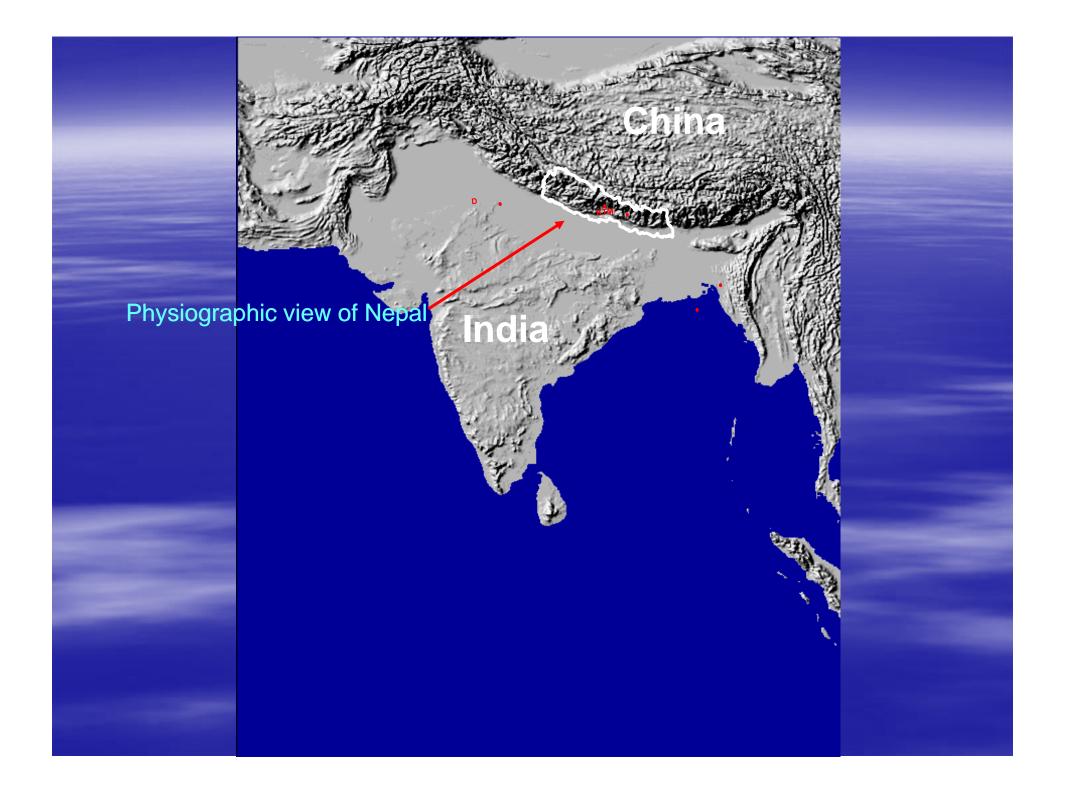
JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-Air Observations in RA II (ASIA) Tokyo, Japan, 27-30 July 2010

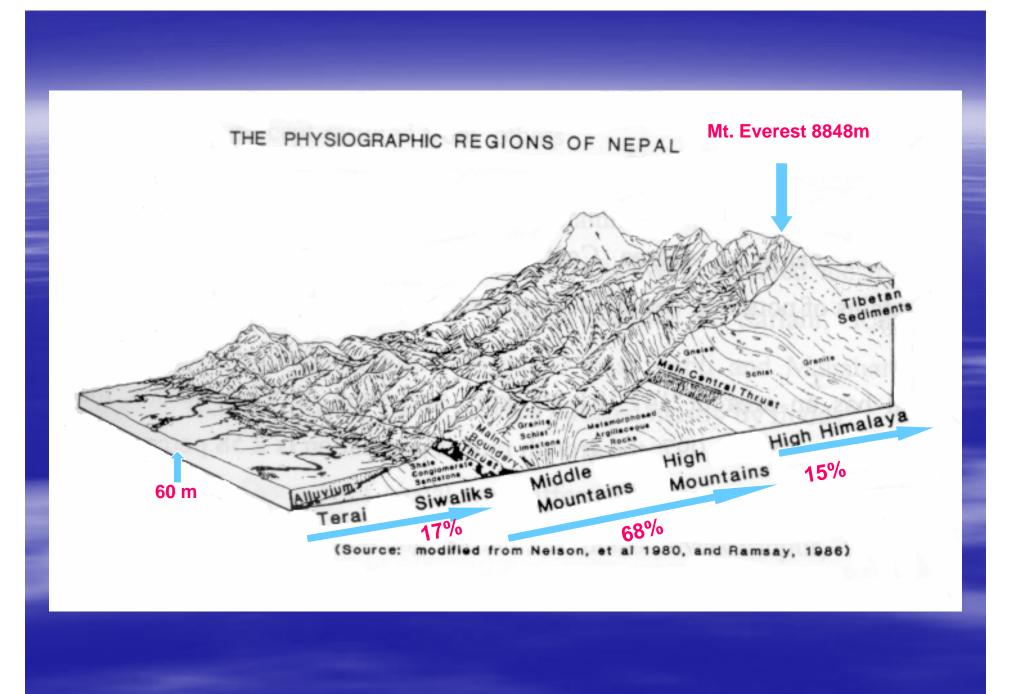
> Rajendra P. Shrestha Meteorological Forecasting Division Department of Hydrology and Meteorology Nepal

