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
02 March 2012
07 March 2012



DATA USED
12 March 2012
19 March 2012

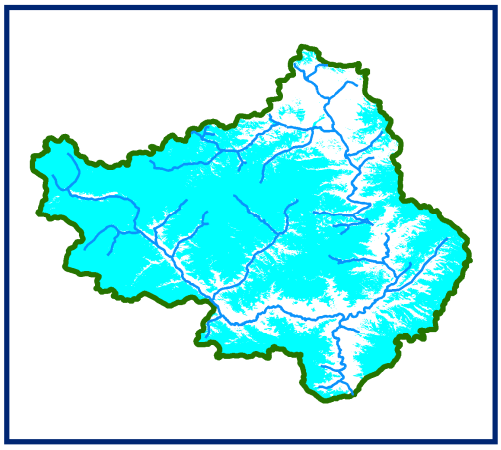


DATA USED
21 March 2012
22 March 2012
31 March 2012

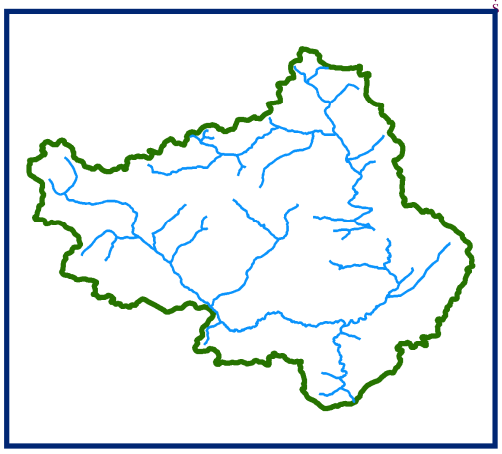
SNOW

0 4.5 9 18 27 36
Kilometers

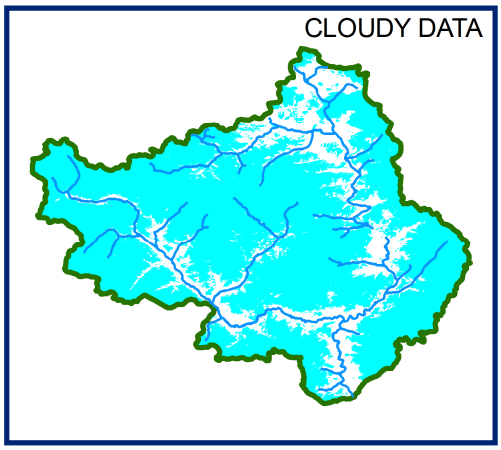
SNOW COVER MAP : SPITI BASIN



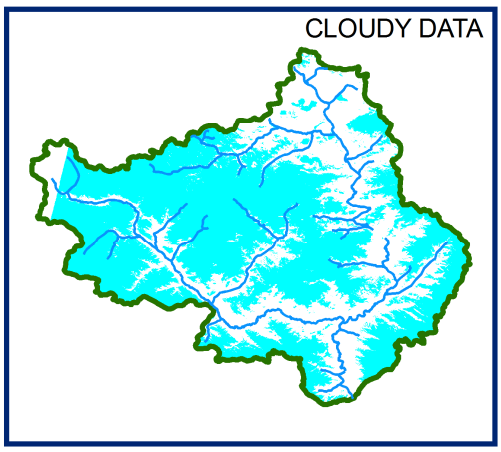
05 April 2012



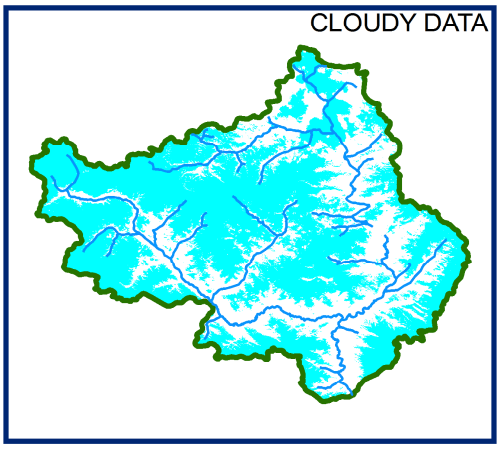
DATA NOT AVAILABLE



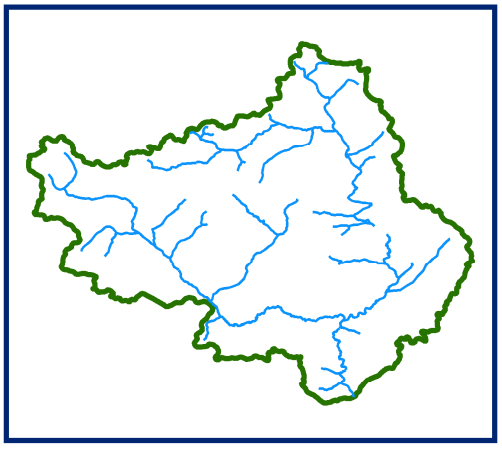
15 April 2012



20 April 2012



24 April 2012

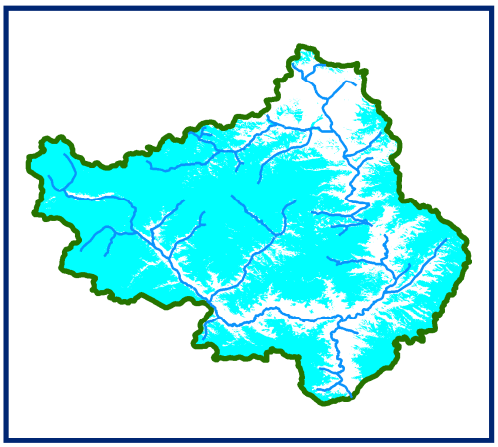


DATA NOT AVAILABLE

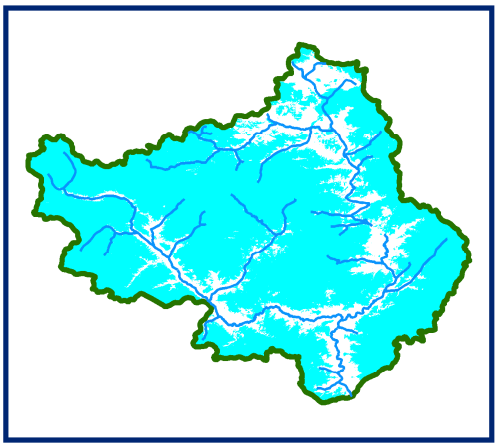
SNOW

0 0.5 1 2 3 4 6
Kilometers

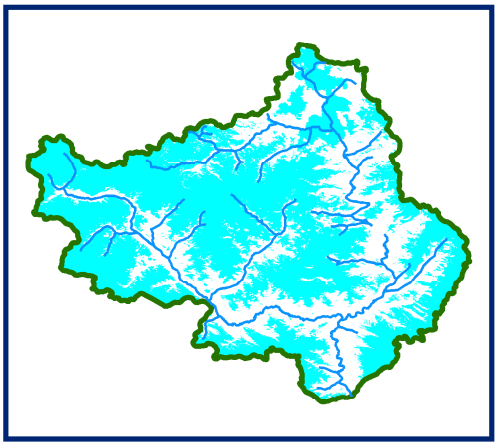
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
05 April 2012



DATA USED
15 April 2012
20 April 2012

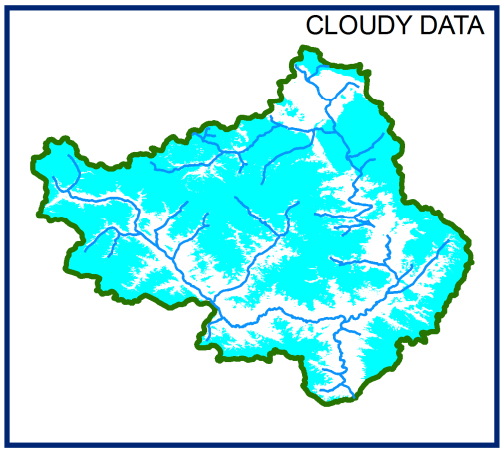


DATA USED
24 April 2012

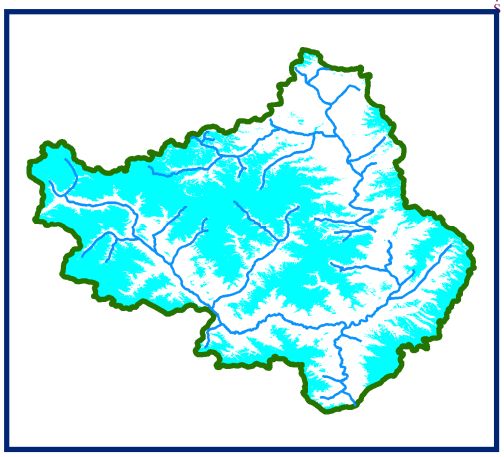
SNOW

0 4.5 9 18 27 36
Kilometers

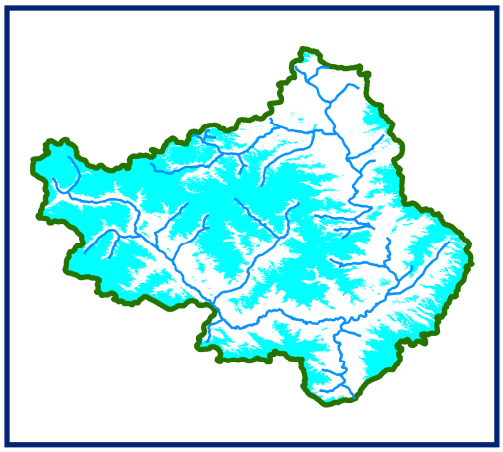
SNOW COVER MAP : SPITI BASIN



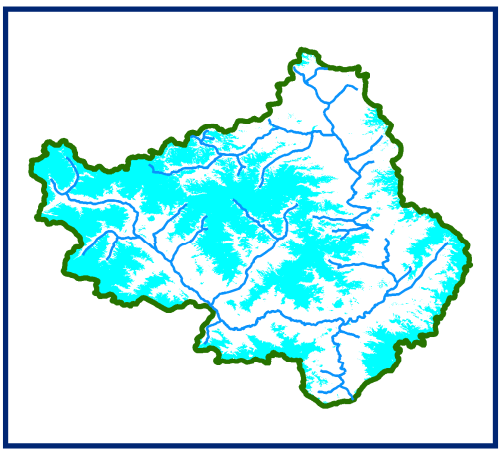
04 May 2012



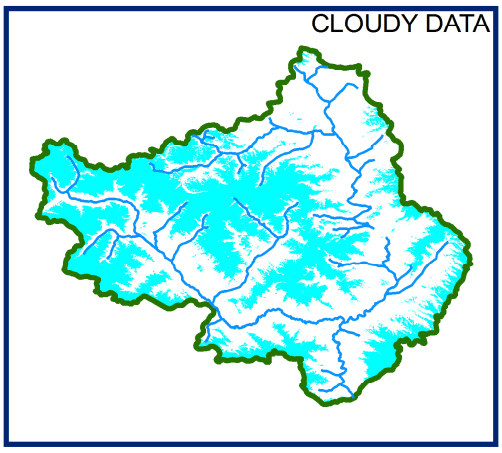
09 May 2012



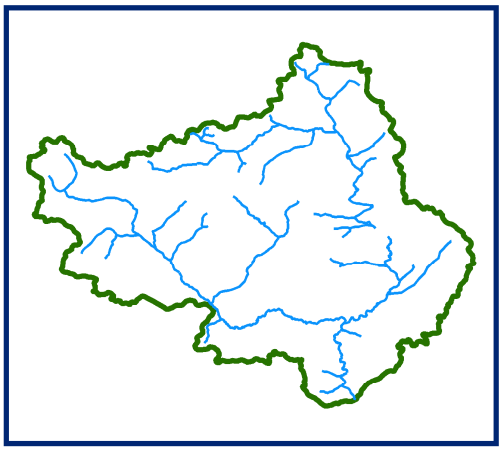
13 May 2012



18 May 2012



23 May 2012

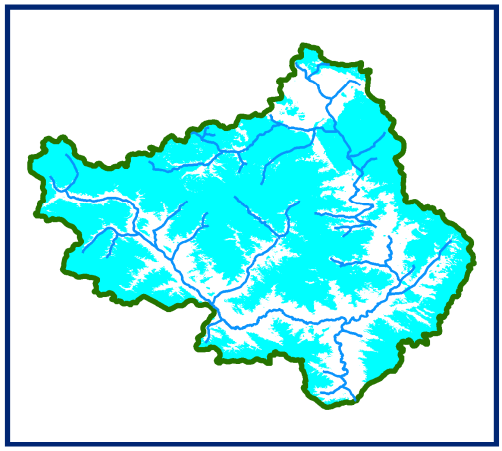


DATA NOT AVAILABLE

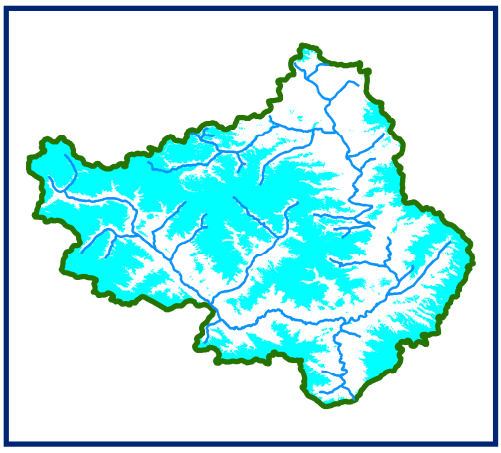
SNOW

0 0.5 1 2 3 4
Kilometers

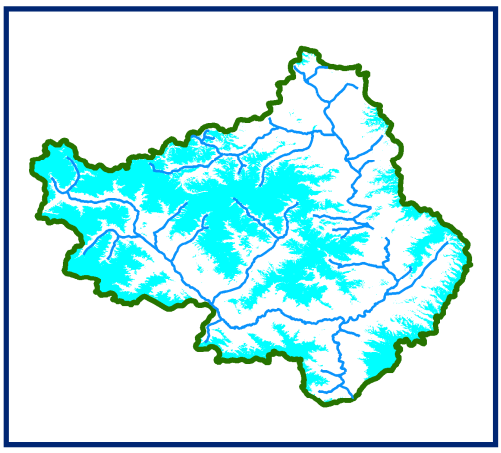
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
04 May 2012
08 May 2012
09 May 2012



DATA USED
13 May 2012
14 May 2012
18 May 2012

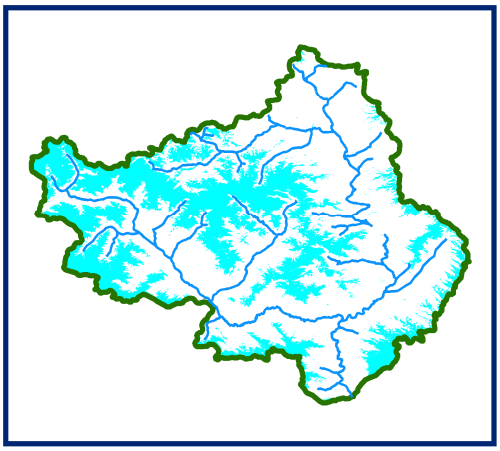


DATA USED
23 May 2012

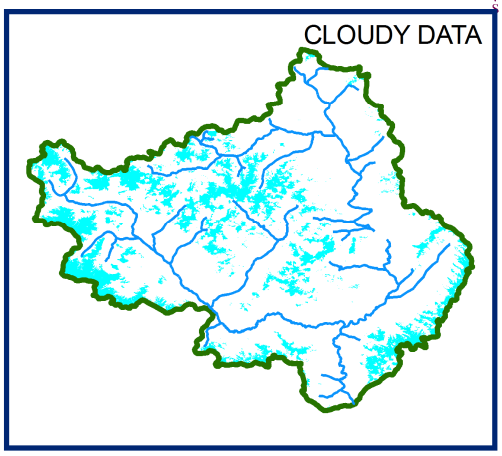
SNOW

0 4.5 9 18 27 36
Kilometers

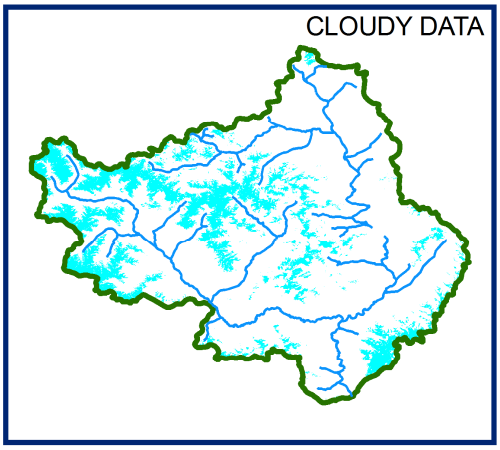
SNOW COVER MAP : SPITI BASIN



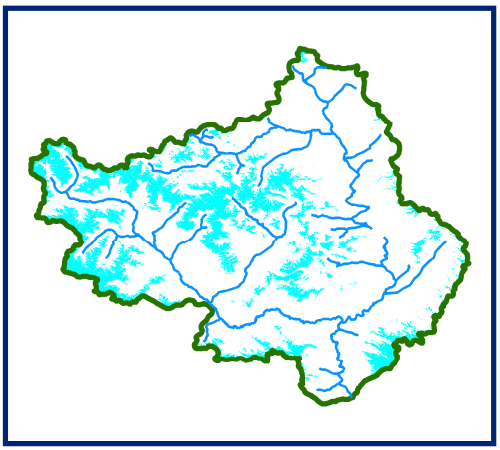
02 June 2012



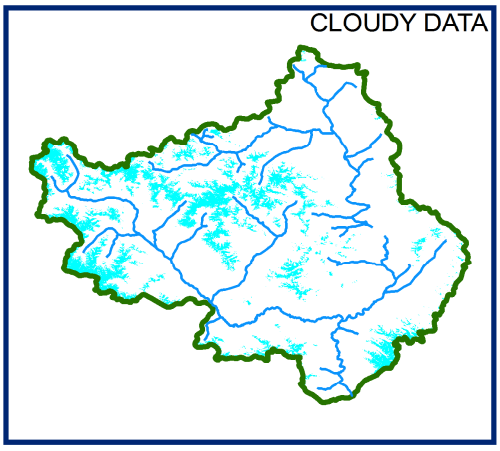
09 June 2012



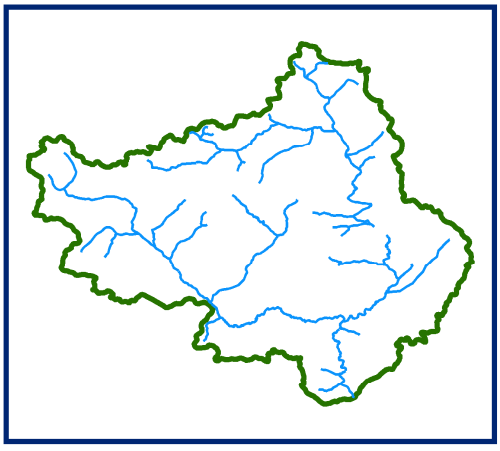
14 June 2012



18 June 2012



23 June 2012



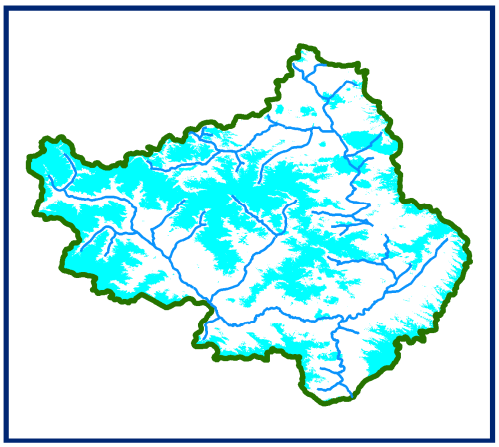
DATA NOT AVAILABLE

SNOW

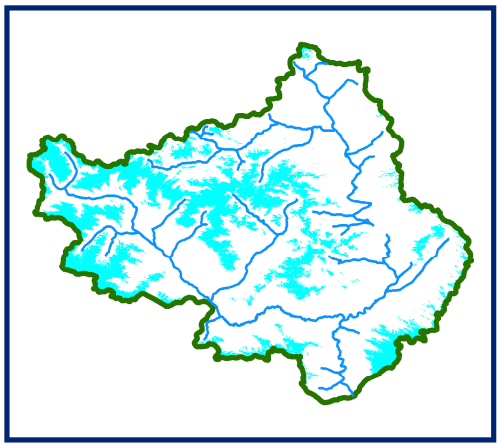
0 5 10 20 30 40

Kilometers

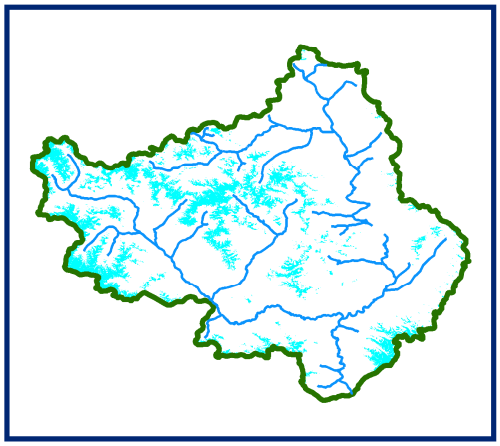
10 DAILY SNOW COVER MAP: SPITI BASIN



DATA USED
01 June 2012
02 June 2012
09 June 2012



DATA USED
14 June 2012
18 June 2012
19 June 2012



DATA USED
23 June 2012

SNOW

0 4.5 9 18 27 36
Kilometers

BASPA BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: BASPA **BASIN AREA: 1096 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	198	18	Clear	3.	23 Oct 2011	262	24	Clear
2.	18 Oct 2011	335	31	Clear	4.	27 Oct 2011	368	34	Clear
November 2011									
1.	20 Nov 2011	237	22	Clear					
December 2011									
1.	04 Dec 2011	203	19	Clear	6.	19 Dec 2011	395	36	Clear
2.	10 Dec 2011	857	78	Clear	7.	21 Dec 2011	395	36	Clear
3.	16 Dec 2011	530	48	Clear	8.	22 Dec 2011	369	34	Clear
4.	17 Dec 2011	478	44	Clear	9.	28 Dec 2011	290	26	Clear
5.	19 Dec 2011	394	36	Clear	10.	31 Dec 2011	286	26	Clear
January2012									
1.	02 Jan2012	268	24	Less	8.	19 Jan2012	1097	100	Clear
2.	03 Jan2012	221	20	Less	9.	21 Jan2012	1067	97	Clear
3.	10 Jan2012	1101	100	Clear	10.	24 Jan2012	1087	99	Clear
4.	12 Jan2012	1051	96	Clear	11.	29 Jan2012	1087	99	Clear
5.	12 Jan2012	1068	97	Clear	12.	29 Jan2012	1087	99	Clear
6.	14 Jan2012	1087	99	Clear		31 Jan2012	1054	96	Clear
7.	17 Jan2012	1097	100	Clear					
February 2012									
1.	02 Feb 2012	1091	100	80%	7.	26 Feb 2012	1075.43	98	Clear
2.	10 Feb 2012	1099	100	Clear	8.	27 Feb 2012	1100.59	100	80%
3.	12 Feb 2012	814	74	Clear	9.	29 Feb 2012	1056.53	96	Clear
4.	12 Feb 2012	1101	100	80%					
5.	17 Feb 2012	1099	100	Clear					
6.	22 Feb 2012	1094	100	80%					
March 2012									
1.	02 March 2012	1056	96	Clear	6.	15 March 2012	1023	93	Clear
2.	07 March 2012	1067	97	Clear	7.	15 March 2012	1023	93	Clear
3.	10 March 2012	1059	97	Clear	8.	19 March 2012	1010	92	Clear
4.	12 March 2012	1065	97	Clear	9.	21 March 2012	1075	98	70%
5.	12 March 2012	1064	97	Clear	10.	22 March 2012	1007	92	Clear
6.	12 March 2012	1007	92	Clear	11.	31 March 2012	964	88	Clear

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
April 2012									
1.	05 April 2012	923	84	Clear	3.	20 April 2012	885	81	5%
2.	15 April 2012	969	88	25%	4.	24 April 2012	966	88	Clear
May 2012									
1.	04 May 2012	876	80	Clear	5.	14 May 2012	808	74	Clear
2.	08 May 2012	866	79	Clear	6.	18 May 2012	863	79	90%
3.	09 May 2012	833	76	Clear	7.	23 May 2012	780	71	Clear
4.	13 May 2012	835	76	Clear	8.	28 May 2012	744	68	Clear
June 2012									
1.	01 June 2012	727	66	10%	6.	14 June 2012	399	36	50%
2.	02 June 2012	685	62	Clear	7.	18 June 2012	396	36	30%
3.	04 June 2012	396	36	30%	8.	19 June 2012	438	40	20%
4.	09 June 2012	498	45	40%	9.	23 June 2012	289	26	60%
5.	09 June 2012	504	46	40%					

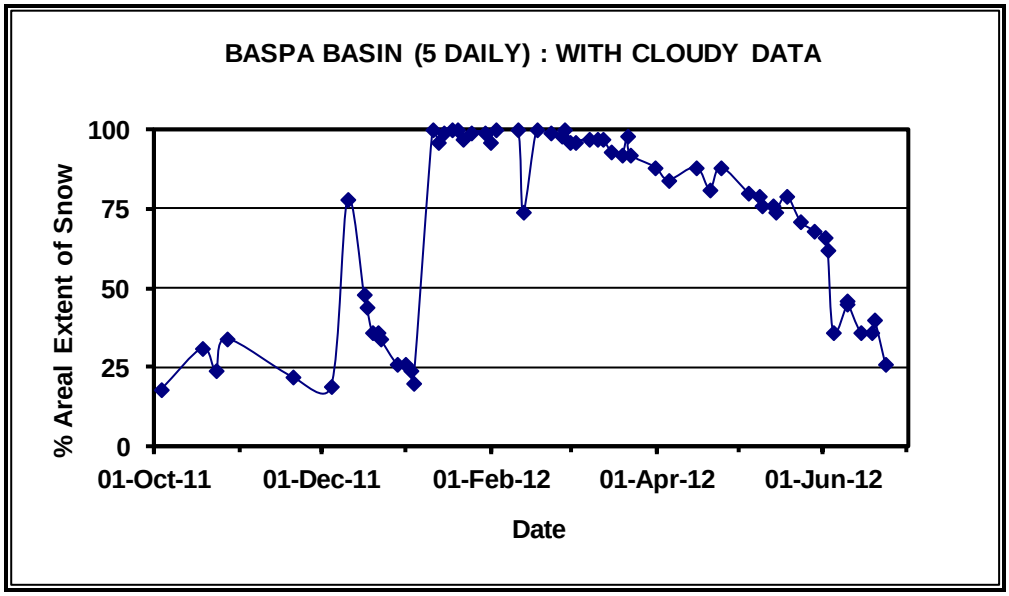
AREAL EXTENT OF SNOW (10 DAILY)

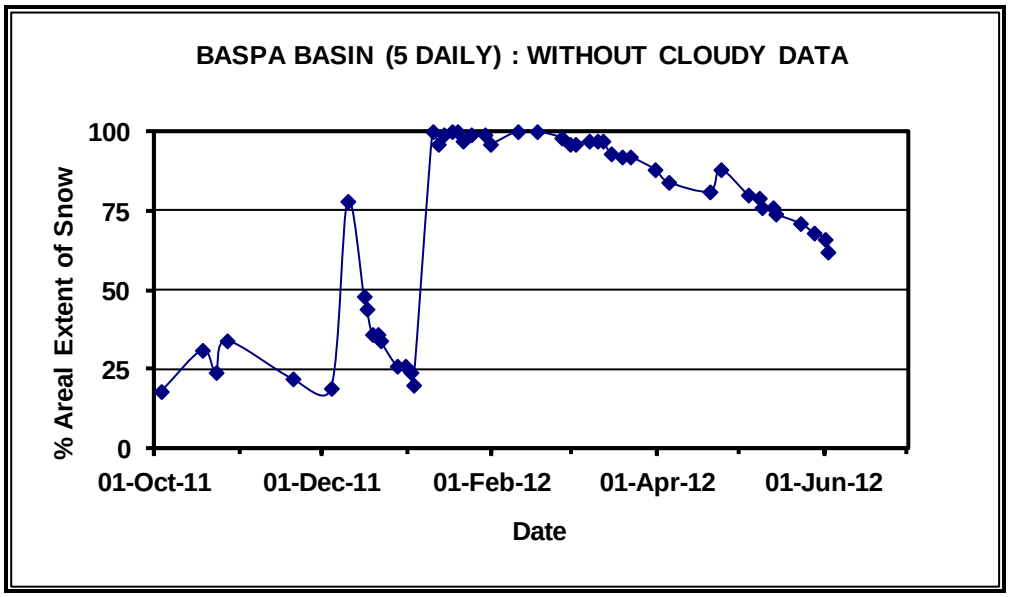
BASIN NAME: BASPA **BASIN AREA: 1096 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	198	18	Clear	3.	23 Oct 2011	372	34	Clear
2.	18 Oct 2011	335	31	Clear	4.	27 Oct 2011			Clear
November 2011									
1.	20 Nov 2011	237	22	Clear					
December 2011									
1.	04 Dec 2011	743	68	Clear	6.	21 Dec 2011	244	22	Clear
2.	10 Dec 2011			Clear	7.	28 Dec 2011			Clear
3.	16 Dec 2011	555	51	Clear	8.	31 Dec 2011			Clear
4.	17 Dec 2011			Clear					
5.	19 Dec 2011			Clear					
January2012									
1.	02 Jan 2012	187	17	Less	7.	21 Jan 2012	1091	100	Clear
2.	03 Jan 2012			Less	8.	29 Jan 2012			Clear
3.	10 Jan 2012			Clear	9.	31 Jan 2012			Clear
4.	12 Jan 2012	1099	100	Clear					
5.	14 Jan 2012			Clear					
6.	19 Jan 2012			Clear					
February 2012									
1.	02 Feb 2012	1091	100	80%	5.	26 Feb 2012	1094	100	Clear
2.	10 Feb 2012			Clear	6.	27 Feb 2012			80%
3.	12 Feb 2012	1101	100	Clear	7.	29 Feb 2012			Clear
4.	17 Feb 2012			Clear					
March 2012									
1.	02 March 2012	1069	98	Clear	4.	12 March 2012	1056	96	Clear
2.	07 March 2012			Clear	5.	15 March 2012			Clear
3.	10 March 2012			Clear	6.	19 March 2012			Clear
					7.	22 March 2012	1010	92	Clear
					8.	31 March 2012			Clear
April 2012									
1.	05 April 2012	923	84	Clear	4.	24 April 2012	966	88	Clear
2.	15 April 2012	988	90	25%					
3.	20 April 2012			5%					

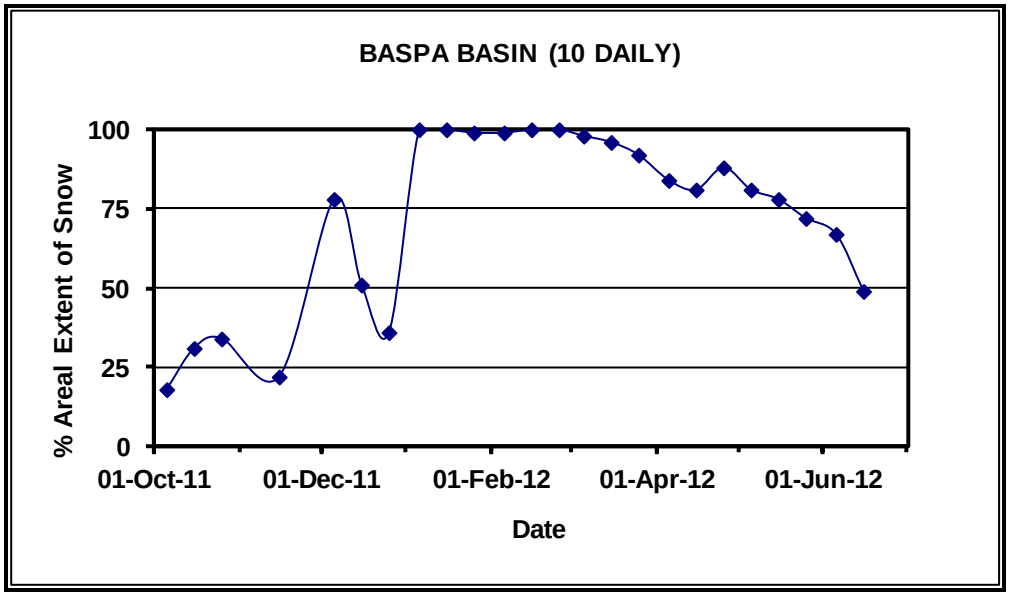
S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
May 2012									
1.	04 May 2012	887	81	Clear	4.	13 May 2012	851	78	Clear
2.	08 May 2012			Clear	5.	14 May 2012			Clear
3.	09 May 2012			Clear	6.	23 May 2012	785	72	Clear
					7.	28 May 2012			Clear
June 2012									
1.	01 June 2012	738	67	10%	5.	23 June 2012	289	26	60%
2.	02 June 2012			Clear					
3.	18 June 2012	538	49	30%					
4.	19 June 2012			20%					

Snow cover depletion curve



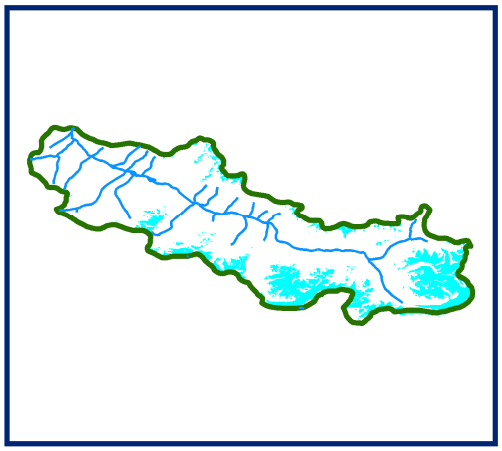


Snow cover depletion curve

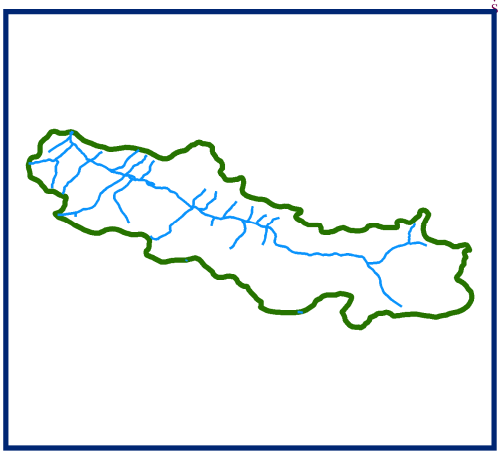


SNOW COVER MAPS

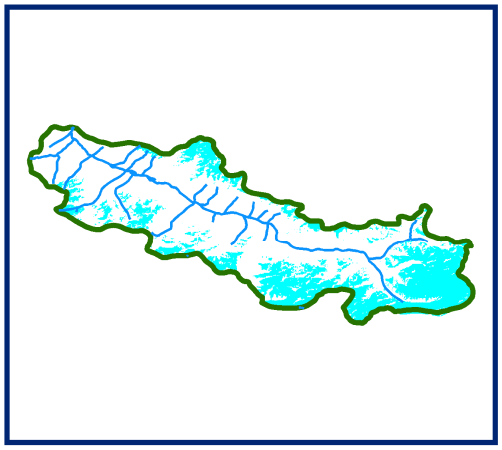
SNOW COVER MAP : BASPA BASIN



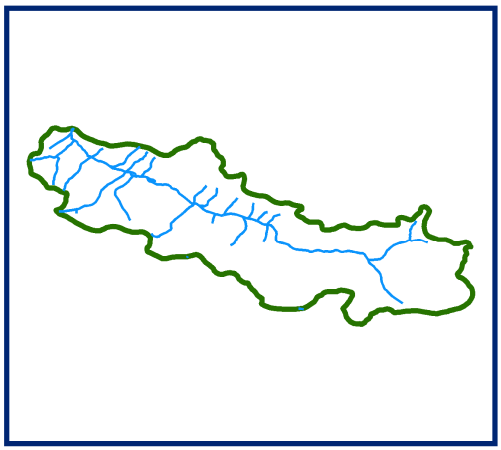
03 Oct 2011



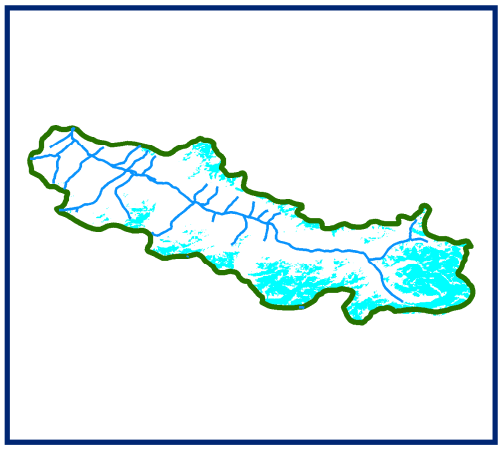
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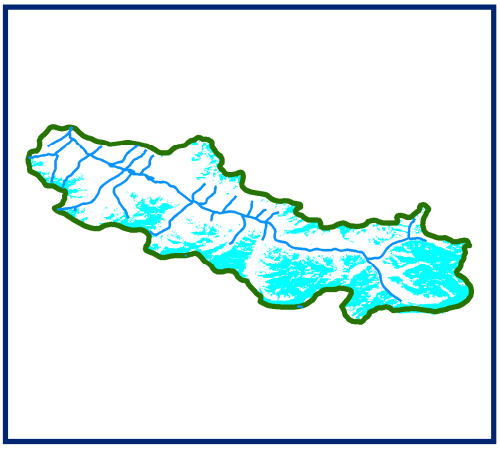
18 Oct 2011



DATA NOT AVAILABLE



23 Oct 2011

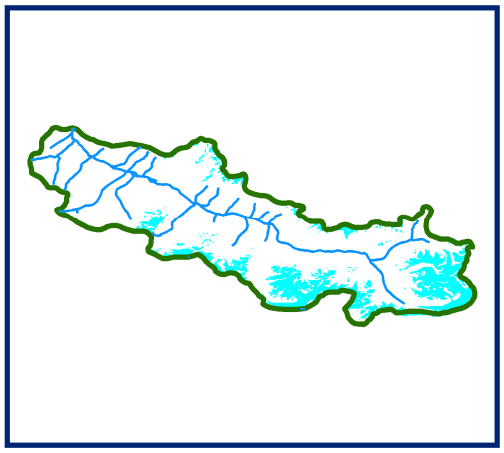


27 Oct 2011

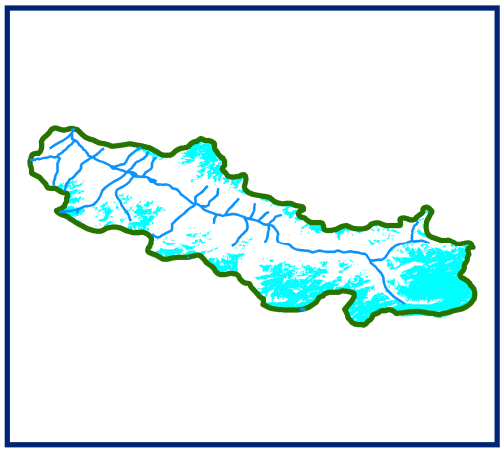
SNOW

0 2.5 5 10 15 20
Kilometers

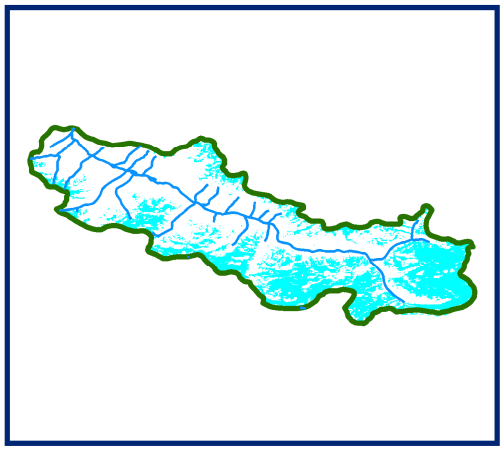
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
03 OCT 2011



