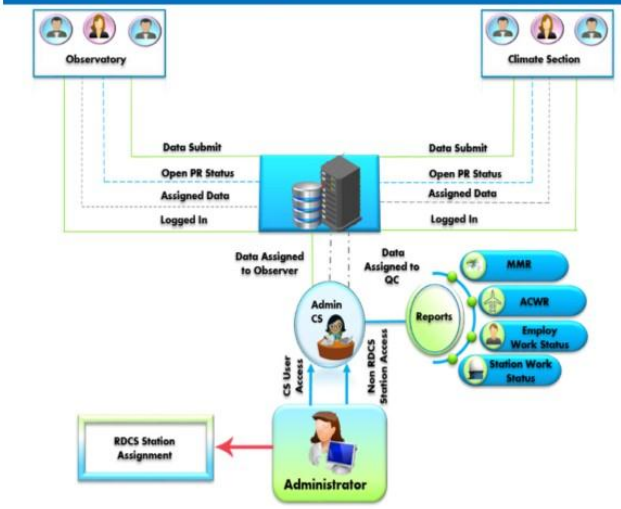
RMC LAHORE TIMES

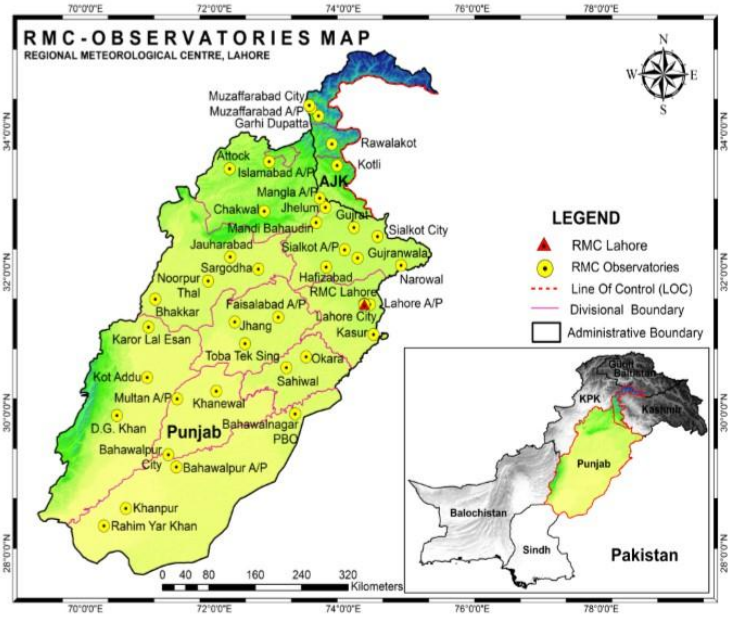
Pakistan Meteorological Department

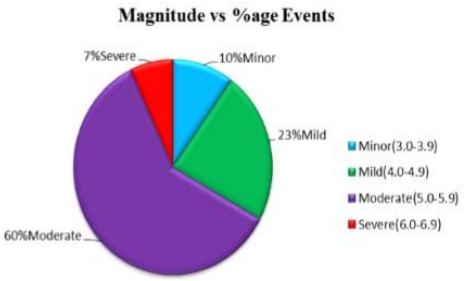
HIGHLIGHTS

- **The second phase of RDCS has been launched. The meteorological data of pocket register is now collected in soft form .**
- **Total 73 local events recorded at Lahore station.**
- **Highest Max. Temp 43.0°C at Bhakkar on 06-09-2019.**
- **Lowest Min. Temp 7.0°C at Muree on 18-10-2019.**
- **Highest Rainfall 75mm at Mandi Bahuddin on 06-09-2019**
- **Highest Windspeed 70 knots at Mangla A/P on 16-09-2019.**

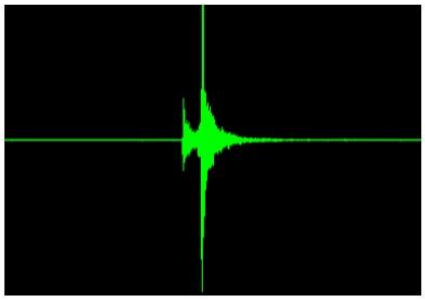
Pocket Register Work Flow







Quarterly Seismicity



6.4Mw 210KM Hindukush Region

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Preface

The basic objective of this publication is to highlight the quarterly activities carried out at Regional Meteorological Centre (RMC) Lahore. RMC is part of Pakistan Meteorological Department (PMD) headed by the Director, responsible for administrative, financial and technical control of Met Observatories as well as Met Offices at Airports in Punjab and Azad Jammu & Kashmir region. The region is very important and vulnerable for all-natural disasters due to its geographical & geological features. The socio-economic activities in this region are heavily depended on meteorological parameters. All the meteorological parameters which are recorded at different units of PMD are then computerized at Regional Climate Data Processing Section at RMC after quality checks for the public, researchers, developers, economists, government and private agencies for the development, land reforms, agricultural sector, urban planning and all fields of life.

In meteorology, the human skill development is very important for accurate weather parameter reporting. This can be achieved by developing a healthy, hygienic and up to date environment to all staff at all units which has been insured at all units.

