

**JMA/WMO Workshop on Quality Management in Surface,
Climate and Upper-Air Observations in RA II (ASIA)
Tokyo, Japan, 27-30 July 2010**

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Nepal

Location of Nepal



- South Asian landlocked country with fascinating topography and climate.
- It lies between $26^{\circ}22'$ to $30^{\circ}27'$ N lat and $84^{\circ}04'$ to $88^{\circ}12'$ E long.
- Area: 1,41,741 sq km.
- Highest elevation: 8848 m
- Lowest Elevation: 64 m

Physiographic view of Nepal

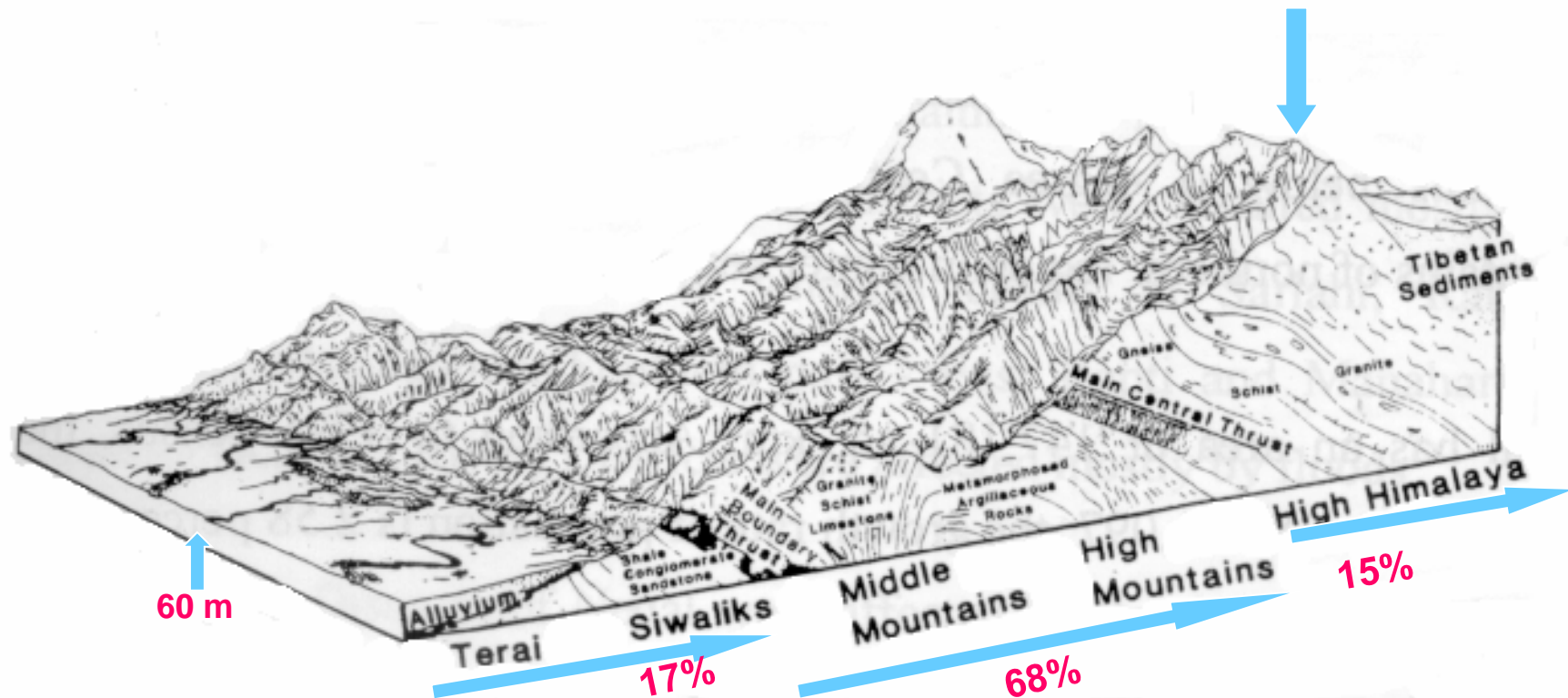
India

China



THE PHYSIOGRAPHIC REGIONS OF NEPAL

Mt. Everest 8848m



(Source: modified from Nelson, et al 1980, and Ramsay, 1986)

Introduction

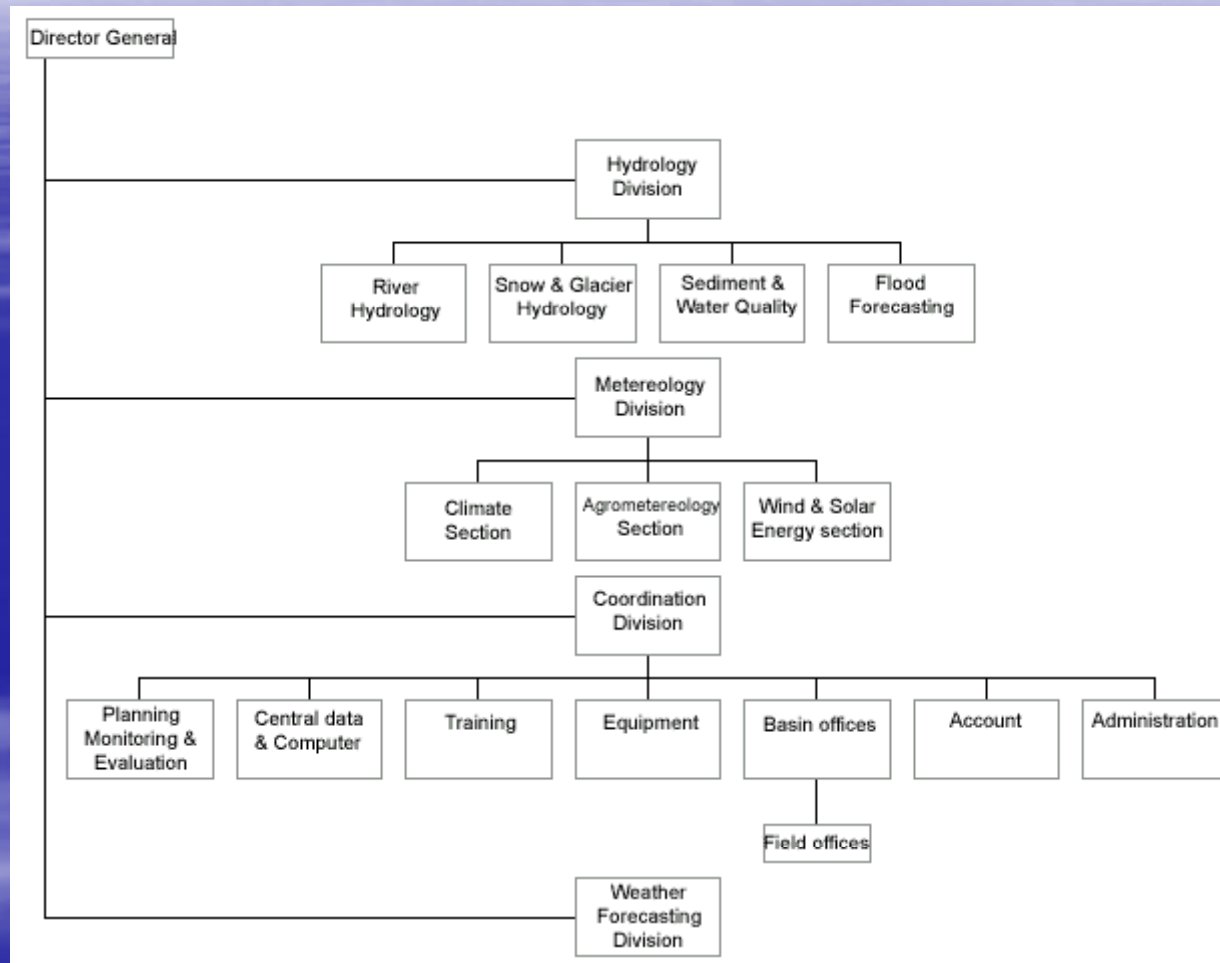
- Established -1962
- WMO Member -1966
- Upgraded to department -1988

Scope of Work

- River Hydrology
- Climate
- Agro-meteorology
- Sediment
- Air Quality & Water Quality
- Limnology
- Snow Hydrology
- Glaciology
- Wind & Solar Energy
- Aviation & General Forecast
- Look upon network of observation stations
- Global Exchange of Meteorological Data

The Principal Activities of DHM

- Collect and disseminate hydrological and meteorological information for water resources, agriculture, energy and other development activities.
- Issue hydrological and meteorological forecast for public, mountaineering expedition, civil aviation and for the mitigation of natural disasters.
- To provide meteorological support for flood warning and flood control operations.
- Conduct special studies required for the policy maker and for the development of hydrological and meteorological sciences in the region.
- Promote relationship with national and international organization in the field of hydrology and meteorology.