DATA USED
18 OCT 2011

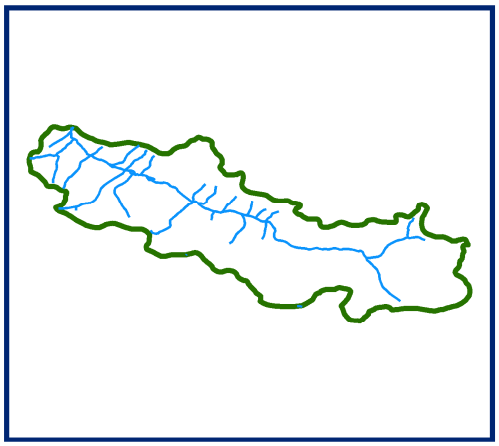


DATA USED
23 OCT 2011
27 OCT 2011

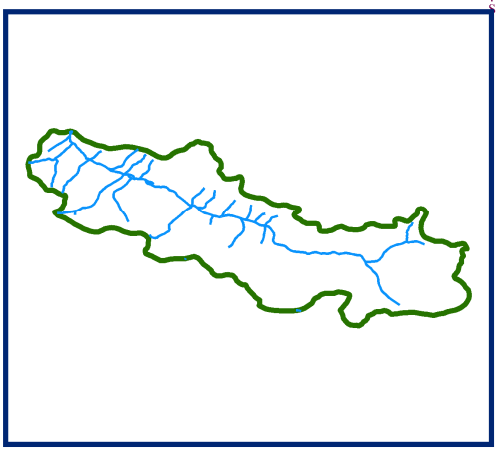
SNOW

0 5 10 20 30 40
Kilometers

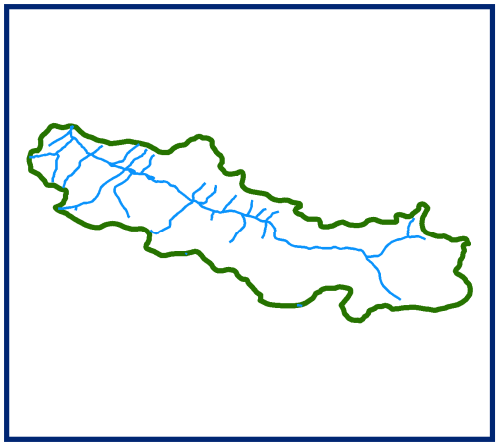
SNOW COVER MAP : BASPA BASIN



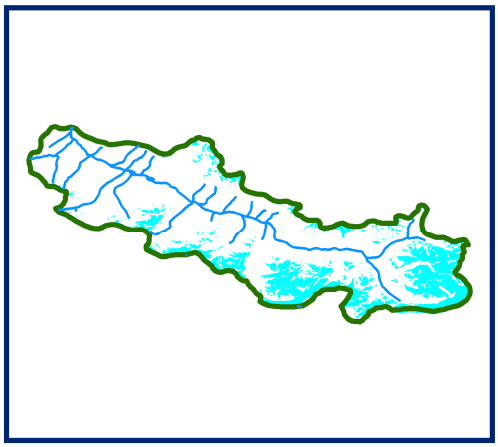
DATA NOT AVAILABLE



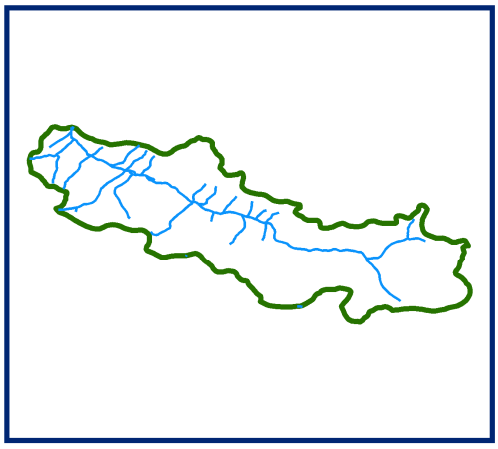
DATA NOT AVAILABLE



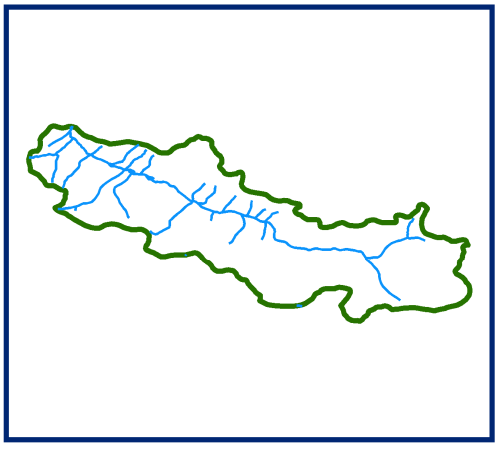
DATA NOT AVAILABLE



20 Nov 2011



DATA NOT AVAILABLE

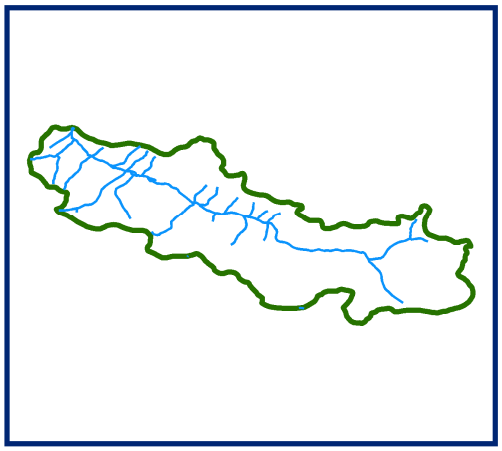


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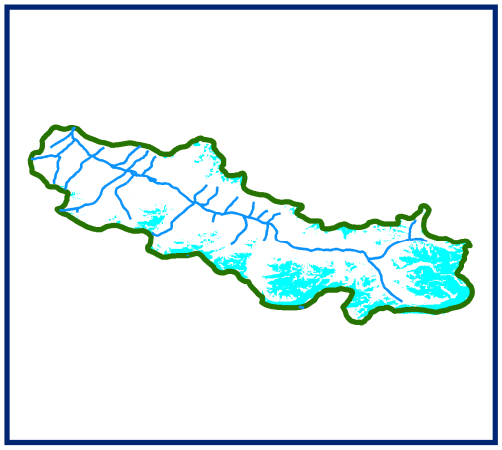
SNOW

0 2.5 10 15 20
Kilometers

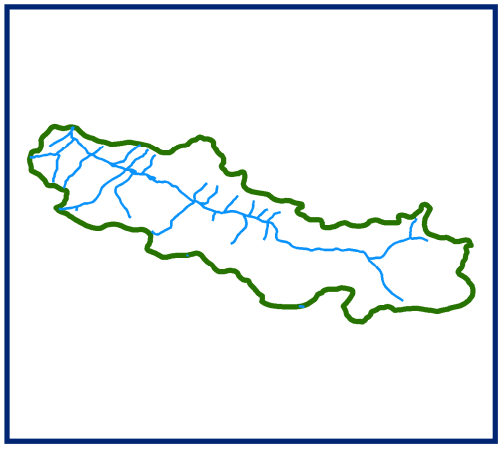
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
DATA NOT AVAILABLE



DATA USED
20 NOV 2011

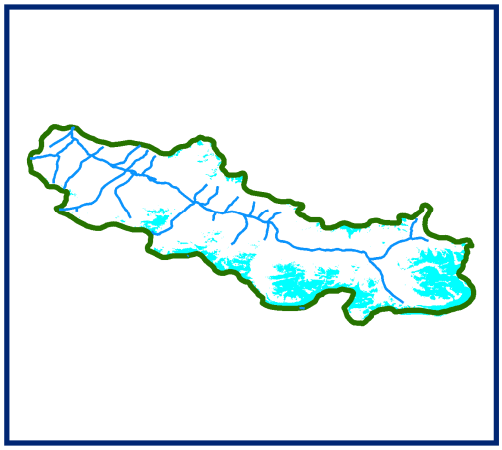


DATA USED
DATA NOT AVAILABLE

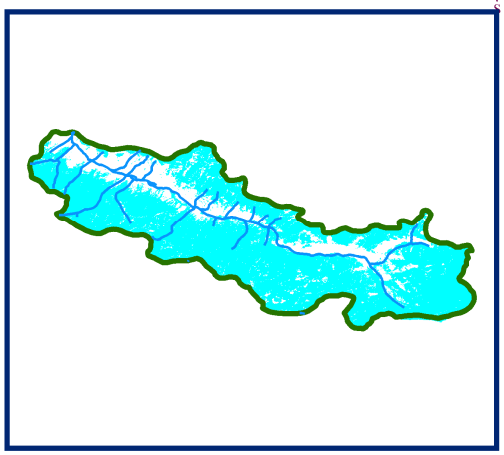
SNOW

0 5 10 20 30 40
Kilometers

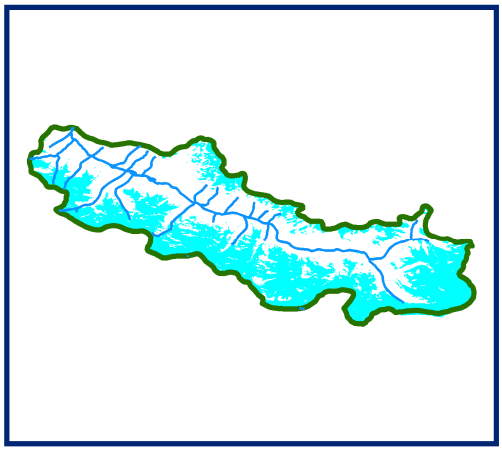
SNOW COVER MAP : BASPA BASIN



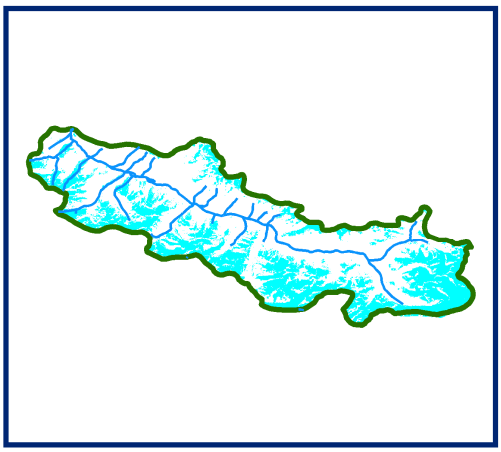
04 Dec 2011



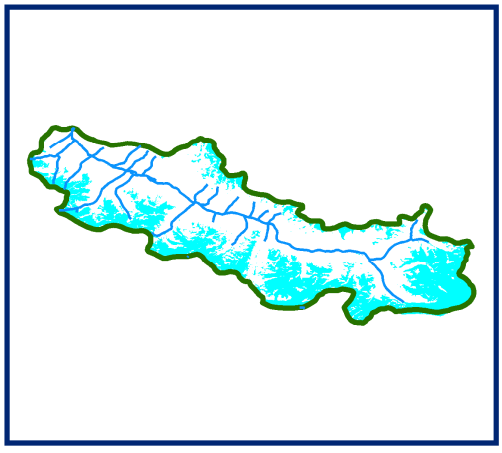
10 Dec 2011



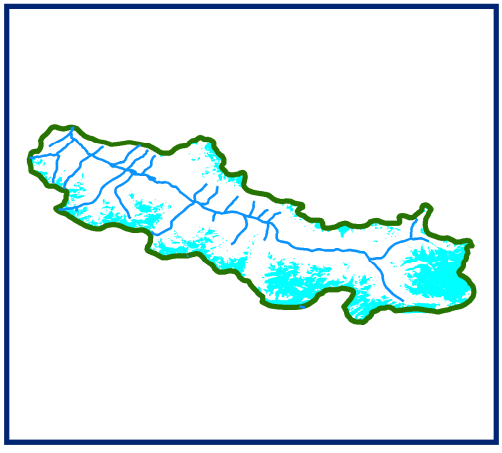
16 Dec 2011



19 Dec 2011



21 Dec 2011

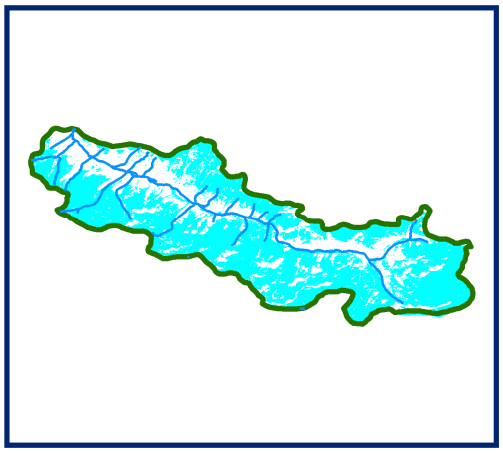


31 Dec 2011

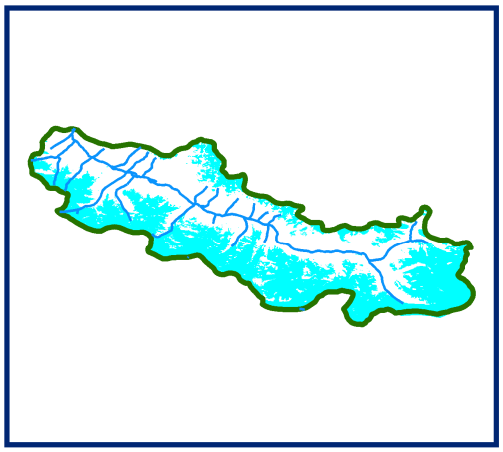
SNOW

0 2.5 5 10 15 20
Kilometers

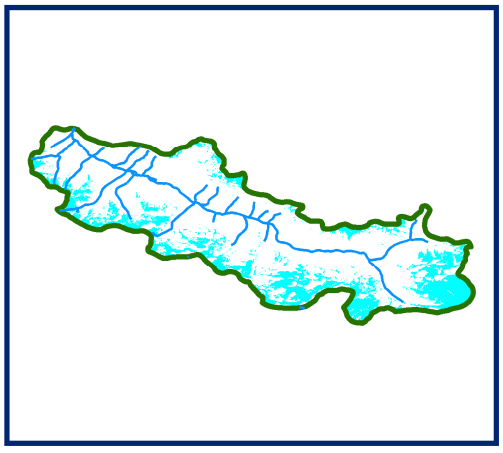
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
04 DEC 2011
10 DEC 2011



DATA USED
16 DEC 2011
20 DEC 2011

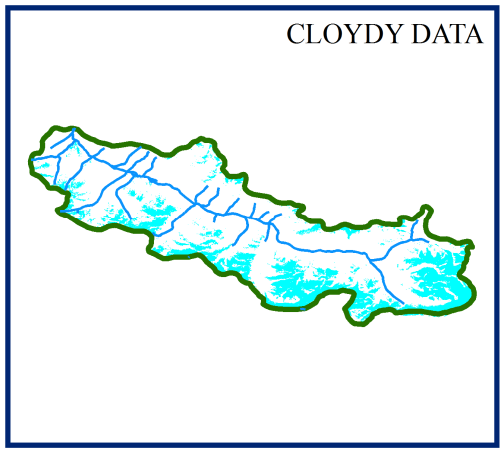


DATA USED
21 DEC 2011
31 DEC 2011

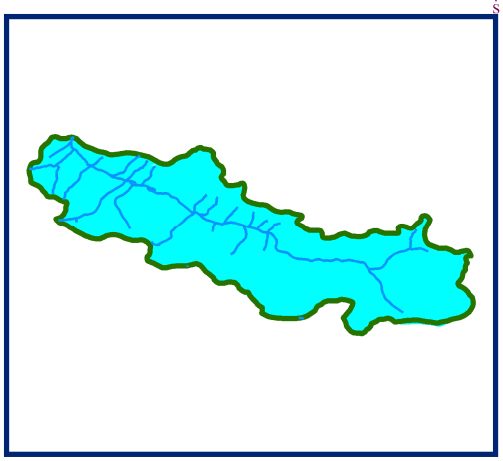
SNOW

0 5 10 20 30 40
Kilometers

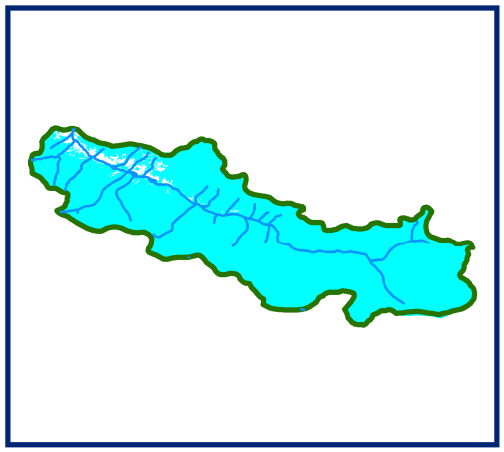
SNOW COVER MAP : BASPA BASIN



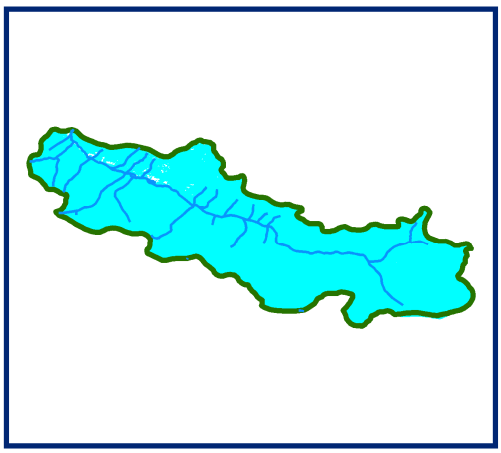
02 Jan 2012



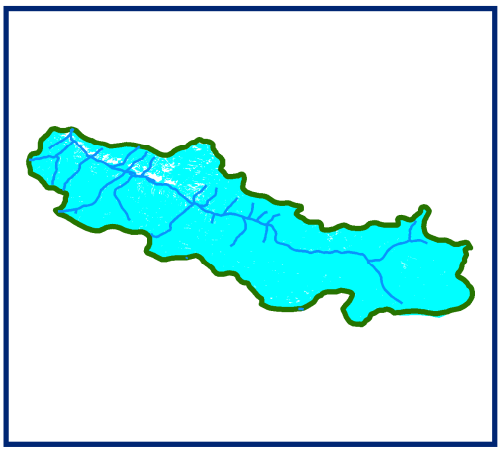
10 Jan 2012



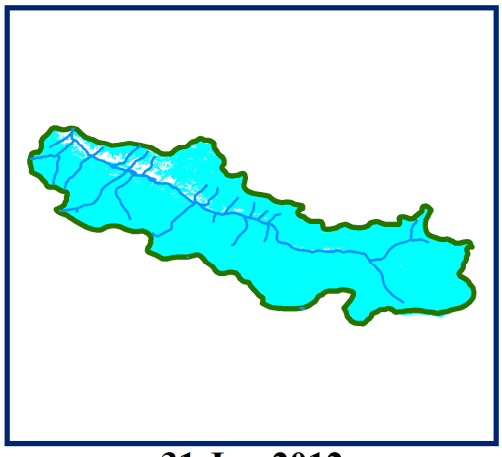
12 Dec 2012



19 Jan 2012



21 Jan 2012

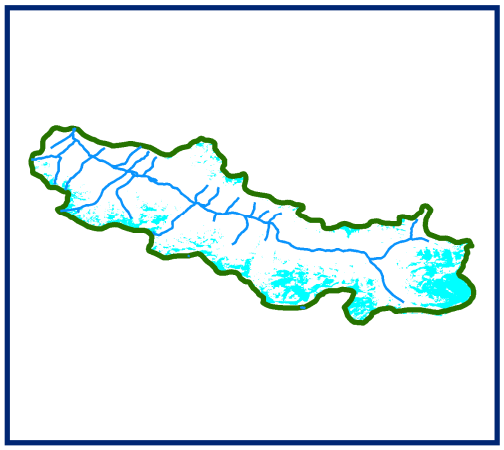


31 Jan 2012

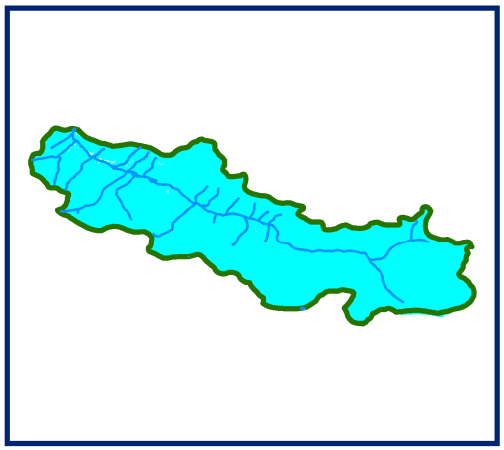
SNOW

0 2.5 5 10 15 20
Kilometers

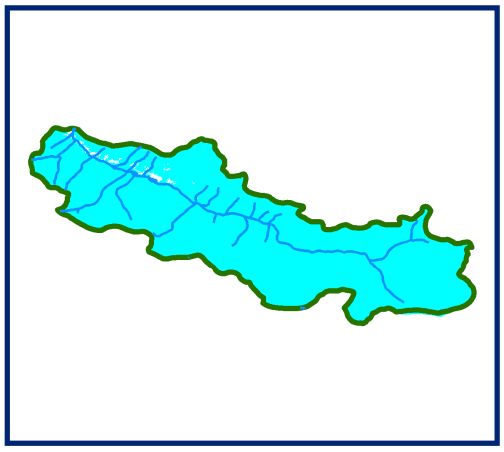
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
02 JAN 2012
10 JAN 2012



DATA USED
12 JAN 2012
19 JAN 2012



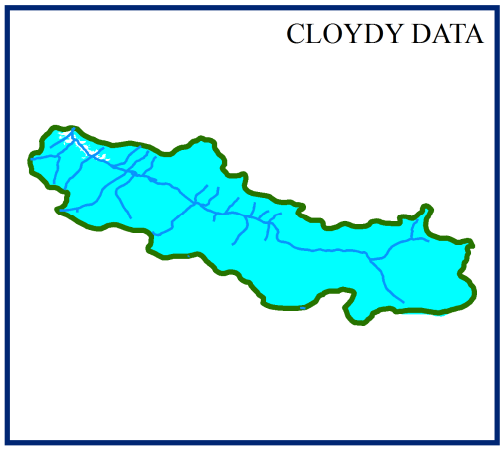
DATA USED
21 JAN 2012
31 JAN 2012

SNOW

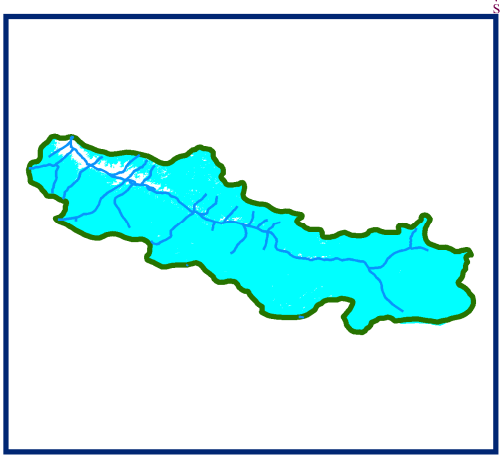
0 5 10 20 30 40
Kilometers

SNOW COVER MAP : BASPA BASIN

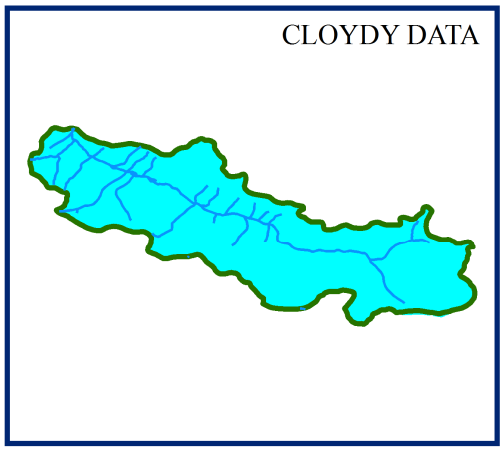




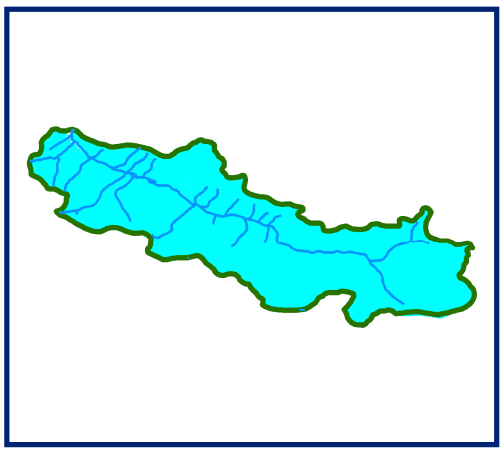
02 Feb 2012



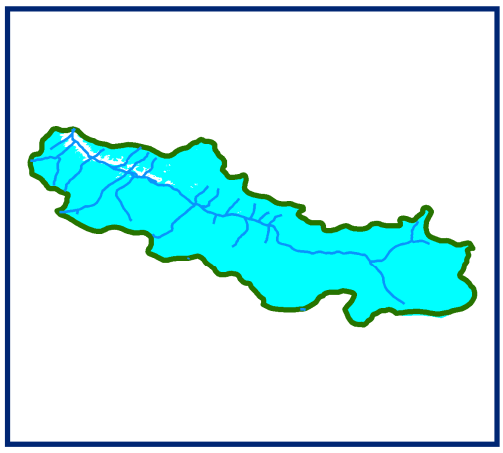
10 Feb 2012



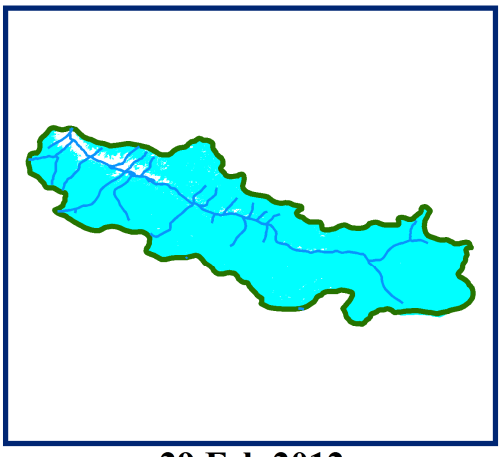
12 Feb 2012



17 Feb 2012



26 Feb 2012

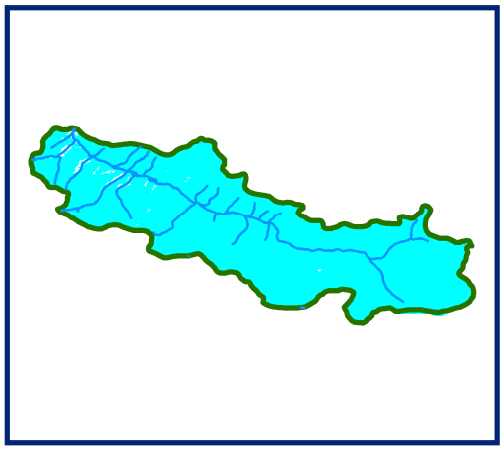


29 Feb 2012

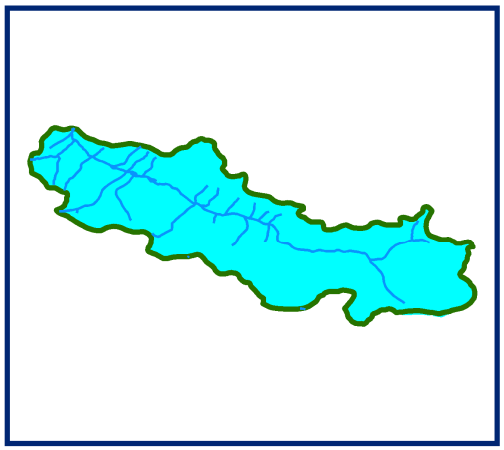
SNOW

0 2.5 5 10 15 20
Kilometers

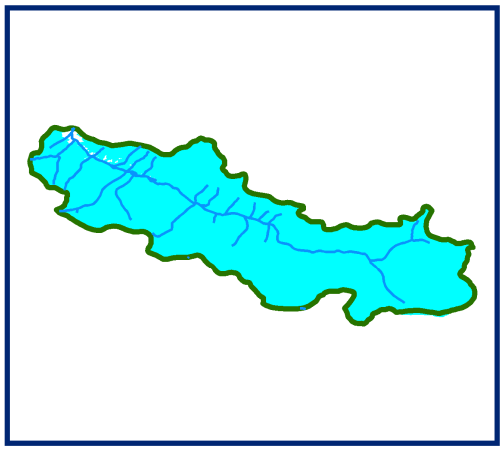
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
02 FEB 2012
10 FEB 2012



DATA USED
12 FEB 2012
17 FEB 2012

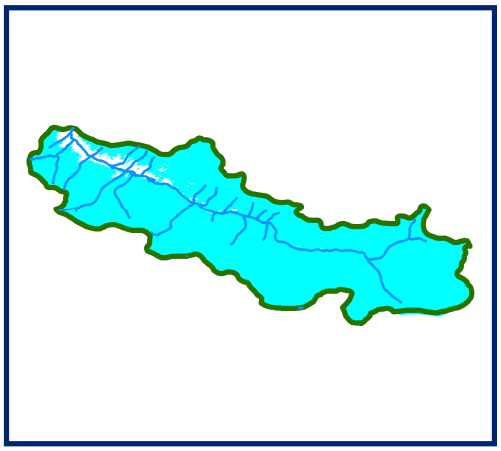


DATA USED
26 FEB 2012
29 FEB 2012

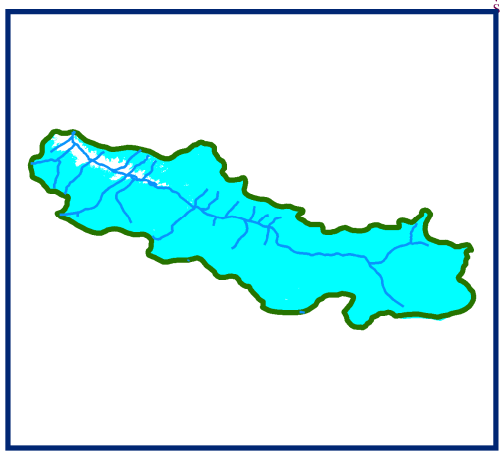
SNOW

0 5 10 20 30 40
Kilometers

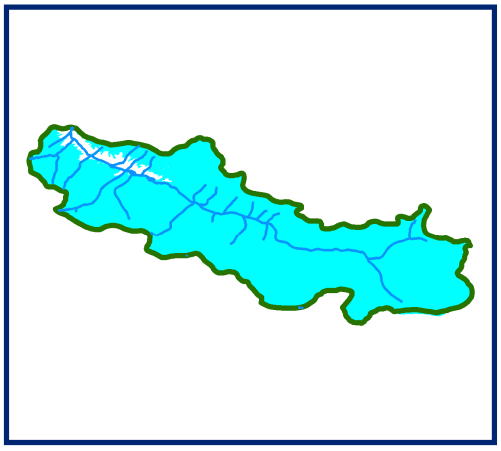
SNOW COVER MAP : BASPA BASIN



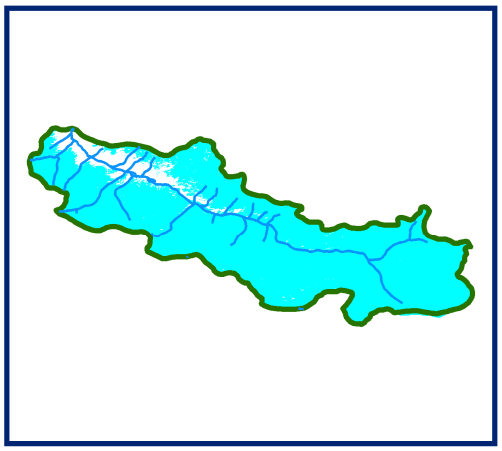
02 March 2012



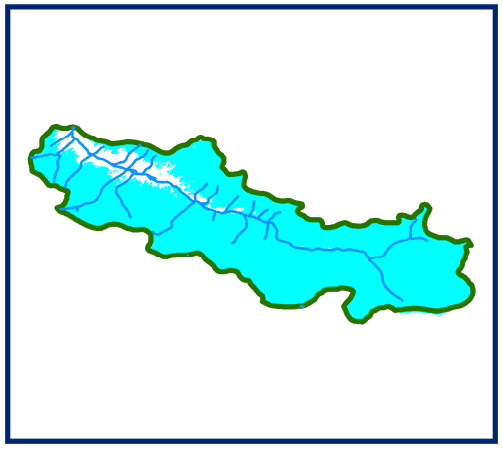
10 March 2012



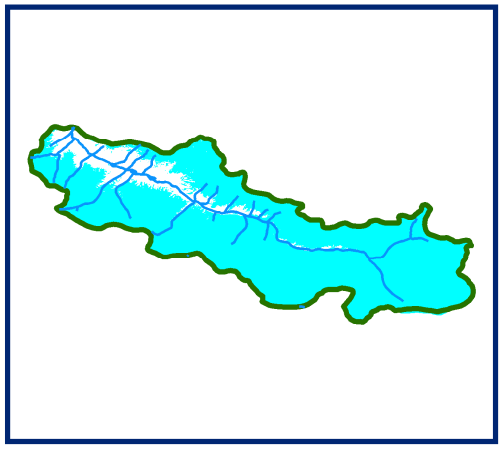
12 March 2012



19 March 2012



22 March 2012

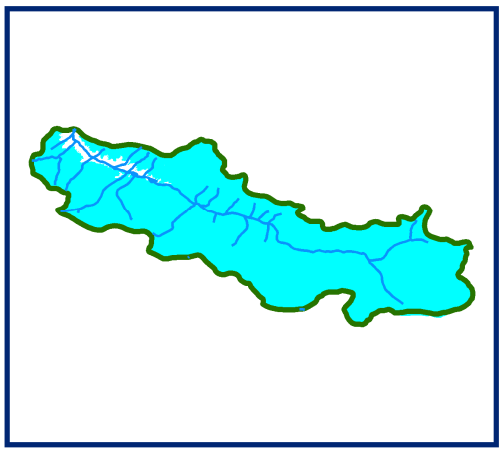


31 March 2012

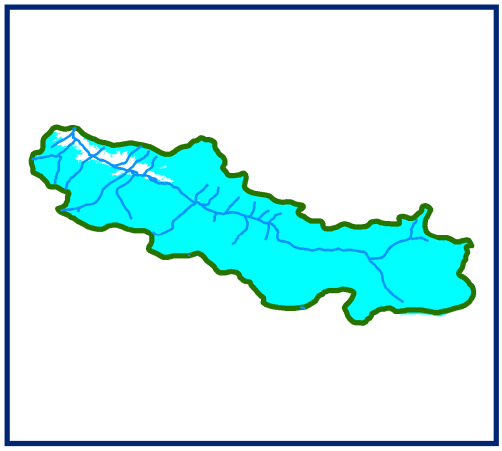
SNOW

0 2.5 5 10 15 20
Kilometers

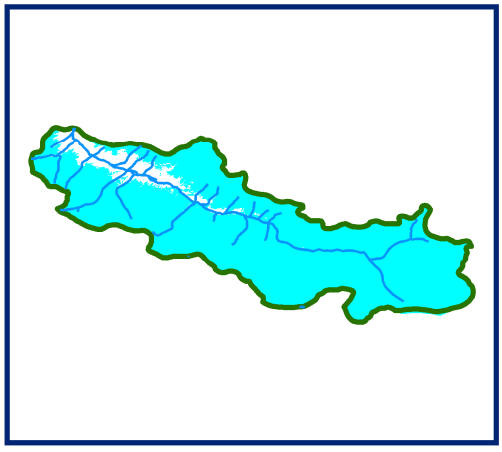
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
02 March 2012
07 March 2012
10 March 2012



DATA USED
12 March 2012
15 March 2012
19 March 2012

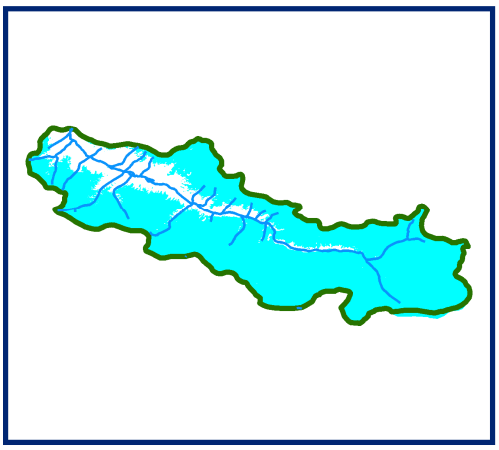


DATA USED
22 March 2012
31 March 2012

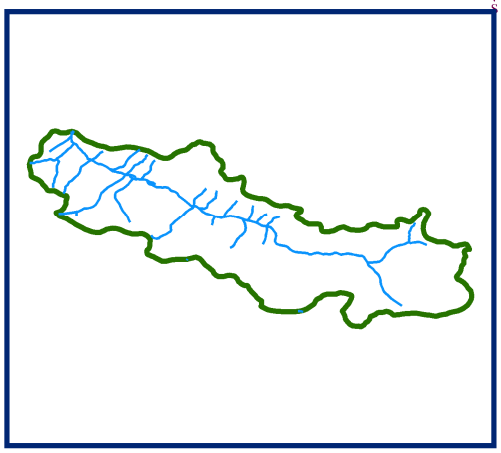
SNOW

04.59 18 27 36
Kilometers

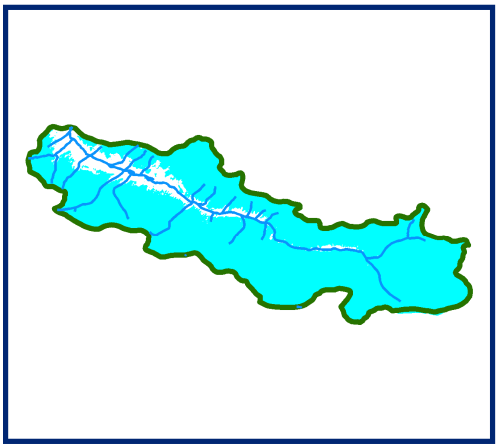
SNOW COVER MAP : BASPA BASIN



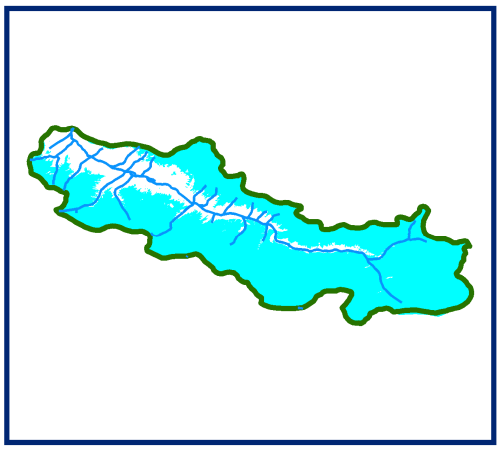
05 April 2012



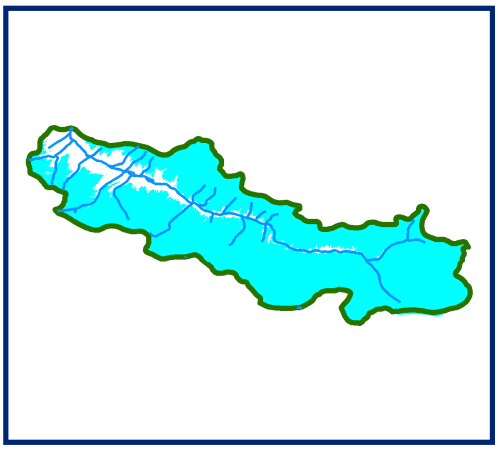
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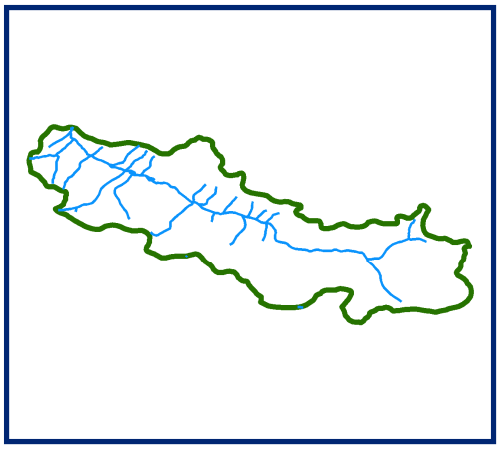
15 April 2012