I acknowledge the efforts of all the officers & officials at respective stations and units for their contribution to maintain the observation up to the mark of World Meteorological Organization (WMO) standards. It is the result of this same spirit that our officials have come up with a new innovation in the techniques for the better data processing and handling. Hence, upgrading the system for a bright and better future of Pakistan in the field of meteorology.

Muhammad Ajmal Shad
Director
RMC Lahore
042-99205591

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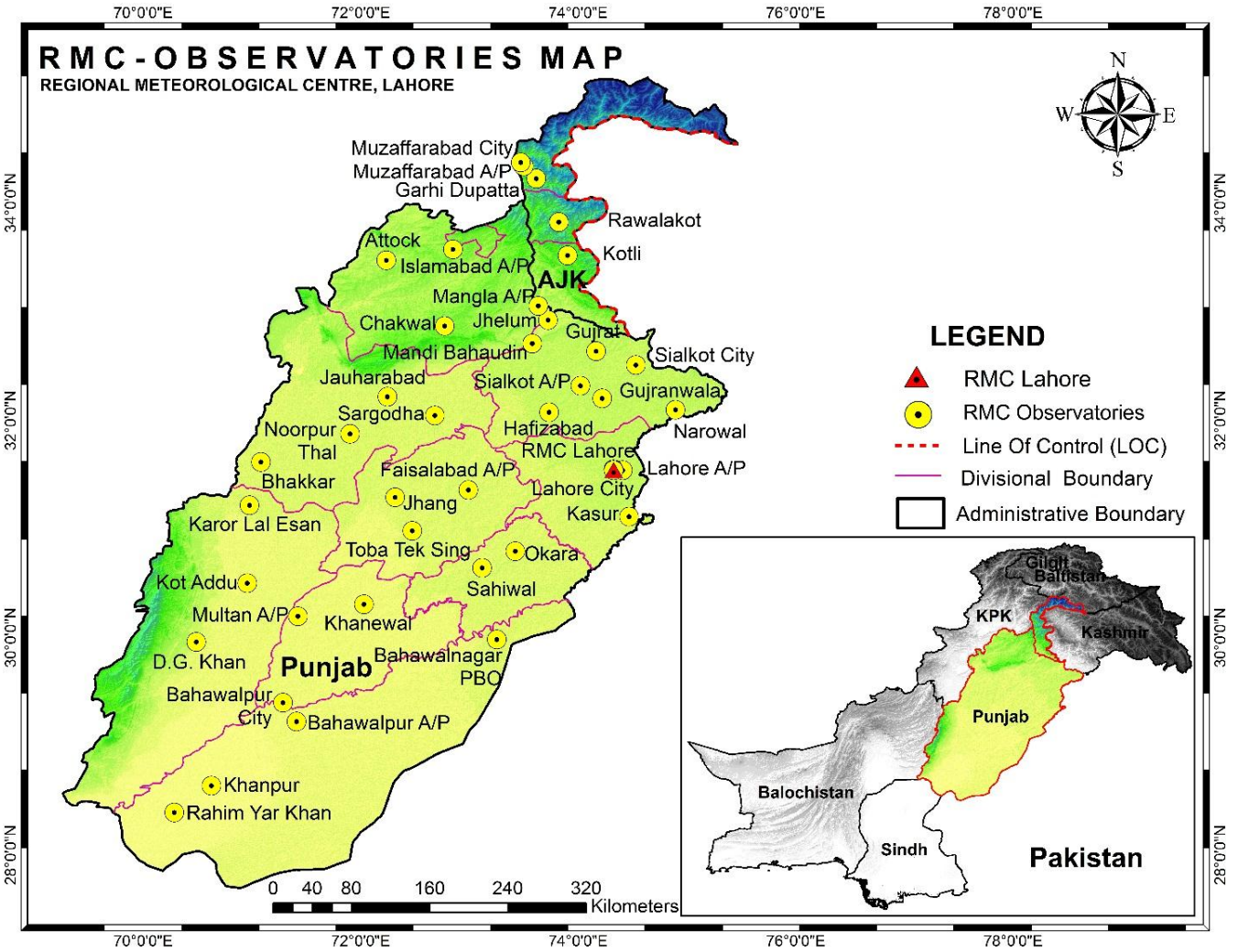
Summary

During the quarter October to December, 2019 working environment has been improved at three Met. Observatories under RMC (Regional Meteorological Centre) while repair/reconstruction work proposed at RMC along with four other observatories. During this tenure seven officials joined on Transfer/Attachment in this office and Met Observatories, four Officials departure on transferred/study abroad/Attachment/Direct Appointment. One employee expired and one employee retired from Govt. service. Seismic Monitoring Centre Lahore has recorded 216 global and 73 local Earthquake events. Most destructive event was 6.4 magnitude originated at 210 km Hindu Kush Region Afghanistan. Regional Climate Data Processing Center Lahore analysis based on meteorological data shows highest maximum temperature 43.0°C at Bhakkar, lowest minimum temperature 7.0°C at Murree, highest rainfall 75.0mm at Mandi Bahauddin and highest wind speed 70 knots at Mangla A/P. The second phase of RDCS has been launched. The meteorological data of pocket register is now collected in computerized form.