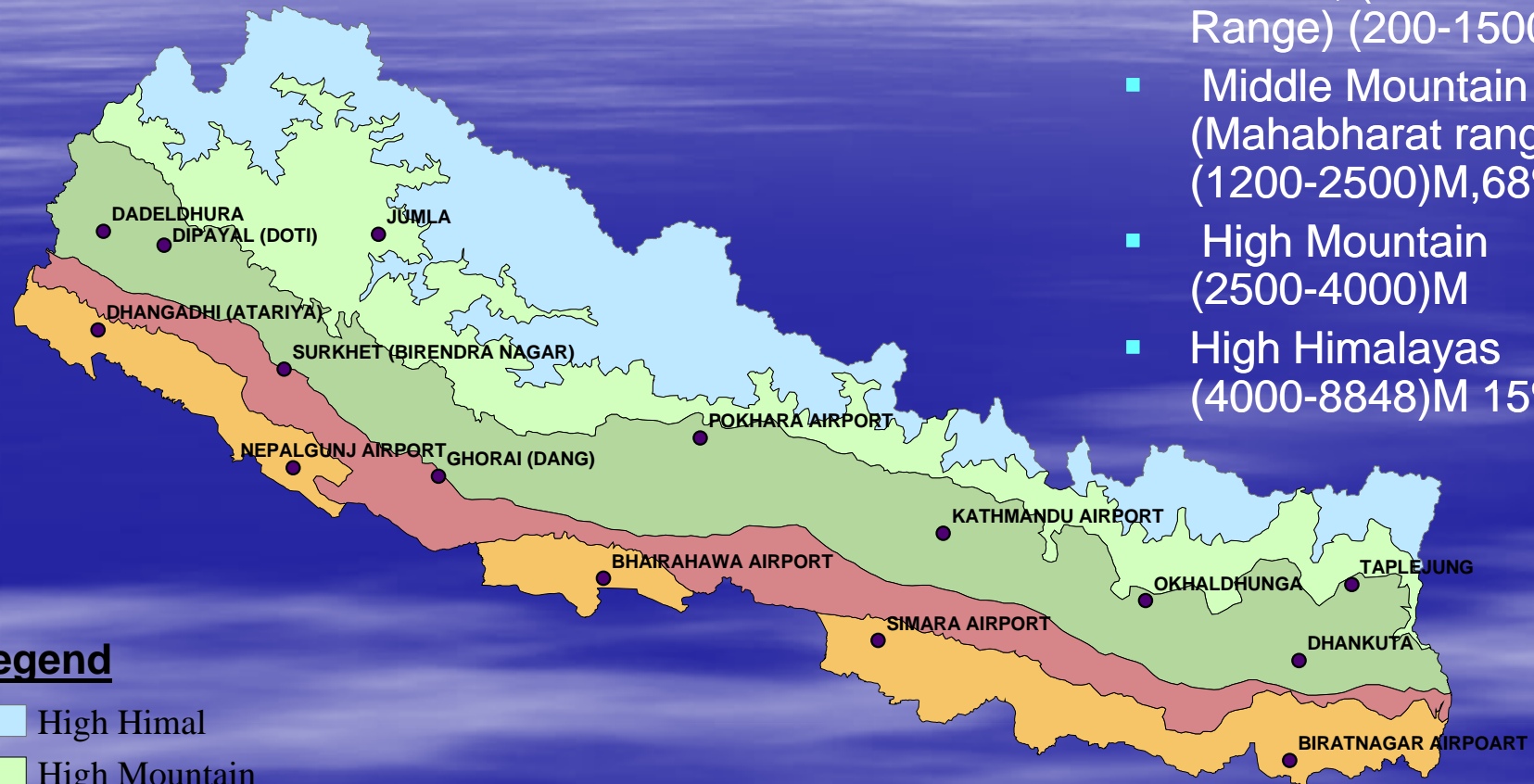
- **Hydro-Meteorological Observation
Network in DHM**

Physiographic Regions based on Topography and 15 Synoptic Stations

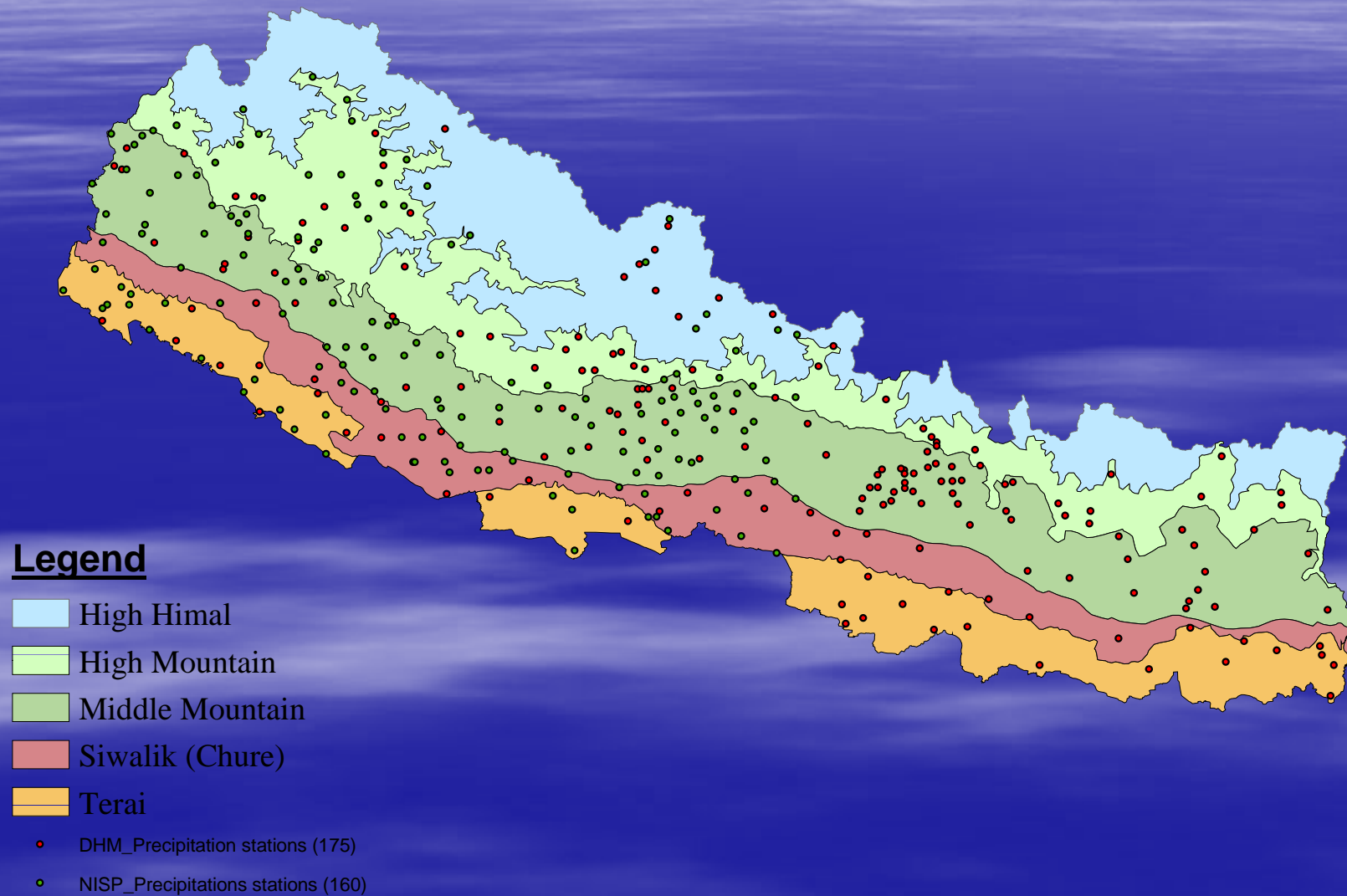
- Terai (60-200)M ,17%,
- Churia, (Siwalik Range) (200-1500)M
- Middle Mountain (Mahabharat range) (1200-2500)M,68%
- High Mountain (2500-4000)M
- High Himalayas (4000-8848)M 15%