20 April 2012



24 April 2012

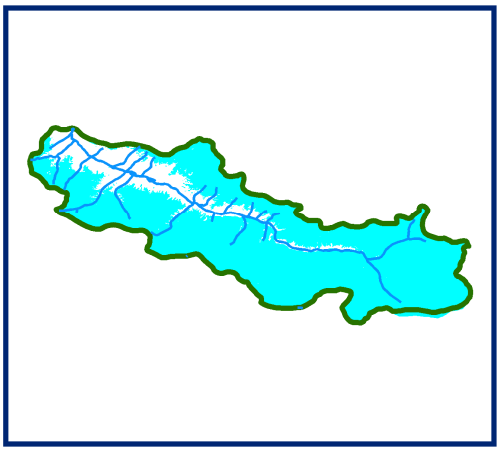


DATA NOT AVAILABLE

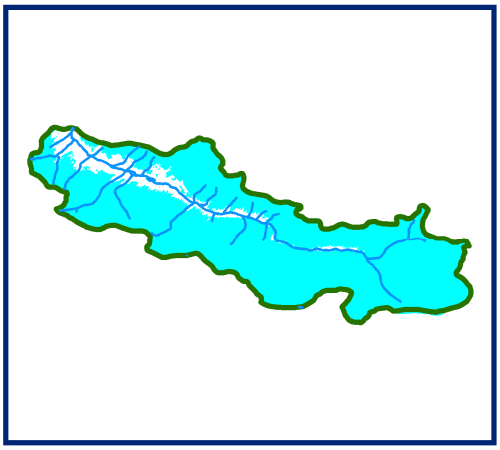
SNOW

0 2.5 5 10 15 20
Kilometers

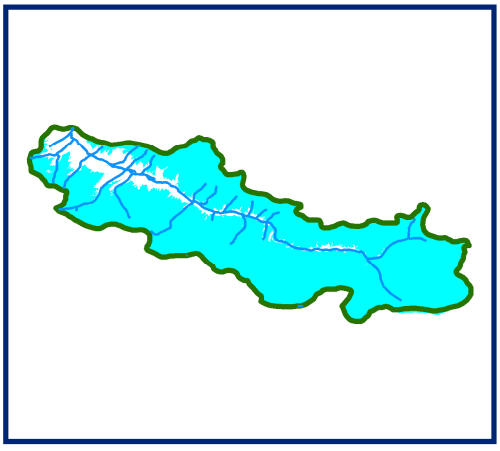
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
05 April 2012



DATA USED
15 April 2012
20 April 2012

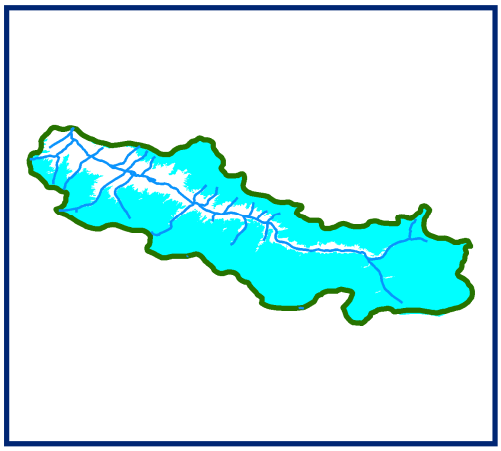


DATA USED
24 April 2012

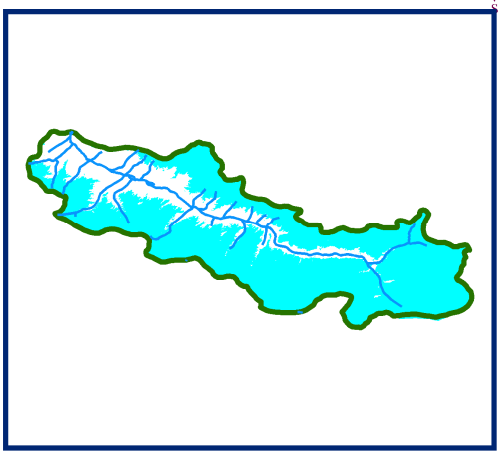
SNOW

04.59 18 27 36
Kilometers

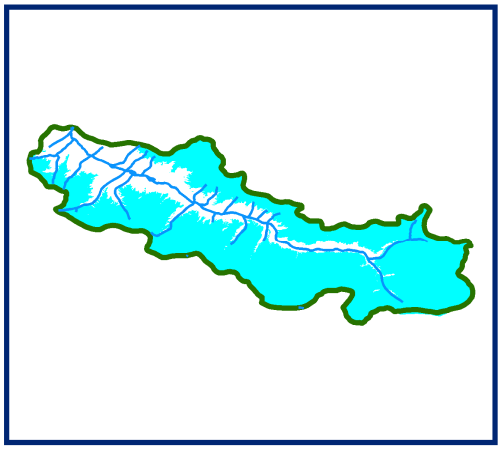
SNOW COVER MAP : BASPA BASIN



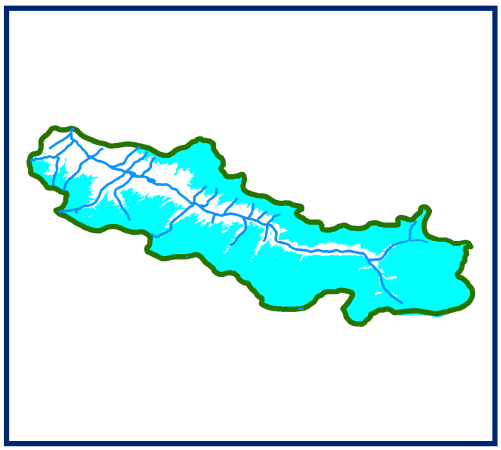
04 May 2012



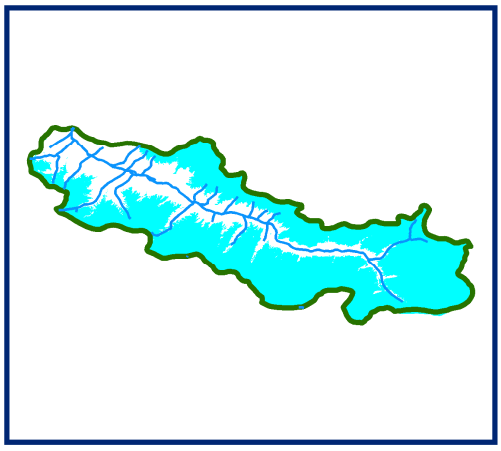
09 May 2012



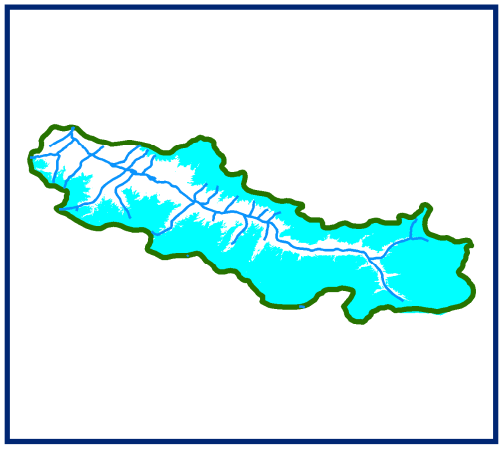
13 May 2012



14 May 2012



23 May 2012

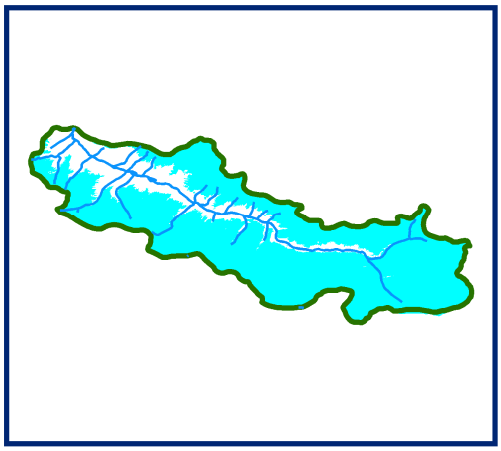


28 May 2012

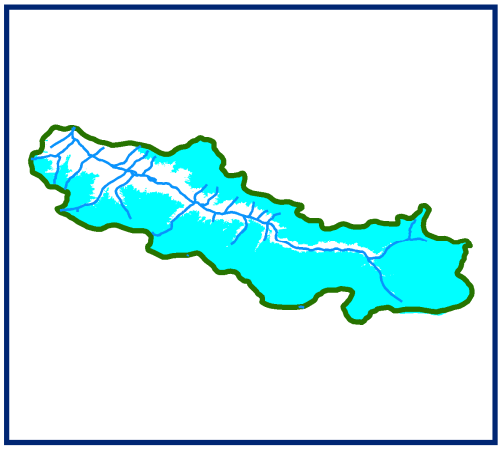
SNOW

0 2.5 5 10 15 20
Kilometers

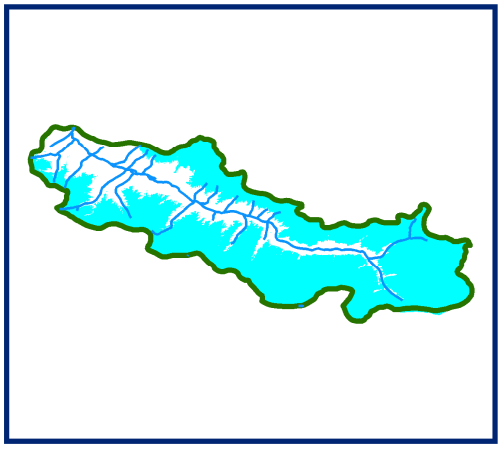
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
04 May 2012
08 May 2012
09 May 2012



DATA USED
13 May 2012
14 May 2012

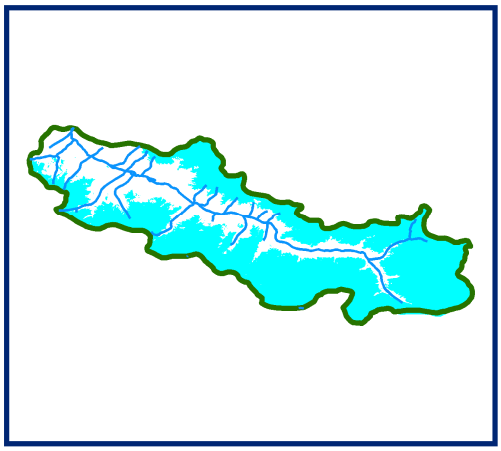


DATA USED
23 May 2012
28 May 2012

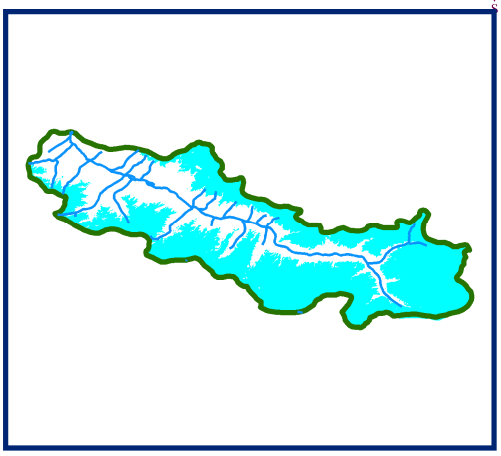
SNOW

04.59 18 27 36
Kilometers

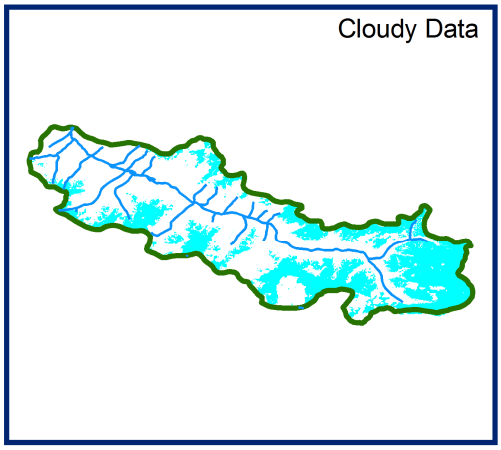
SNOW COVER MAP : BASPA BASIN



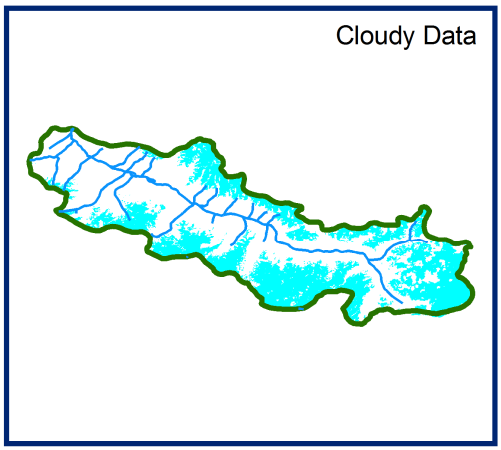
01 June 2012



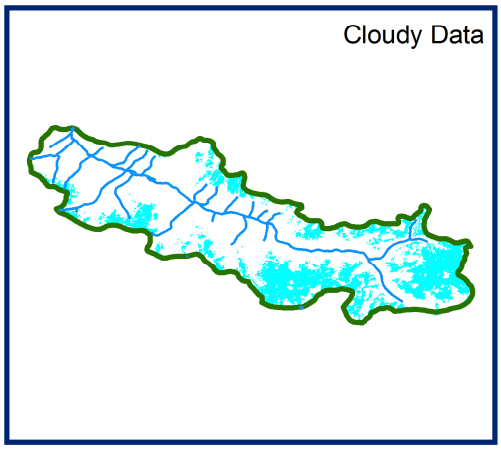
02 June 2012



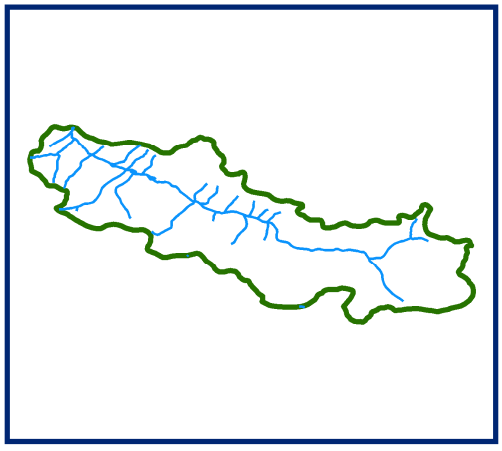
18 June 2012



19 June 2012



23 June 2012

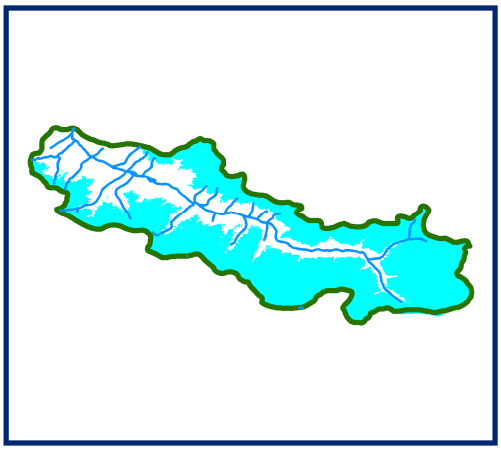


DATA NOT AVAILABLE

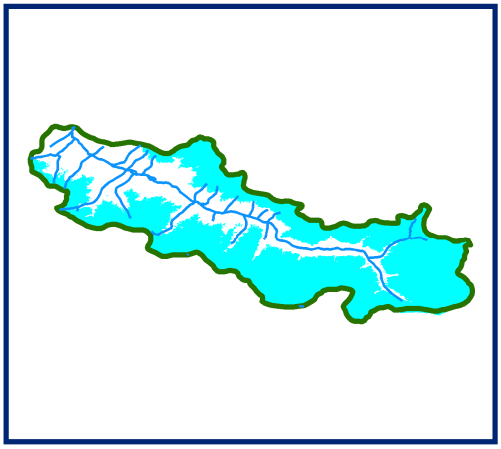
SNOW

0 2.5 5 10 15 20
Kilometers

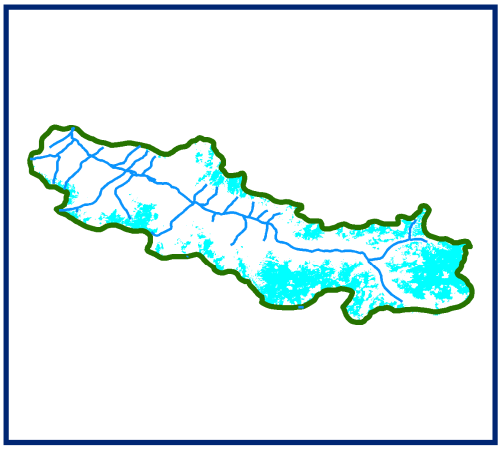
10 DAILY SNOW COVER MAP: BASPA BASIN



DATA USED
01 June 2012
02 June 2012



DATA USED
18 June 2012
19 June 2012



DATA USED
23 June 2012

SNOW

04.59 18 27 36
Kilometers

JIWA BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: JIWA **BASIN AREA: 1445 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	88	6	Clear	3.	18 Oct 2011	158	11	Clear
2.	12 Oct 2011	91	6	Clear	4.	27 Oct 2011	232	16	Clear
November 2011									
1.	05 Nov 2011	177	12	Clear	2.	05 Nov 2011	111	8	Clear
December 2011									
1.	04 Dec 2011	96	7	Clear	6.	19 Dec 2011	326	23	Clear
2.	14 Dec 2011	445	31	Clear	7.	21 Dec 2011	357	25	Clear
3.	16 Dec 2011	378	26	Clear	8.	23 Dec 2011	284	20	Clear
4.	17 Dec 2011	366	25	Clear	9.	28 Dec 2011	268	19	Clear
5.	19 Dec 2011	320	22	Clear	10	31 Dec 2011	287	20	Clear
January2012									
1.	02 Jan2012	366	25	80%	8.	24 Jan2012	1057	73	Clear
2.	09 Jan2012	1417	98	70%	9.	28 Jan2012	934	65	15%
3.	10 Jan2012	1339	93	Clear	10.	29 Jan2012	884	61	Clear
4.	12 Jan2012	916	63	Data problem	11.	29 Jan2012	1196	83	Less
5.	14 Jan2012	1196	83	10%		31 Jan2012	842	58	Clear
6.	17 Jan2012	1056	73	Less					
7.	19 Jan2012	1004	69	<5%					
8.	21 Jan2012	1106	77	Clear					
February 2012									
1.	02 Feb 2012	773	53	20%	7.	27 Feb 2012	699	48	Less
2.	10 Feb 2012	973	67	Clear	8.	29 Feb 2012	706	49	Clear
3.	12 Feb 2012	1115	77	80%					
4.	17 Feb 2012	1003	69	Clear					
5.	22 Feb 2012	686	47	Clear					
6.	26 Feb 2012	911	63	Clear					
March 2012									
1.	02 March 2012	740	51	Clear	5.	12 March 2012	737	51	Clear
2.	07 March 2012	924	64	Clear	6.	19 March 2012	612	42	Clear
3.	10 March 2012	607	42	5%	7.	21 March 2012	620	43	5%
4.	12 March 2012	735	51	Clear	8.	22 March 2012	614	42	Clear
5.	12 March 2012	615	43	Clear	9.	31 March 2012	581	40	Clear

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
April 2012									
1.	05 April 2012	582	40	20%	3.	24 April 2012	579	40	5%
2.	15 April 2012	629	44	20%					
May 2012									
1.	03 May 2012	551	38	5%	5.	13 May 2012	491	34	5%
2.	04 May 2012	535	37	5%	6.	18 May 2012	438	30	30%
3.	08 May 2012	697	48	5%	7.	23 May 2012	431	30	Clear
4.	09 May 2012	471	33	10%	8.	28 May 2012	351	24	25%
June 2012									
1.	01 June 2012	390	27	Clear	5.	09 June 2012	254	18	40%
2.	02 June 2012	521	36	45%	6.	14 June 2012	124	9	50%
3.	04 June 2012	77	5	95%	7.	18 June 2012	50	3	100%
4.	09 June 2012	250	17	40%	8.	23 June 2012	185	13	30%

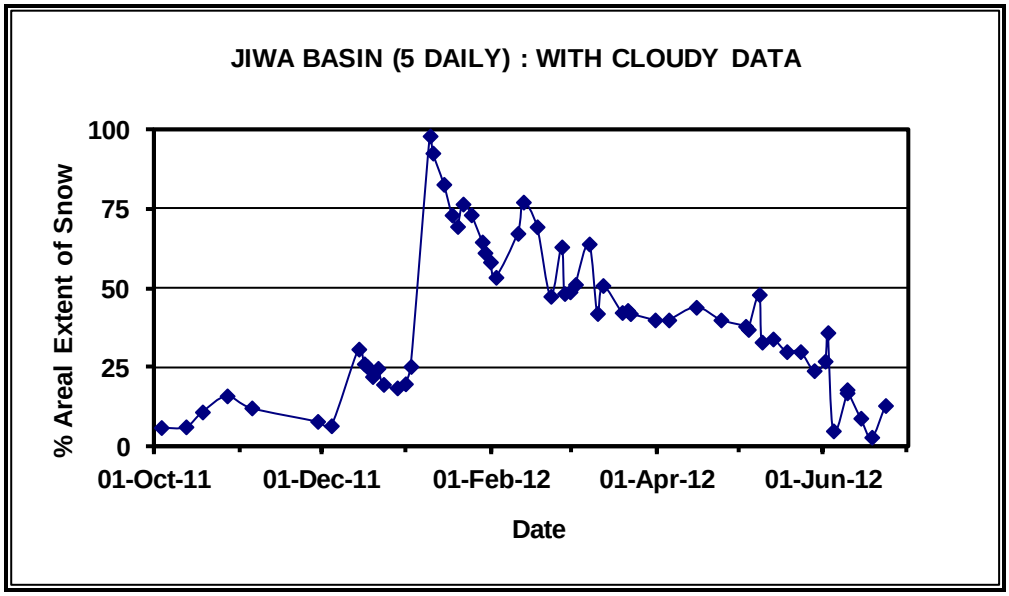
AREAL EXTENT OF SNOW (10 DAILY)

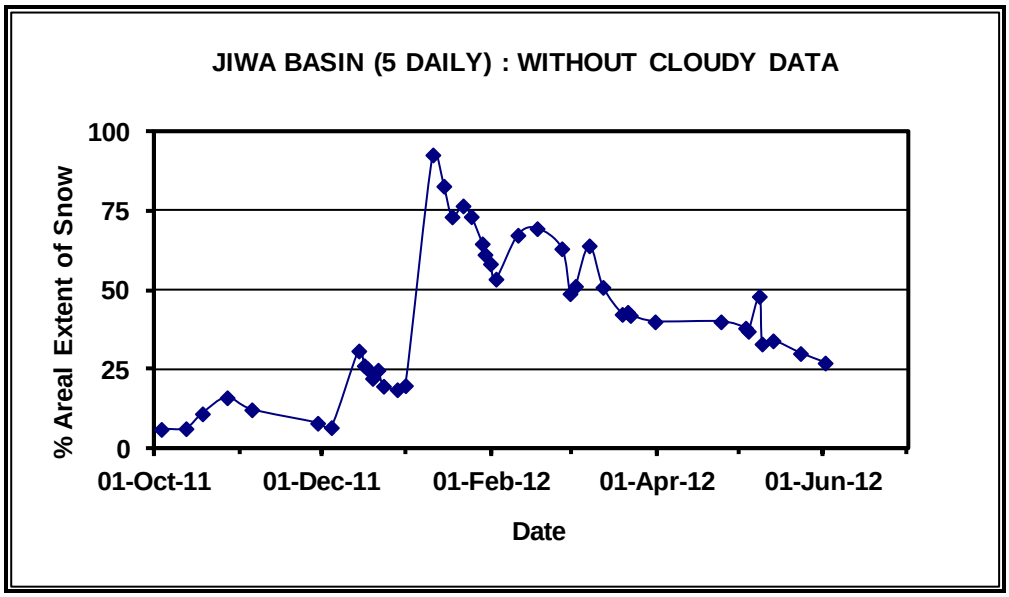
BASIN NAME: JIWA **BASIN AREA: 1445 sq km**

S. No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	180	12	Clear	4.	27 Oct 2011	232	16	Clear
2.	12 Oct 2011	114	8	Clear					
3.	18 Oct 2011			Clear					
November 2011									
1.	05 Nov 2011	177	12	Clear					
December 2011									
1.	04 Dec 2011	96	7	Clear	5.	23 Dec 2011	274	19	Clear
2.	14 Dec 2011	383	27	Clear	6.	28 Dec 2011			Clear
3.	16 Dec 2011			Clear	7.	31 Dec 2011			
4.	19 Dec 2011			Clear					
January 2012									
1.	02 Jan 2012	1339	93	80%	7.	21 Jan 2012	1113	77	Clear
2.	09 Jan 2012			70%	8.	24 Jan 2012			Clear
3.	10 Jan 2012			Clear	9.	31 Jan 2012			Clear
4.	14 Jan 2012	1231	85	10%					
5.	17 Jan 2012			Less					
6.	19 Jan 2012			<5%					
February 2012									
1.	02 Feb 2012	937	65	20%	4.	22 Feb 2012	784	54	Clear
2.	10 Feb 2012			Clear	5.	26 Feb 2012			Clear
3.	17 Feb 2012	1003	69	Clear	6.	29 Feb 2012			Clear
March 2012									
1.	02 mar 2012	946	65	Clear	4.	12 mar 2012	725	50	Clear
2.	07 mar 2012			Clear	5.	19 mar 2012			Clear
3.	10 mar 2012			5%	6.	22 mar 2012	626	43	Clear
					7.	31 mar 2012			Clear
April 2012									
1.	05 April 2012	582	40	20%	3.	24 April 2012	579	40	5%
2.	15 April 2012	629	44	20%					

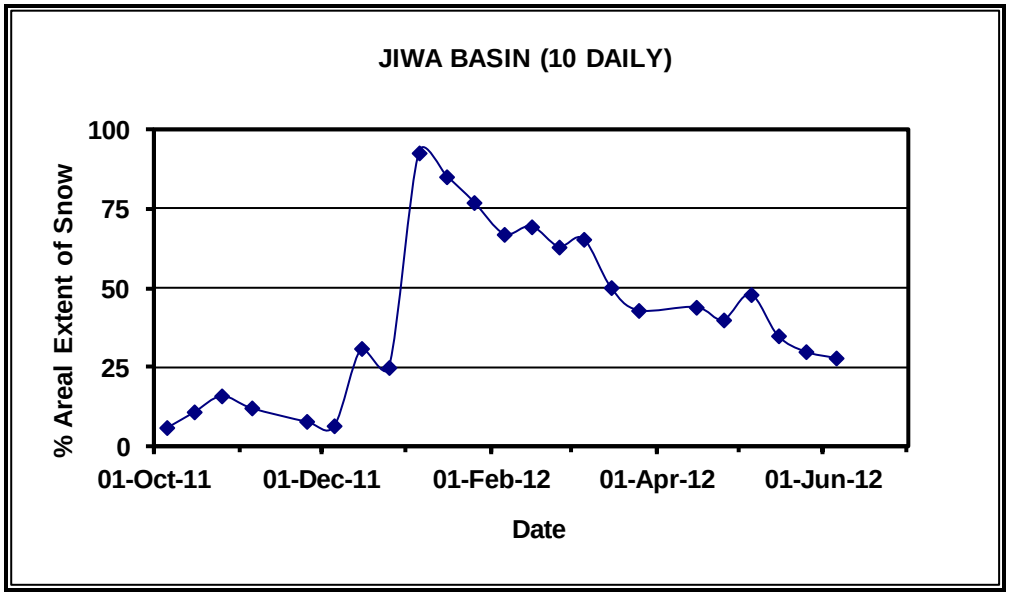
S. No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
May 2012									
1.	04 May 2012	540	37	5%	5.	23 May 2012	432	30	Clear
2.	09 May 2012			10%	6.	28 May 2012			25%
3.	13 May 2012	504	35	5%					
4.	18 May 2012			30%					
June 2012									
1.	01 June 2012	404	28	Clear	3.	14 June 2012	124	9	50%
2.	09 June 2012			40%	4.	23 June 2012	185	13	30%

Snow cover depletion curve



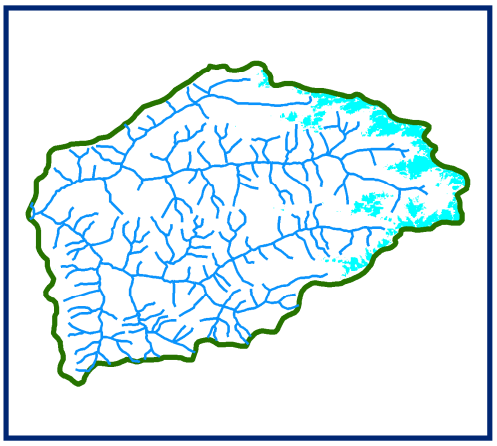


Snow cover depletion curve

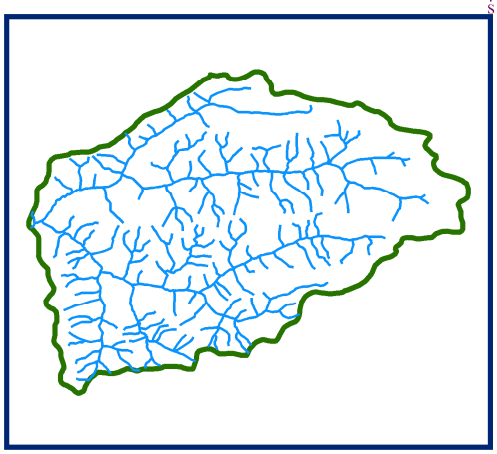


SNOW COVER MAPS

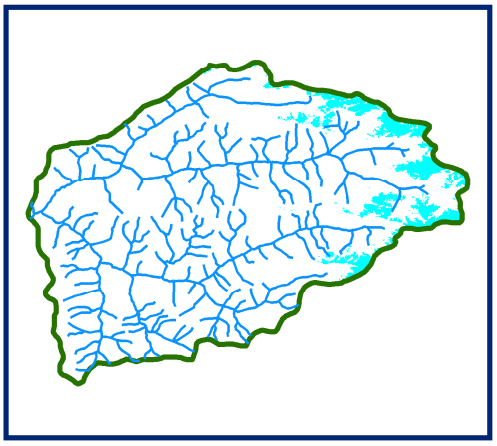
SNOW COVER MAP : JIWA BASIN



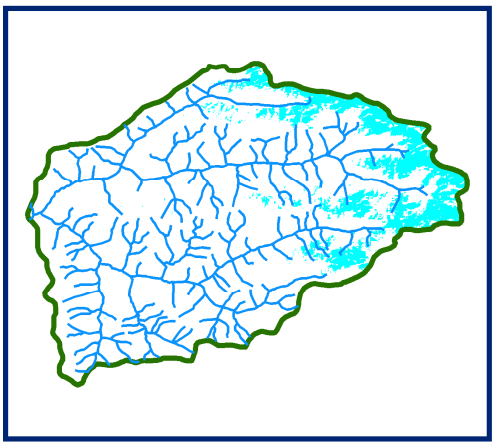
03 Oct 2011



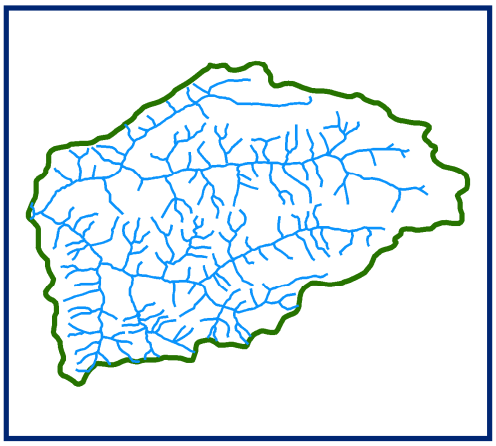
DATA NOT AVAILABLE



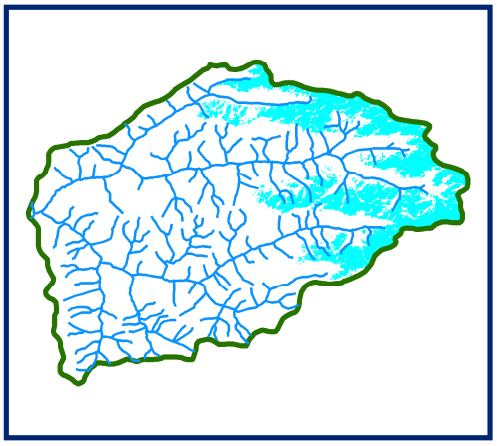
12 Oct 2011



18 Oct 2011



DATA NOT AVAILABLE

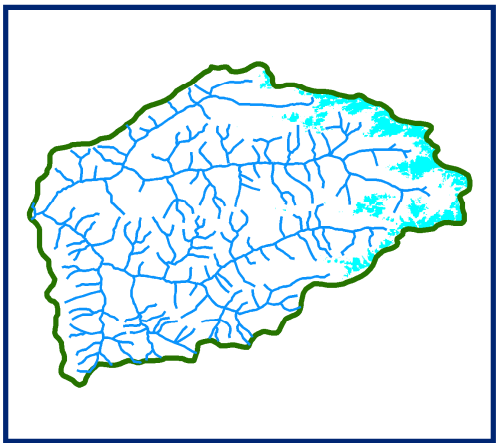


27 Oct 2011

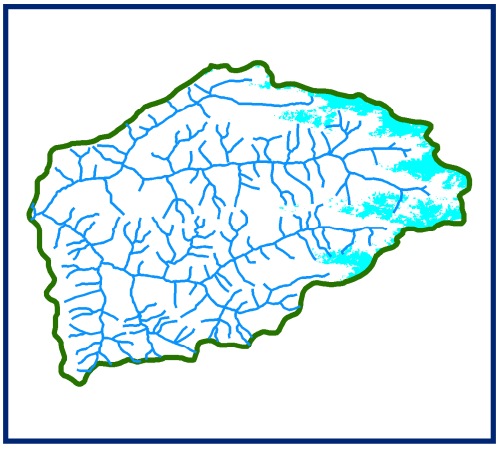
SNOW

024 8 1216
Kilometers

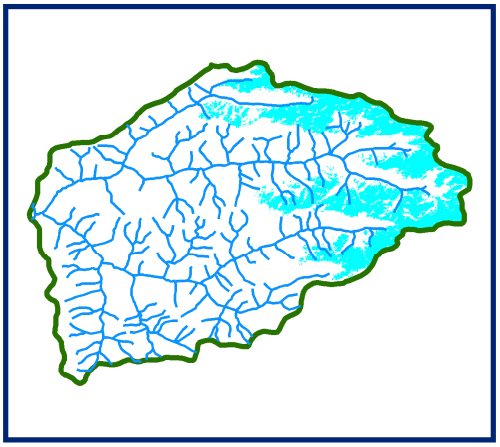
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
03 OCT 2011



DATA USED
12 OCT 2011
18 OCT 2011

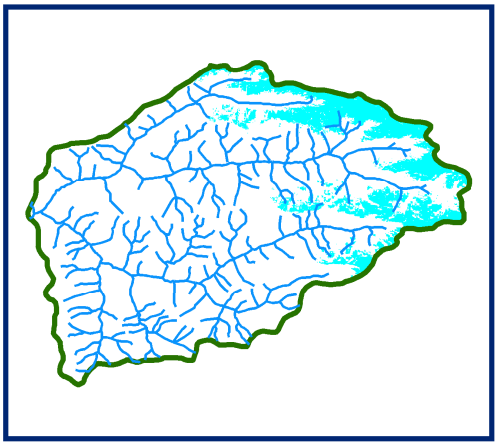


DATA USED
27 OCT 2011

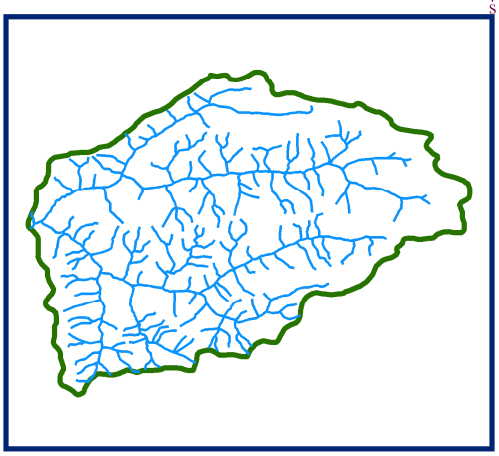
SNOW

03.57 14 21 28
Kilometers

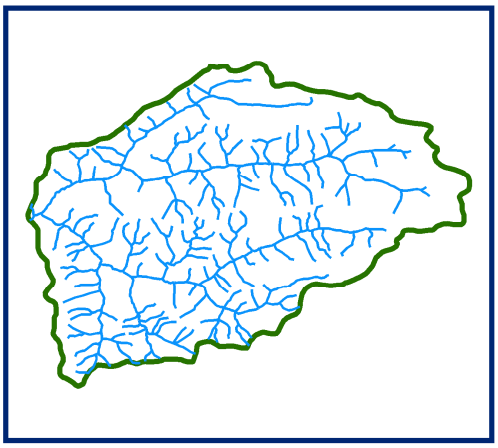
SNOW COVER MAP : JIWA BASIN



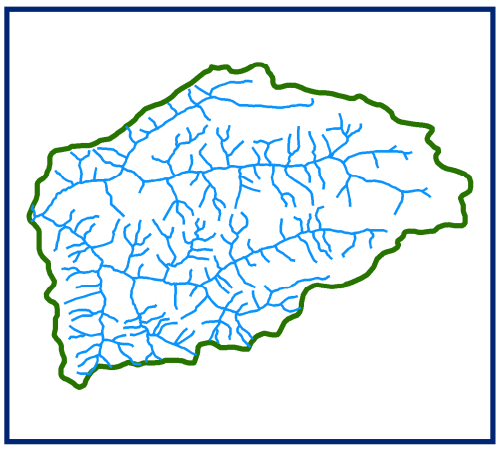
05 Nov 2011



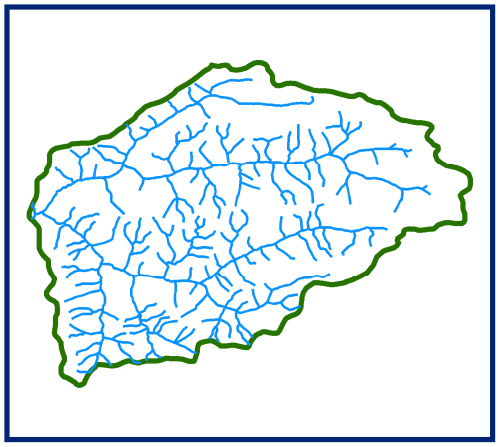
DATA NOT AVAILABLE



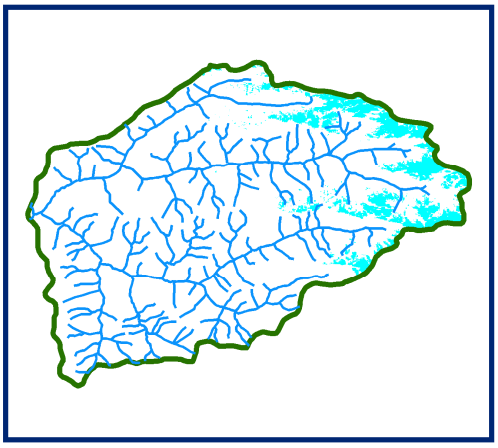
DATA NOT AVAILABLE



DATA NOT AVAILABLE



DATA NOT AVAILABLE

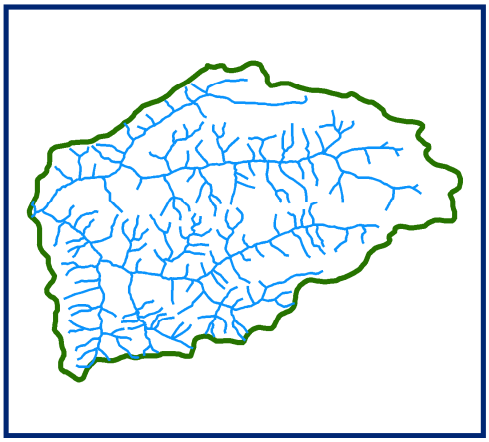


29 Nov 2011

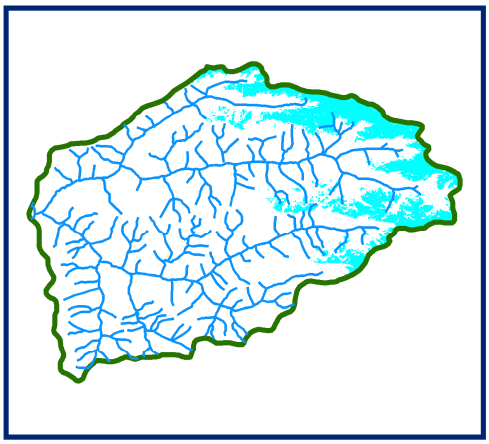
SNOW

024 8 1216
Kilometers

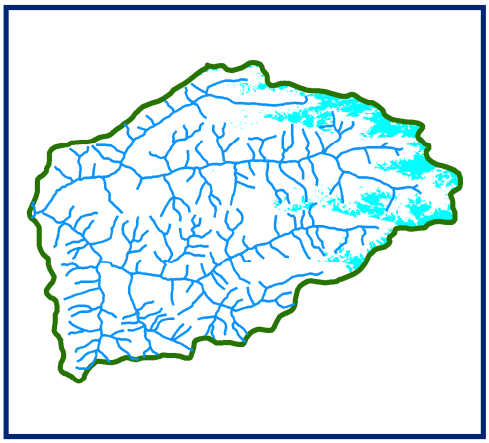
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
DATA NOT AVAILABLE