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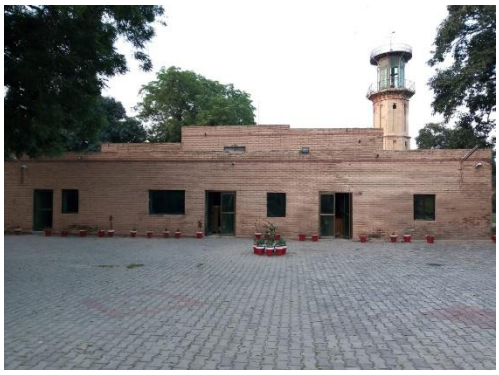
About RMC Lahore

REGIONAL METEOROLOGICAL CENTRE (RMC), Lahore is the regional head office of the Pakistan Meteorological Department (PMD) in Punjab and Kashmir. RMC Lahore started its function as a Meteorological Observatory in 1885 and has been functioning since then. It is one of the oldest observatories in Indo-Pak sub-continent. The Meteorological. Observatory was then upgraded into Regional Meteorological Centre in 1956 and shifted in a newly constructed building. Mr. Abdul Hayee was the first Director of RMC, Lahore. Then in 1958, Seismic Observatory was also established in the building of RMC Lahore. Initially RMC Lahore was controlling all the Meteorological Observational stations located at various places of Punjab, Kashmir, KPK and Gilgit-Baltistan.

Now, Regional Meteorological Center (RMC), Lahore, under the supervision of Director controlling all the Surface observatories Met. Offices (MOs), PBO Stations, Agro met stations, AWS Stations and Seismic stations of Punjab and Kashmir.



Observatories

1. MET Observatory, Sahiwal

Met Observatory, Sahiwal lies on 30.69N and 73.10E with elevation 173.5m having index No 41680 is the 3rd oldest observatory functioning under RMC established in 2004.

2. PBO, Okara

PBO, Okara lies on 30.49N and 73.26E with elevation 181.5m having index No 41646 is the 4th oldest observatory functioning under RMC established in 2006.

Improved Working Environment at Met Observatories

Three Met Observatories repair/ installation work has been carried out during this quarter. Accordingly, the requisite work was carried on the following stations, keeping in view the budget provision.

Sr. No	Station Name	Brief Description of Work
01	Met Office, Multan	Polished the furniture of Met Office.
02	Met Observatory, Narowal	Allotment of another room by DC office as already requested by RMC, Lahore.
03	Met Observatory, Bhakkar	Paint the Enclosure doors and stairs of observatory.

Details of Repair/Reconstruction Work Required at RMC Lahore and Met Observatories under RMC

Sr. No	Station Name	Required work
01	RMC Lahore	Approval of construction of 08 Cat-v, family lodges and hostel accommodation has been accorded in 2008 and PC-1 has also been submitted but the construction work has not been started so far due to non-availability of fund. There is a need for allocation/release of fund for the said work.
02	Met Observatory, Mandi Bahauddin	Repair work of In-charge room, observational room and white wash of building, paint of Met. Instruments as well as enclosure, shifting of main gate.
03	Met Observatory, Bahawalpur City	White wash of building and minor repair of building as required in hostel.
04	Met Observatory, Sahiwal	Minor repair work and tiles for washroom are required in observatory building.

The condition of infrastructure is very poor and requires major investment for construction. Coordinated and progressive efforts are requested that would help contribute in projecting positive image of RMC.

RMC Activities

1. Director RMC visited Multan for site selection of Radar/CCRI.
2. Director RMC attended the workshop regarding Agromet data and Climatology for farmer's community at Multan.
3. Sajjid Hussain, Inspector Observatories visited PAF bases like Rahwali, Chander, Murid, M.M Alam, Mushaf, Rafiqui and Vehari for the calibration of Met instruments.

PMD Training/ Course	Participant(s)	Duration
68Th Initial-Meteorology Course	• Asif Saghir, Sr. Observer • Malik Afzal, Sr. Observer	w.e.f 02-12-2019 (08 weeks)

Transfer/Joining Within Region

1. Raja Adnan Rasool, Sr. Observer joined on 02-10-2019 at Met. Observatory, Sahiwal on a/c of his transfer from PBO, Khanpur.
2. Zaka Ullah, Radio Mechanic joined on 30-10-2019 at Met. Observatory, Sargodha on a/c of his transfer from RMC, Lahore.

Joinings on Transfer

1. Awais Azam, Assistant Meteorologist joined on 07-10-2019 at M.O, Sialkot on a/c of his transfer from Aeromet, Sukkar.
2. Ikram-ul-Mohsin, Naib Qasid joined on 04-11-2019 at PBO, Khanpur on a/c of his transfer from NWFC, Islamabad.
3. Mr. Abu Bakar, Sr. Observer joined on 19-11-2019 at Met. Observatory, Hafizabad on a/c of his transfer from RMC, Quetta.
4. Mr. Muhammad Faisal, Observer joined on 06-12-2019 at Met. Office, Sialkot on a/c of his transfer from RMC, Gilgit Baltistan.