### Location of Nepal



- South Asian landlocked country with fascinating topography and climate.
- It lies between 26º22'to30º27'N lat and 84º04'to 88º12'E long.
- Area: 1,41,741 sq km.
- Highest elevation: 8848 m
- Lowest Elevation: 64 m





### 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

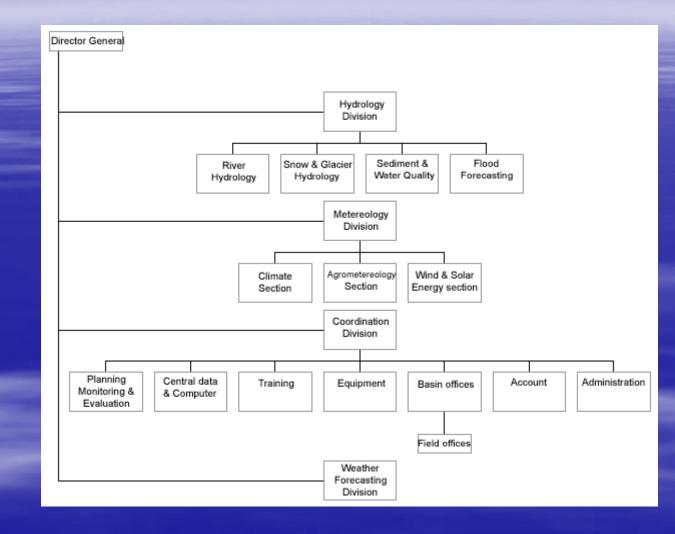
### **The Principal Activities of DHM**

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



# Precipitation Stations (337)

#### <u>Legend</u>

- High Himal High Mountain Middle Mountain
- Siwalik (Chure)
- Terai
- DHM\_Precipitation stations (175)
- NISP\_Precipitations stations (160)

# Climate Station (72)

·5~~?

#### Legend

High Himal
High Mountain
Middle Mountain
Siwalik (Chure)
Terai
Climate\_stations (72)

## Agro-meteorological Stations (22)

Fur:

6 6

6

Smor

6

6

6

#### Legend

High Himal
High Mountain
Middle Mountain
Siwalik (Chure)
Terai

6 Agromet\_stations (22)

## Sunshine Stations (17)

~ Shr SC

▲

#### Legend

Λ

High Himal
High Mountain
Middle Mountain
Siwalik (Chure)
Terai

Sunshine\_stations (17)

## Wind Stations (34)

v.Str.7

#### Legend

High Himal
High Mountain
Middle Mountain
Siwalik (Chure)
Terai
Wind\_stations (34)

# Soil Temperature Stations (7)

Show

3

**3** 

3

**3** 

#### Legend

- High Himal
  High Mountain
  Middle Mountain
  Siwalik (Chure)
  Terai
- 3 Soiltemperature\_stations (7)

## **Evaporatation Stations (14)**

mon Stranger

#### Legend

- High Himal
  High Mountain
  Middle Mountain
  Siwalik (Chure)
  Terai
  - Evaporation\_stations (14)

# Snow Stations (7)

~ × Str Stropx

#### Legend

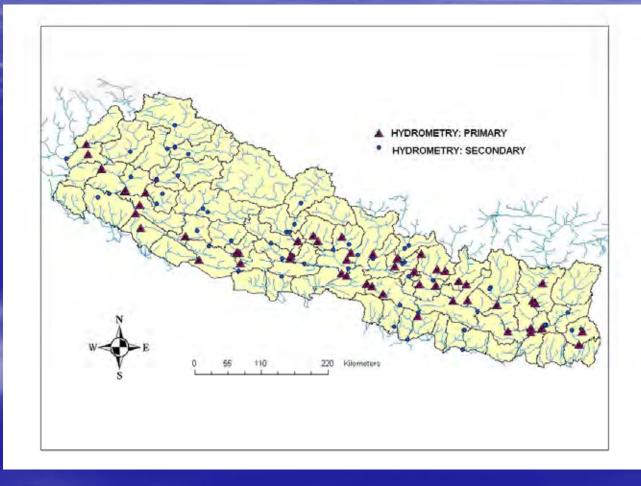
High Himal
High Mountain
Middle Mountain
Siwalik (Chure)
Terai
Snow\_stations (7)