DATA USED
05 NOV 2011

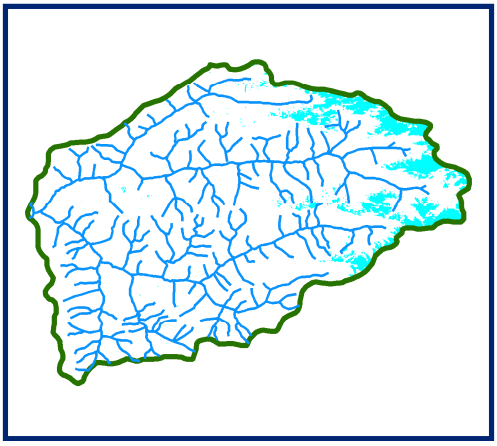


DATA USED
29 NOV 2011

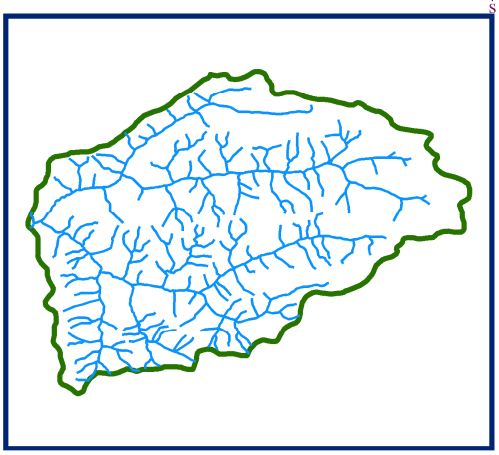
SNOW

03.57 14 21 28
Kilometers

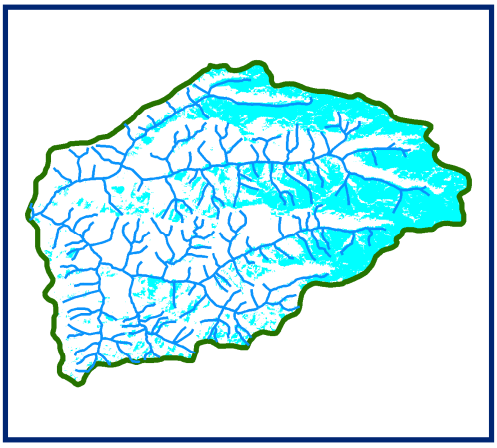
SNOW COVER MAP : JIWA BASIN



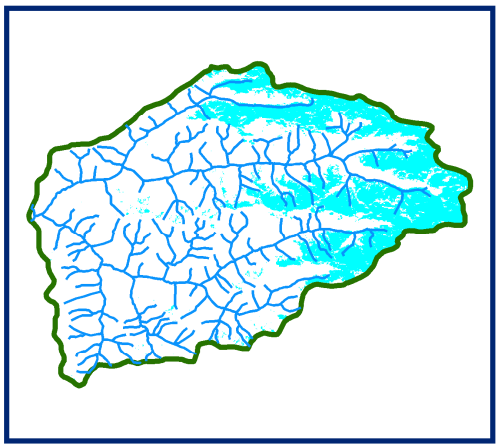
04 Dec 2011



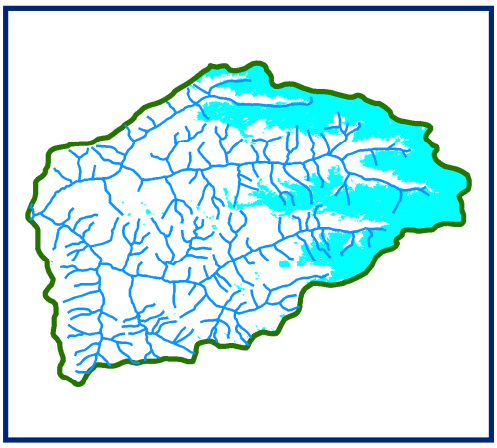
DATA NOT AVAILABLE



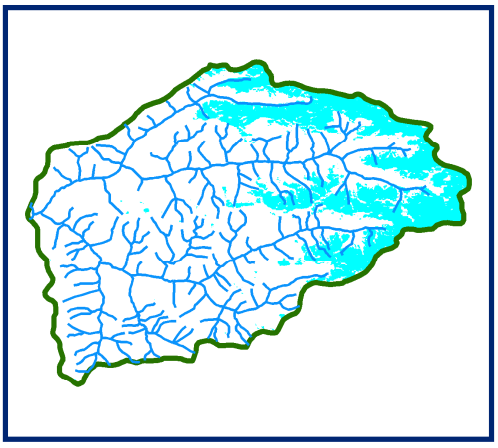
14 Dec 2011



19 Dec 2011



21 Dec 2011



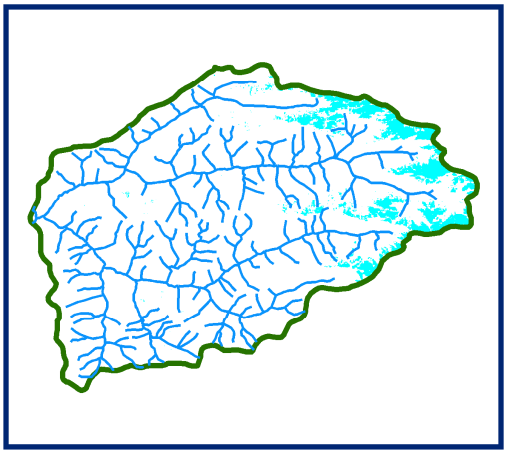
31 Dec 2011

SNOW

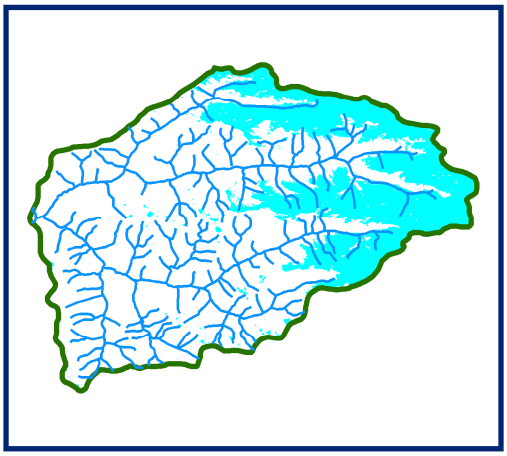
024 8 1216

Kilometers

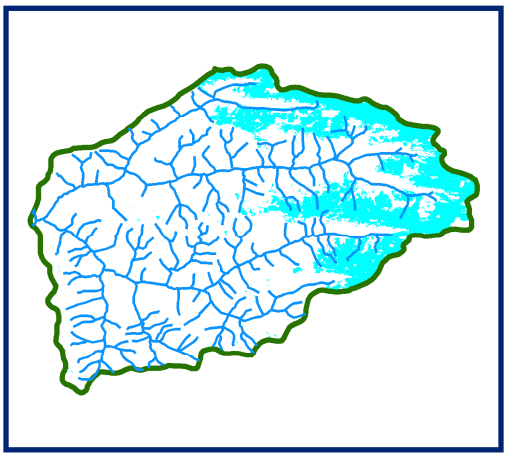
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
04 DEC 2011



DATA USED
14 DEC 2011
19 DEC 2011

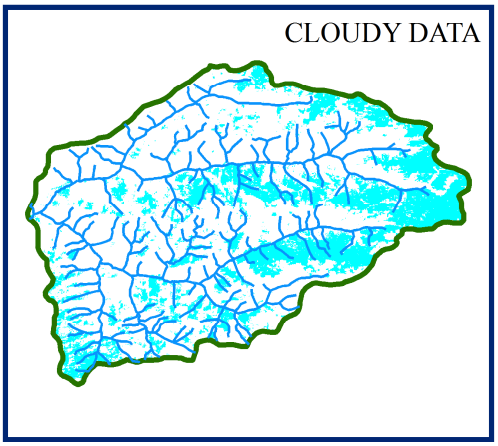


DATA USED
21 DEC 2011
28 DEC 2011

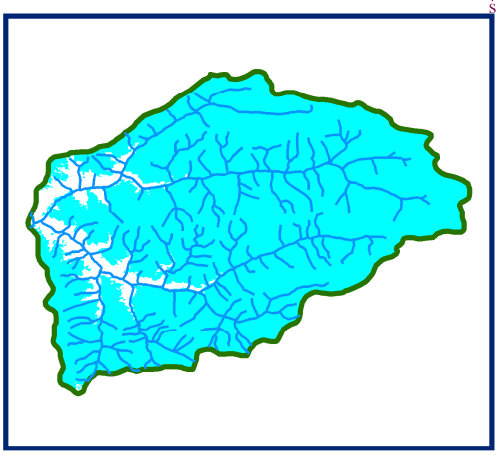
SNOW

03.57 14 21 28

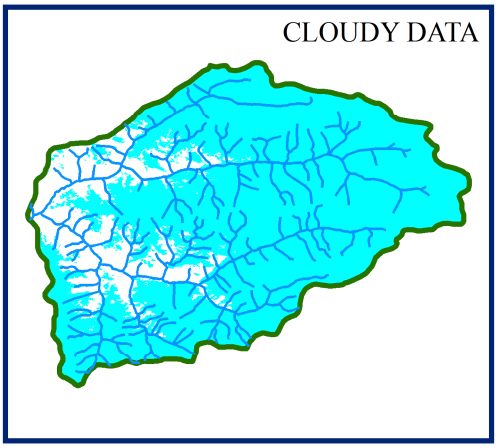
SNOW COVER MAP : JIWA BASIN



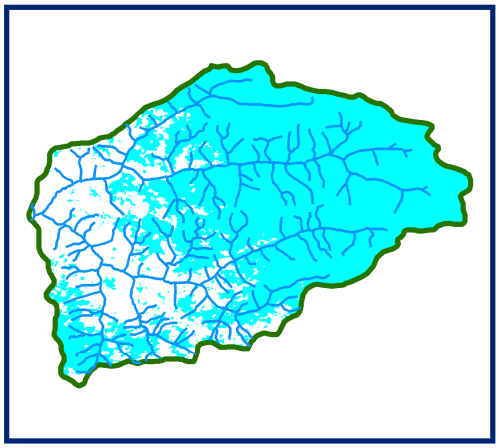
02 Jan 2012



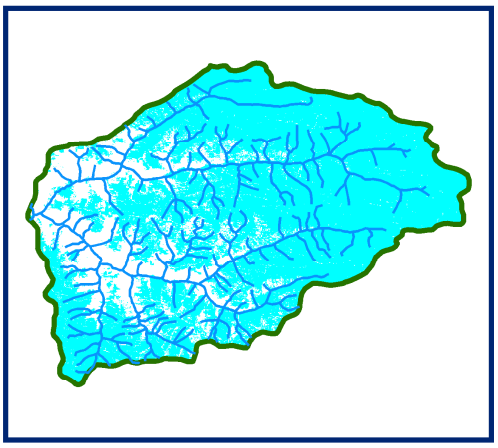
10 Jan 2012



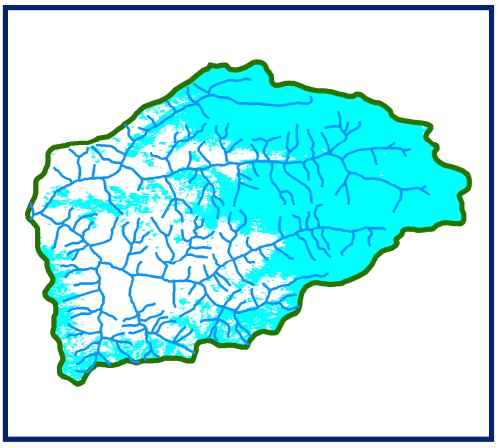
14 Jan 2012



19 Jan 2012



21 Jan 2012



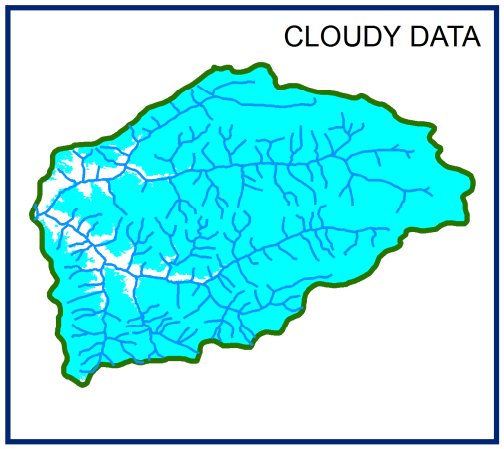
31 Jan 2012

SNOW

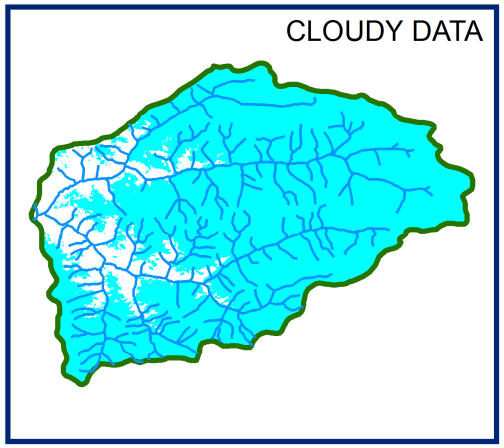
024 8 1216

Kilometers

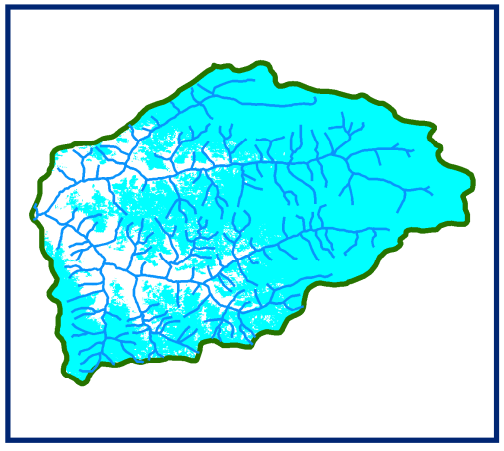
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
02 JAN 2012
10 JAN 2012



DATA USED
14 JAN 2012
19 JAN 2012

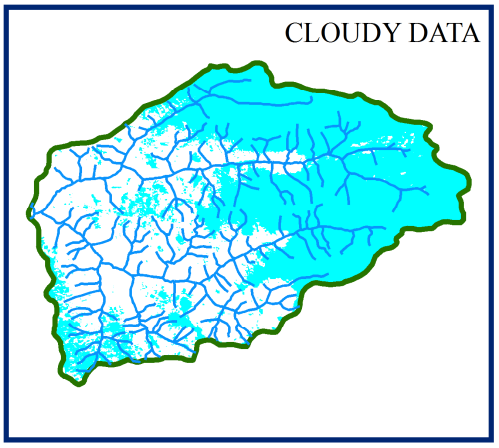


DATA USED
21 JAN 2012
31 JAN 2012

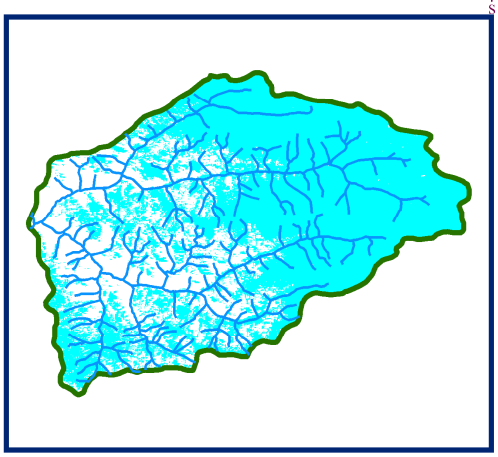
SNOW

03.57 14 21 28
Kilometers

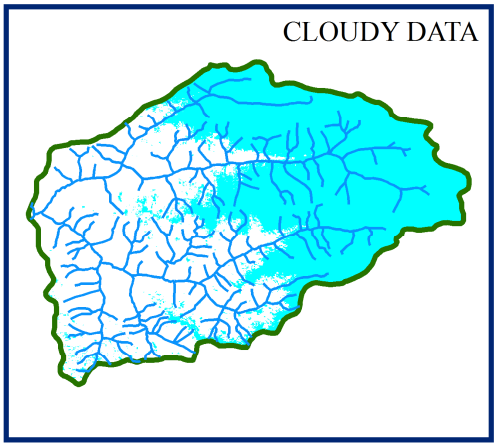
SNOW COVER MAP : JIWA BASIN



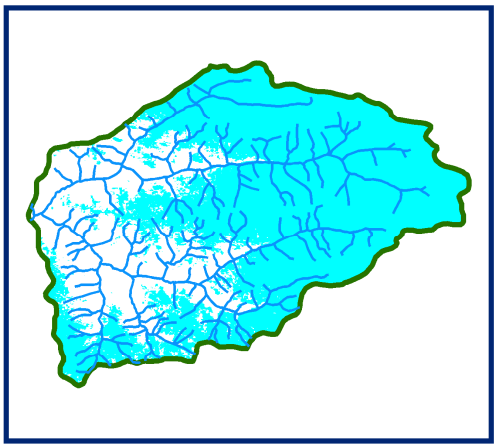
02 Feb 2012



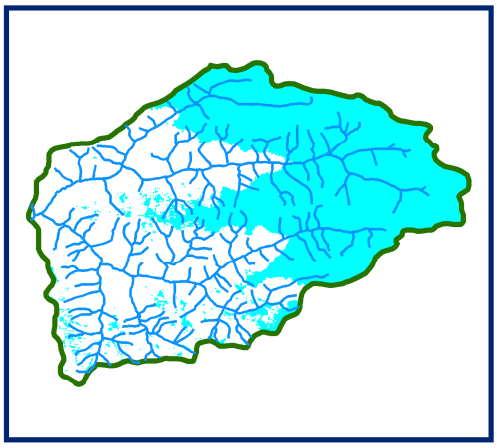
10 Feb 2012



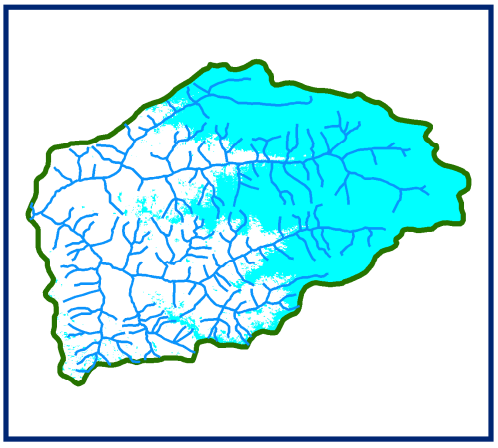
12 Feb 2012



17 Feb 2012



22 Feb 2012



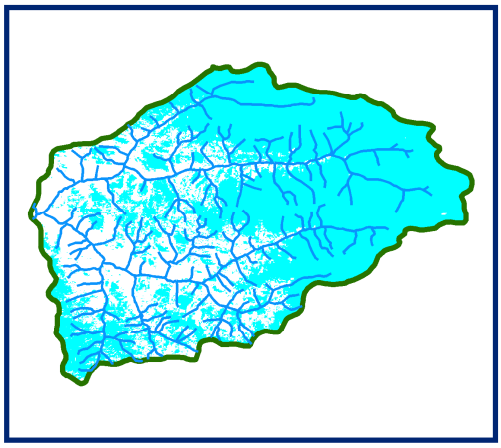
29 Feb 2012

SNOW

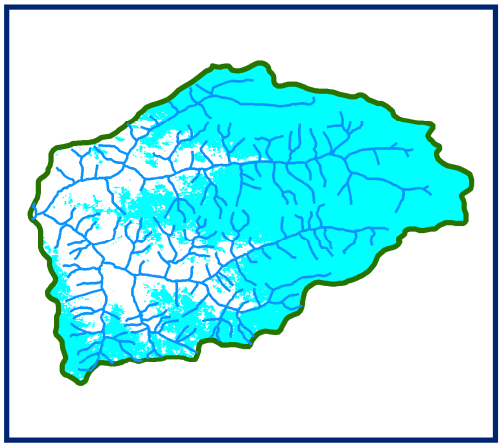
024 8 1216

Kilometers

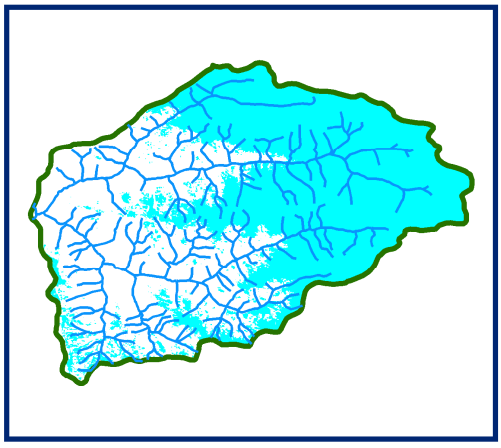
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
02 FEB 2012
10 FEB 2012



DATA USED
17 FEB 2012

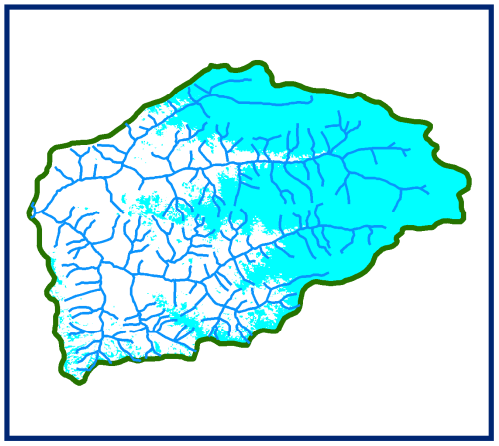


DATA USED
22 FEB 2012
29 FEB 2012

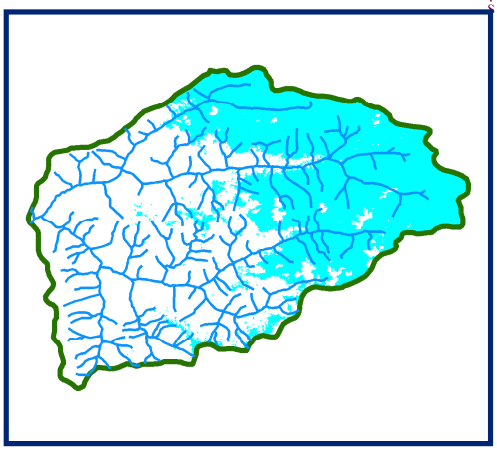
SNOW

03.57 14 21 28
Kilometers

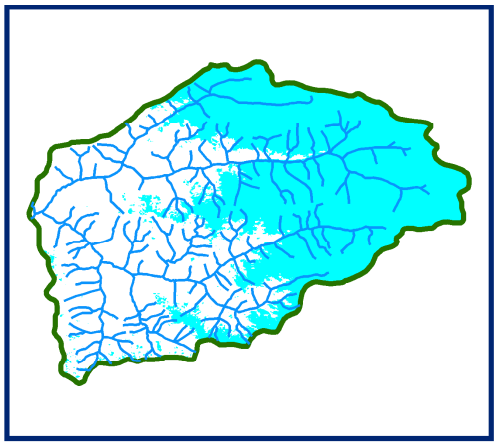
SNOW COVER MAP : JIWA BASIN



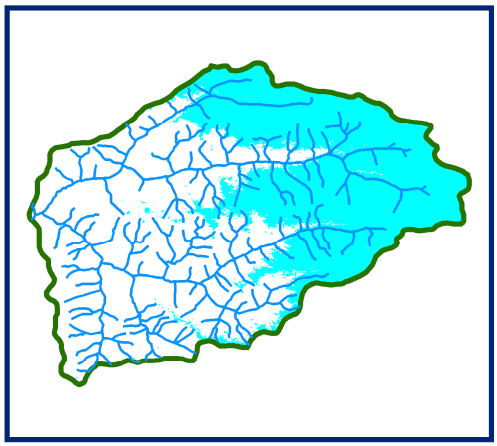
02 March 2012



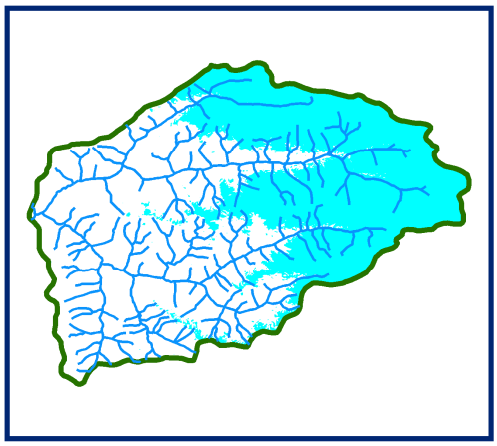
10 March 2012



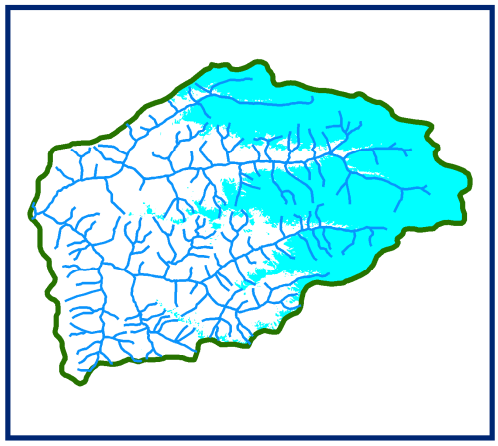
12 March 2012



19 March 2012



22 March 2012



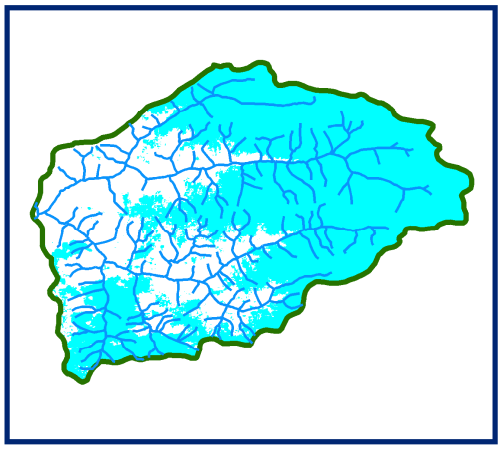
31 March 2012

SNOW

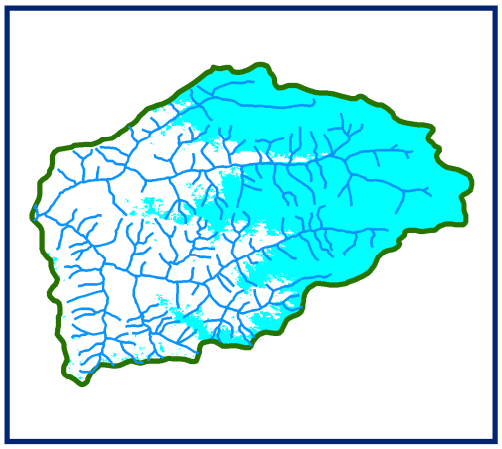
024 8 1216

Kilometers

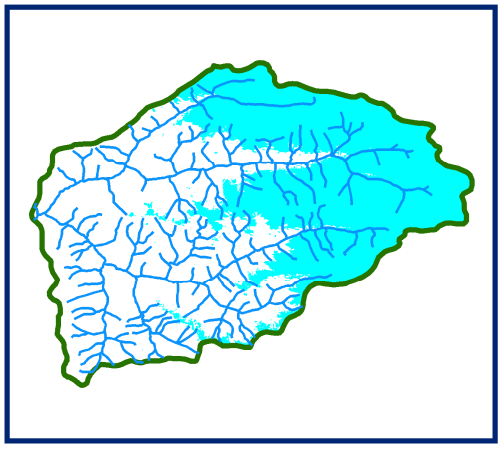
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
02 March 2012
07 March 2012
10 March 2012



DATA USED
12 March 2012
19 March 2012

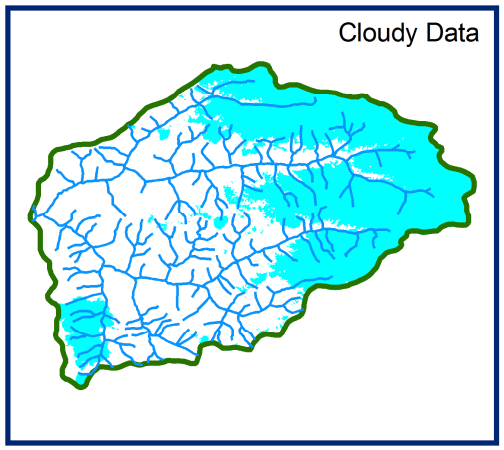


DATA USED
22 March 2012
31 March 2012

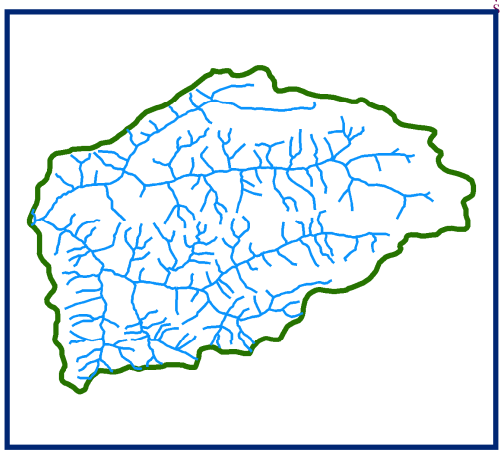
SNOW

024 8 1216
Kilometers

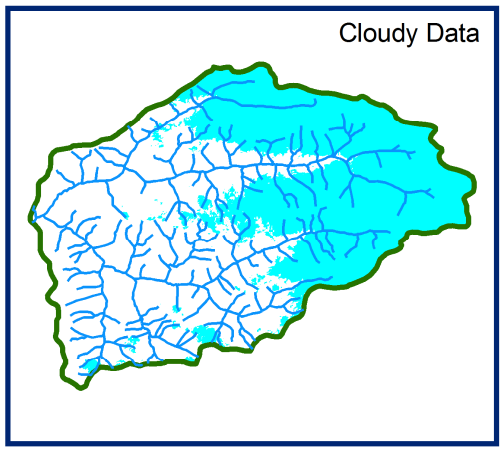
SNOW COVER MAP : JIWA BASIN



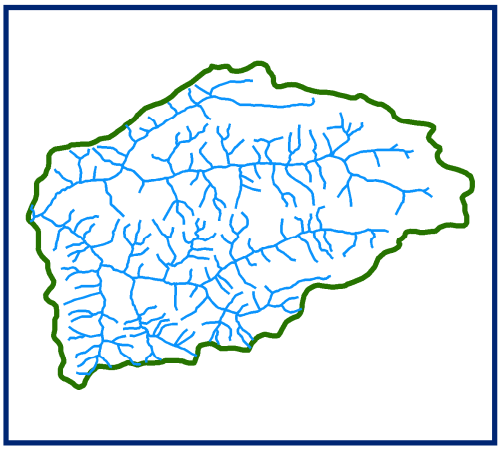
05 April 2012



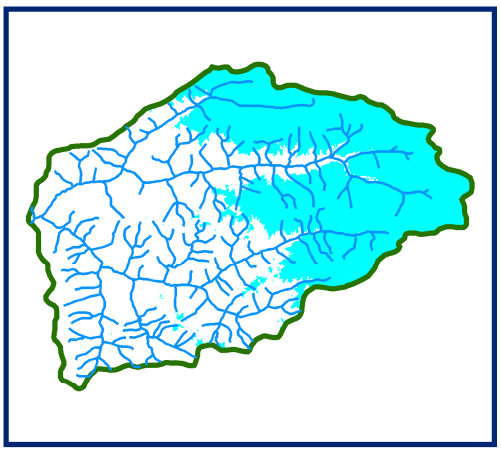
DATA NOT AVAILABLE



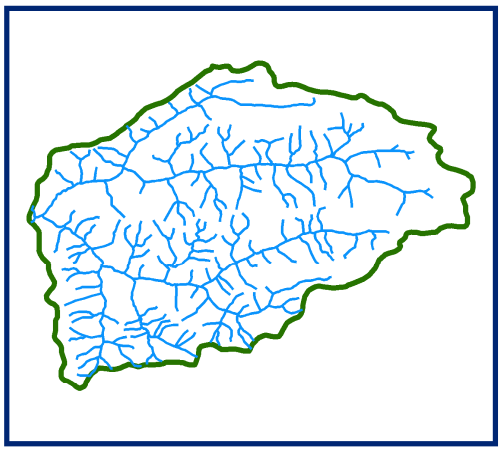
15 April 2012



DATA NOT AVAILABLE



24 April 2012

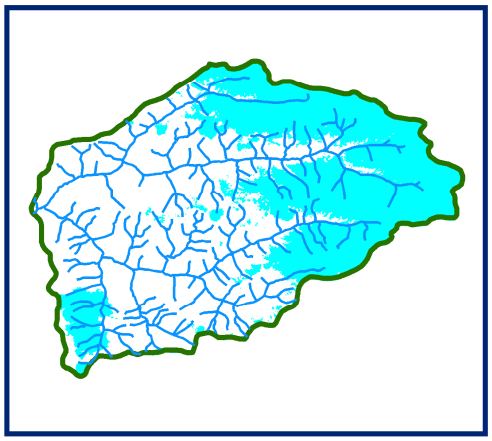


DATA NOT AVAILABLE

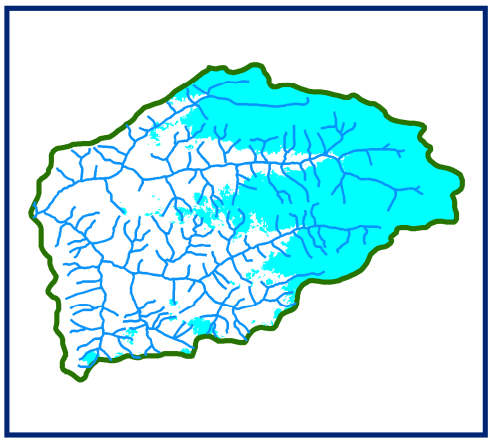
SNOW

024 8 1216
Kilometers

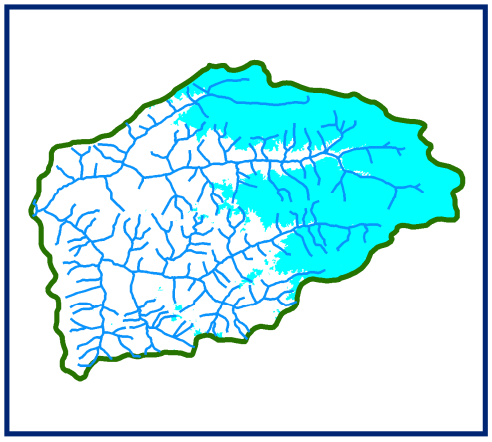
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
05 April 2012



DATA USED
15 April 2012

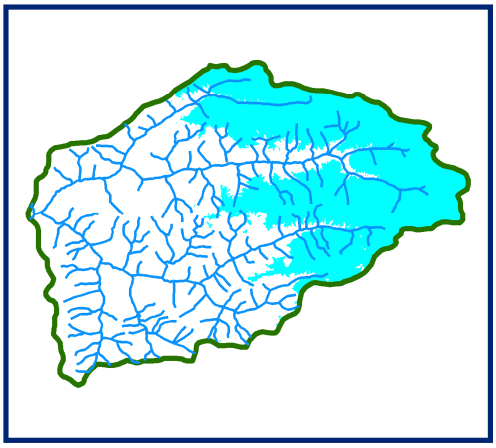


DATA USED
24 April 2012

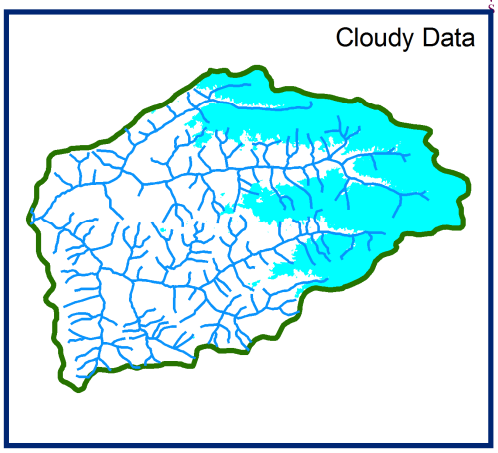
SNOW

0 3 6 9 12
Kilometers

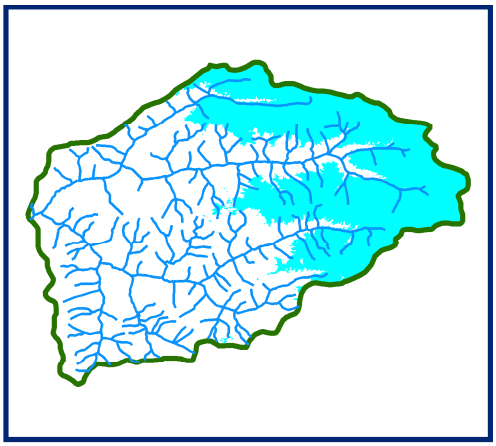
SNOW COVER MAP : JIWA BASIN



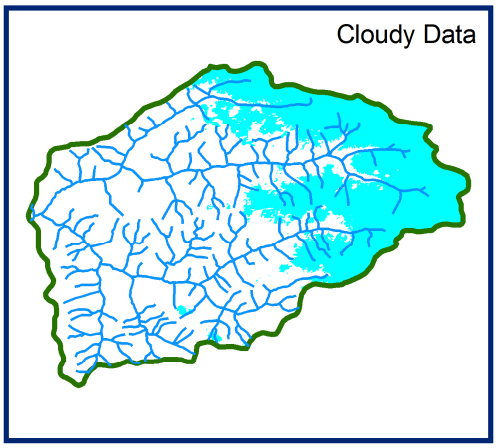
04 May 2012



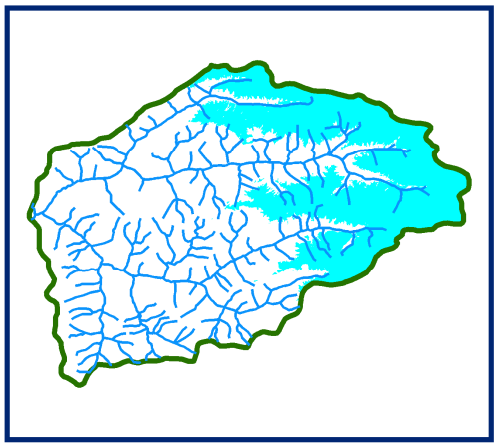
09 May 2012



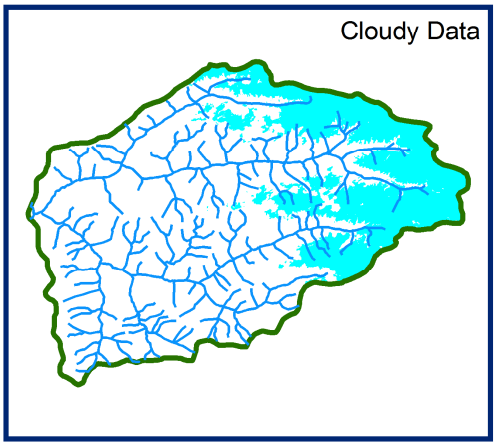
13 May 2012



18 May 2012



23 May 2012



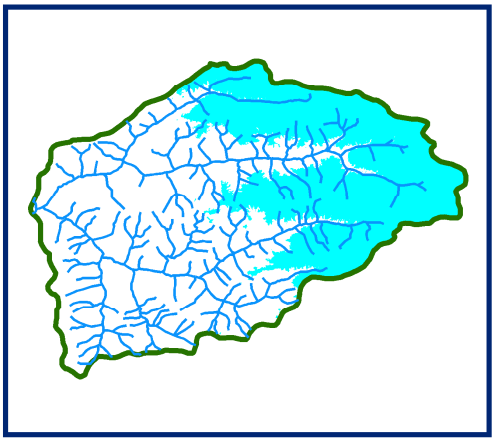
28 May 2012

SNOW

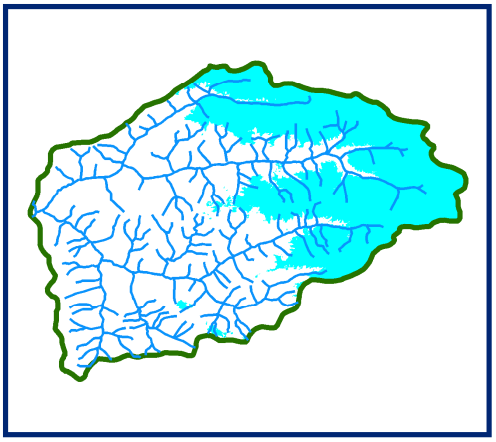
024 8 1216

Kilometers

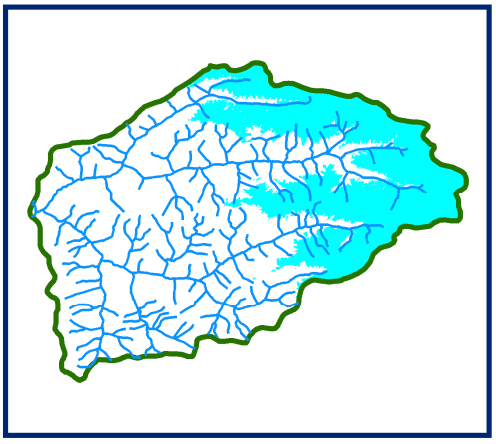
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
04 May 2012
09 May 2012