Joining on Attachment

1. Mr. Hussain Ahmad, Observer joined on 13-11-2019 at Met. Observatory, Attock on a/c of his transfer from Met. Office, Skardu.

Departure on Transfer

1. Mr. Javed Iqbal, Sr. Observer departed on 19-11-2019 on a/c of his transfer from Met. Observatory, D.G. Khan to PBO, Zhob.

Departure on Study Abroad

1. Mr. Muhammad Arshad, Meteorologist, M.O. Faisalabad departed on 09-10-19 for Ph.D. from China.

Departure on Attachment

1. Mr. Shahid Pervez, Met. Assistant departed from PBO, Bahawalnagar on 29-11-2019 on a/c of his attachment at RAMC, Faisalabad.

Departure on Direct Appointment

1. Mr. Shahid Mahmood, Sub. Engineer departed on 12-11-2019 from RMC, Lahore on a/c of his direct appointment at FFD, Lahore as Assistant Electronic Engineer through FPSC.

Obituary

1. Mr. Muhammad Amjad, Met. Assistant, Met. Observatory, Hafizabad expired on 11-11-2019.

Retirements

1. Mr. Mukhtar Ali Javed, Assistant Programmer, RMC, Lahore retired from Govt. Service w.e.f 10-12-2019 at the age of superannuation.

Seismic Activity

Particulars of Station

Sr. No.	Station	Symbol	Latitude °N	Longitude °E	Height (a.s.l.) in meters	Equipment Installed	Remarks
01.	LAHORE	Lhr	31.5500	74.3300	210	D.S.E	Short Period

The Seismic Monitoring Centre Lahore is working round the clock to record and monitor seismic activities all over the world, especially Pakistan, South-Asia and neighboring countries.

During the months from October to December 2019, total numbers of events recorded by Sensor at Seismic Monitoring Centre Lahore are 289. The frequency analysis based on magnitude of events depicts that 10% events are in Minor (3.0-3.9), 23% events are of mild magnitude (4.0-4.9) range 60% events of moderate magnitude (5.0-5.9) and 7% events of severe magnitude (6.0-6.9) are reported during October to December, 2019 as depicted in the Fig.01.

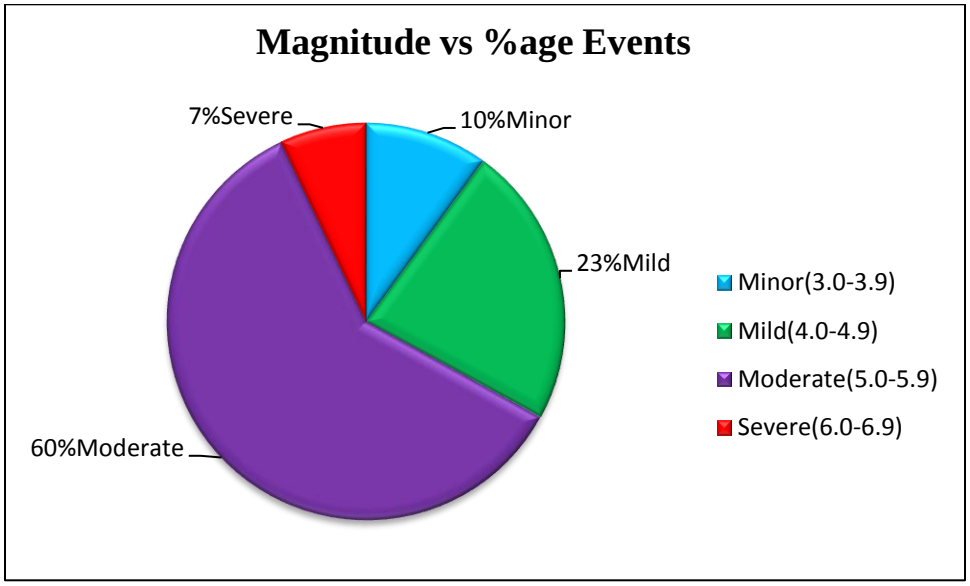


Figure 01: shows the number of events in %age recorded during October to December, 2019 for different categories of severity in Magnitude range.

Focal Depth

The frequency analysis based on focal depth of Seismic events during the months from October to December, 2019 was carried out.

The analysis depicts that the frequency of Shallow focal depth (0-70 km) seismic events was maximum with 202 numbers. Shallow focal depth earthquakes are also known as crustal earthquakes. The Medium focal depth (70-300 km) seismic events were 74 numbers and 13 number of deep focal depth (300-700 km) seismic events recorded by PMD Seismic network at Lahore Seismic Station.