Legend

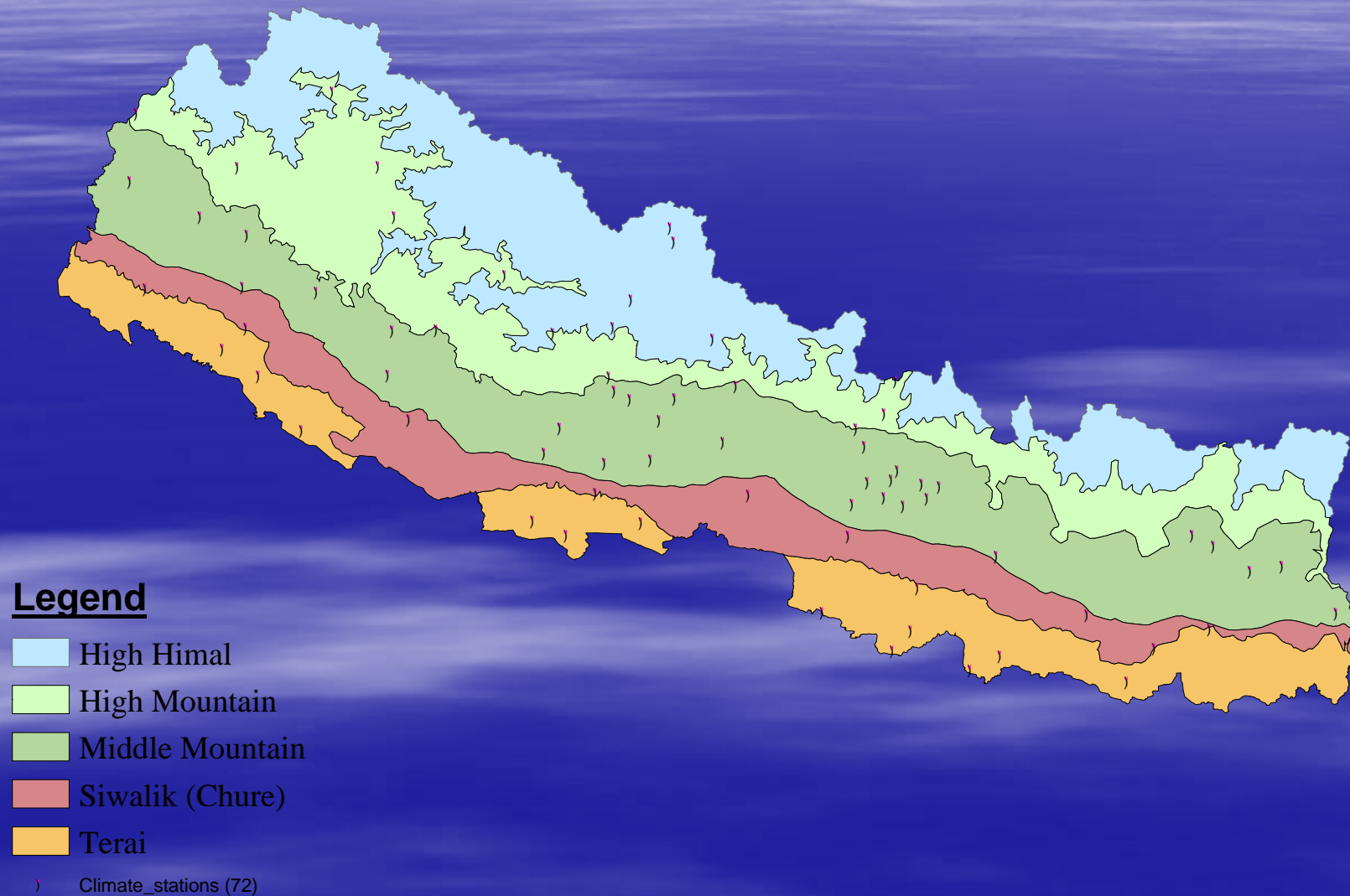
- High Himal
- High Mountain
- Middle Mountain
- Siwalik (Chure)
- Terai
- Synoptic_stations (15)



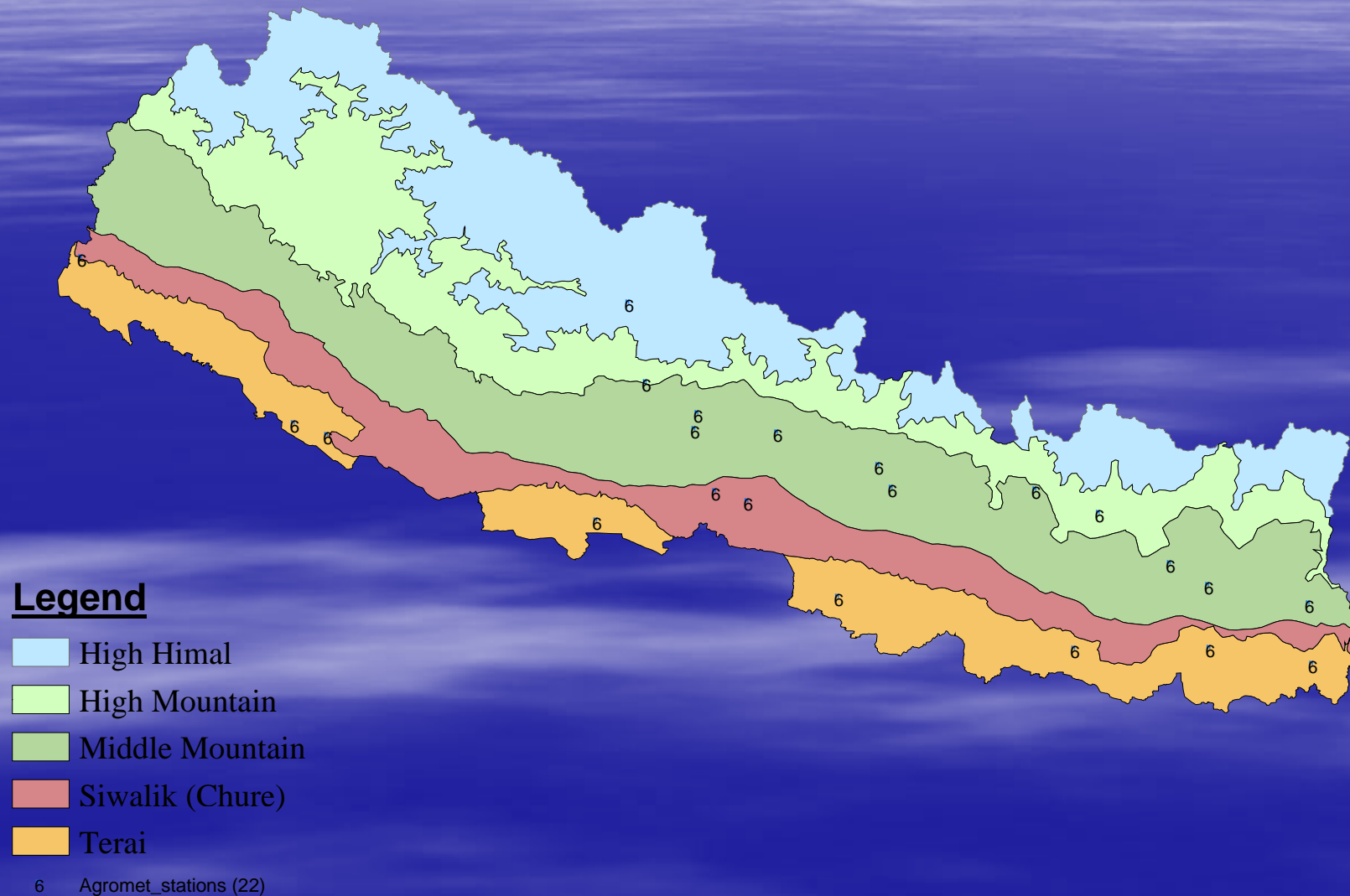
Precipitation Stations (337)