DATA USED
13 May 2012
18 May 2012

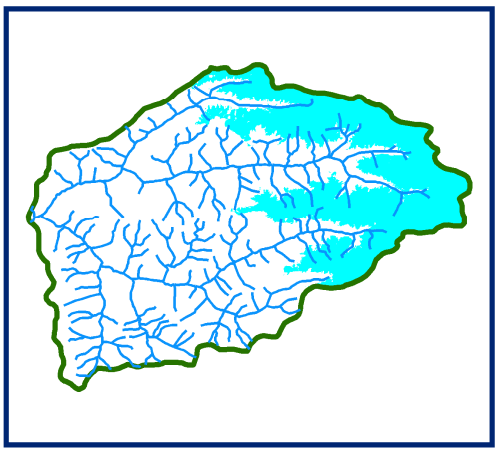


DATA USED
23 May 2012
28 May 2012

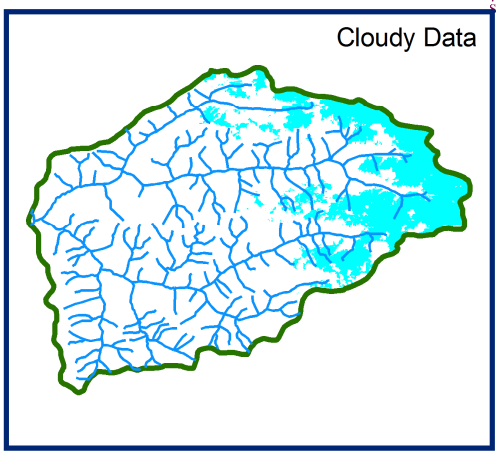
SNOW

024 8 1216
Kilometers

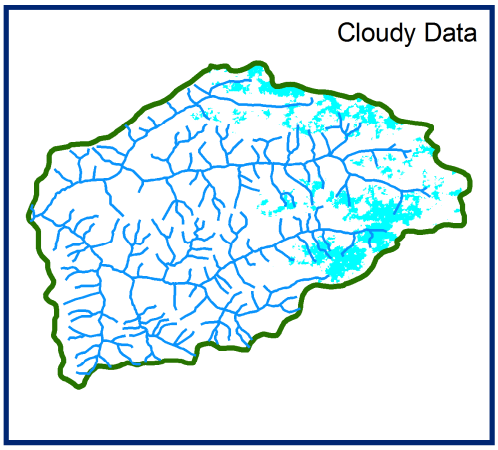
SNOW COVER MAP : JIWA BASIN



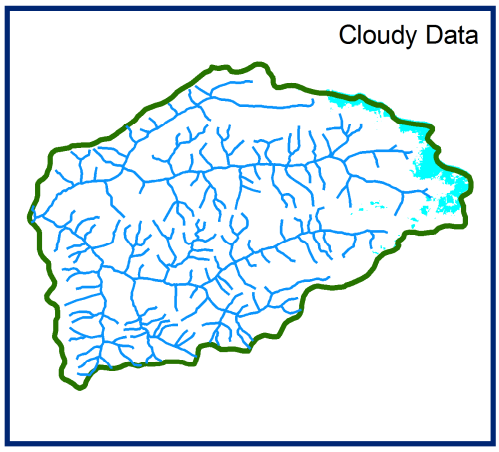
01June 2012



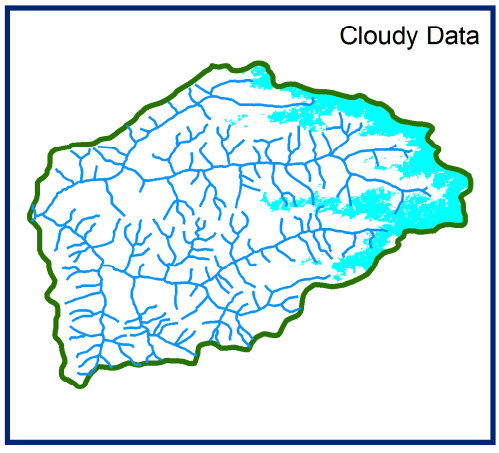
09 June 2012



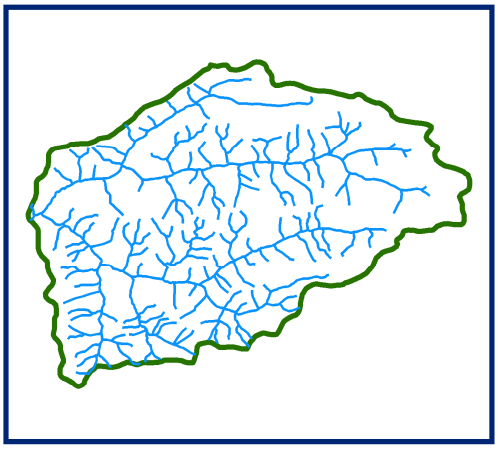
14 June 2012



18 June 2012



23 June 2012

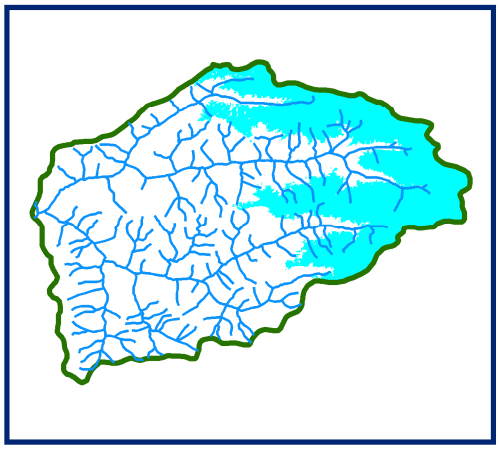


DATA NOT AVAILABLE

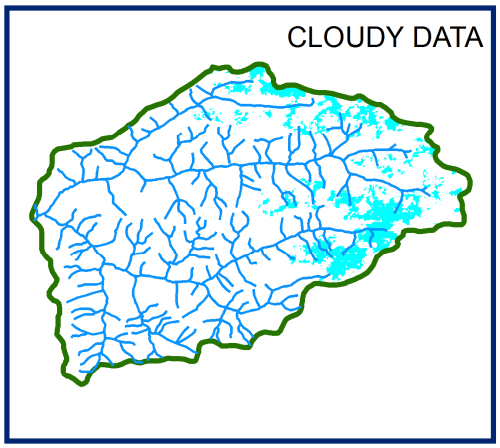
SNOW

024 8 1216
Kilometers

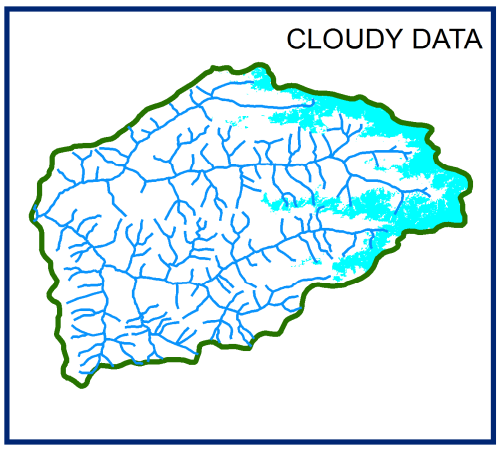
10 DAILY SNOW COVER MAP: JIWA BASIN



DATA USED
01 June 2012
09 June 2012



DATA USED
14 June 2012



DATA USED
23 June 2012

SNOW

024 8 1216
Kilometers

PARBATI BASIN

AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: PARBATI **BASIN AREA: 1773 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	434	24	Clear	3.	18 Oct 2011	523	30	Clear
2.	12 Oct 2011	494	28	Clear	4.	27 Oct 2011	763	43	Clear
November 2011									
1.	05 Nov 2011	992	56	Clear	2.	29 Nov 2011	614	35	Clear
2.	20 Nov 2011	744	42	Clear					
December 2011									
1.	04 Dec 2011	549	31	Clear	6.	19 Dec 2011	1069	60	Clear
2.	14 Dec 2011	1225	69	Clear	7.	21 Dec 2011	1230	69	Clear
3.	16 Dec 2011	1225	69	Clear	8.	23 Dec 2011	1046	59	Clear
4.	17 Dec 2011	1217	69	Clear	9.	28 Dec 2011	999	56	Clear
5.	19 Dec 2011	1068	60	Clear	10.	31 Dec 2011	1065	60	Clear
January2012									
1.	02 Jan2012	879	50	80%	9.	24 Jan2012	1641	93	Clear
2.	09 Jan2012	1769	100	70-80%	10.	28 Jan2012	1604	90	Clear
3.	10 Jan2012	1724	97	Clear	11.	29 Jan2012	1602	90	Clear
4.	12 Jan2012	1591	90	20-30%	12.	29 Jan2012	1702	96	Less
5.	14 Jan2012	1702	96	<5%	13.	31 Jan2012	1545	87	Clear
6.	17 Jan2012	1427	80	30-40%					
7.	19 Jan2012	1621	91	Clear					
8.	21 Jan2012	1662	94	Clear					
February 2012									
1.	02 Feb 2012	1577	89	50%	6.	26 Feb 2012	1545	87	Clear
2.	10 Feb 2012	1609	91	Clear	7.	27 Feb 2012	1777	100	Full cloud
3.	12 Feb 2012	1779	100	80%	8.	27 Feb 2012	1490	84	Clear
4.	17 Feb 2012	1665	94	Clear					
5.	22 Feb 2012	1487	84	Less					
March 2012									
1.	02 March 2012	1521	86	Clear	6.	12 March 2012	1505	85	Clear
2.	07 March 2012	1562	88	Clear	7.	19 March 2012	1375	78	Clear
3.	10 March 2012	1435	81	Clear	8.	21 March 2012	1435	81	Clear
4.	12 March 2012	1501	85	Clear	9.	22 March 2012	1414	80	Clear
5.	12 March 2012	1414	80	Clear	10	31 March 2012	1387	78	Clear

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
April 2012									
1.	05 April 2012	1303	73	5%	3.	24 April 2012	1359	77	Clear
2.	15 April 2012	1389	78	10%					
May 2012									
1.	03 May 2012	1329	75	Clear	5.	13 May 2012	1267	71	Clear
2.	04 May 2012	1295	73	Clear	6.	18 May 2012	1202	68	5%
3.	08 May 2012	1325	75	Clear	7.	23 May 2012	1177	66	Clear
4.	09 May 2012	1227	69	5%	8.	28 May 2012	1087	61	5%
June 2012									
1.	01 June 2012	1121	63	5%	5.	09 June 2012	996	56	10%
2.	02 June 2012	1207	68	30%	6.	14 June 2012	767	43	25%
3.	04 June 2012	537	30	75%	7.	18 June 2012	720	41	25%
4.	09 June 2012	992	56	10%	8.	23 June 2012	764	43	10%

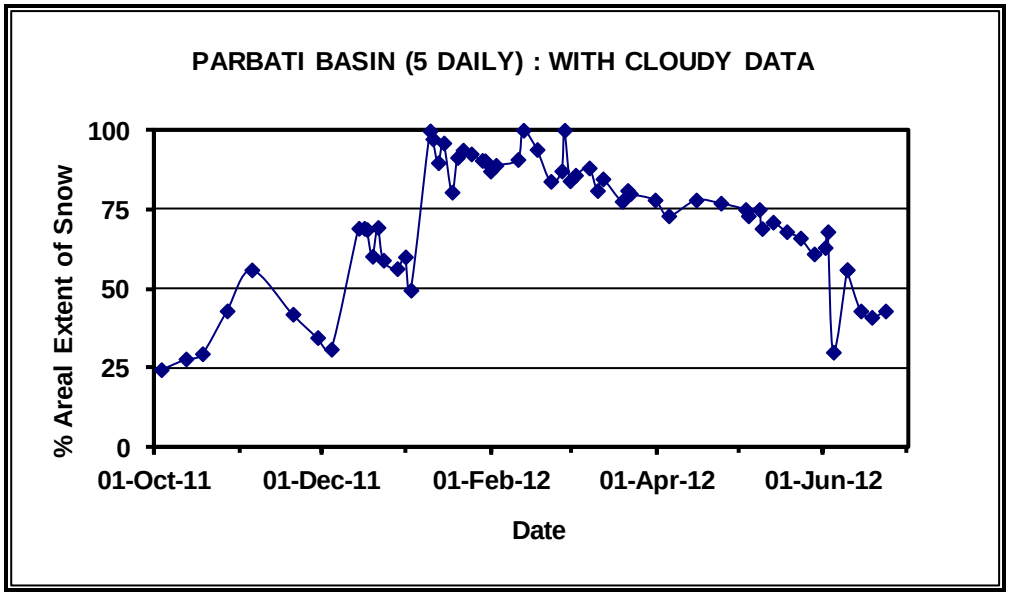
AREAL EXTENT OF SNOW (10 DAILY)

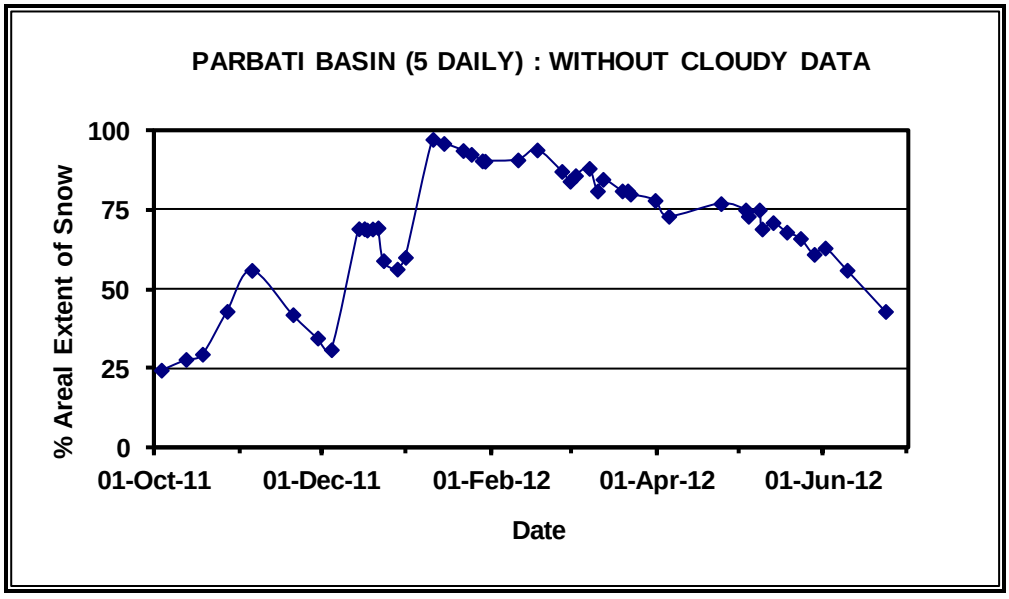
BASIN NAME: PARBATI **BASIN AREA: 1773 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	434	24.489	Clear	3.	27 Oct 2011	762.90	43.02876	Clear
2.	12 Oct 2011	599	33.81162	Clear					
3.	18 Oct 2011			Clear					
November 2011									
1.	05 Nov 2011	992	55.9577	Clear	3.	29 Nov 2011	613.74	34.61591	Clear
2.	20 Nov 2011	744	41.98195	Clear					
December 2011									
1.	04 Dec 2011	548.59	30.94134	Clear	5.	21 Dec 2011	922.10	52.0079	Clear
2.	14 Dec 2011	1257	70.89961	Clear	6.	28 Dec 2011			Clear
3.	17 Dec 2011			Clear	7.	31 Dec 2011			Clear
4.	19 Dec 2011			Clear					
January 2012									
1.	02 Jan 2012	1724	97.25324	80%	5.	21 Jan 2012	1651.00	93.11901	Clear
2.	09 Jan 2012			80%	6.	28 Jan 2012			Clear
3.	10 Jan 2012			Clear	7.	31 Jan 2012			Clear
4.	12 Jan 2012	1690	95.34461	30%					
5.	14 Jan 2012			<5%					
6.	19 Jan 2012			Clear					
February 2012									
1.	02 Feb 2012	1599	90.19289	50%	5.	26 Feb 2012	1534.47	86.54653	Clear
2.	10 Feb 2012			Clear	6.	29 Feb 2012			Clear
3.	12 Feb 2012	1750.96	98.75691	80%					
4.	17 Feb 2012			Clear					
March 2012									
1.	02 Mar 2012	1562	88.12126	Clear	4.	12 Mar 2012	1518.31	85.63508	Clear
2.	07 Mar 2012			Clear	5.	19 Mar 2012			Clear
3.	10 Mar 2012			Clear	6.	22 Mar 2012	1444.91	81.49521	Clear
					7.	31 Mar 2012			Clear
April 2012									
1.	05 April 2012	1303	73.49408	5%	3.	24 April 2012	1359.31	76.66723	Clear
2.	15 April 2012	1388.96	78.33954	10%					

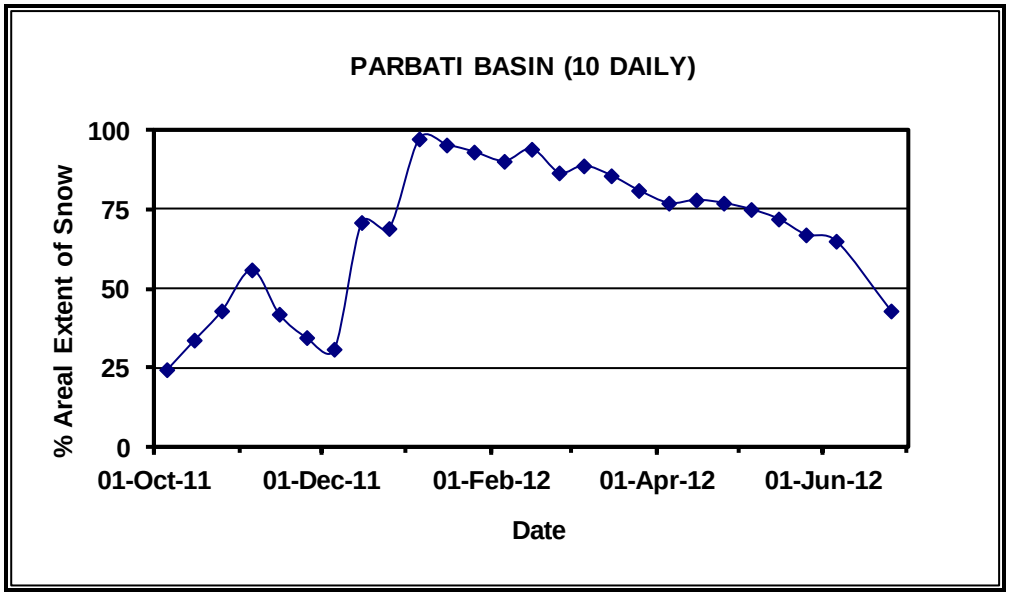
S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
May 2012									
1.	03 May 2012	1335	75.30626	Clear	5.	23 May 2012	1179.88	66.5471	Clear
2.	08 May 2012			Clear	6.	28 May 2012			5%
3.	13 May 2012	1275.82	71.95826	Clear					
4.	18 May 2012			5%					
June 2012									
1.	01 June 2012	1145.56	64.61139	5%	3.	14 June 2012	950.85	53.62944	25%
2.	09 June 2012			10%	4.	18 June 2012			25%
					5.	23 June 2012	763.80	43.07953	10%

Snow cover depletion curve



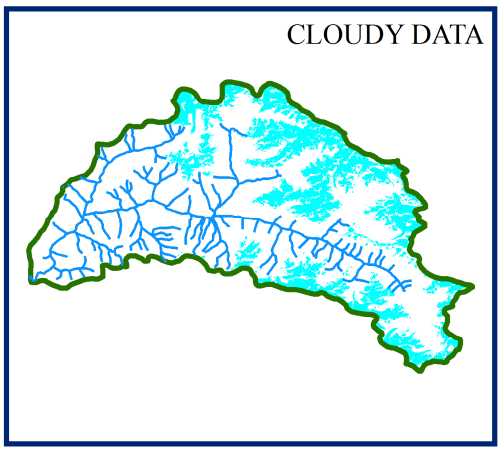


Snow cover depletion curve

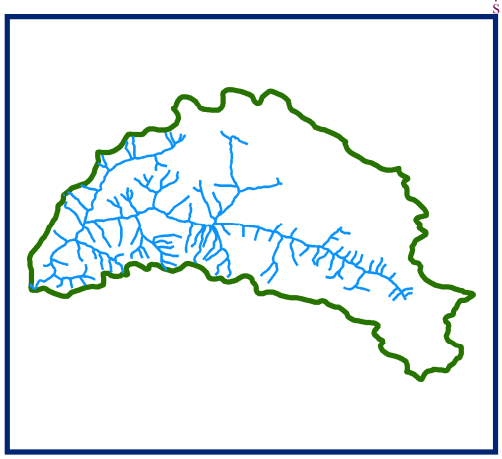


SNOW COVER MAPS

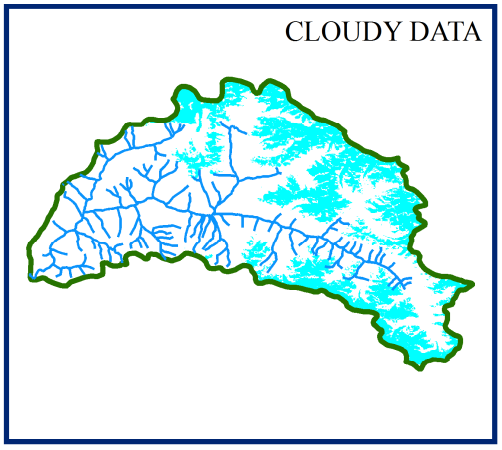
SNOW COVER MAP : PARBATI BASIN



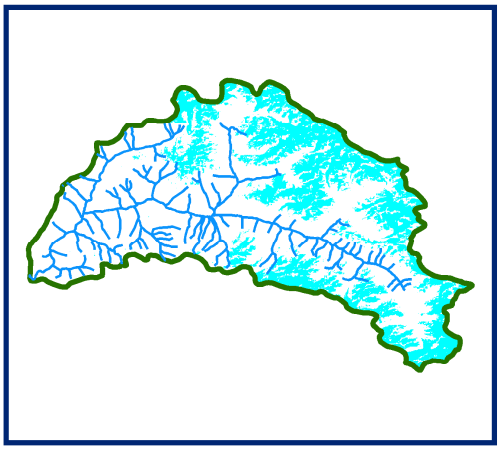
03 Oct 2011



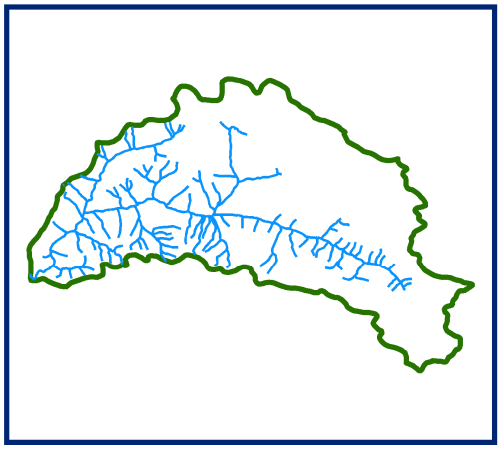
DATA NOT AVAILABLE



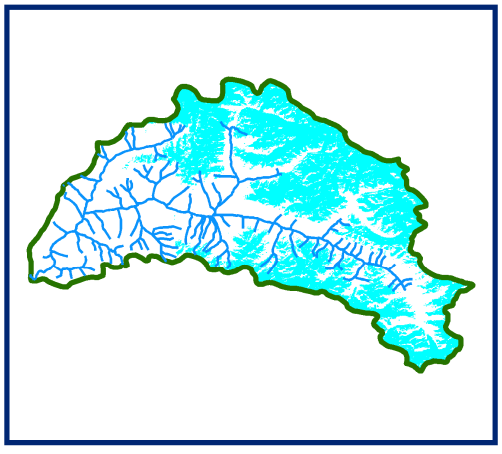
12 Oct 2011



18 Oct 2011



DATA NOT AVAILABLE

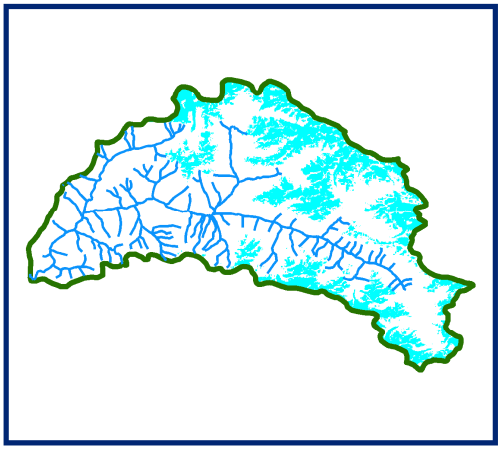


27 Oct 2011

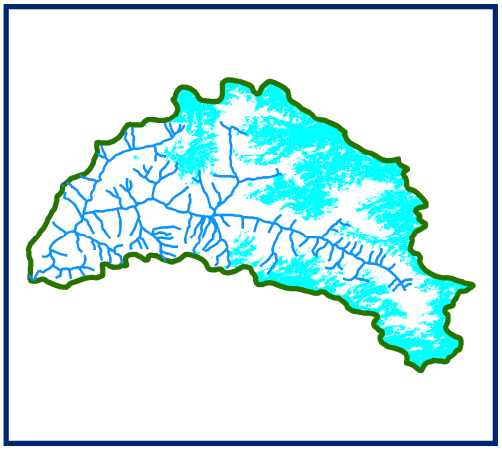
SNOW

0 2.5 5 10 15 20
Kilometers

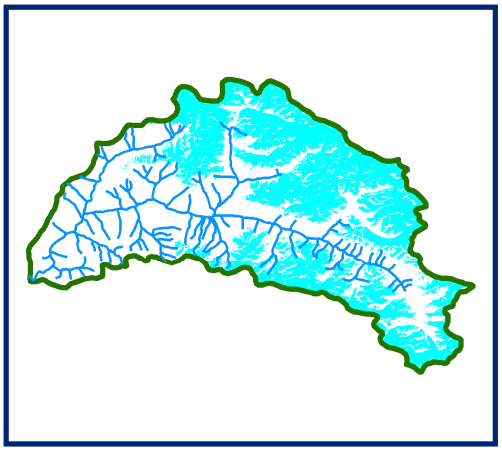
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
03 OCT 2011



DATA USED
12 OCT 2011
18 OCT 2011

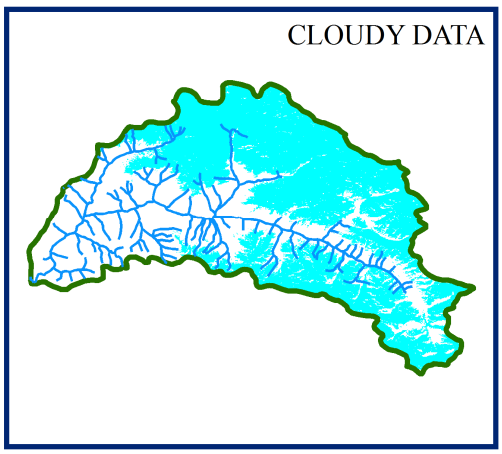


DATA USED
27 OCT 2011

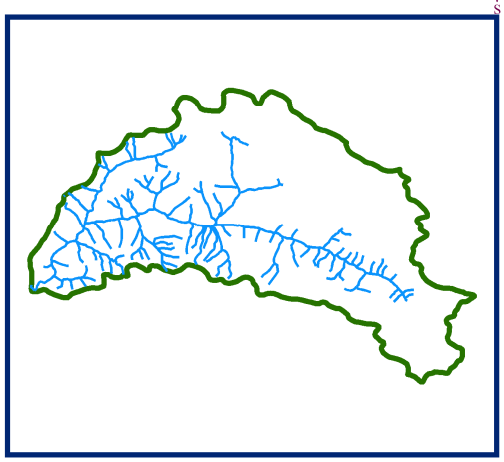
SNOW

04.59 18 27 36
Kilometers

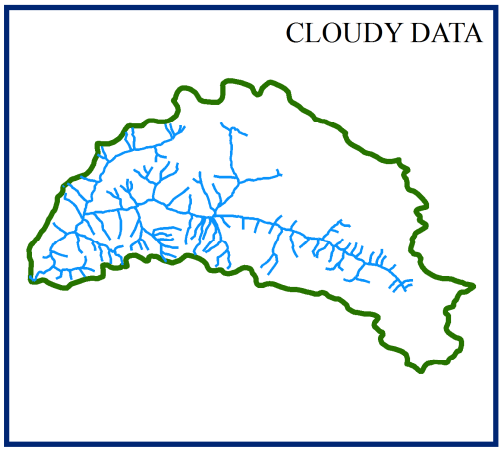
SNOW COVER MAP : PARBATI BASIN



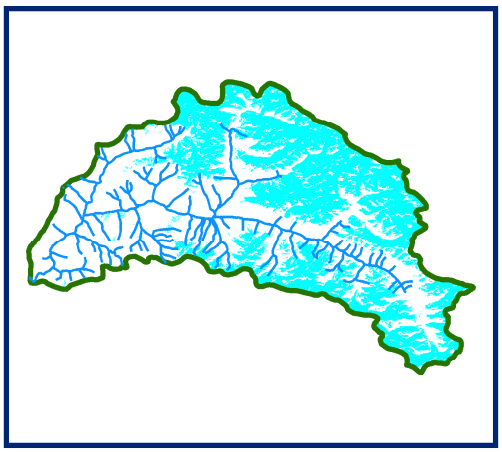
05 Nov 2011



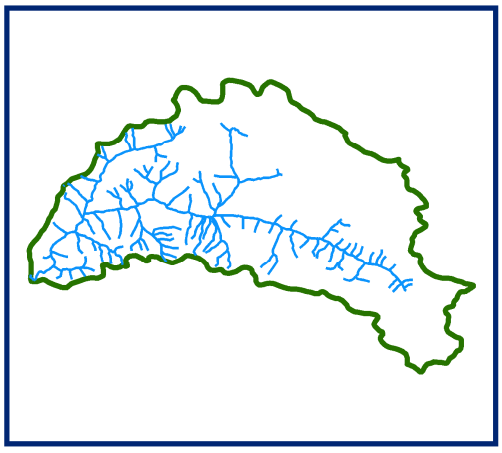
DATA NOT AVAILABLE



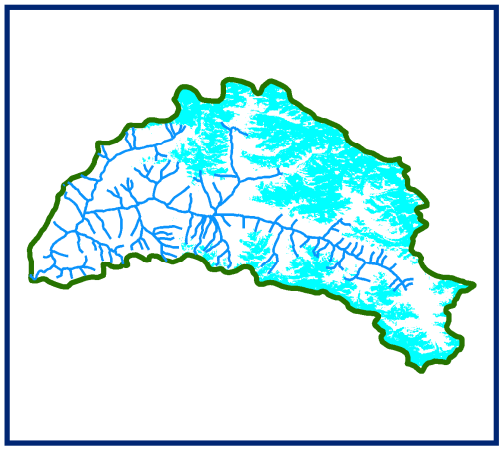
DATA NOT AVAILABLE



20 Nov 2011



DATA NOT AVAILABLE



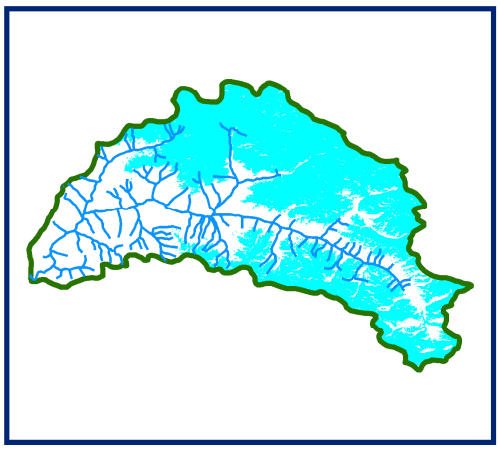
29 Nov 2011

SNOW

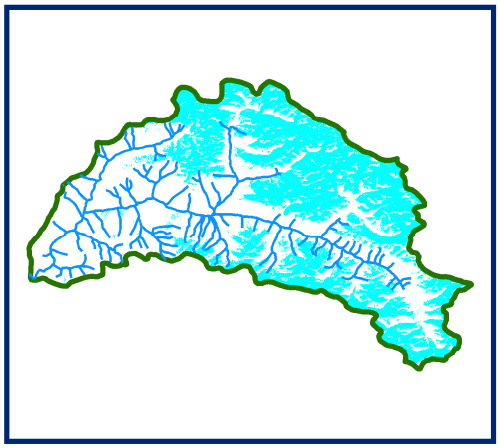
0 2.5 10 15 20

Kilometers

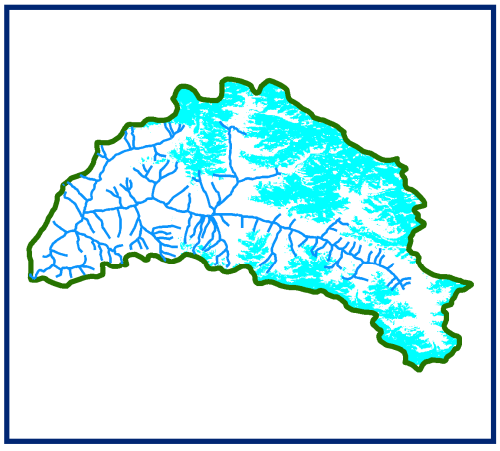
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
05 NOV 2011



DATA USED
20 NOV 2011

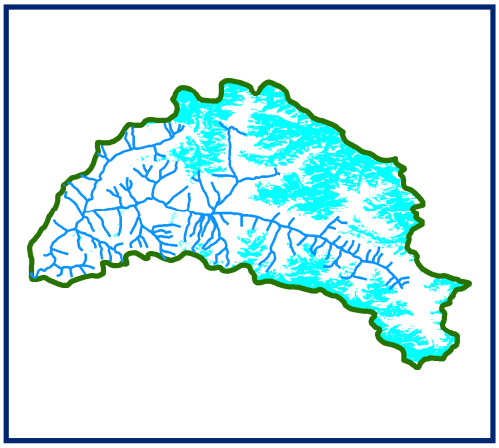


DATA USED
29 NOV 2011

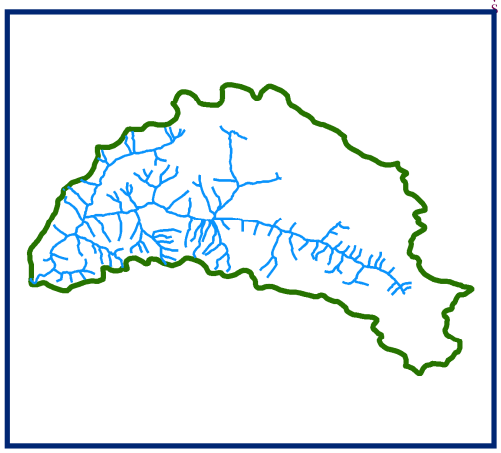
SNOW

04.59 18 27 36
Kilometers

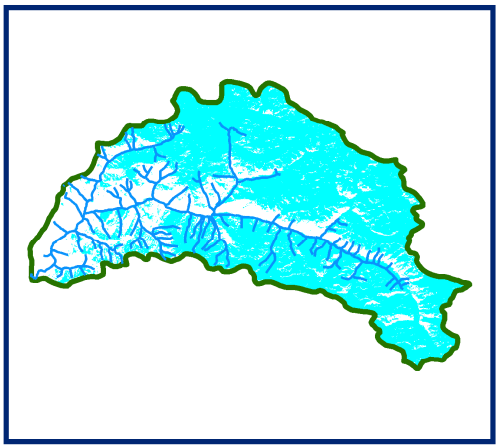
SNOW COVER MAP : PARBATI BASIN



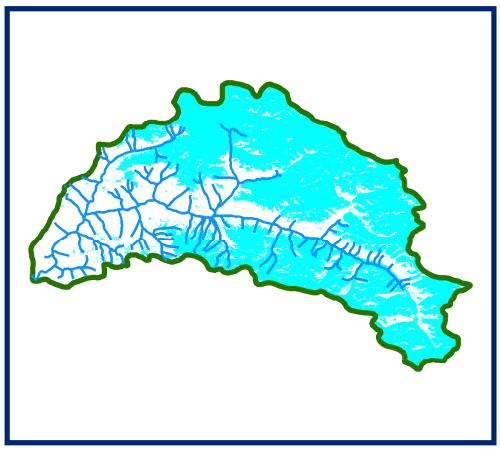
04 Dec 2011



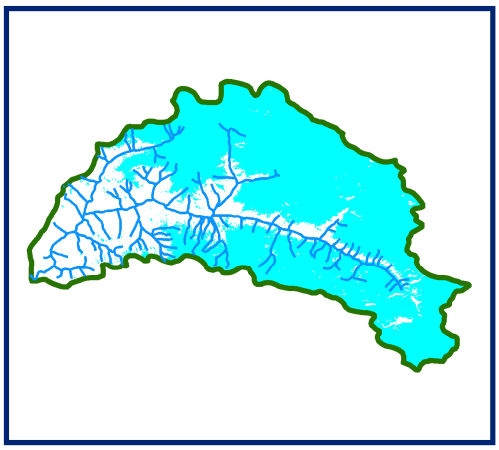
DATA NOT AVAILABLE



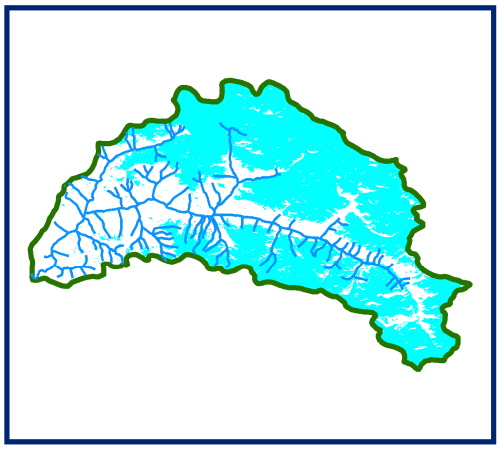
14 Dec 2011



19 Dec 2011



21 Dec 2011

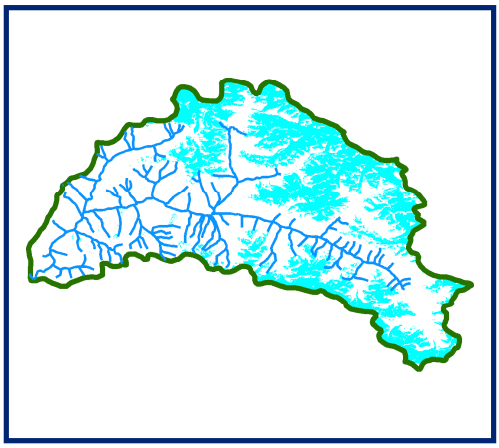


31 Dec 2011

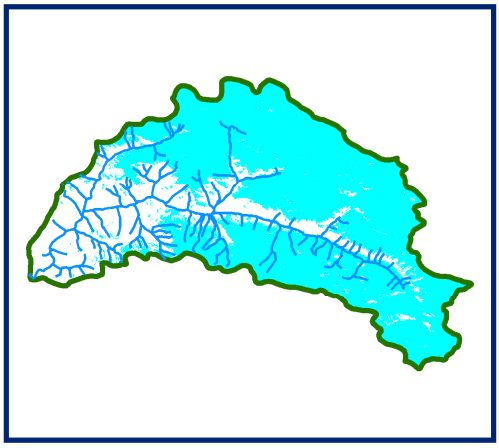
SNOW

0 2.5 5 10 15 20
Kilometers

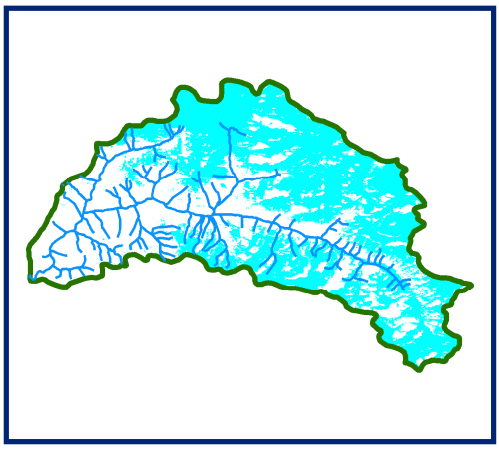
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
04 DEC 2011