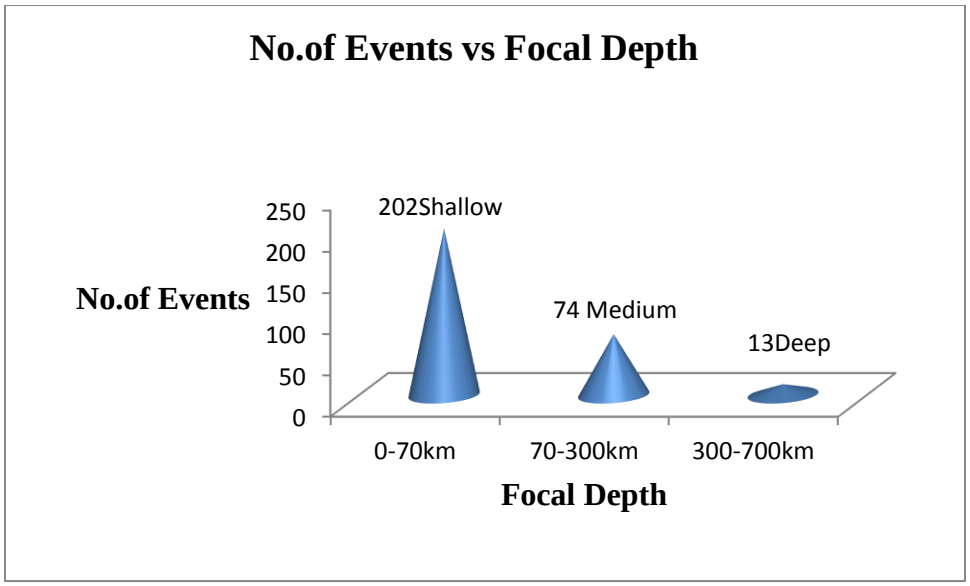
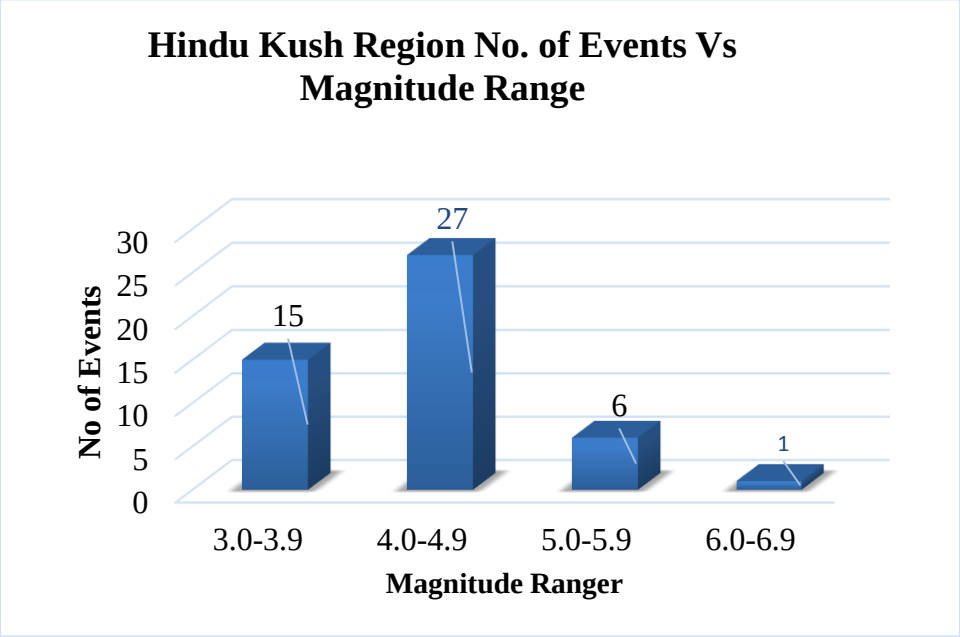


Figure 02: shows the number of events vs. Focal Depth recorded during October to December, 2019 for different categories of severity.

Seismicity of the Hindu Kush Himalaya Region

The Hindu Kush Himalaya region is the most vulnerable area for the Seismic activities due to continuous movement of Indian plate toward Eurasian plate resulting a movement of approximately 3mm/year which make it hazardous for seismic activities. Due to this major earthquake in the regions i.e. Pakistan, Afghanistan, Bangladesh, China, Nepal, India, Myanmar, Bhutan occurs periodically. The seismic activity during October to December 2019 has been plotted in the graph.



Most Destructive Event Felt During October to December 2019

Date: 20-10-2019

Origin Time: 11:39:33 UTC

Magnitude: 6.4

Depth: 210 km

Latitude: 36.52 N Longitudes: 70.68 E

Epicenter: Hindu Kush Region Afghanistan.

This earthquake was strongly felt in most parts of Upper Punjab (Jhelum, Mangla, Dina, Lahore, Kharian, Gujjar Khan, Gujrat, Hafizabad, Lala-Musa,) and AJK (Mirpur, Muzaffarabad). It was also felt at a number of places in KPK and Islamabad.

October-2019

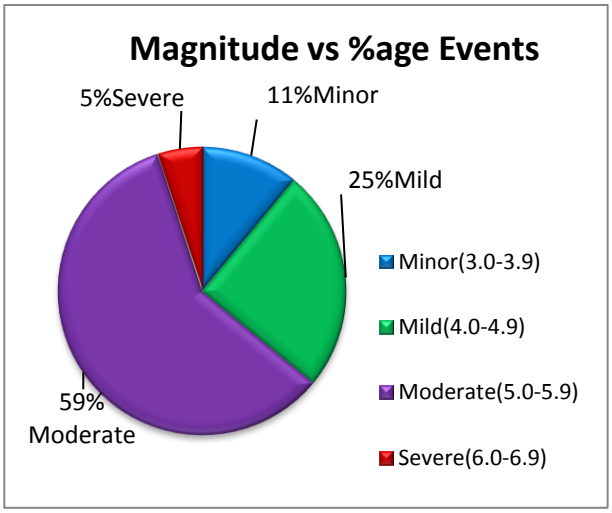


Figure 1(ii): Shows the number of events in %age recorded during the month of October, 2019 for different categories of severity.