# Hydrometric Station Network

Flood forecasting section has a network of 45 stations:

•15 hydrometric stations and

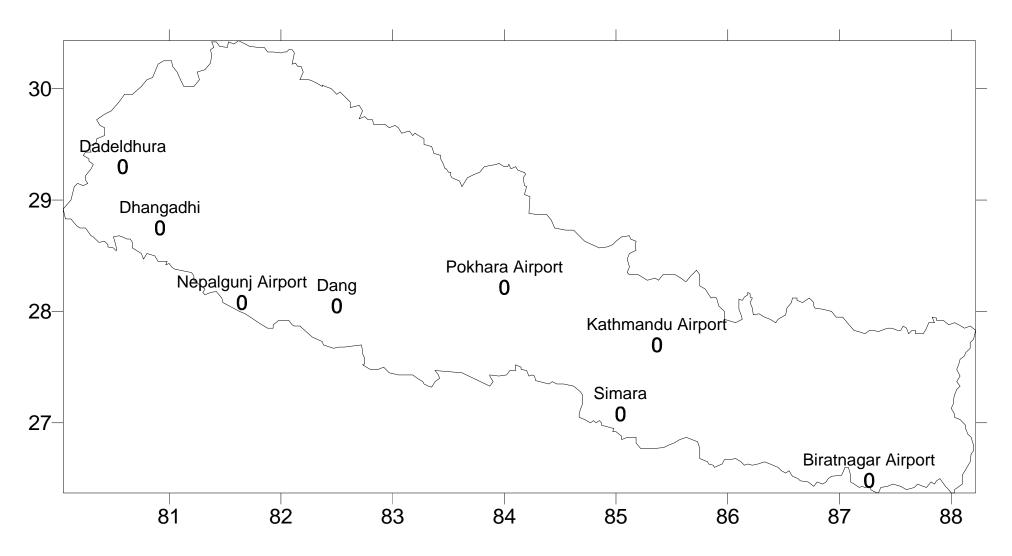
•30 meteorological stations



### Synoptic Station Kathmandu



## Automatic Weather Stations (15)



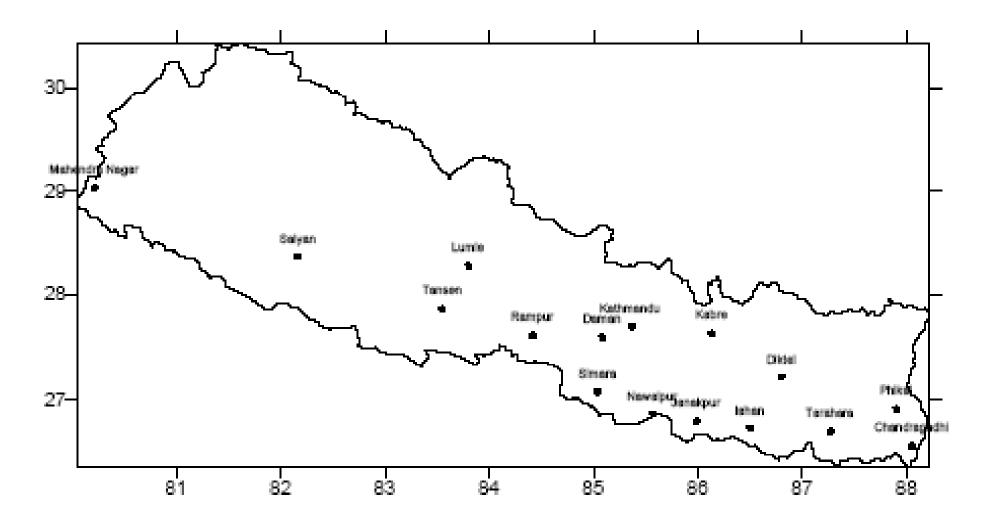


Fig. 1. Proposed locations of the AWS to be installed in Nepal under the SAARC STORM Programme.