DATA USED
14 DEC 2011
17 DEC 2011
19 DEC 2011

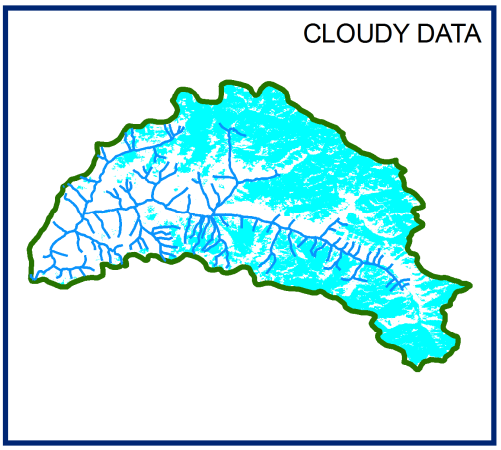


DATA USED
21 DEC 2011
28 DEC 2011
31 DEC 2011

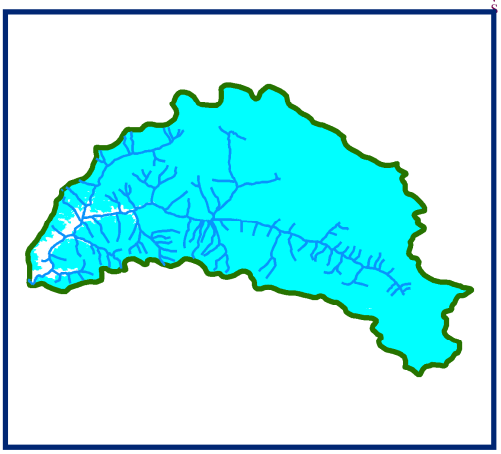
SNOW

04.59 18 27 36
Kilometers

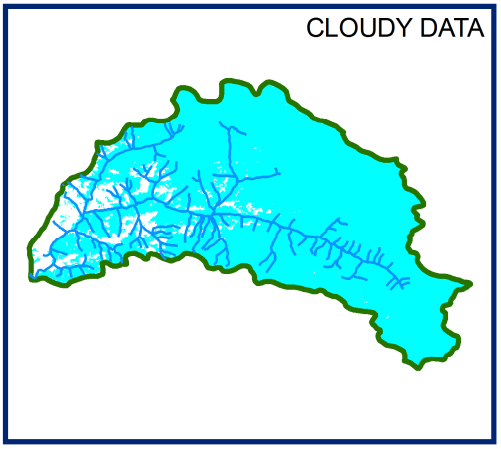
SNOW COVER MAP : PARBATI BASIN



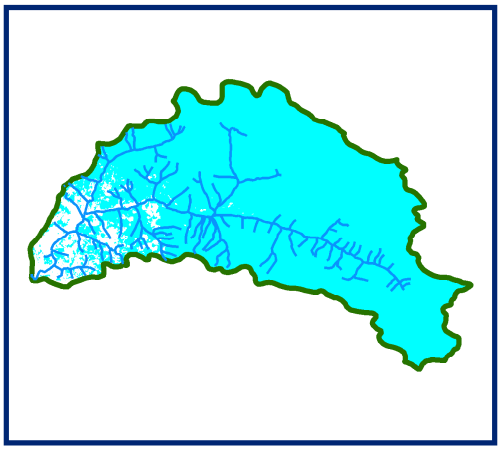
02 Jan 2012



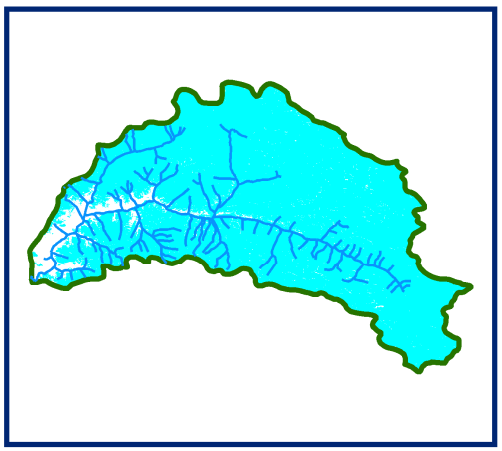
10 Jan 2012



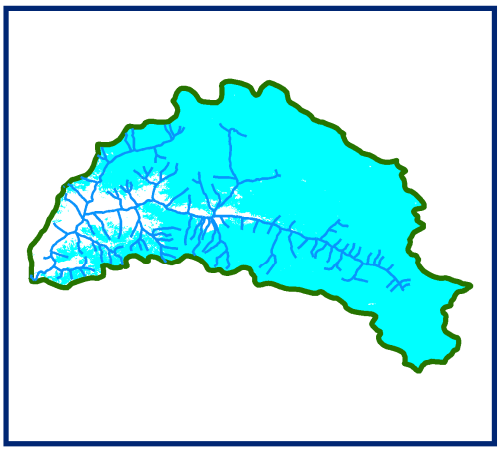
12 Jan 2012



19 Jan 2012



21 Jan 2012

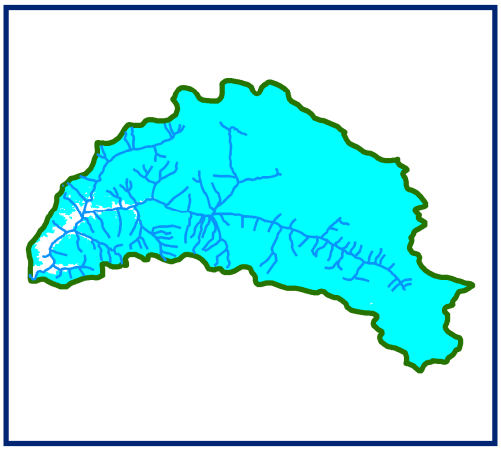


31 Jan 2012

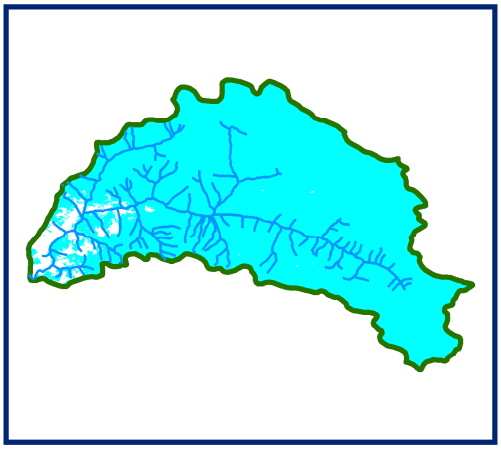
SNOW

0 2.5 5 10 15 20
Kilometers

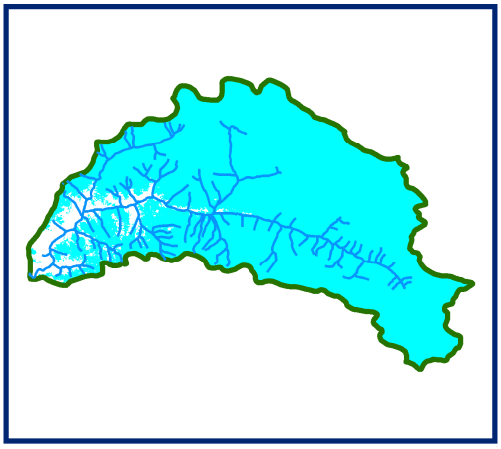
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
02 JAN 2012
10 JAN 2012



DATA USED
14 JAN 2012
19 JAN 2012

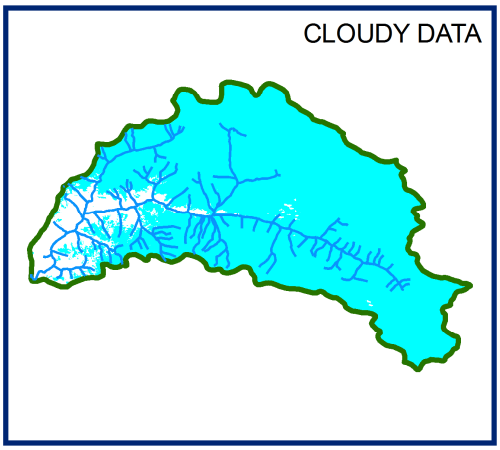


DATA USED
21 JAN 2012
28 JAN 2012
31 JAN 2012

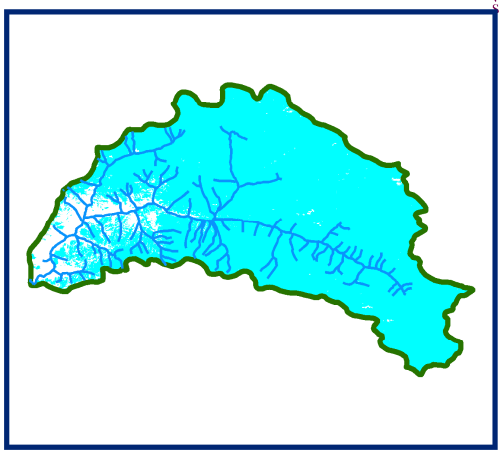
SNOW

04.59 18 27 36
Kilometers

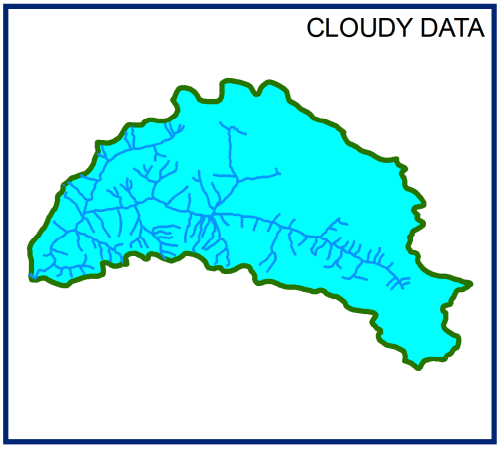
SNOW COVER MAP : PARBATI BASIN



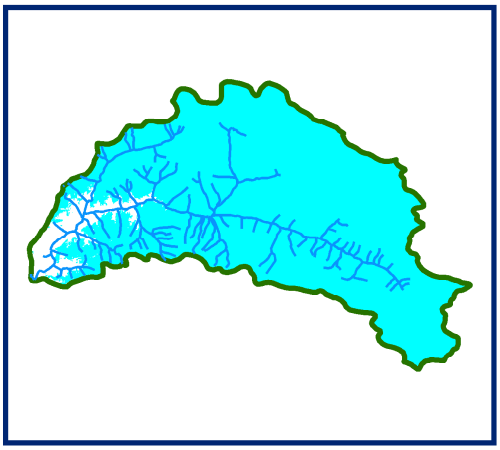
02 Feb 2012



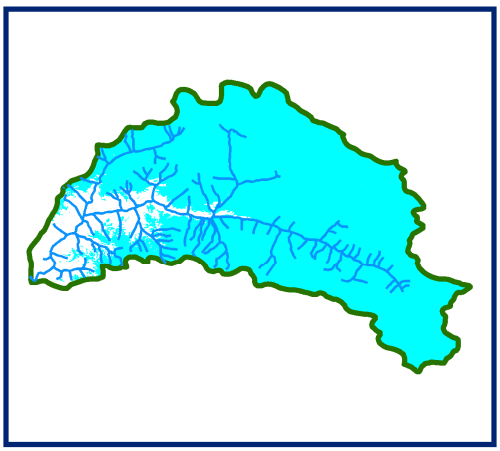
10 Feb 2012



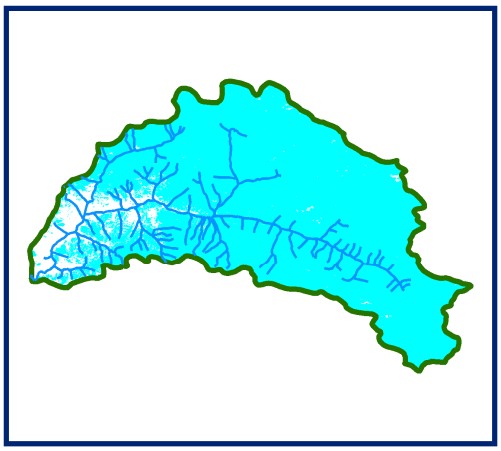
12 Feb 2012



17 Feb 2012



26 Feb 2012

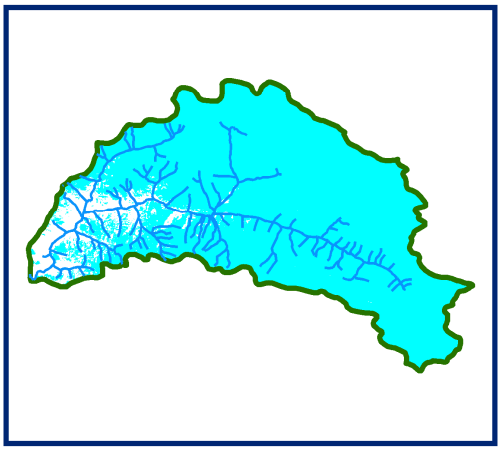


29 Feb 2012

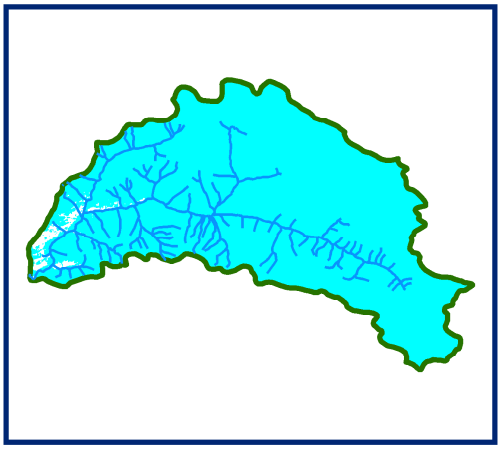
SNOW

0 2.5 5 10 15 20
Kilometers

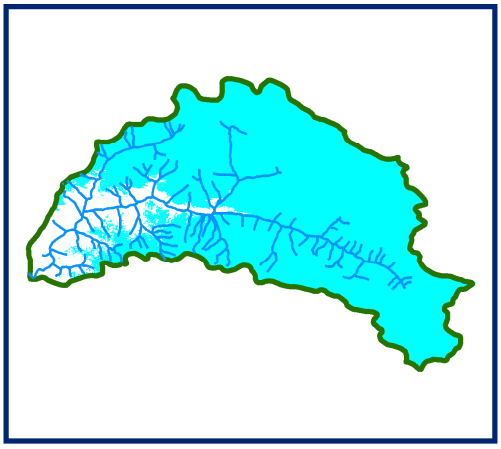
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
02 FEB 2012
10 FEB 2012



DATA USED
12 FEB 2012
17 FEB 2012

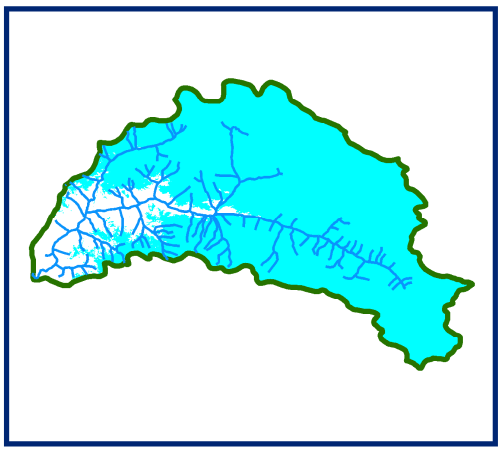


DATA USED
26 FEB 2012
29 FEB 2012

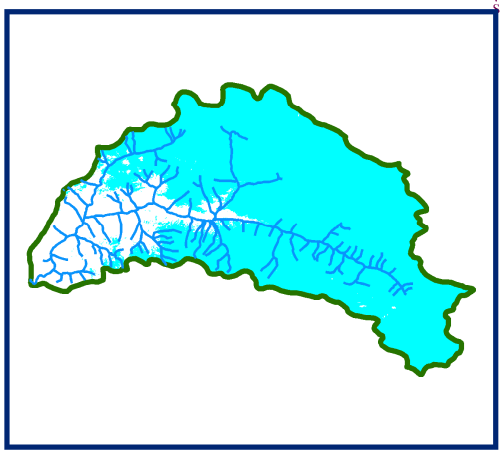
SNOW

04.59 18 27 36
Kilometers

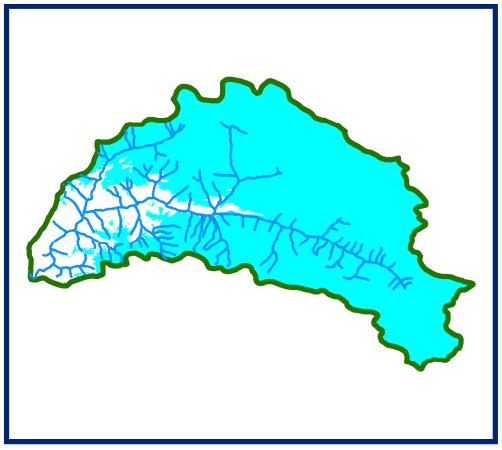
SNOW COVER MAP : PARBATI BASIN



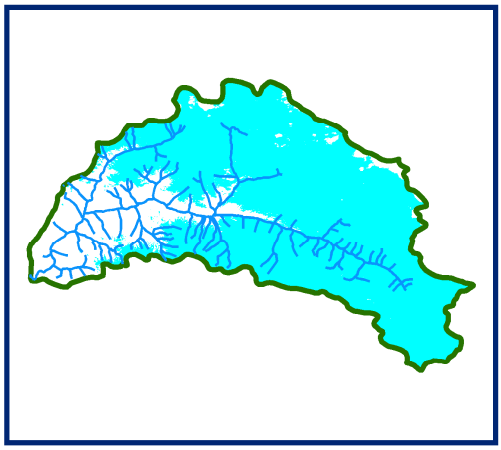
02 March 2012



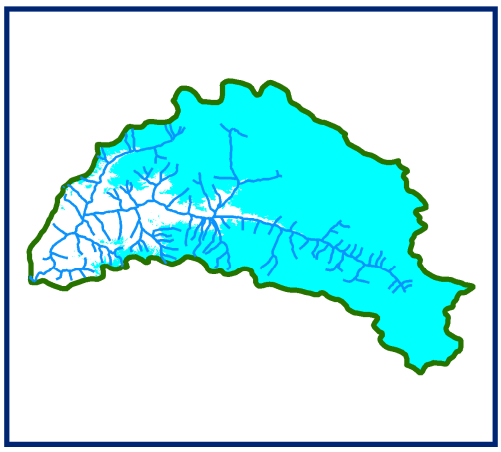
10 March 2012



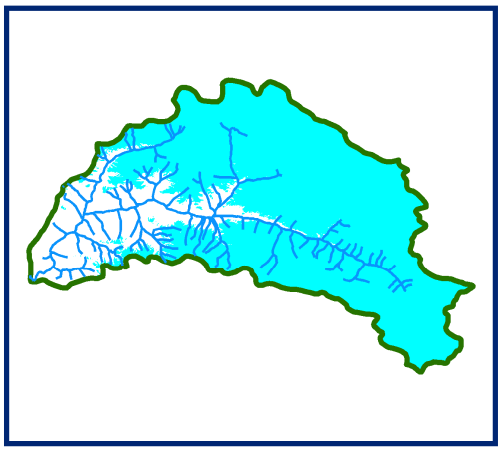
12 March 2012



19 March 2012



22 March 2012

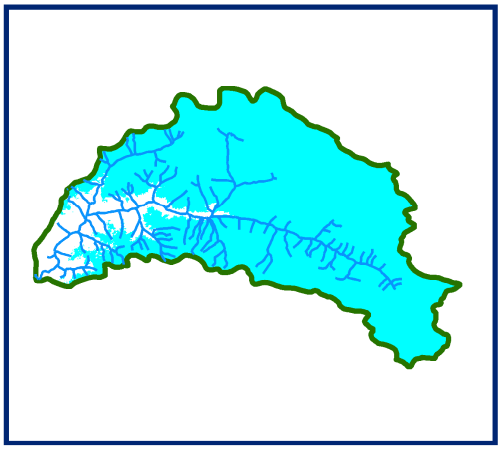


31 March 2012

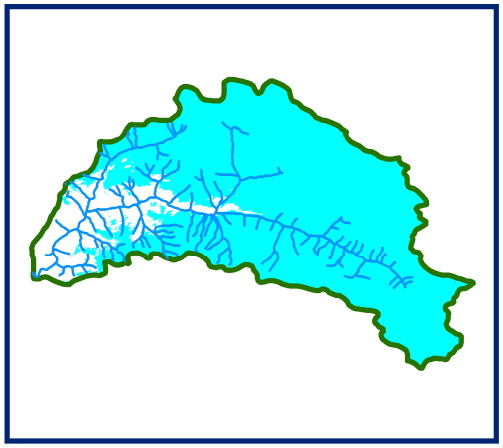
SNOW

0 2.5 10 15 20
Kilometers

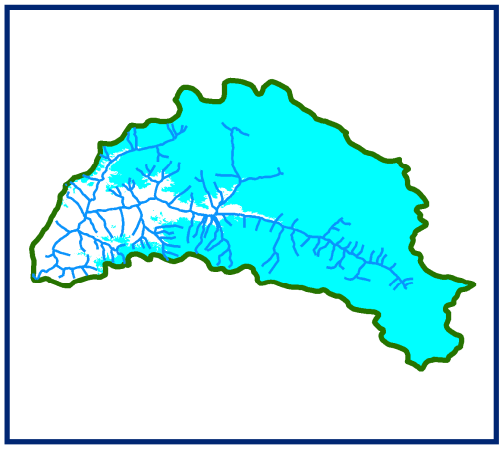
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
02 March 2012
07 March 2012
10 March 2012



DATA USED
12 March 2012
19 March 2012

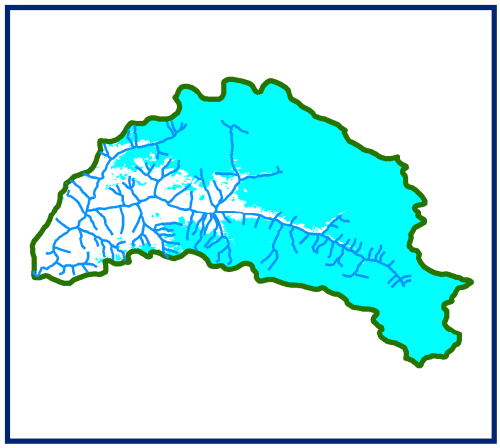


DATA USED
22 March 2012
31 March 2012

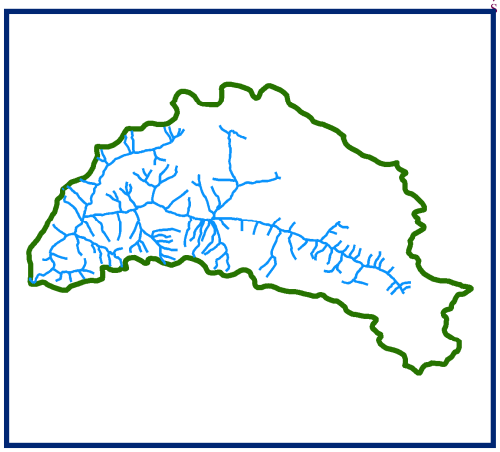
SNOW

0 2.5 5 10 15 20
Kilometers

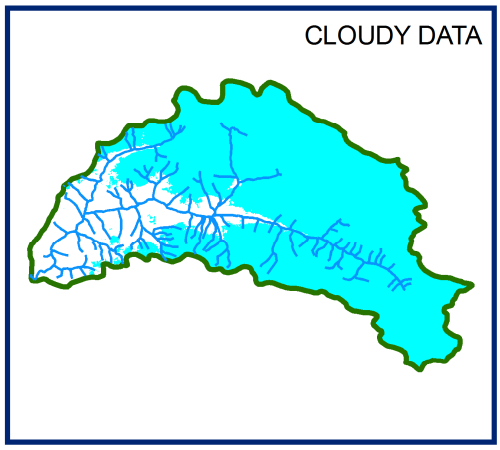
SNOW COVER MAP : PARBATI BASIN



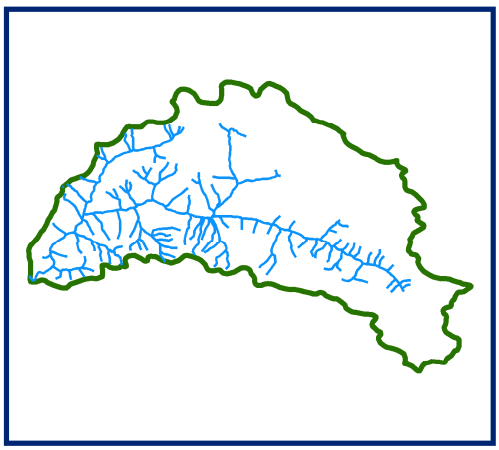
05 April 2012



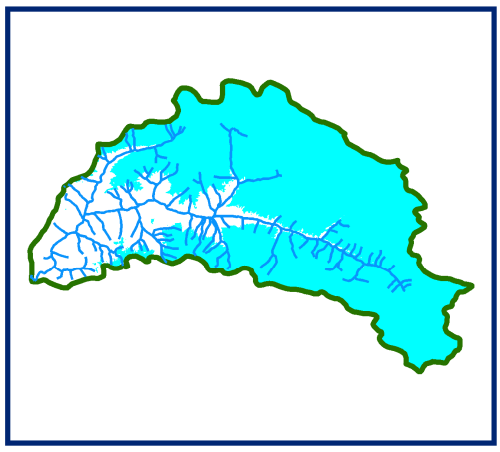
DATA NOT AVAILABLE



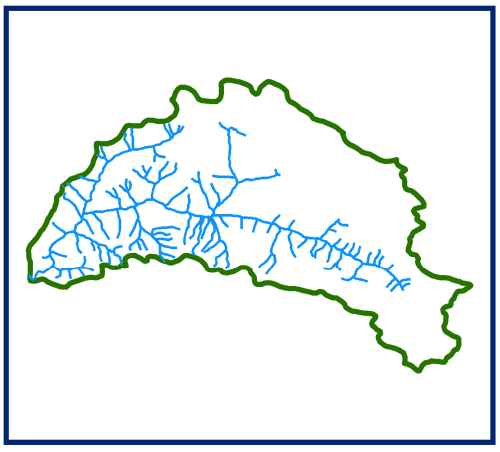
15 April 2012



DATA NOT AVAILABLE



24 April 2012

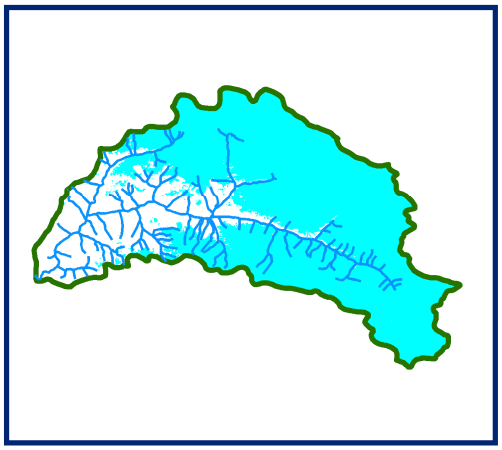


DATA NOT AVAILABLE

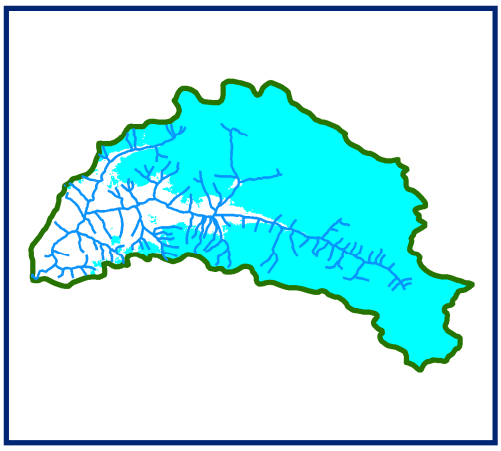
SNOW

0 2.5 5 10 15 20
Kilometers

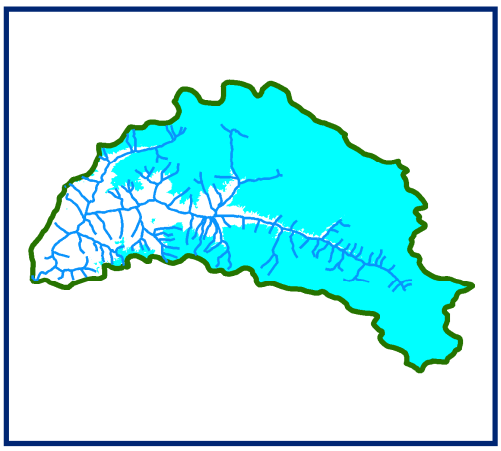
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
05 April 2012



DATA USED
15 April 2012

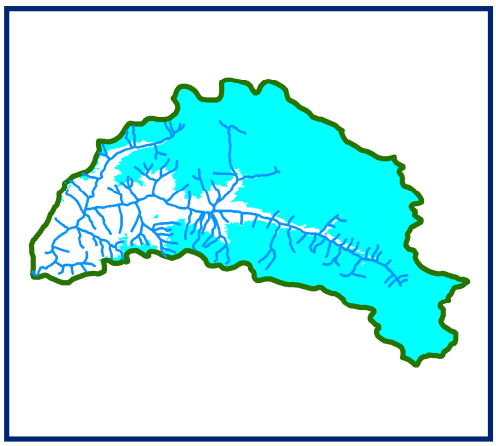


DATA USED
24 April 2012

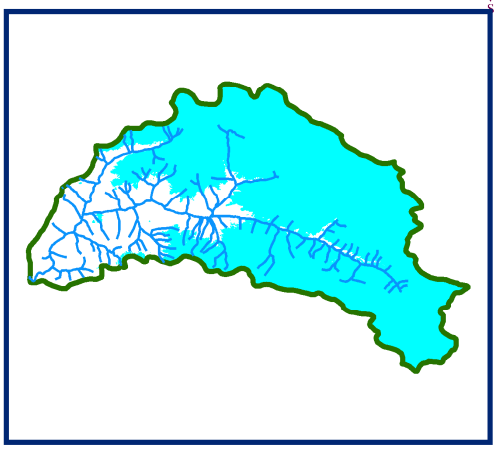
SNOW

0 2.5 5 10 15 20
Kilometers

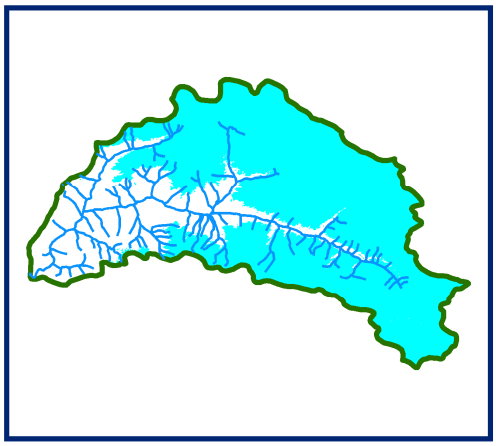
SNOW COVER MAP : PARBATI BASIN



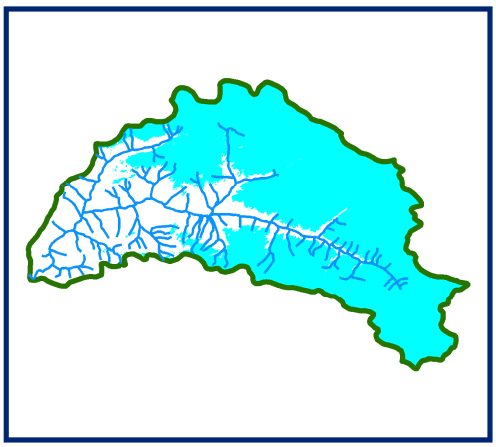
03 May 2012



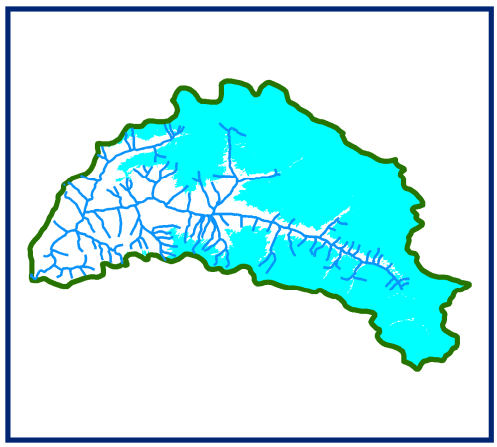
08 May 2012



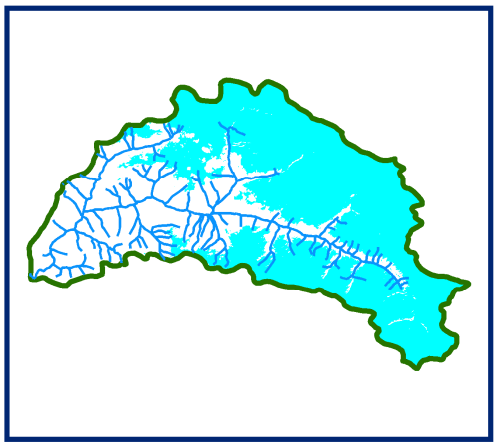
13 May 2012



18 May 2012



23 May 2012



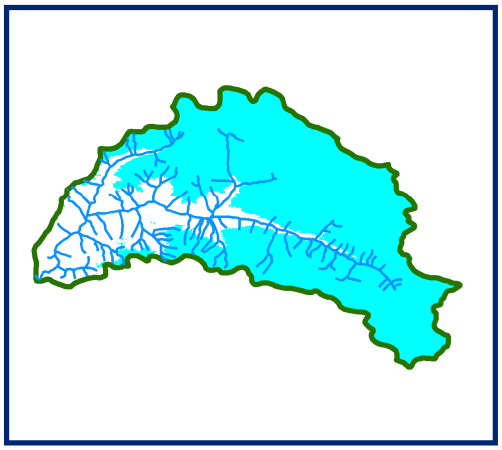
28 May 2012

SNOW

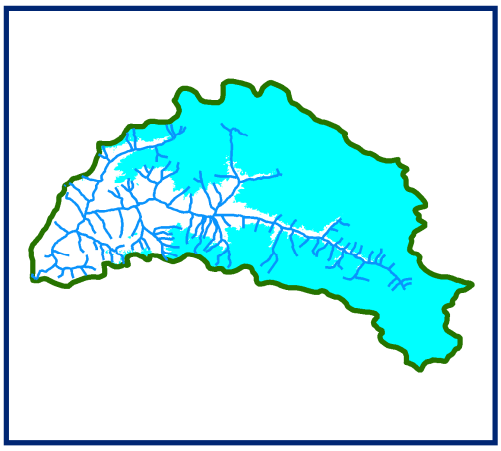
0 2.5 10 15 20

Kilometers

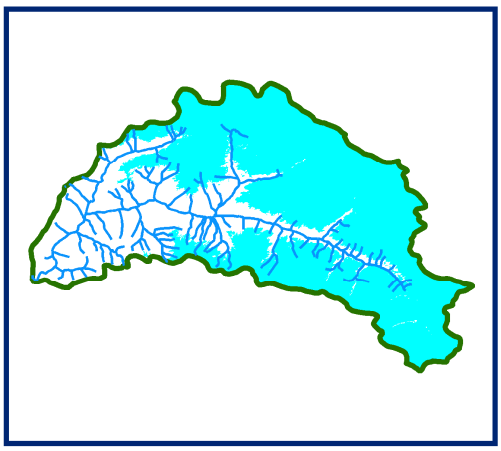
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
03 May 2012
08 May 2012