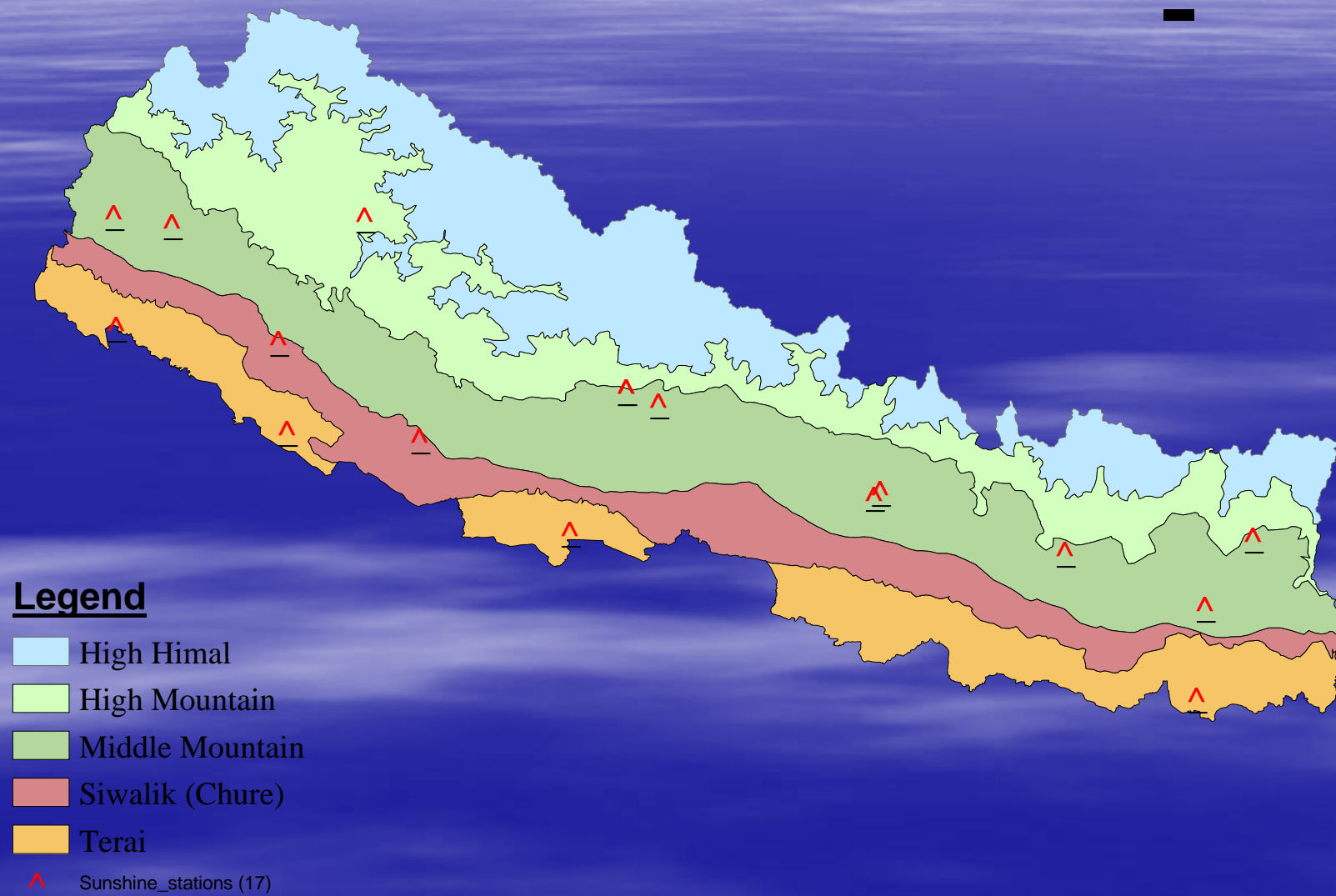
Climate Station (72)



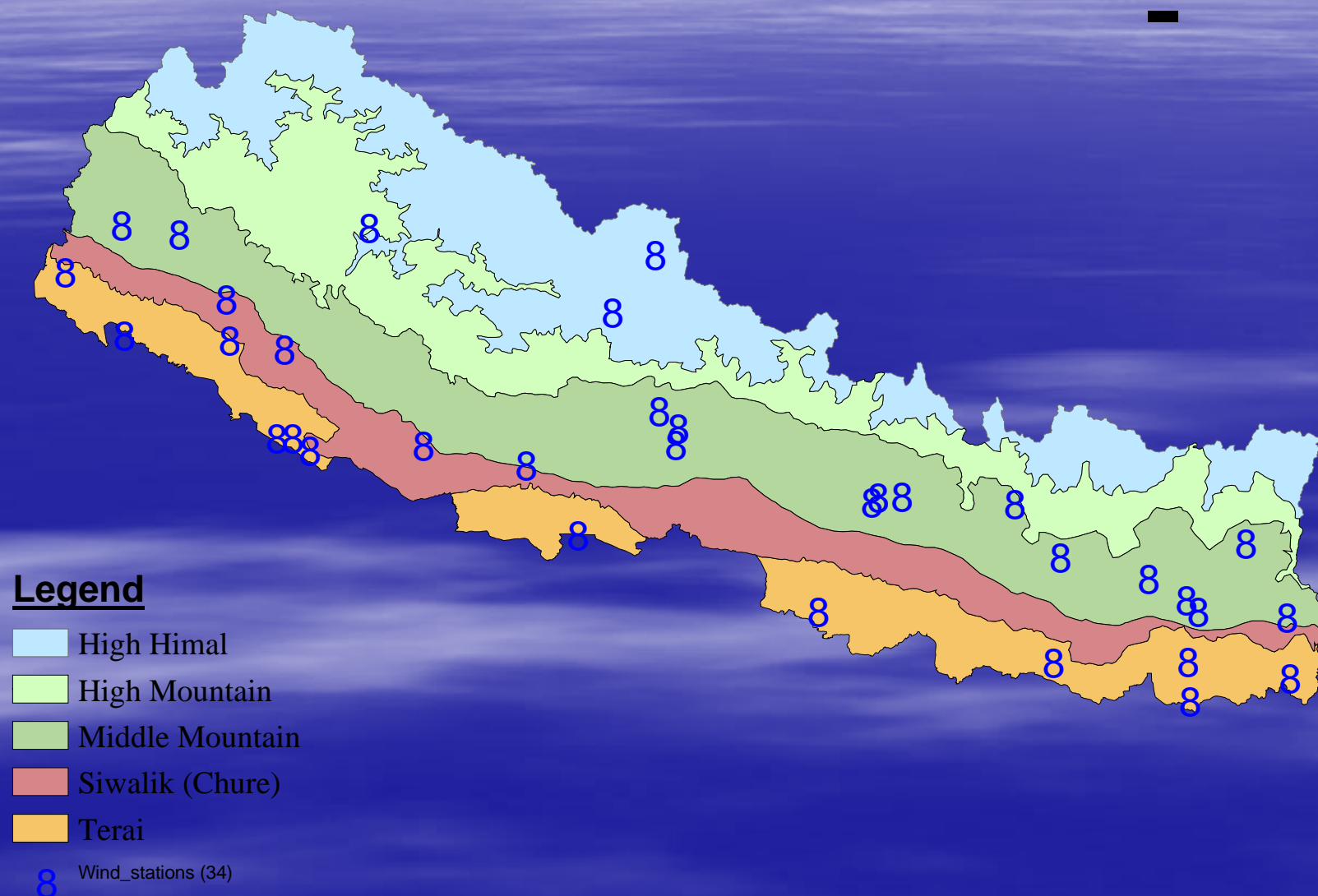
Agro-meteorological Stations (22)