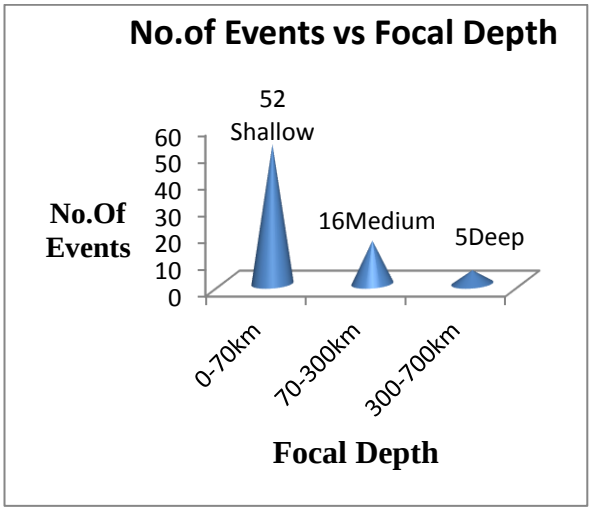
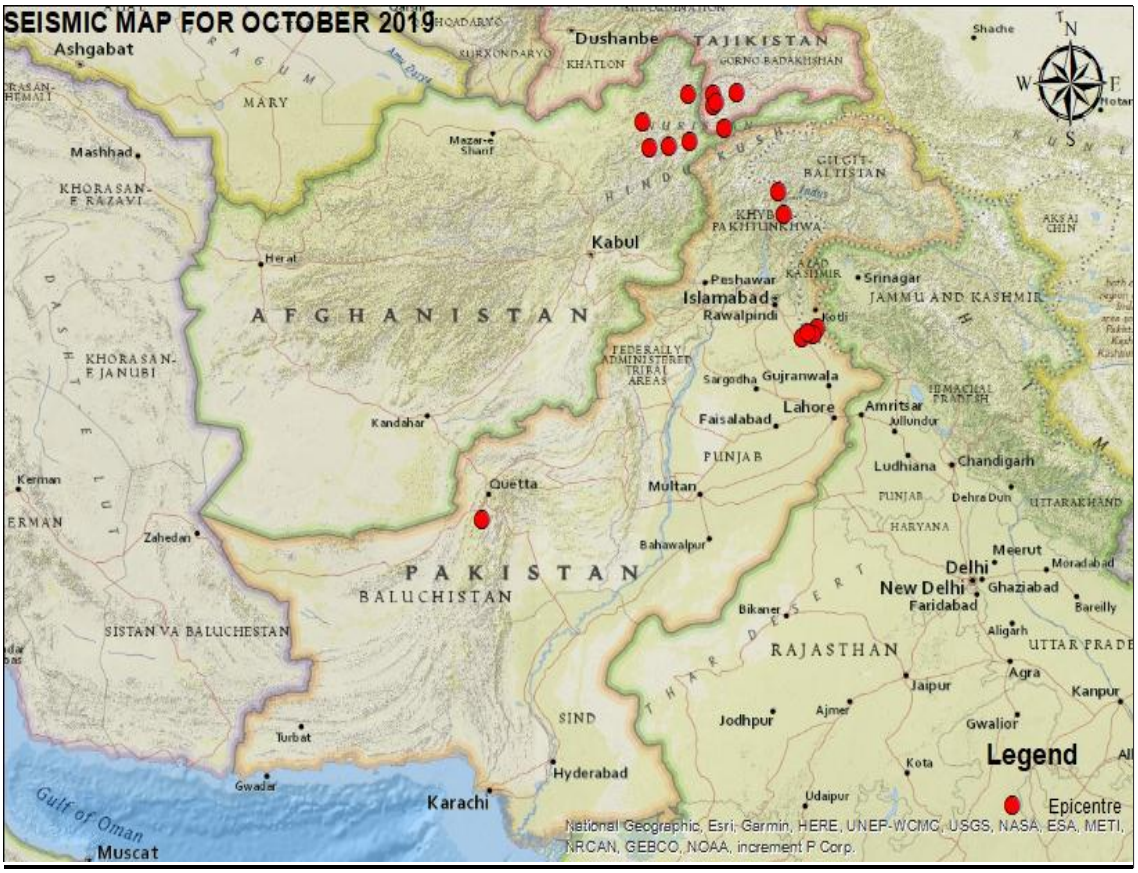
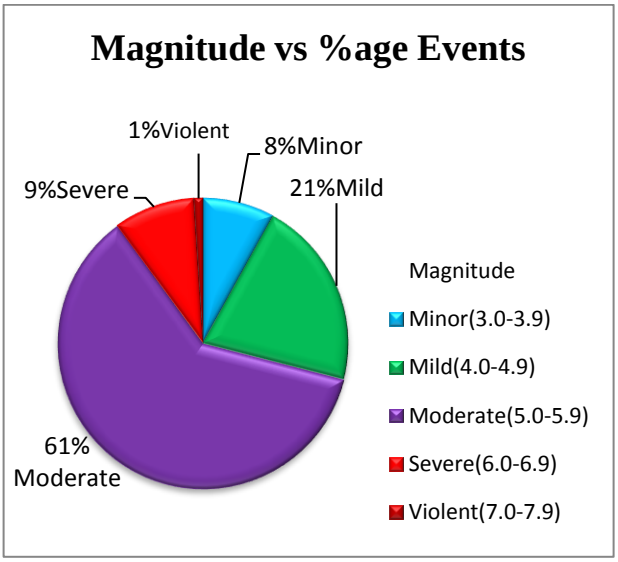