DATA USED
13 May 2012
18 May 2012

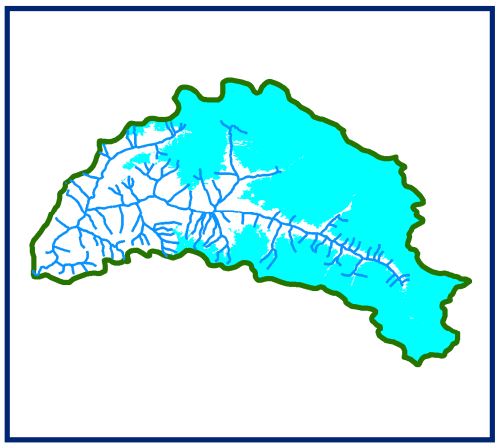


DATA USED
23 May 2012
28 May 2012

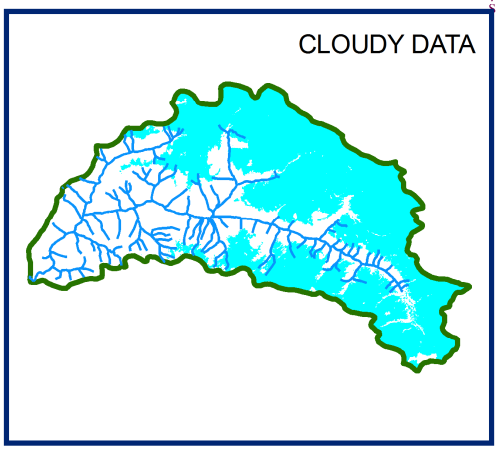
SNOW

0 2.5 5 10 15 20
Kilometers

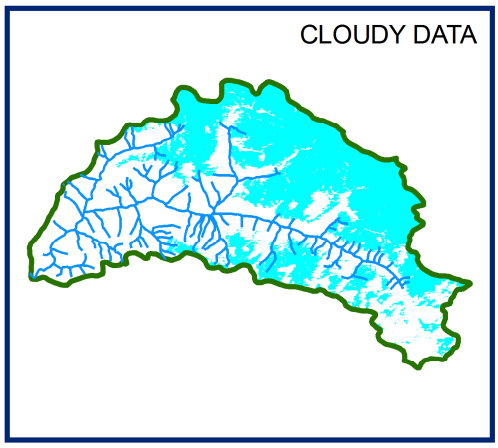
SNOW COVER MAP : PARBATI BASIN



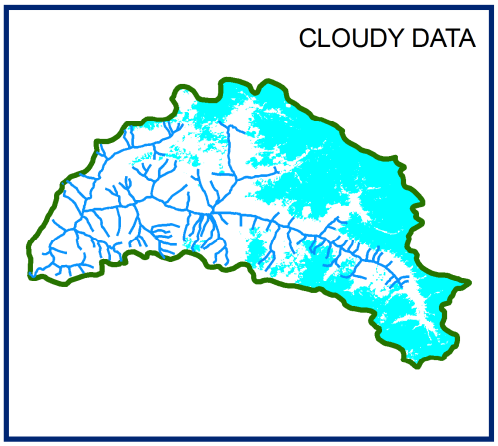
01 June 2012



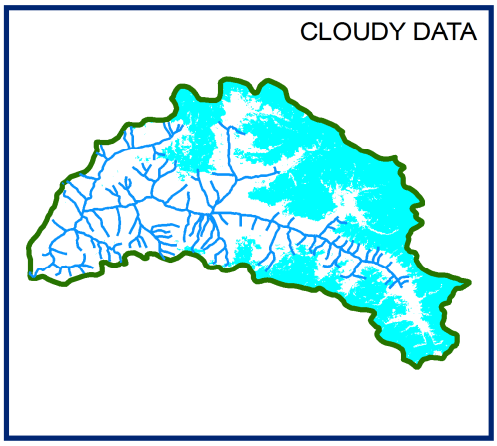
09 June 2012



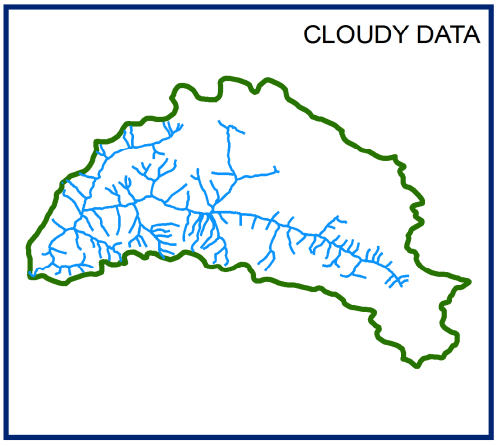
14 June 2012



18 June 2012



23 June 2012

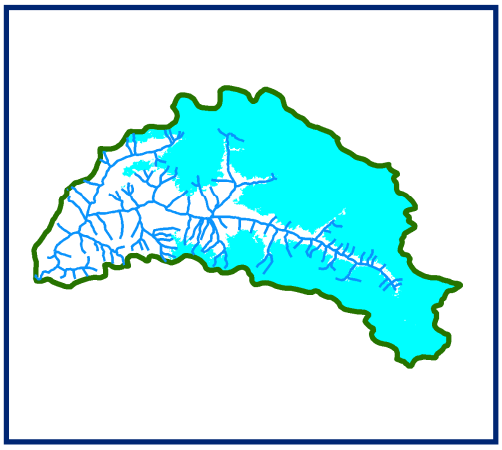


DATA NOT AVAILABLE

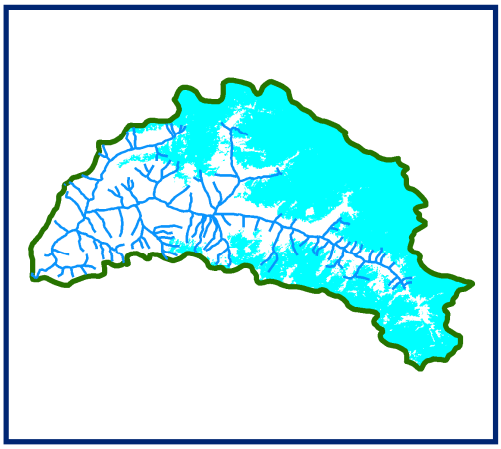
SNOW

0 2.5 10 15 20
Kilometers

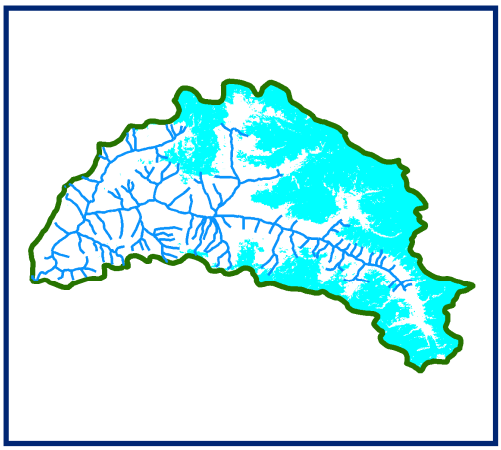
10 DAILY SNOW COVER MAP: PARBATI BASIN



DATA USED
01 June 2012
09 June 2012



DATA USED
14 June 2012
18 June 2012



DATA USED
23 June 2012

SNOW

0 2.5 5 10 15 20
Kilometers

BEAS BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: BEAS **BASIN AREA: 1132 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	50.67	4.47615	Clear	3.	18 Oct 2011	70.32	6.21201	Less
2.	12 Oct 2011	77.28	6.82686	Clear	4.	27 Oct 2011	199.75	17.64576	Clear
November 2011									
1.	05 Nov 2011	333.08	29.42403	Less	2.	29 Nov 2011	115.79	10.2288	Clear
December 2011									
1.	04 Dec 2011	90.92	8.0318	Clear	6.	19 Dec 2011	420.81	37.17403	Less
2.	14 Dec 2011	558.37	49.32597	Clear	7.	21 Dec 2011	549.45	48.53799	Clear
3.	16 Dec 2011	562.33	49.6758	Clear	8.	23 Dec 2011	494.77	43.7076	Clear
4.	17 Dec 2011	555.69	49.08922	Clear	9.	28 Dec 2011	471.25	41.62986	Clear
5.	19 Dec 2011	426.10	37.64134	Clear	10.	31 Dec 2011	470.59	41.57155	Clear
January2012									
1.	02 Jan2012	217.67	19.2288	80%	9.	24 Jan2012	1017.14	89.85336	Clear
2.	09 Jan2012	1122.82	99.18905	80%	10.	28 Jan2012	988.61	87.33304	45%
3.	10 Jan2012	1097.51	96.95318	Less	11.	29 Jan2012	980.62	86.62721	Clear
4.	12 Jan2012	932.81	82.40371	Clear	12.	29 Jan2012	1100.67	97.23233	30%
5.	14 Jan2012	1100.67	97.23233	30%	13.	31 Jan2012	915.09	80.83834	Clear
6.	17 Jan2012	667.50	58.96643	100%					
7.	19 Jan2012	948.61	83.79947	80%					
8.	21 Jan2012	1040.72	91.9364	Clear					
February 2012									
1.	02 Feb 2012	921.13	81.37191	10%	6.	26 Feb 2012	908.89	80.29064	Clear
2.	10 Feb 2012	917.59	81.05919	Clear	7.	27 Feb 2012	1135.36	100	80%
3.	12 Feb 2012	1135.98	100	80%					
4.	17 Feb 2012	1040.39	91.90724	Clear					
5.	22 Feb 2012	973.82	86.0265	60%					
March 2012									
1.	02 March 2012	877.90	77.553	Clear	6.	12 March 2012	853.07	75.35954	20%
2.	07 March 2012	942.68	83.27562	40%	7.	19 March 2012	645.78	57.0477	Clear
3.	10 March 2012	715.47	63.20406	Clear	8.	21 March 2012	731.34	64.60601	10%
4.	12 March 2012	852.46	75.30565	20%	9.	22 March 2012	737.91	65.1864	Clear
5.	12 March 2012	738.62	65.24912	Clear	10	31 March 2012	709.60	62.68551	Clear

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
April 2012									
1.	05 April 2012	722	64	65%	3.	24 April 2012	631	55.7182	15%
2.	15 April 2012	720	64	60%					
May 2012									
1.	03 May2012	619	55	Clear	5.	13 May2012	551	48.63339	Clear
2.	04 May2012	579	51	Clear	6.	18 May2012	505	44.60424	20%
3.	08 May2012	553	49	20%	7.	23 May2012	452	39.96025	Clear
4.	09 May2012	490	43	10%	8.	28 May2012	302	26.67933	40%
June 2012									
1.	01 June2012	525	46	40%	5.	09 June2012	184	16.26767	70%
2.	02 June2012	862	76	90%	6.	14 June2012	182	16.07597	30%
3.	04 June2012	234	21	40%	7.	18 June2012	50	4.4311	90%
4.	09 June2012	180	16	90%	8.	23 June2012	133	11.78622	50%

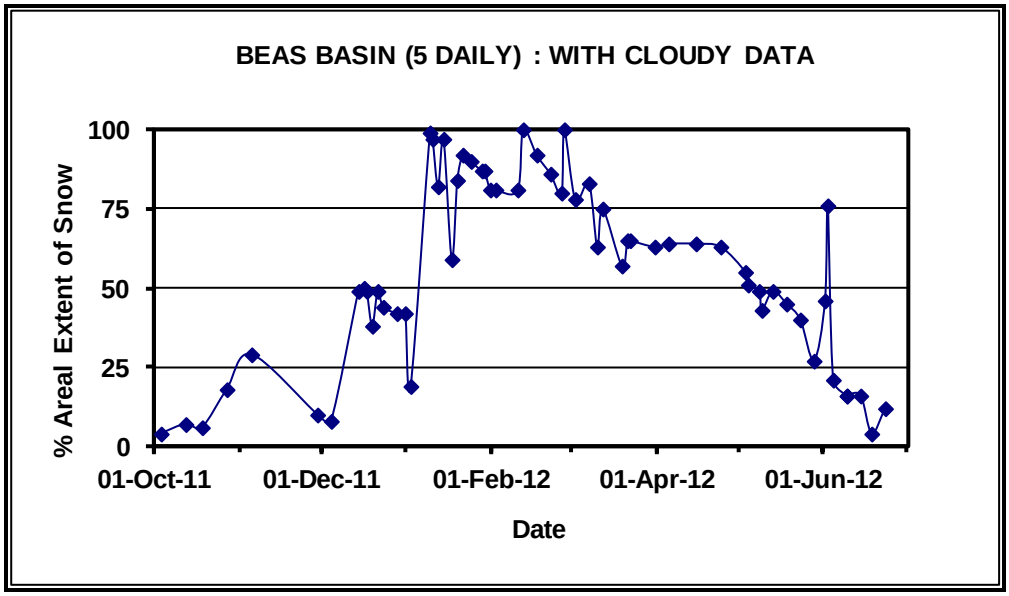
AREAL EXTENT OF SNOW (10 DAILY)

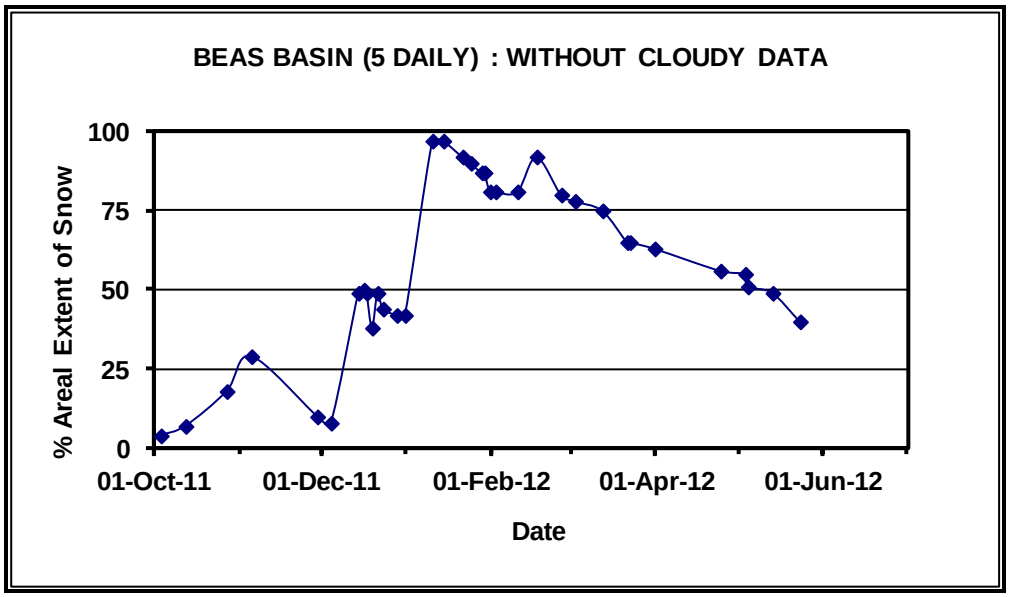
BASIN NAME: BEAS **BASIN AREA: 1132 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
October 2011									
1.	03 Oct 2011	51	8	Clear	3.	27 Oct 2011	200	18	Clear
2.	12 Oct 2011	818	7	Clear					
3.	18 Oct 2011			Less					
November 2011									
1.	05 Nov 2011	333	29	Clear					
December 2011									
1.	04 Dec 2011	91	8	Clear	5.	23 Dec 2011	469	41	Clear
2.	14 Dec 2011	598	53	Clear	6.	28 Dec 2011			Clear
3.	16 Dec 2011			Clear	7.	31 Dec 2011			Clear
4.	19 Dec 2011			Clear					
January 2012									
1.	10 Jan 2012	1098	97	Less	5.	24 Jan 2012	1041	92	Clear
2.	12 Jan 2012	1066	94	Clear	6.	29 Jan 2012			Clear
3.	14 Jan 2012			30%	7.	31 Jan 2012			Clear
February 2012									
1.	02 Feb 2012	942	83	10%	5.	26 Feb 2012	909	80	Clear
2.	10 Feb 2012			Clear					
3.	12 Feb 2012	945	83	80%					
4.	17 Feb 2012			Clear					
March2012									
1.	02 Mar 2012	944	83	Clear	4.	12 Mar 2012	860	76	20%
2.	07 Mar 2012			40%	5.	19 Mar 2012			Clear
3.	10 Mar 2012			Clear	6.	22 Mar 2012	751	66	Clear
					7.	31 Mar 2012			Clear
April 2012									
1.	05 April 2012	722	64	65%	3.	24 April 2012	631	56	15%
2.	15 April 2012	720	64	60%					
May 2012									
1.	04 May2012	583	51	Clear	5.	23 May2012	457	40	Clear
2.	09 May2012			10%	6.	28 May2012			40%
3.	13 May2012	574	51	Clear					
4.	18 May2012			20%					

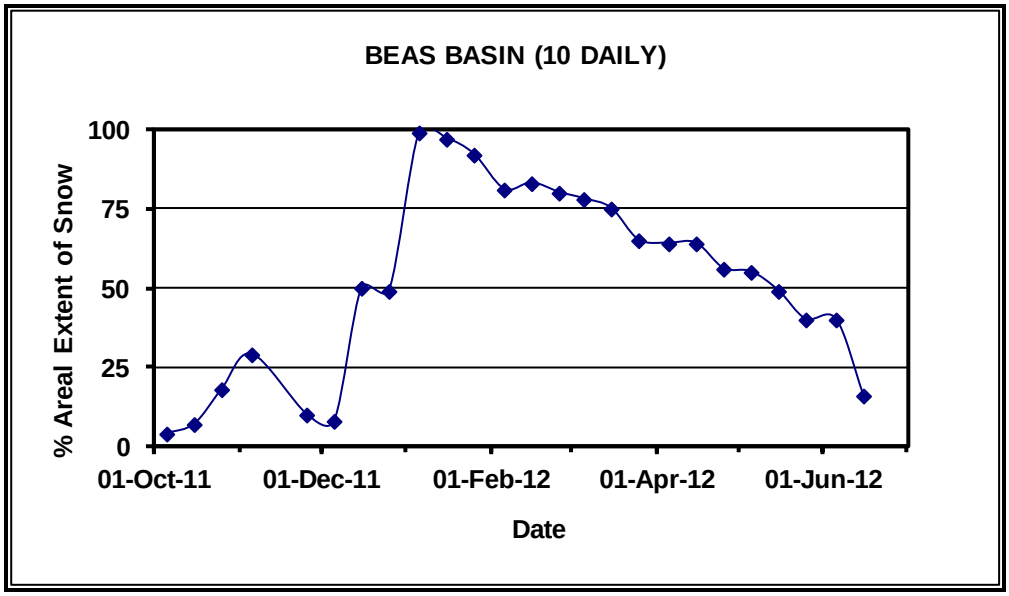
S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover	S No	Date	Snow cover (sq km)	Snow cover (%)	Cloud cover
June 2012									
1.	01 June2012	429	38	40%	3.	14 June2012	182	16	30%
2.	04 June2012			40%	4.	23 June2012	133	12	50%

Snow cover depletion curve



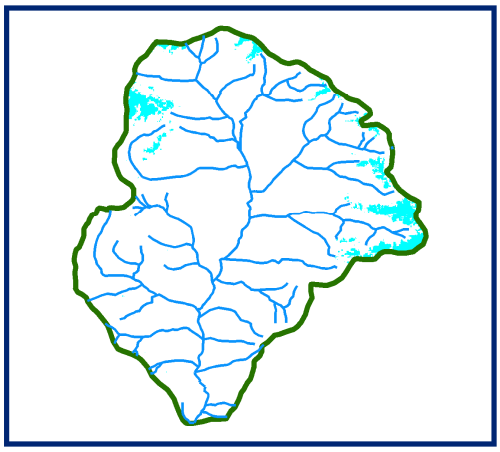


Snow cover depletion curve

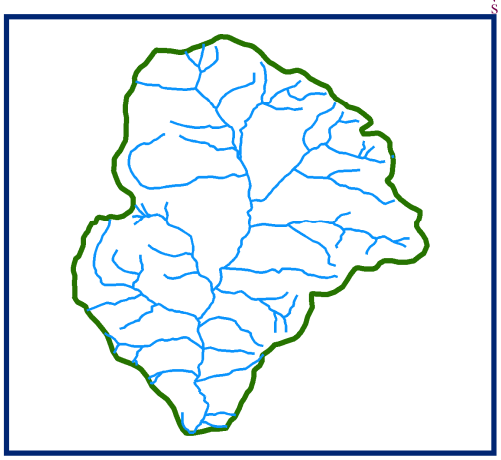


SNOW COVER MAPS

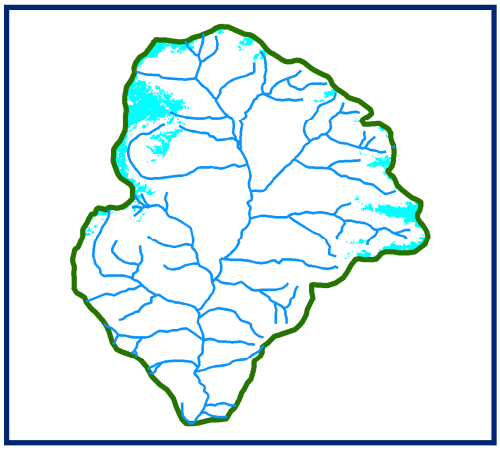
SNOW COVER MAP : BEAS BASIN



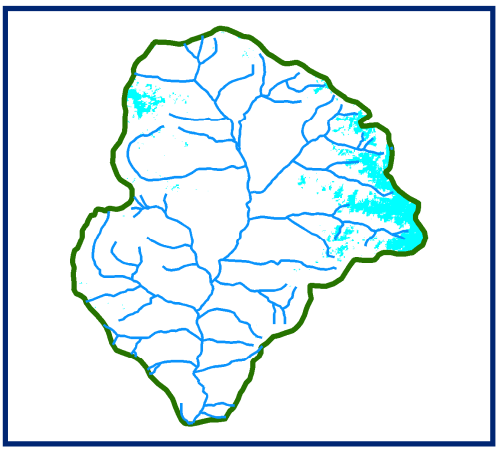
03 Oct 2011



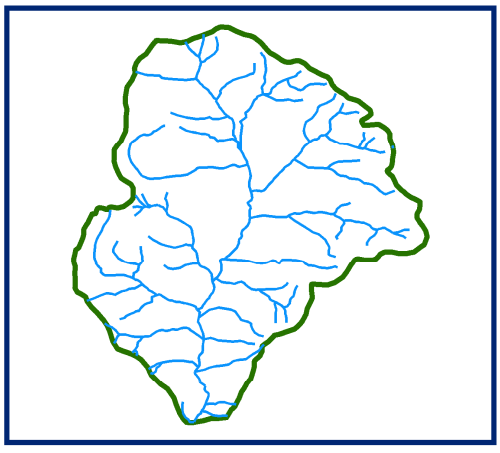
DATA NOT AVAILABLE



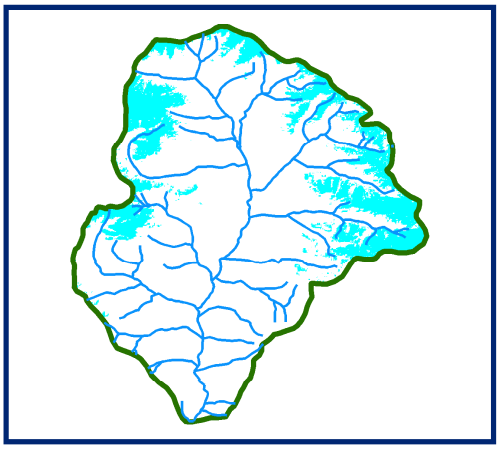
12 Oct 2011



18 Oct 2011



DATA NOT AVAILABLE

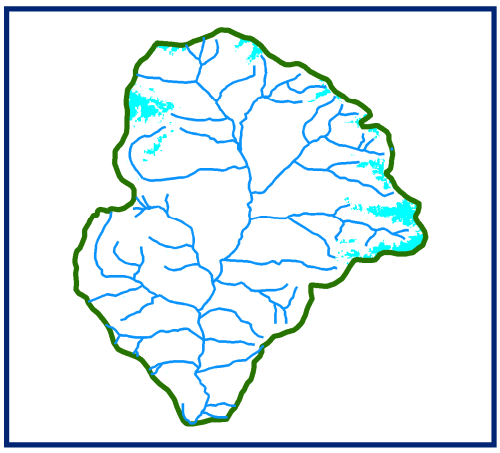


27 Oct 2011

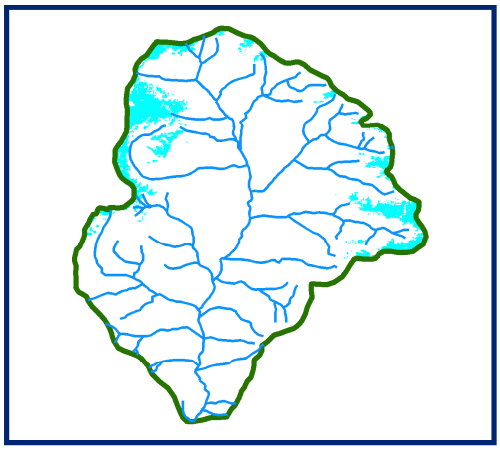
SNOW

0 3 6 912
Kilometers

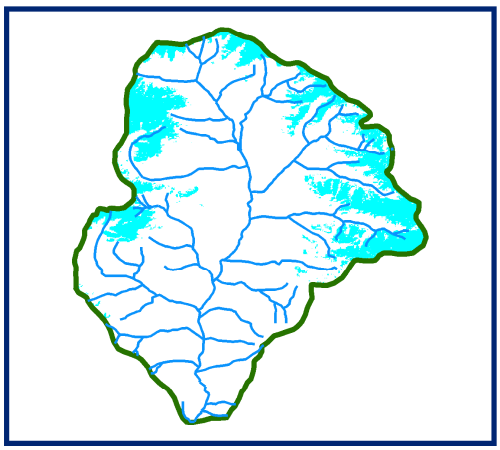
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
03 OCT 2011



DATA USED
12 OCT 2011
18 OCT 2011

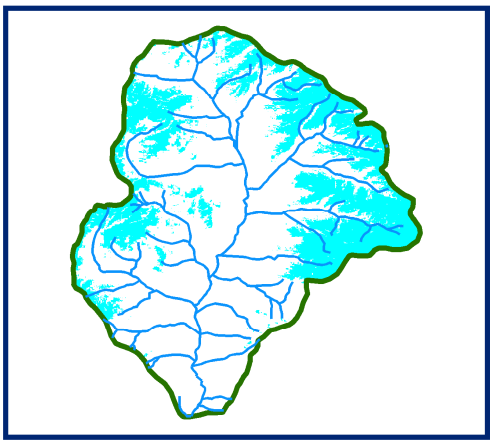


DATA USED
27 OCT 2011

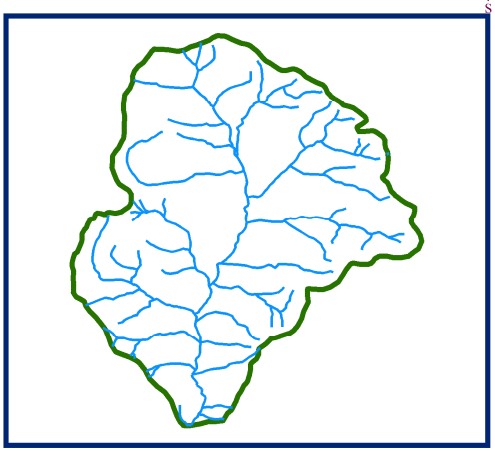
SNOW

03.57 14 21 28
Kilometers

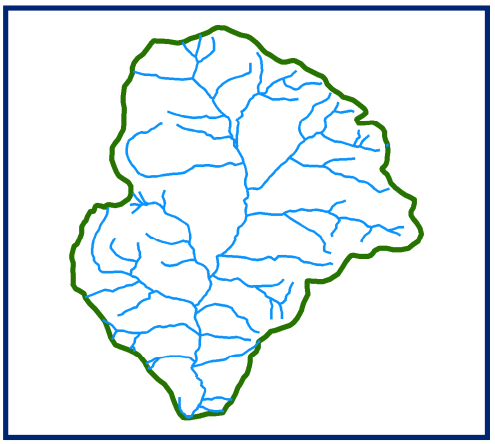
SNOW COVER MAP : BEAS BASIN



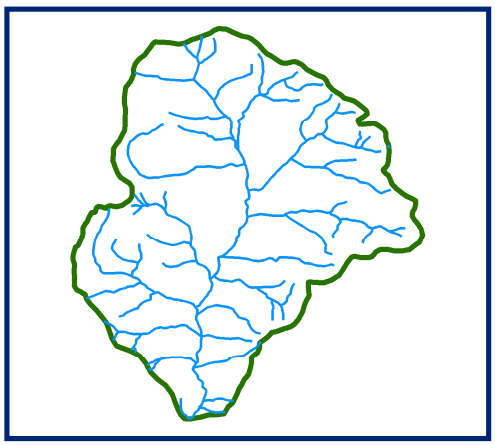
05 Nov 2011



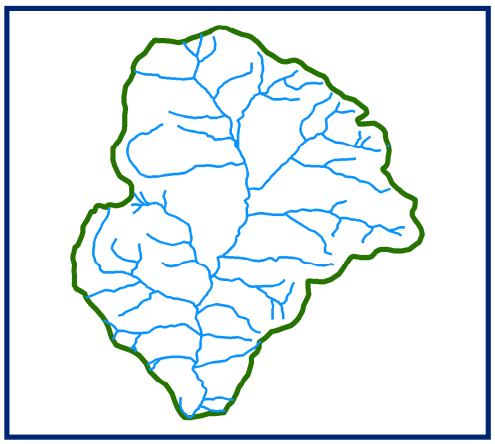
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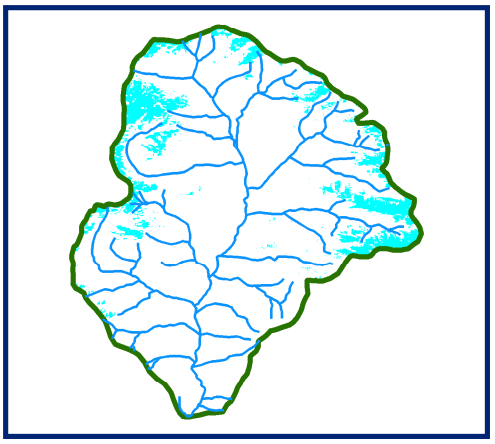
DATA NOT AVAILABLE



DATA NOT AVAILABLE



DATA NOT AVAILABLE

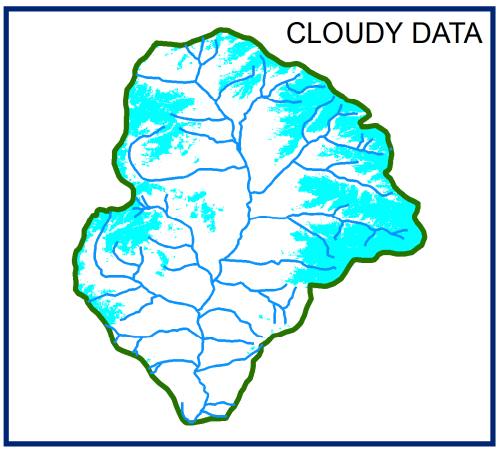


29 Nov 2011

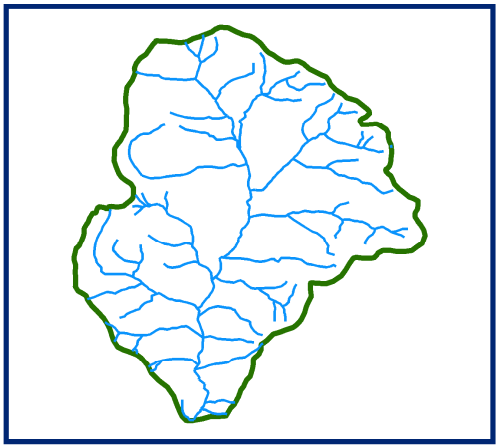
SNOW

0 3 6 912
Kilometers

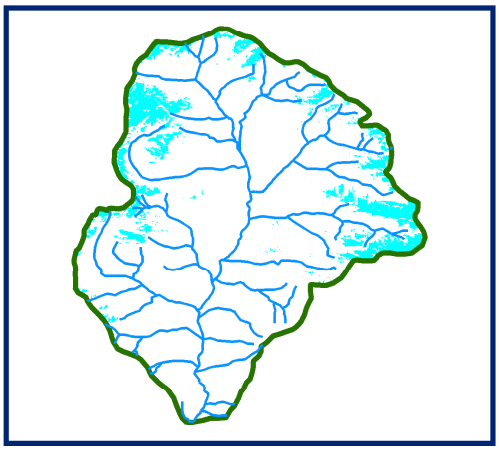
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
05 NOV 2011



DATA USED
DATA NOT AVAILABLE

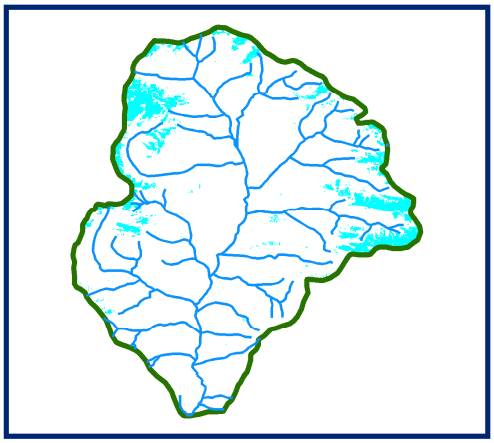


DATA USED
29 NOV 2011

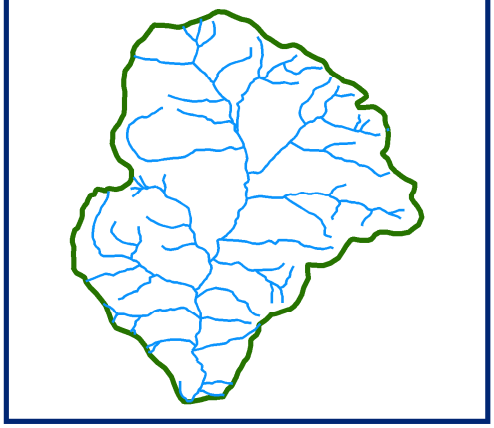
SNOW

03.57 14 21 28
Kilometers

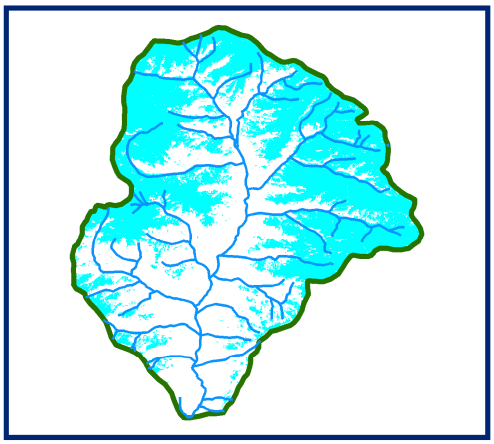
SNOW COVER MAP : BEAS BASIN



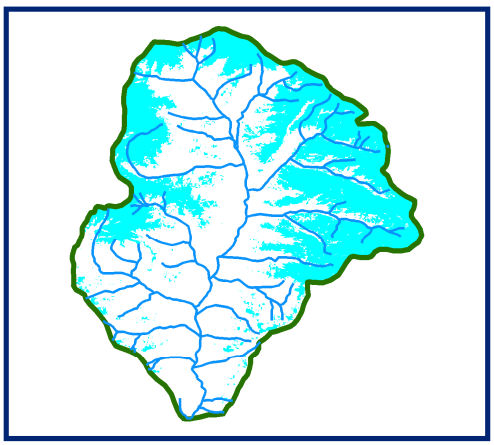
04 Dec 2011



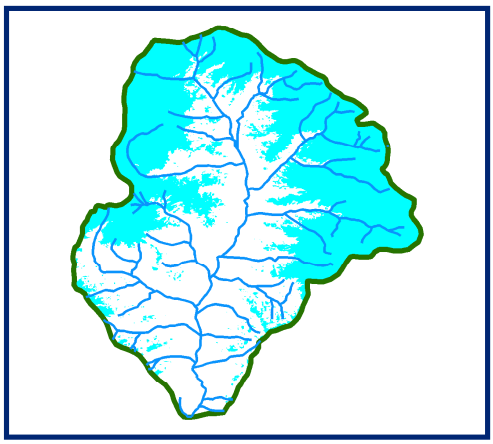
DATA NOT AVAILABLE



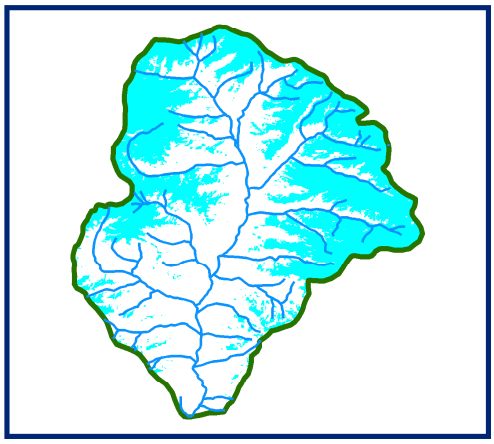
14 Dec 2011



19 Dec 2011



21 Dec 2011



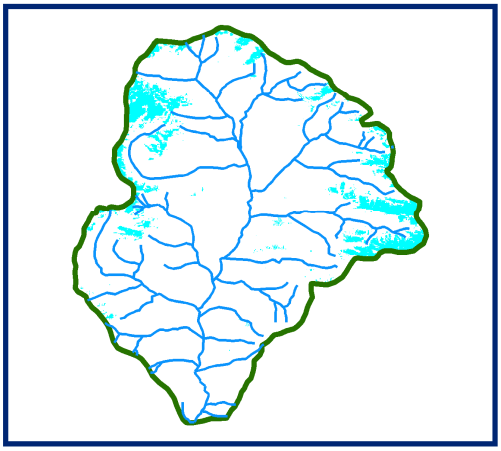
31 Dec 2011

SNOW

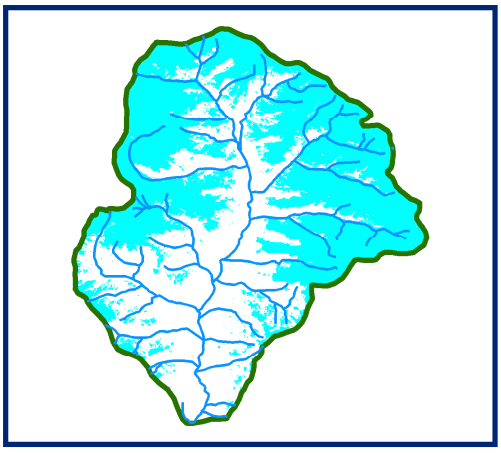
0 3 6 9 12

Kilometers

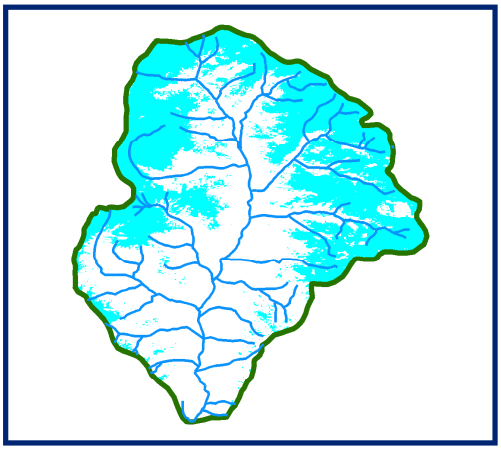
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
04 DEC 2011