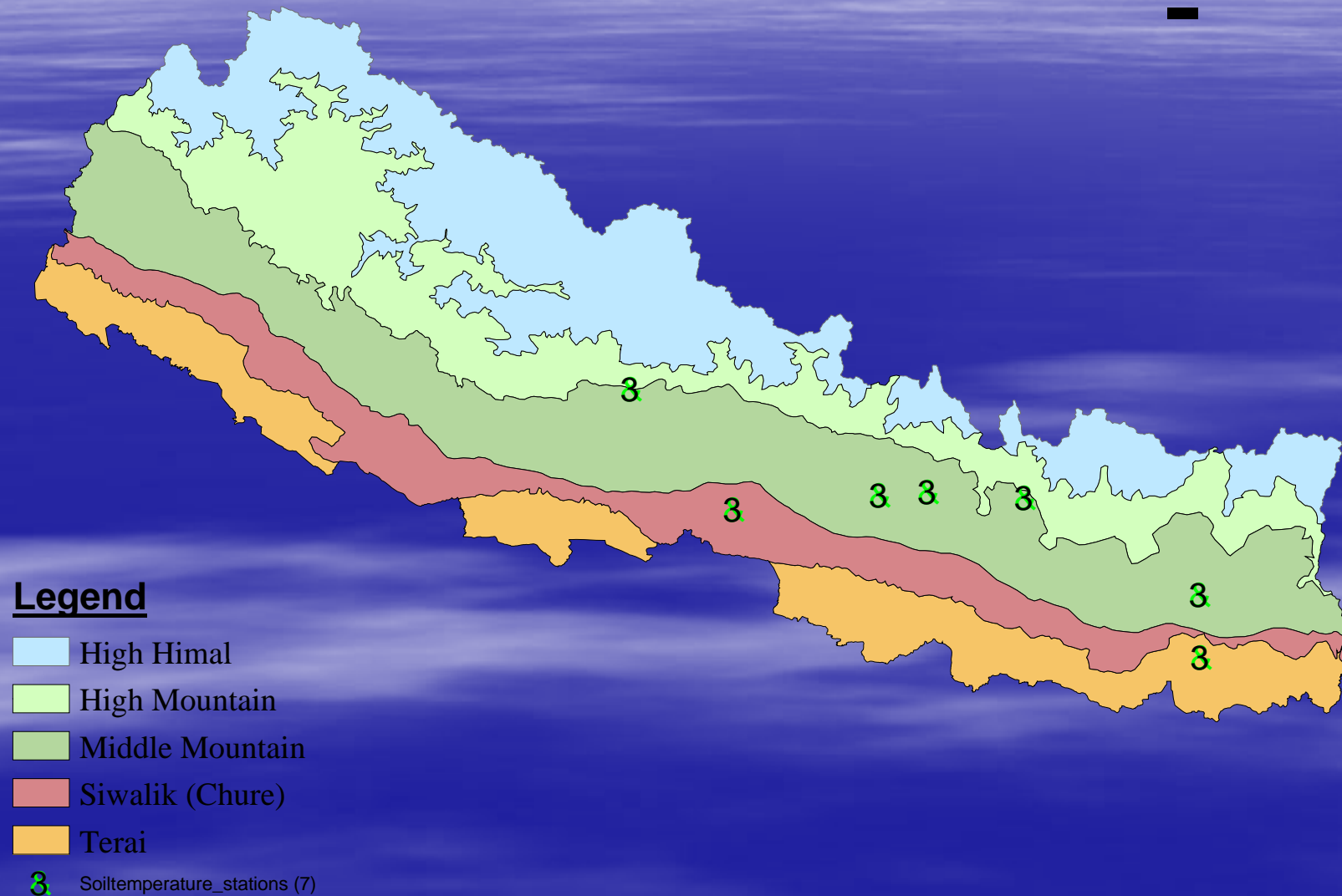
Sunshine Stations (17)



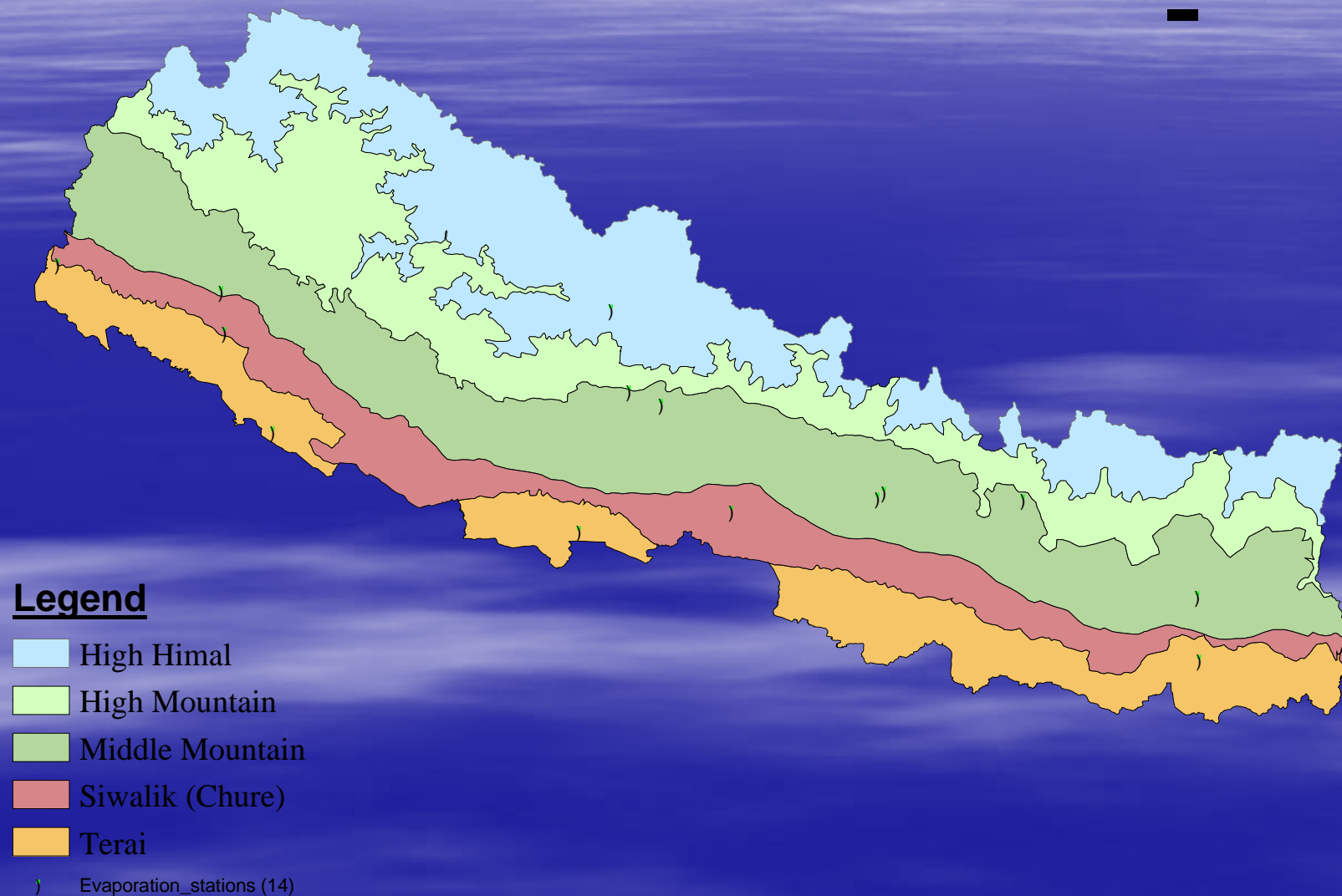
Wind Stations (34)