Figure 02(ii): Shows the number of events vs. Focal Depth recorded during the month of October, 2019 for different categories of severity.



November-2019



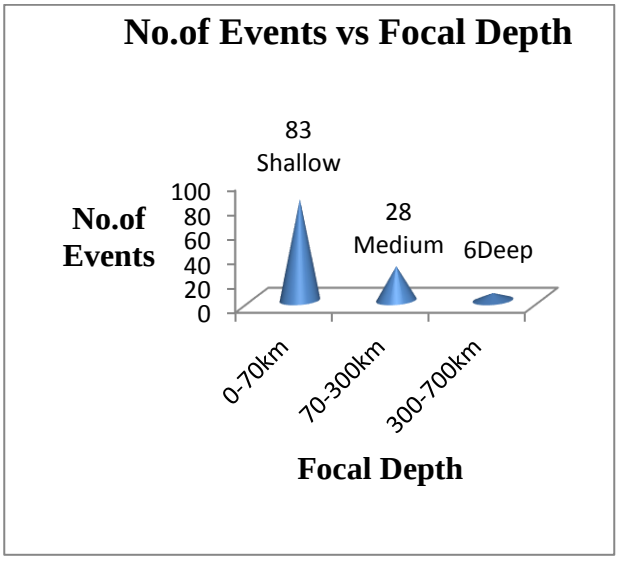


Figure 1(ii): Shows the number of events in %age recorded during the month of November, 2019 for different categories of severity.

Figure 02(ii): Shows the number of events vs. Focal Depth recorded during the month of November, 2019 for different categories of severity.

December-2019

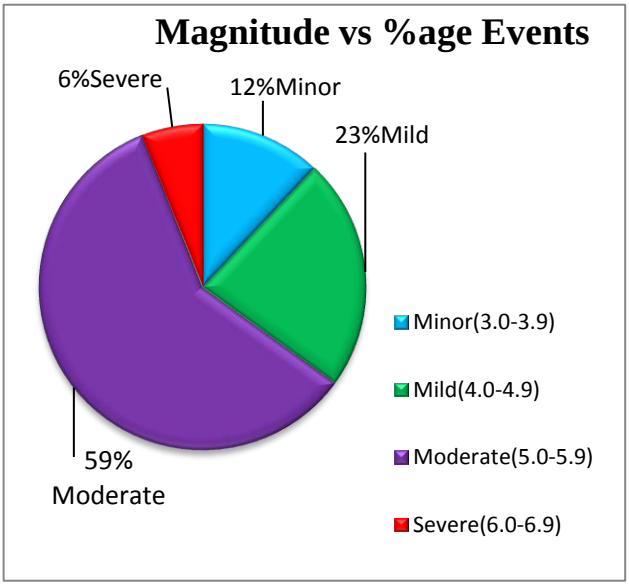


Figure 1(ii): shows the number of events in %age recorded during the month of December, 2019 for different categories of severity.