DATA USED
14 DEC 2011
19 DEC 2011

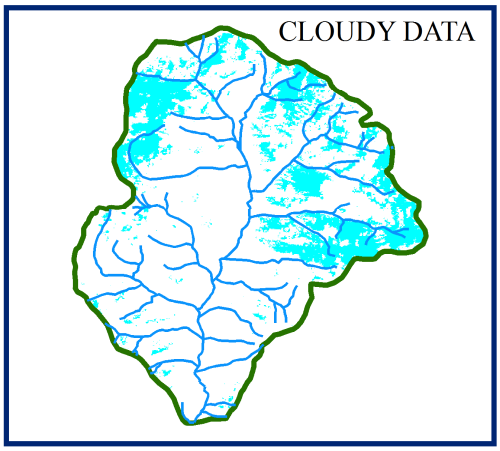


DATA USED
21 DEC 2011
31 DEC 2011

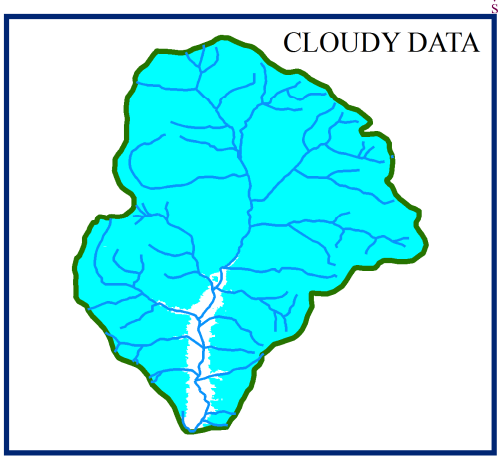
SNOW

03.57 14 21 28
Kilometers

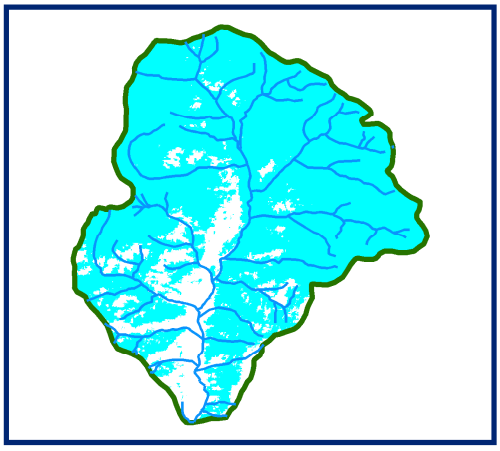
SNOW COVER MAP : BEAS BASIN



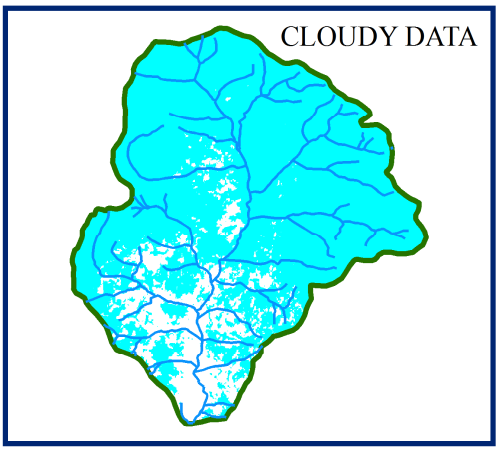
02 Jan 2012



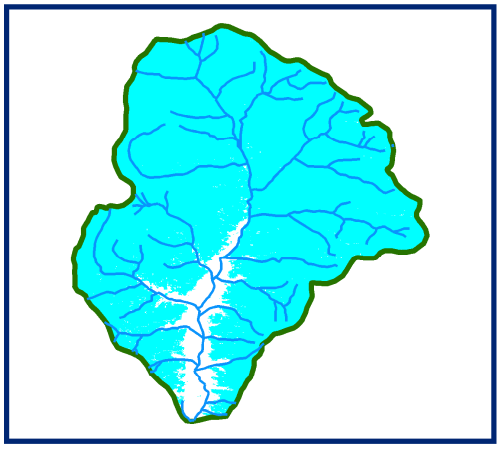
10 Jan 2012



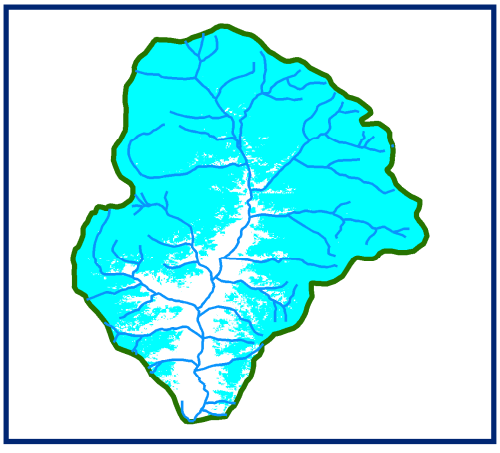
12 Jan 2012



19 Jan 2012



21 Jan 2012

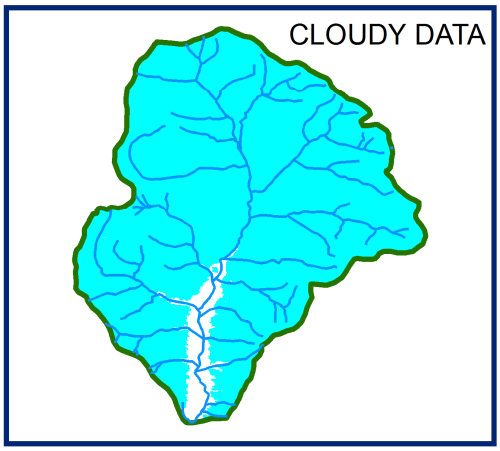


31 Jan 2012

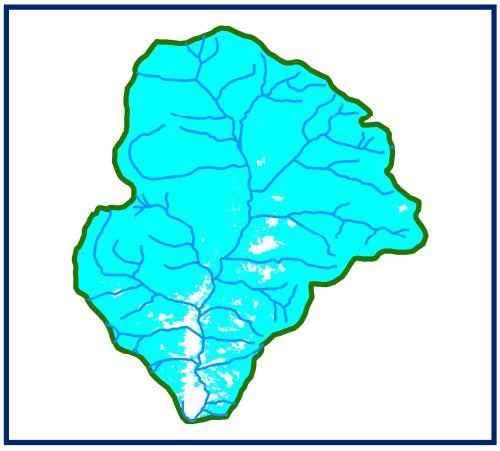
SNOW

0 3 6 9 12
Kilometers

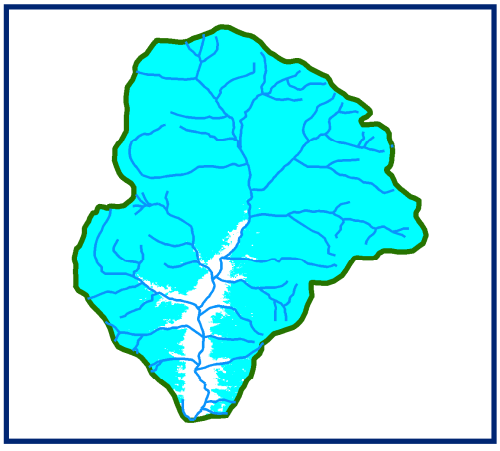
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
10 JAN 2012



DATA USED
12 JAN 2012
14 JAN 2012

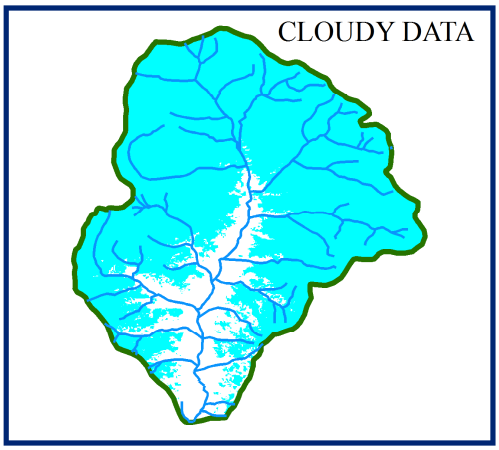


DATA USED
21 JAN 2012
29 JAN 2012

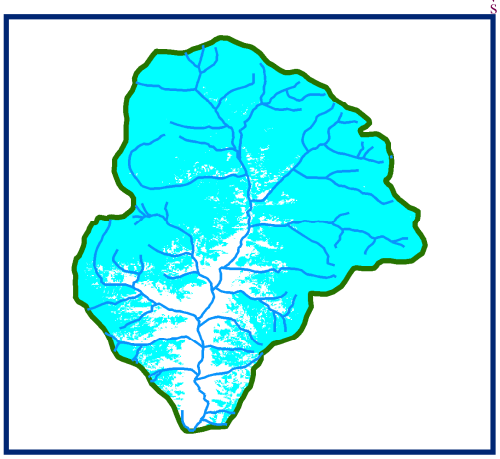
SNOW

03.57 14 21 28
Kilometers

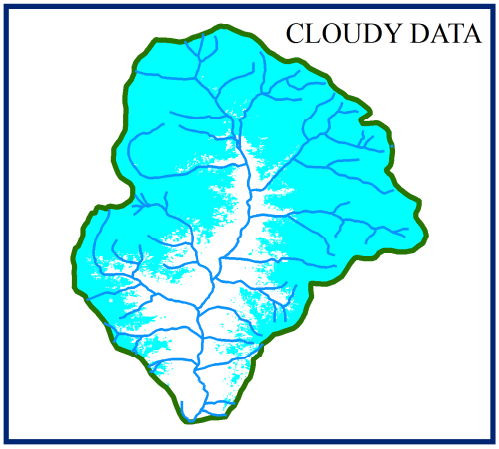
SNOW COVER MAP : BEAS BASIN



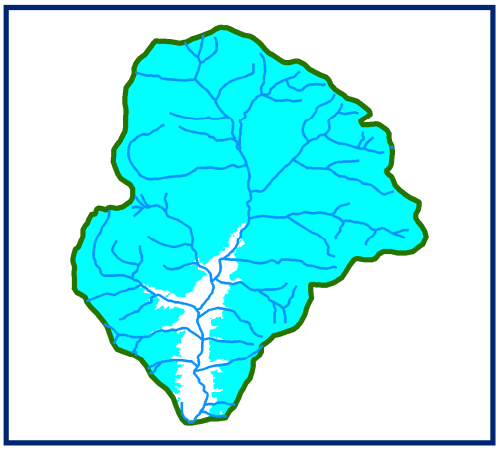
02 Feb 2012



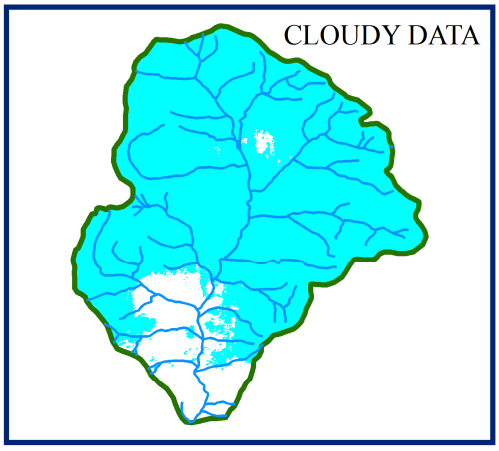
10 Feb 2012



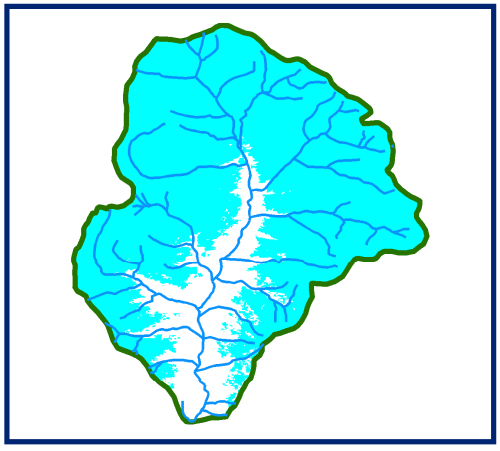
12 Feb 2012



17 Feb 2012



22 Feb 2012

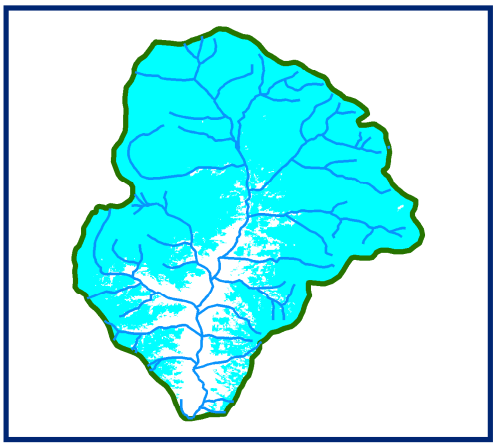


26 Feb 2012

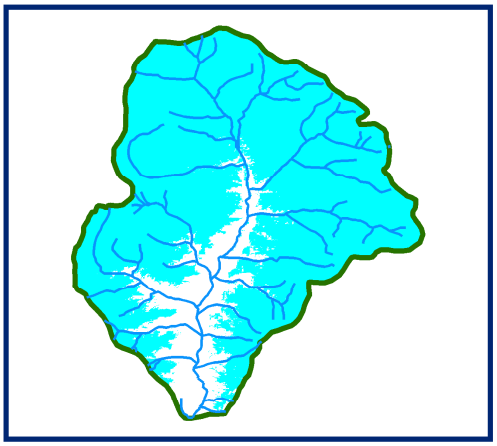
SNOW

0 3 6 9 12
Kilometers

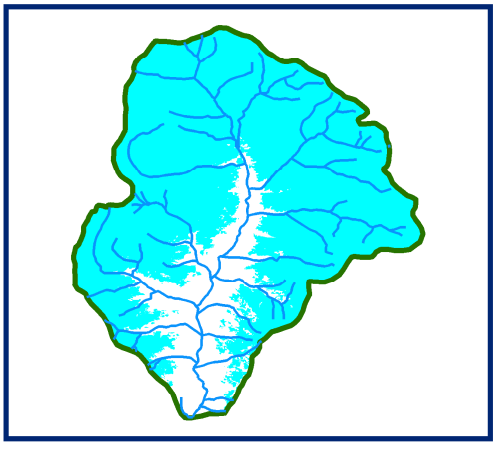
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
02 FEB 2012
10 FEB 2012



DATA USED
12 FEB 2012
17 FEB 2012

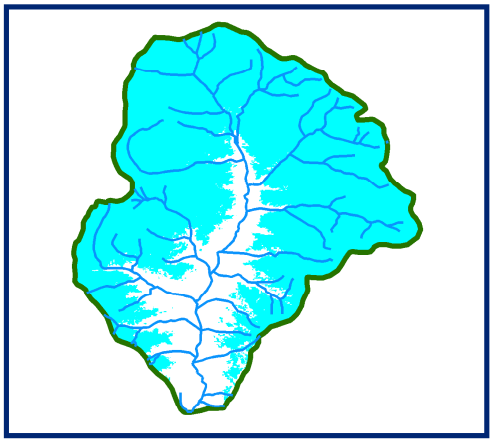


DATA USED
26 FEB 2012

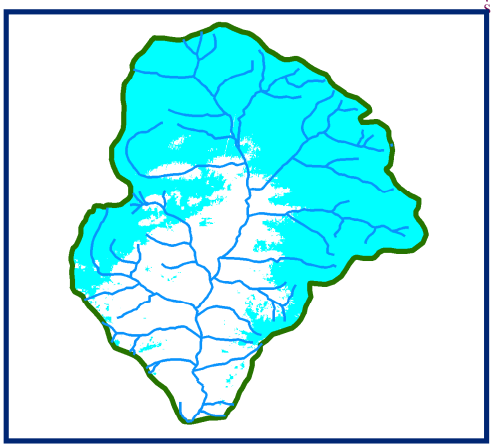
SNOW

0 3.5 7 14 21 28
Kilometers

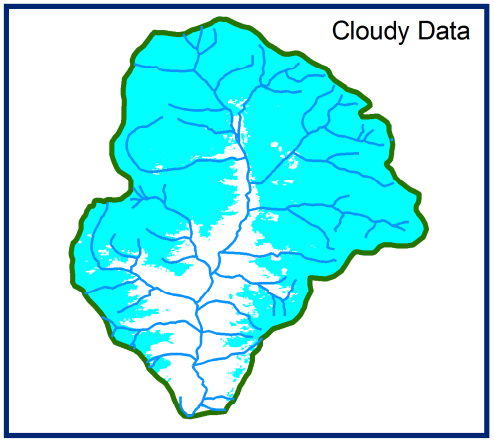
SNOW COVER MAP : BEAS BASIN



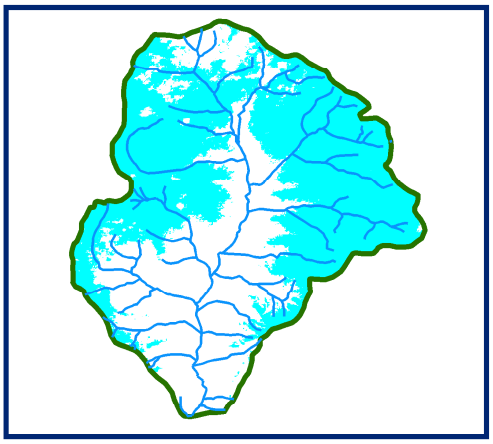
02 March 2012



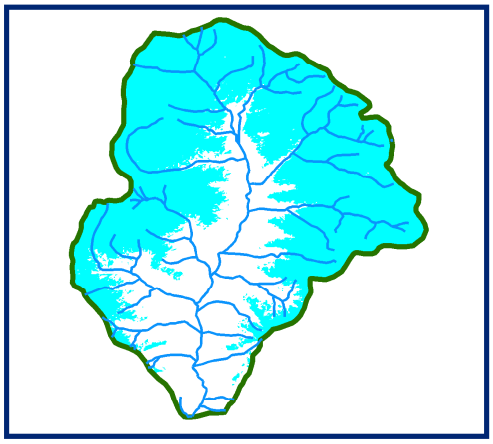
10 March 2012



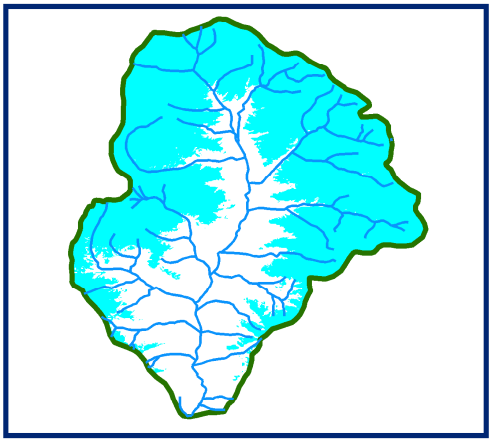
12 March 2012



19 March 2012



22 March 2012

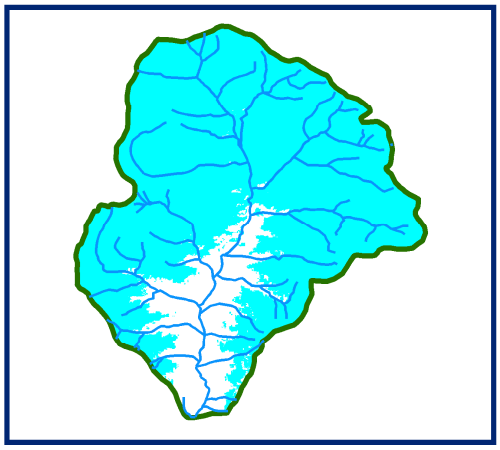


31 March 2012

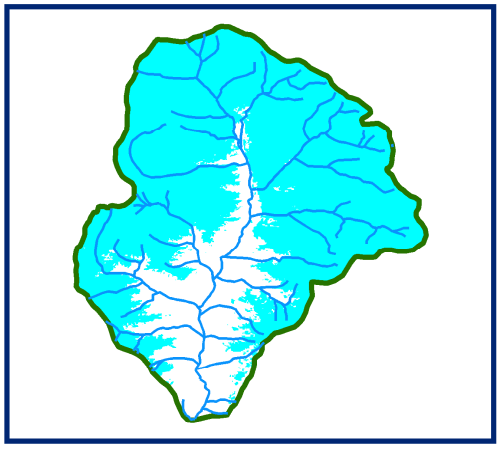
SNOW

0 3 6 9 12
Kilometers

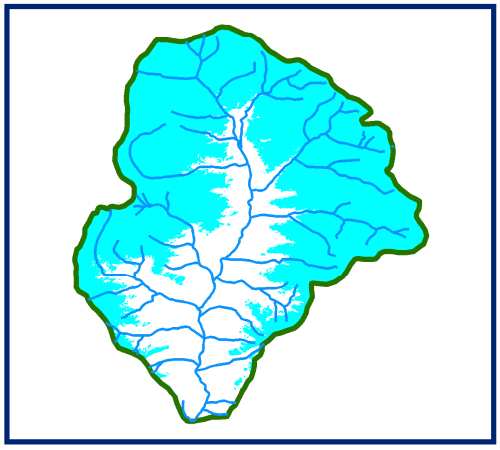
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
02 March 2012
07 March 2012
10 March 2012



DATA USED
12 March 2012
19 March 2012

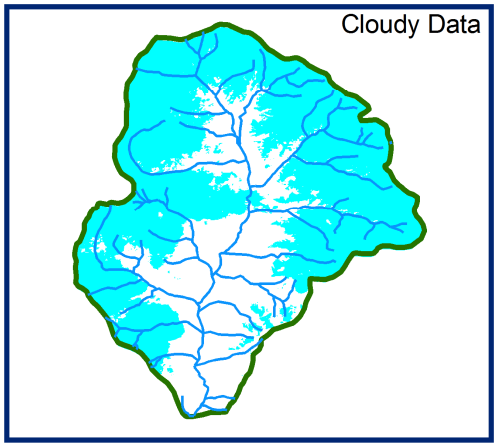


DATA USED
22 March 2012
31 March 2012

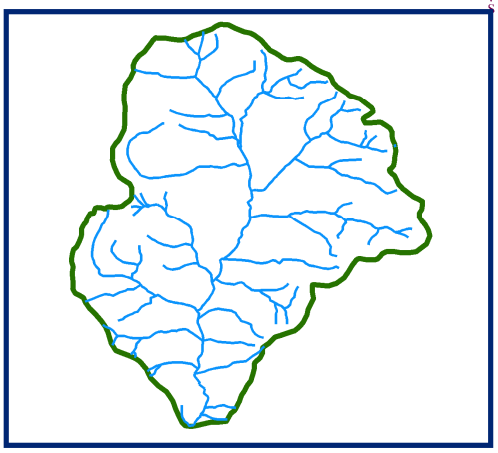
SNOW

0 3 6 9 12
Kilometers

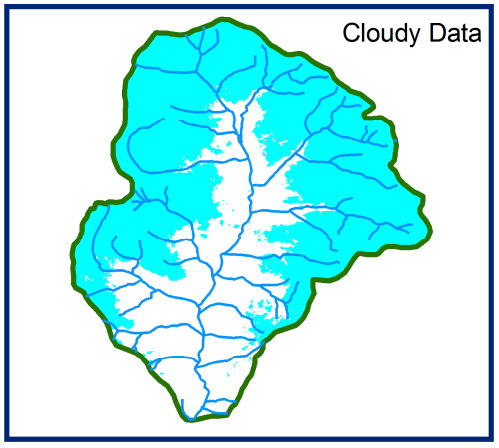
SNOW COVER MAP : BEAS BASIN



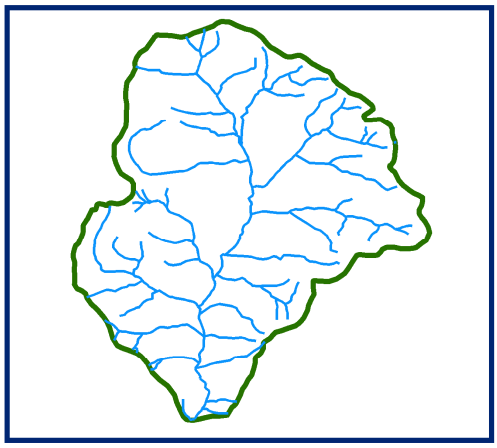
05 April 2012



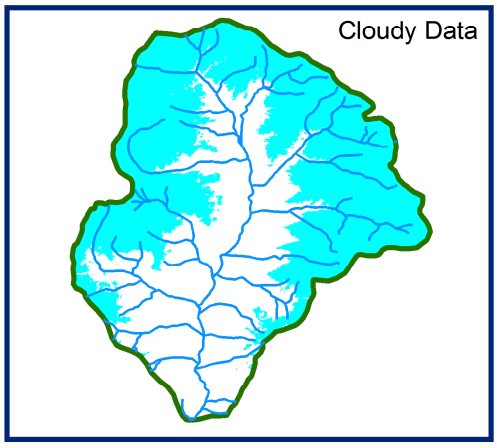
DATA NOT AVAILABLE



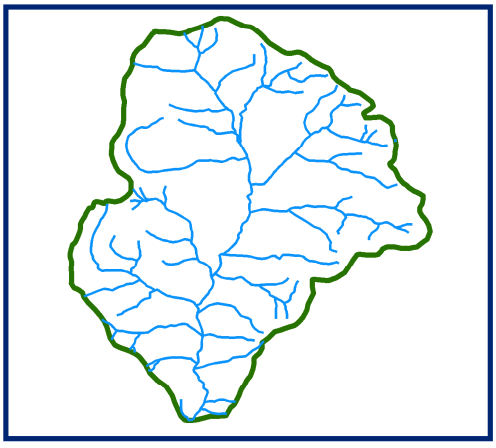
15 April 2012



DATA NOT AVAILABLE



24 April 2012

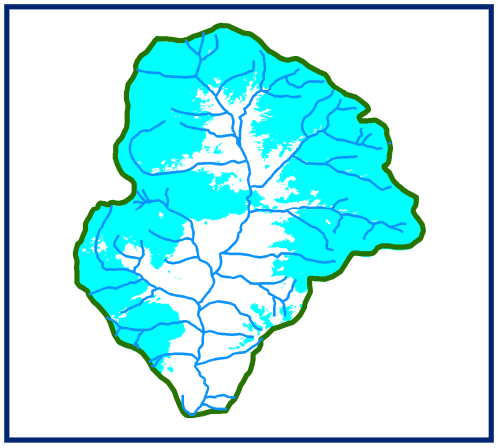


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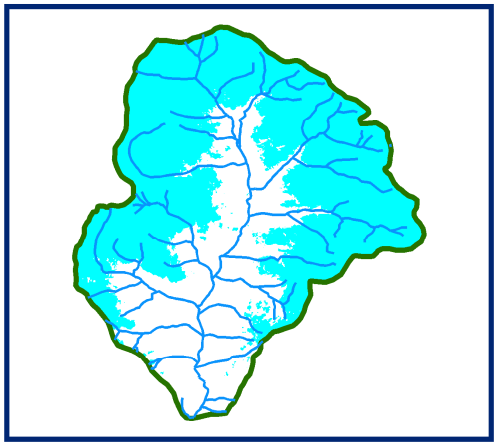
SNOW

0 3 6 9 12
Kilometers

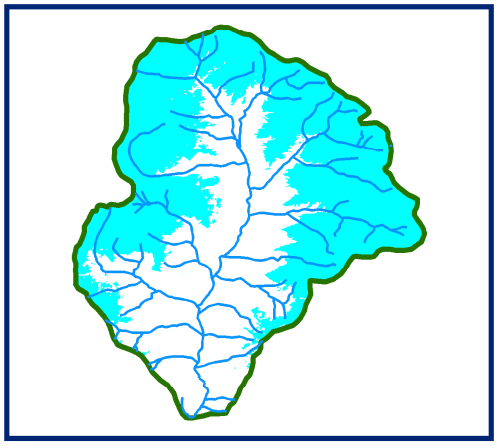
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
05 April 2012



DATA USED
15 April 2012

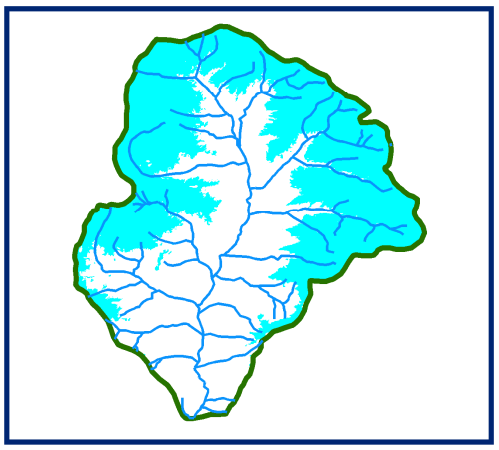


DATA USED
24 April 2012

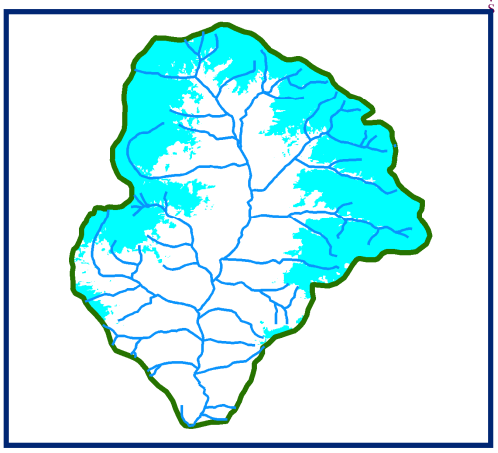
SNOW

0 2.5 5 10 15 20
Kilometers

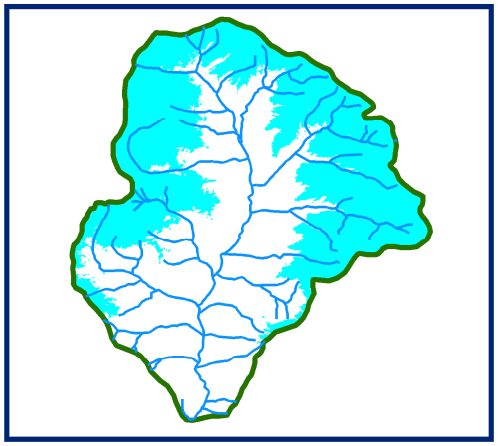
SNOW COVER MAP : BEAS BASIN



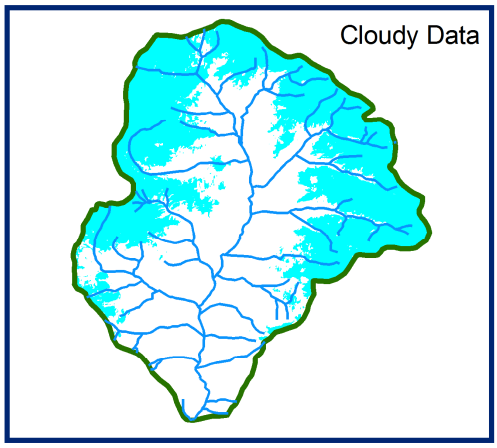
04 May 2012



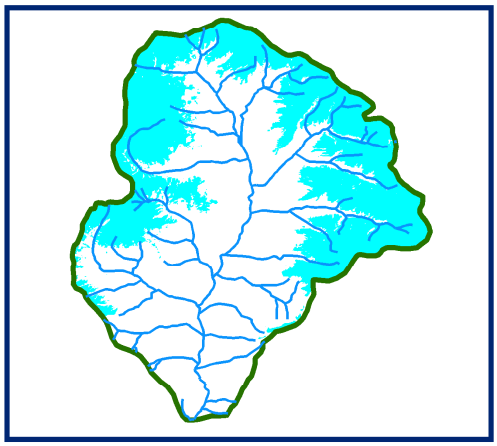
09 May 2012



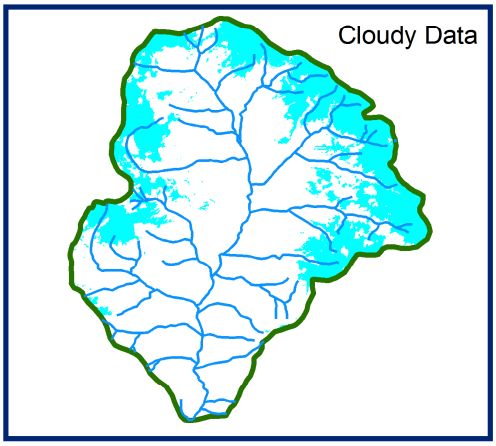
13 May 2012



18 May 2012



23 May 2012



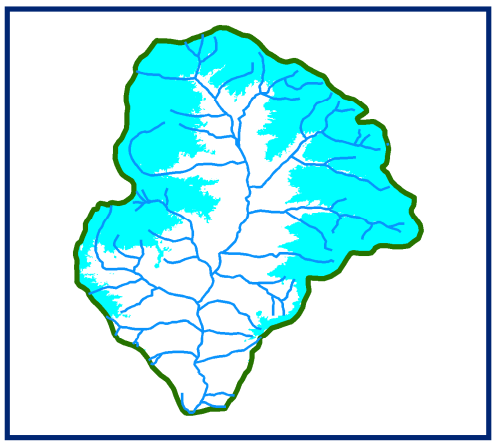
28 May 2012

SNOW

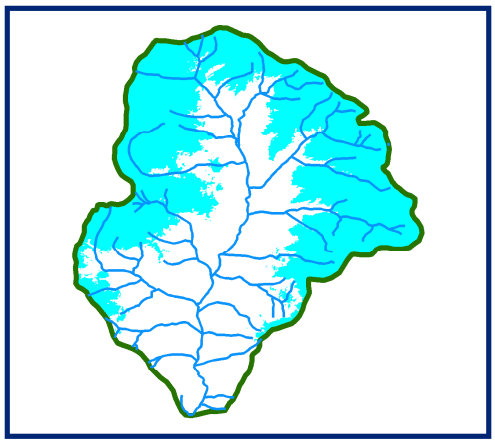
0 3 6 9 12

Kilometers

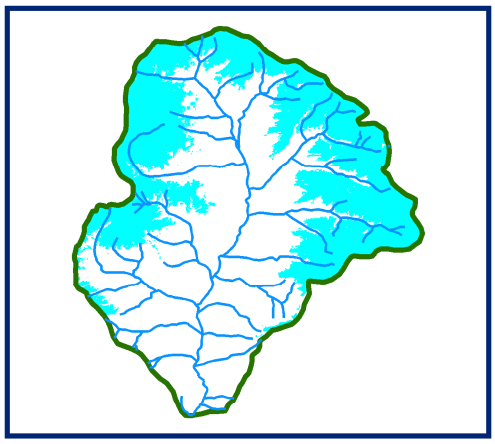
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
04 May 2012
09 May 2012



DATA USED
13 May 2012
18 May 2012

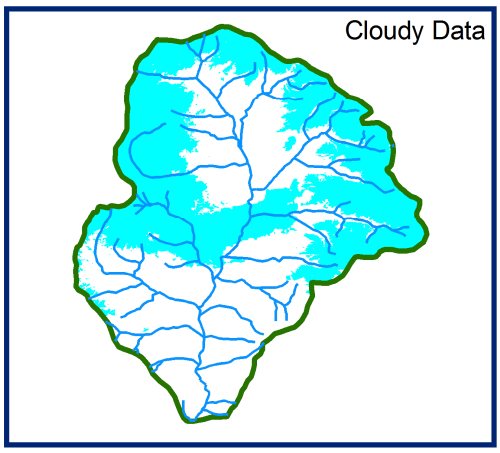


DATA USED
23 May 2012
28 May 2012

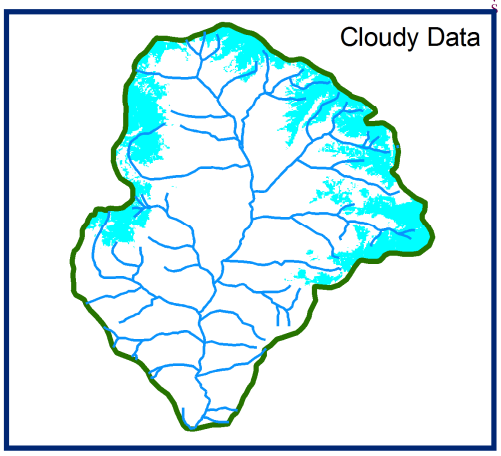
SNOW

0 3 6 9 12
Kilometers

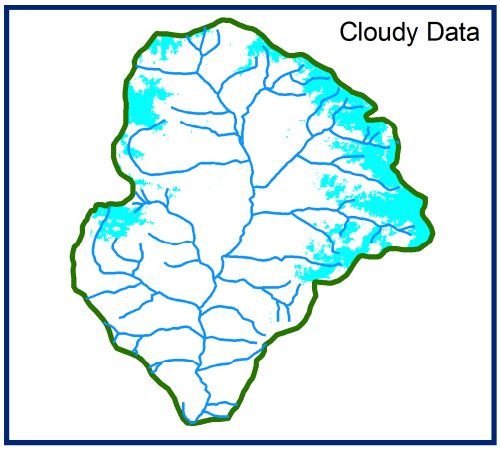
SNOW COVER MAP : BEAS BASIN



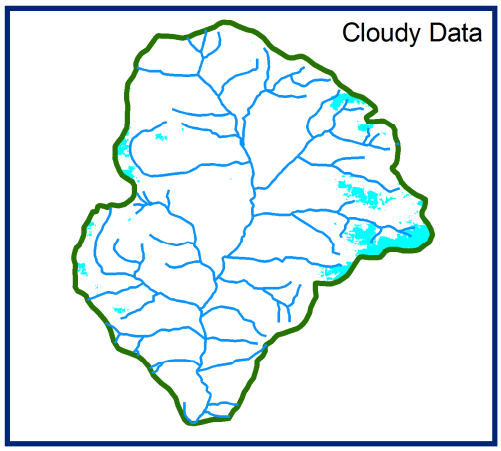
01 June 2012



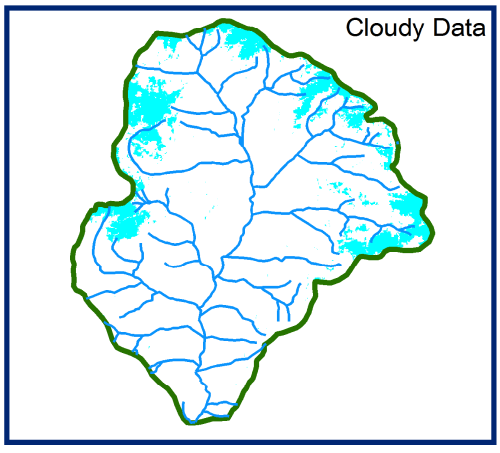
04 June 2012



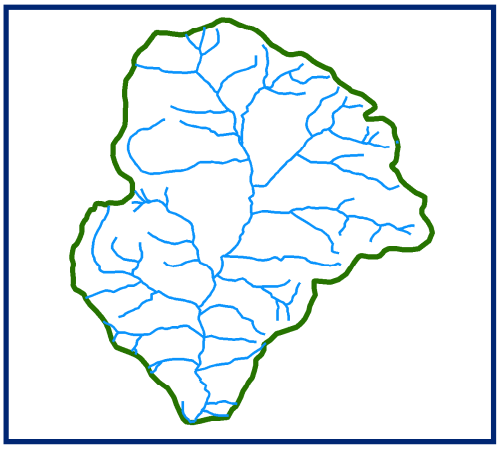
14 June 2012



18 June 2012



23 June 2012

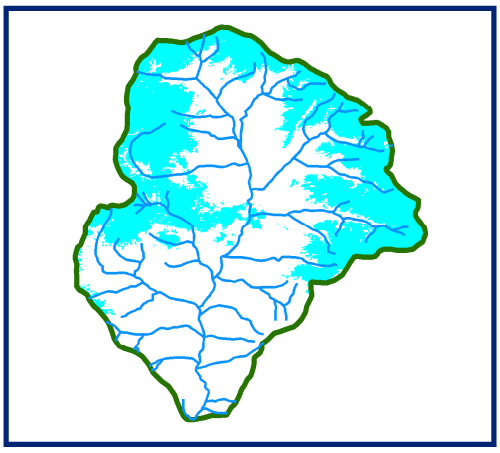


DATA NOT AVAILABLE

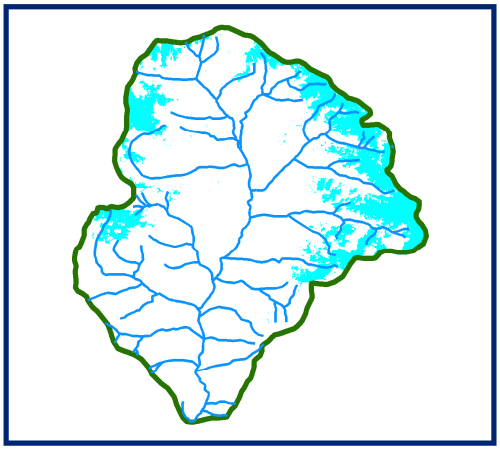
SNOW

0 3 6 9 12
Kilometers

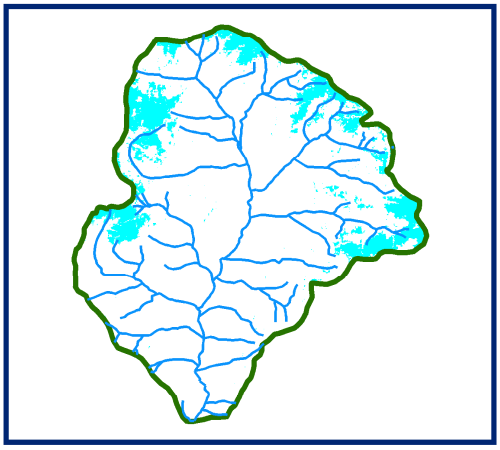
10 DAILY SNOW COVER MAP: BEAS BASIN



DATA USED
01 June 2012
04 June 2012



DATA USED
14 June 2012



DATA USED
23 June 2012

SNOW

0 3 6 9 12
Kilometers