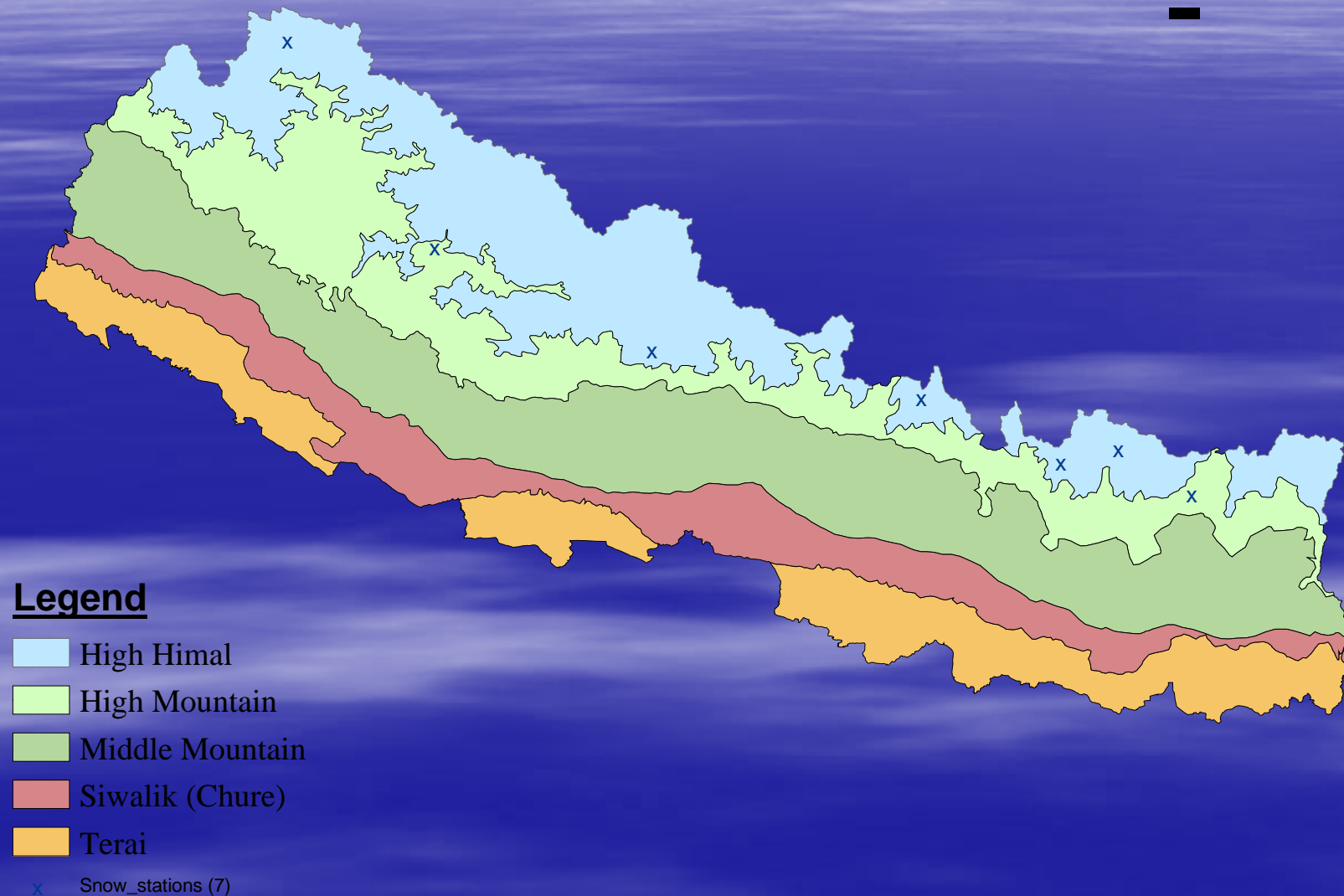
Soil Temperature Stations (7)



Evaporatation Stations (14)



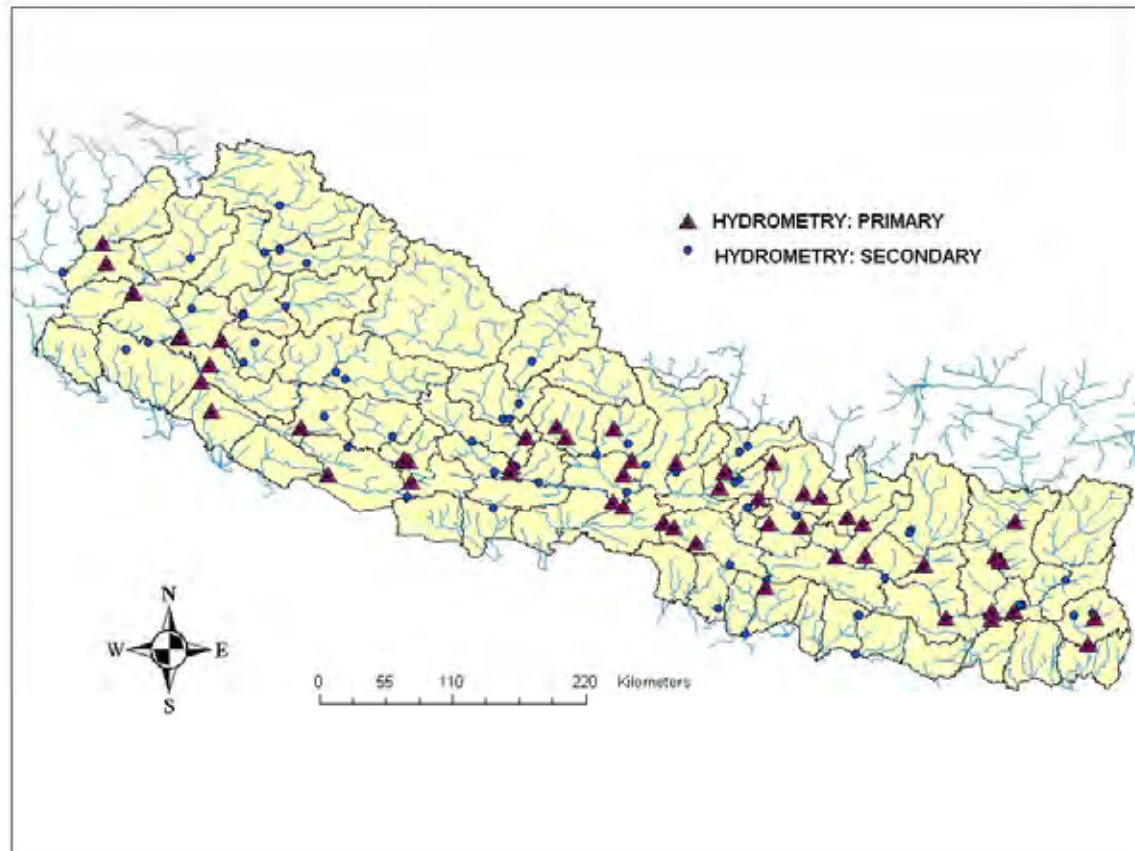
Snow Stations (7)



Hydrometric Station Network

Flood forecasting section has a network of 45 stations:

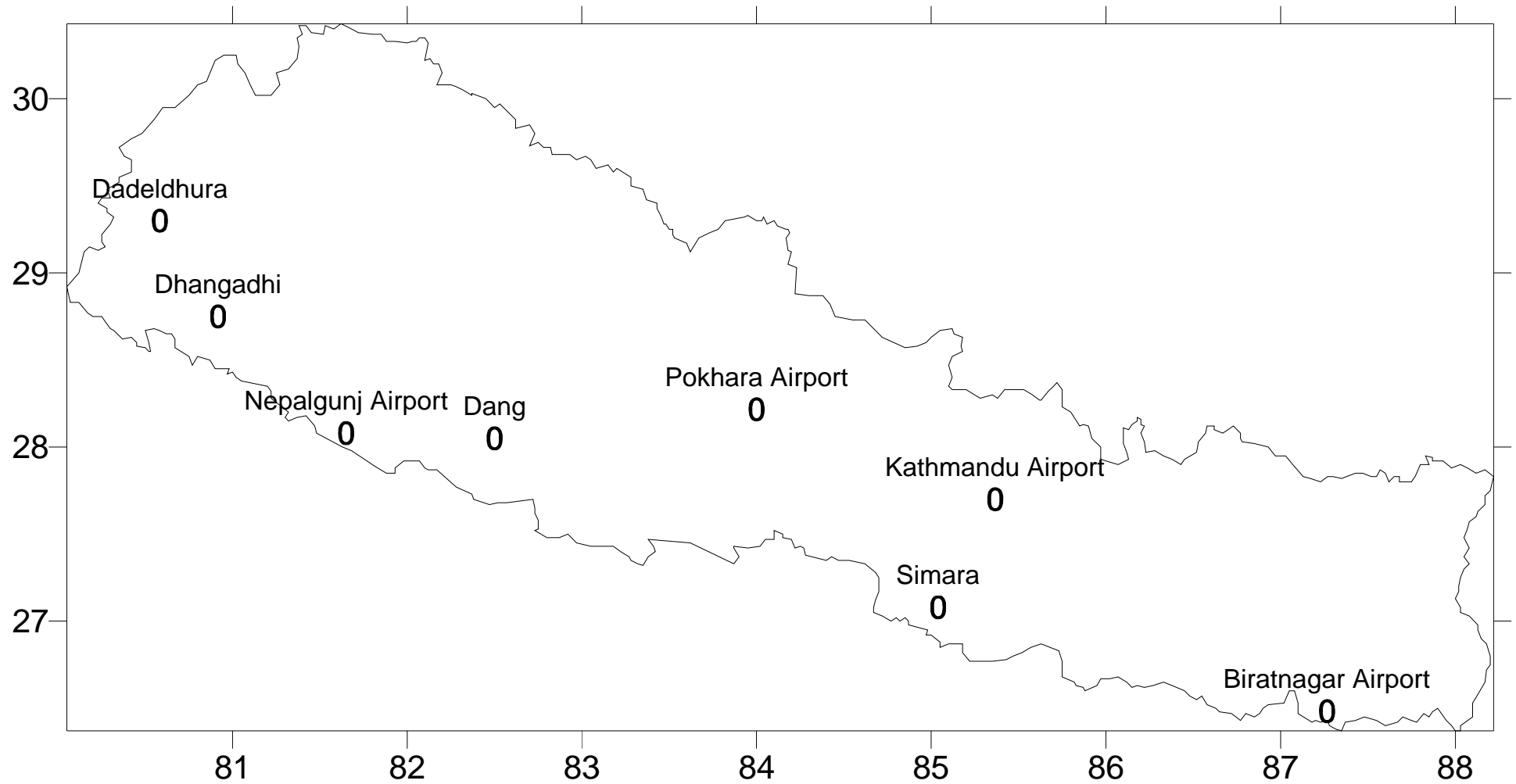
- 15 hydrometric stations and
- 30 meteorological stations