### 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

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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



		De	partment		ocience and ogy and Division		Y Login
ver Hydrology	Snow and Glacier H	ydrology	Sediment and	Water Quality	Flood Fo	recasting	
Home			Septe	mber 24, 2	2008 - 1	1 Hr.	
About Us Data Dessemina Hydrological Sta	no.	Station	Longitude (E)	Latitude (N)	Hourly Rainfall (mm)	Todays Rainfall from 08:45 NST (nm)	Waterlevel (m)
Resources	810.5	Ansing	83° 48' 00"	27° 53' 24"	O	0	
Personnel	1002	Arughat	84° 49' 12"	28° 03' 00"	0	0	
ublication	609	Beni	83° 36' 00"	28° 16' 12"	O	0	1
raining	104.5	Betrawati	85° 10' 48"	27° 58' 12"	1.40	0.40	
edback	704,5	Danda	84° 12' 00"	28° 03' 00"	O	0	1
Contact	809	Gorkha	84° 37' 12"	27° 58' 12"	N/A	N/A	
	601	Jomsom	83° 43' 12"	28° 46' 48"	N/A	N/A	1
	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	Rajaiya	85° 03' 00"	27° 25' 12"	N/A	N/A	-
		d Summary ad Recent Dat	Select Date : 2	2008-09-24 Download			

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Archi	ve Report			-
rchive[Weather Reports]				
ssued On 2008-05-25 ( Manday ) AT 0	5:00 PM (12.13	S UTC)		
	ate 2009-05-26			
Tonight's Weather Forecast For Nepal				
Senerally cloudy in the country with rain or lihund	Intshowers likely	at many place	sas mainte	over the
central and eastern regions. Heavy rain is also e				
Tomorrow's Weather Forecast For Nep				
Mostly cloudy in the country with rain or thunder		many otheras	mainhi au	of the early
and eastern regions.	NUCLASSING DECOY OF	traitly freeces	contrast ca	or mo contra
a commence and a second				
Tonight's Weather Forecast For Kathmi	andu			
Senerally cloudy with rain or thundershowens to-	rught.			
<b>Tomorrow's Weather Forecast For Kath</b>	an made			
	and million a			
Mostly cloudy,temporary rain or thundershowers	and million a	he valley		
	may likely over t			
Expected Minimum Temperature Tonig	may likely over t	16-1	8 °C	
	may likely over t	16-1	18 °C 7-29 °C	
Expected Minimum Temperature Tonig	may likely over t ht at Kathman wrow at Kathr	ndu: 16-1 nandu: 2	7-29 ℃	r Records
Expected Minimum Temperature Tonig Expected Maximum Temperature Tomo Weather Records For Kathmandu	may likely over t ht at Kathman rrow at Kathr Today's	16-1	7-29 ℃	r Records
Expected Minimum Temperature Tonigi Expected Maximum Temperature Tomo Weather Records For Kathmandu Todays Relative Humidity	may likely over t ht at Kathman rrow at Kathm Today's Stations	ndu: 16-1 nandu: 2 (Monday) Max. Immp. (*C)	7-29 °C Weathe	24 hrs Rain (mm)#
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Expected Minimum Temperature Tonigi Expected Maximum Temperature Tomo Weather Records For Kathmandu Todays Relative Humidity	may likely over t ht at Kathmar prow at Kathr Today's Catations Dadeldhura Dipayal	Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday) (Monday)	7-29 °C Weathe temp. (°C) 12,0 20.0	24 hrs Ratel (mm)# 3.0 NA
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Archi	ve Report			-
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Tonight's Weather Forecast For Nepal			_	_
Parity cloudy in the eastern regions with chances	al homeses and rate	n at one of th	a pincar I	America Pour la
the rest of the country.	e or tumporary rat	IL OF OTHE OF TY	lo hanas y	dancery hart o
Tomorrow's Weather Forecast For Neps	at			
Mainly fair throughout the country But chances o		cloudy in the	hilly regio	ris Iowarda
atternoon.	and a second second			
Tonight's Weather Forecast For Kathma	andu			
Mauniv fair				
Tomorrow's Weather Forecast For Kath	mandu			
Mainly fair but chances of becoming partly cloud	y towards afterno	· ·	6*C	
	y towards afterno ht at Kathman	du: 14-1	6 °C 7-29 °C	
Mainly lair but chances of becoming partly cloud Expected Minimum Temperature Tonigl	y lowards afferno ht at Kathman prrow at Kathn	du: 14-1	7-29 °C	r Record
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### FY-2D Satellite 86.5°E



### **FY-2D Satellite Antenna**