Synoptic Station Kathmandu



Automatic Weather Stations (15)



Proposed Automatic weather station for storm project

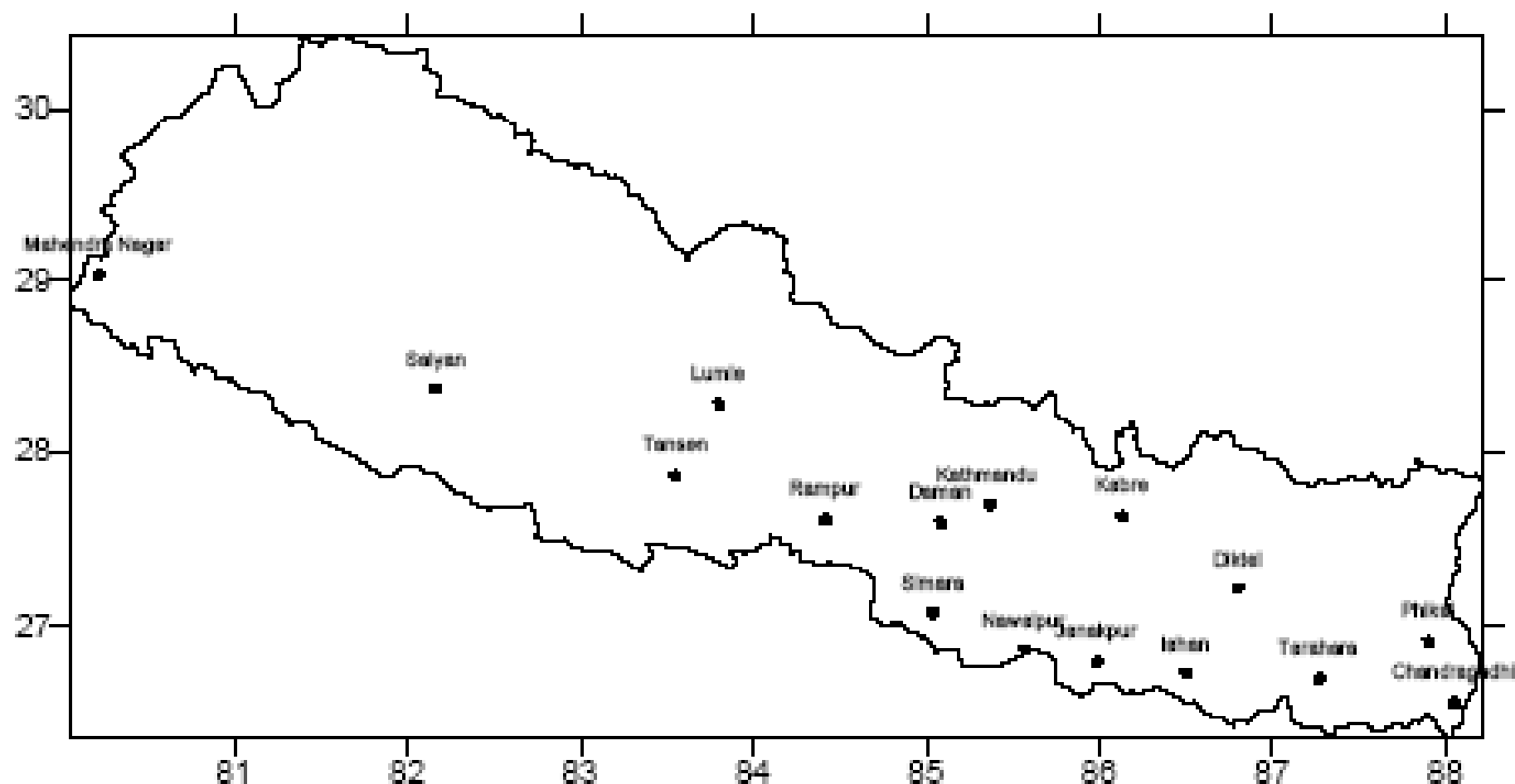


Fig. 1. Proposed locations of the AWS to be installed in Nepal under the SAARC STORM Programme.

Proposed locations for the installation of AWS Network

| S.N. | Name of station | Latitude | Longitude | Elevation (m) |
|------|-----------------|----------|-----------|---------------|
| 1 | Chandragadhi | 26.57 | 88.05 | 120 |
| 2 | Phikal | 26.92 | 87.90 | |
| 3 | Tarahara | 26.70 | 87.27 | |
| 4 | Diktel | 27.22 | 86.80 | |
| 5 | lahan | 26.73 | 86.50 | 138 |
| 6 | Janakpur | 26.80 | 85.98 | 93 |
| 7 | Kabre | 27.63 | 86.13 | 1755 |
| 8 | Nawalpur | 26.87 | 85.57 | |
| 9 | Kathmandu | 27.70 | 85.37 | 1320 |
| 10 | Daman | 27.60 | 85.08 | 2314 |
| 11 | Simara | 27.08 | 85.04 | |
| 12 | Rampur | 27.62 | 84.42 | 256 |
| 13 | Lumle | 28.30 | 83.80 | 1652 |
| 14 | Tansen | 27.87 | 83.55 | 1067 |
| 15 | Salyan | 28.38 | 82.17 | 1457 |
| 16 | Mahendra Nagar | 29.03 | 80.22 | |

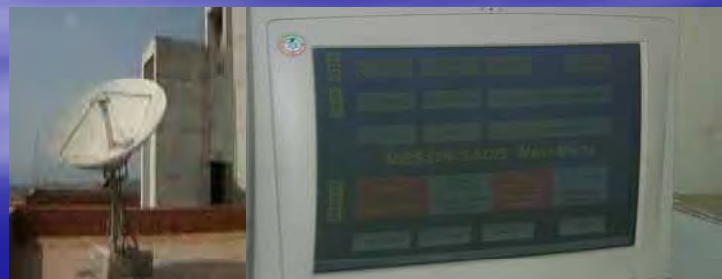
Meteorological Data Communication System



Data Receiving from RTH New Delhi



Real time data receiving from Synoptic Station



Met .Information though SADIS

- Surface and upper air data for forecasting is exchanged under GTS from RTH New Delhi, India.
- Real time data from 15 synoptic station through (HFSSB) radio or Code Division Multiple Access (CDMA) wireless modem used for weather forecast & internal Exchange.
- Since 1998, MFD receive various meteorological information through **SADIS** by World Area Forecast Centre (WAFS) located Barcknail, London

Meteorological Data Communication System



Meteorological Data Communication & Plotting System



TCP/IP Communication

Edition 2.1.1

March 25, 2009 Software and documentation

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Developed by,
eLinkSoftware Inc

3A Corporation, 84-B MAHS, Karachi PAKISTAN

Future Plan

- Installation of AWS in all synoptic stations during this year 2010 under SAARC_STORM project.
- One Doppler Weather Radar probably next year
- Two GPS Sonde Stations
- 16 telemetry rainfall stations will be installed in model basin.
- 5 telemetry water level stations will also be installed in the same model basin.
- WRF model are to be run this year for improve weather forecast as well as flood forecast



Thank You All for Kind Attention



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Ministry of Environment, Science and Technology
Department of Hydrology and Meteorology
Hydrology Division

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September 24, 2008 - 11 Hr.

| Station no. | Station | Longitude (E) | Latitude (N) | Hourly Rainfall (mm) | Today's Rainfall from 08:45 NST (mm) | Waterlevel (m) |
|-------------|-----------------------------|---------------|--------------|----------------------|--------------------------------------|----------------|
| 810.5 | Ansing | 83° 48' 00" | 27° 53' 24" | 0 | 0 | |
| 1002 | Arughat | 84° 49' 12" | 28° 03' 00" | 0 | 0 | |
| 609 | Beni | 83° 36' 00" | 28° 16' 12" | 0 | 0 | |
| 104.5 | Betrawati | 85° 10' 48" | 27° 58' 12" | 1.40 | 0.40 | |
| 704.5 | Danda | 84° 12' 00" | 28° 03' 00" | 0 | 0 | |
| 809 | Gorkha | 84° 37' 12" | 27° 58' 12" | N/A | N/A | |
| 601 | Jomsom | 83° 43' 12" | 28° 46' 48" | N/A | N/A | |
| 450 | Narayanghat | 84° 25' 48" | 27° 42' 36" | 0 | 0 | 3.57 |
| 804.5 | Pokhara | 84° 00' 00" | 28° 13' 12" | 1.00 | 19.80 | |
| 925 | Rajaiva | 85° 03' 00" | 27° 25' 12" | N/A | N/A | |

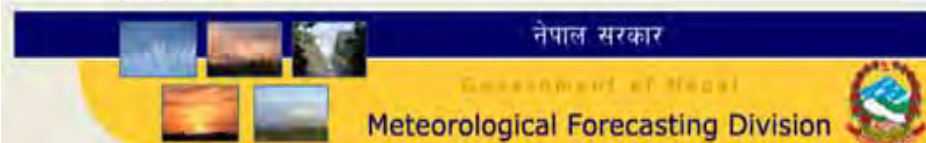
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MFD Forecast

Meteorological Forecasting Division



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Ministry of Environment

Archive[Weather Reports]

Issued On: 2009-05-26 (Monday) AT 06:00 PM (12:15 UTC)

Valid From: 2009-05-26 Till Date: 2009-05-26

Tonight's Weather Forecast For Nepal

Generally cloudy in the country with rain or thundershowers likely at many places, mainly over the central and eastern regions. Heavy rain is also expected at one or two places over far-eastern regions.

Tomorrow's Weather Forecast For Nepal

Mostly cloudy in the country with rain or thundershowers likely at many places, mainly over the central and eastern regions.

Tonight's Weather Forecast For Kathmandu

Generally cloudy with rain or thundershowers to-night.

Tomorrow's Weather Forecast For Kathmandu

Mostly cloudy, temporary rain or thundershowers may likely over the valley.

Expected Minimum Temperature Tonight at Kathmandu: 16-18 °C

Expected Maximum Temperature Tomorrow at Kathmandu: 27-29 °C

Weather Records For Kathmandu

Today's Relative Humidity
At 5:45 A.M.: 95 %
Today's Relative Humidity
At 2:45 P.M.: 68 %

Rainfall Statistics

Total this month to date: 64.3 mm
Normal this month: 116.0 mm
Highest 24 hrs amount ending at 8:45 AM ever recorded in this month on 29/1990: 73.2 mm

Tomorrow's (Tuesday)

SUNRISE at: 05:10 AM

SUNSET at: 06:52 PM

Today's (Monday) Weather Records

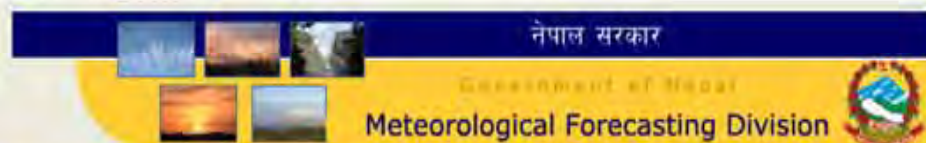
| Stations | Max. temp. (°C) | Min. temp. (°C) | 24 hrs Rainfall (mm) |
|---------------|-----------------|-----------------|----------------------|
| Dadeldhura | 26.5 | 12.0 | 3.0 |
| Dipayal | 34.0 | 20.0 | NA |
| Dhangadi | 36.4 | 22.3 | Traces |
| Birendranagar | 31.5 | 19.0 | 0.0 |
| Nepalgunj | 35.4 | 21.4 | 0.0 |
| Jumla | 21.8 | 9.0 | 35.2 |
| Dang | 29.6 | 19.0 | 82.0 |
| Pokhara | 27.7 | 21.5 | 0.0 |
| Bhairahawa | 32.8 | 25.0 | 0.0 |
| Simra | 29.0 | 25.5 | 2.0 |
| Kathmandu | 23.5 | 18.6 | 5.7 |
| Okhaidhunga | 19.1 | 16.8 | 6.6 |
| Taplejung | 20.0 | 16.4 | NA |
| Dhankuta | 22.5 | 19.2 | 10.2 |
| Biratnagar | 27.3 | 24.2 | 11.8 |
| Janakpur | 27.0 | 24.2 | 4.5* |
| Jiri | 18.5 | 13.0 | 0.2* |
| Jomsom | 18.0 | 9.5 | 3.0* |
| Dharan | 27.3 | 23.5 | 12.8* |

Forecast for Mountaineering Expedition



Satellite Image

Meteorological Forecasting Division



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Issued On: 2009-05-26 (Tuesday) AT 06:00 PM (12:15 UTC)

Valid From: 2009-05-26 Till Date: 2009-05-27

Tonight's Weather Forecast For Nepal

Partly cloudy in the eastern regions with chances of temporary rain at one or two places. Mainly fair in the rest of the country.

Tomorrow's Weather Forecast For Nepal

Mainly fair throughout the country. But chances of becoming partly cloudy in the hilly regions towards afternoon.

Tonight's Weather Forecast For Kathmandu

Mainly fair

Tomorrow's Weather Forecast For Kathmandu

Mainly fair but chances of becoming partly cloudy towards afternoon

Expected Minimum Temperature Tonight at Kathmandu: 14-16 °C

Expected Maximum Temperature Tomorrow at Kathmandu: 27-29 °C

Weather Records For Kathmandu

Today's Relative Humidity
At 5:45 A.M.: 98 %
Today's Relative Humidity
At 2:45 P.M.: 78 %

Rainfall Statistics

Total this month to date: 102.1 mm
Normal this month: 116.0 mm
Highest 24 hrs amount ending at 8:45 AM ever recorded in this month on 29/1990: 73.2 mm

Tomorrow's (Wednesday)

SUNRISE at: 05:10 AM

SUNSET at: 06:52 PM

Today's (Tuesday) Weather Records

| Stations | Max. temp. (°C) | Min. temp. (°C) | 24 hrs Rainfall (mm) |
|---------------|-----------------|-----------------|----------------------|
| Dadeldhura | 27.2 | 13.8 | 0.0 |
| Dipayal | 35.2 | 21.2 | 0.0 |
| Dhangadi | 36.4 | 23.6 | 0.0 |
| Birendranagar | 32.7 | 22.2 | 0.0 |
| Nepalgunj | 35.8 | 22.8 | 0.0 |
| Jumla | 24.7 | 11.2 | 0.0 |
| Dang | 31.5 | 20.6 | 0.1 |
| Pokhara | 30.6 | 20.0 | 1.4 |
| Bhairahawa | 34.6 | 24.0 | 0.0 |
| Simra | 33.2 | 24.0 | 11.8 |
| Kathmandu | 23.4 | 17.0 | 40.3 |
| Okhaidhunga | 17.8 | 14.7 | 40.6 |
| Taplejung | 17.2 | 15.2 | NA |
| Dhankuta | 19.4 | 18.0 | 79.0 |
| Biratnagar | 24.7 | 22.4 | 121.4 |
| Janakpur | 28.5 | 23.5 | 45.3* |
| Jiri | 17.5 | 14.5 | 43.6* |
| Jomsom | 21.0 | 8.5 | 4.0* |
| Dharan | 24.8 | 21.5 | 91.2* |

Forecast for Mountaineering Expedition



Satellite Image

FY-2D Satellite 86.5°E



FY-2D Satellite Antenna