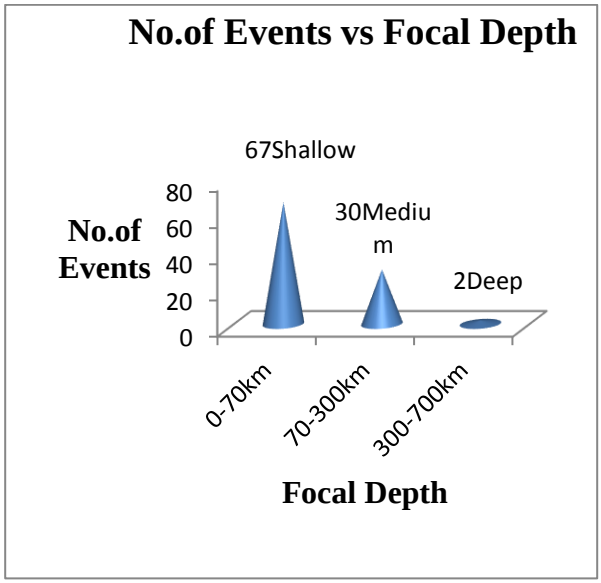
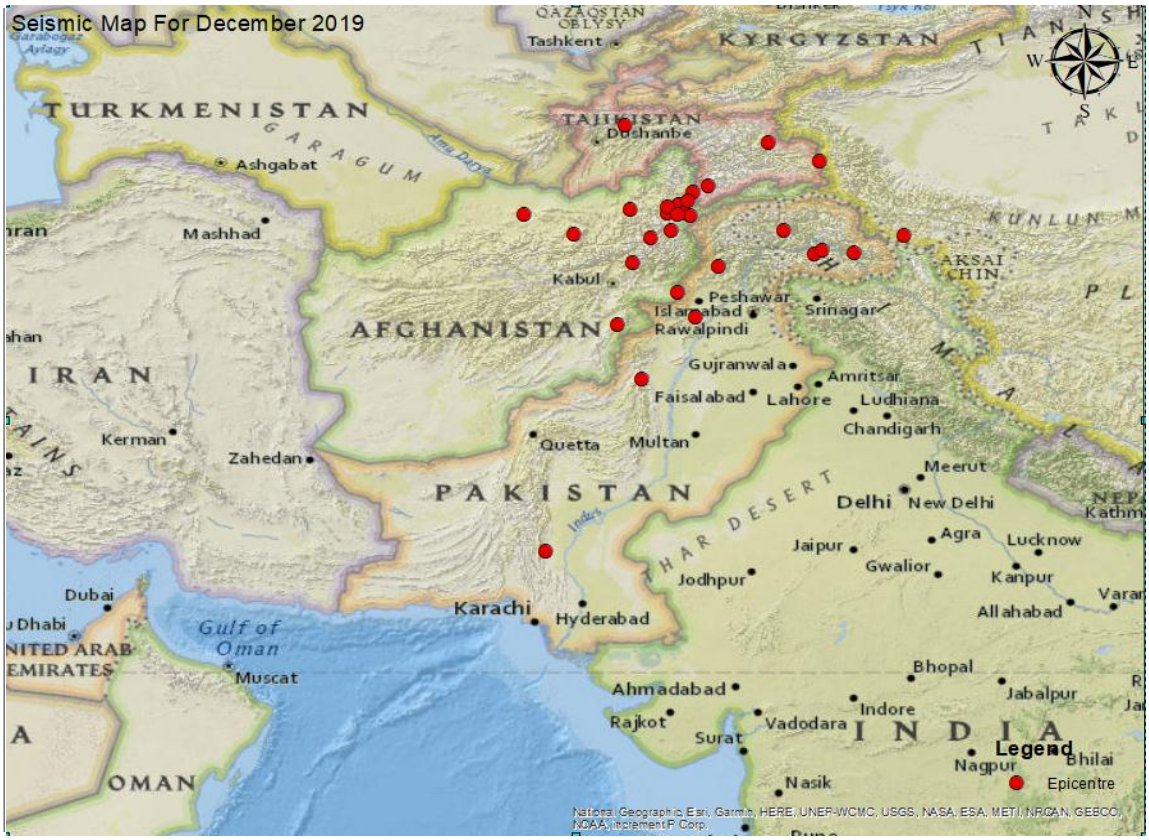
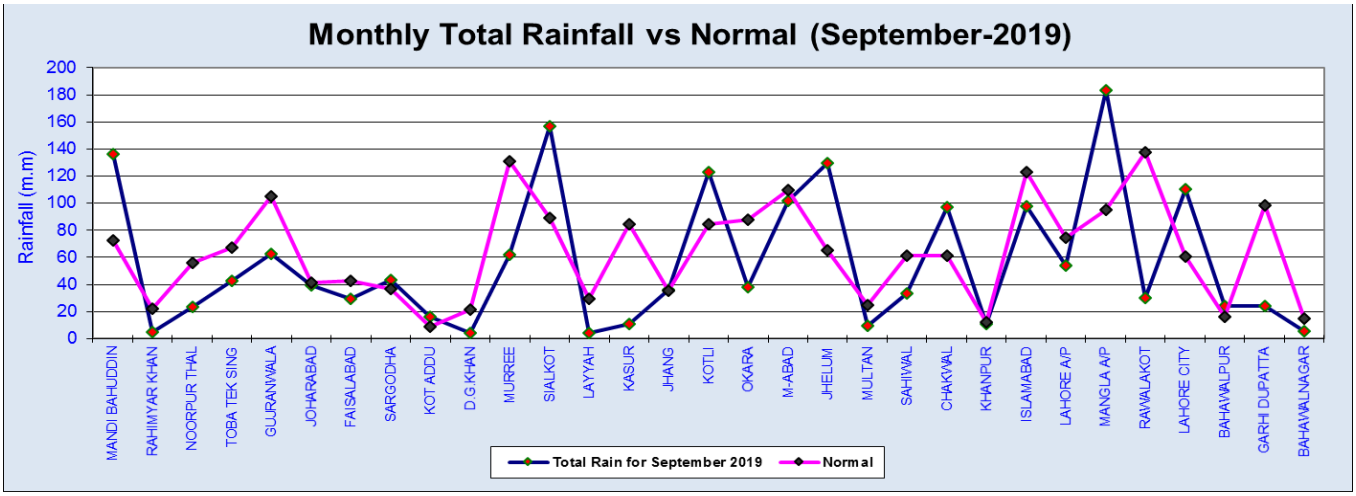


Figure 02(ii): shows the number of events vs. Focal Depth recorded during the month of December, 2019 for different categories of severity

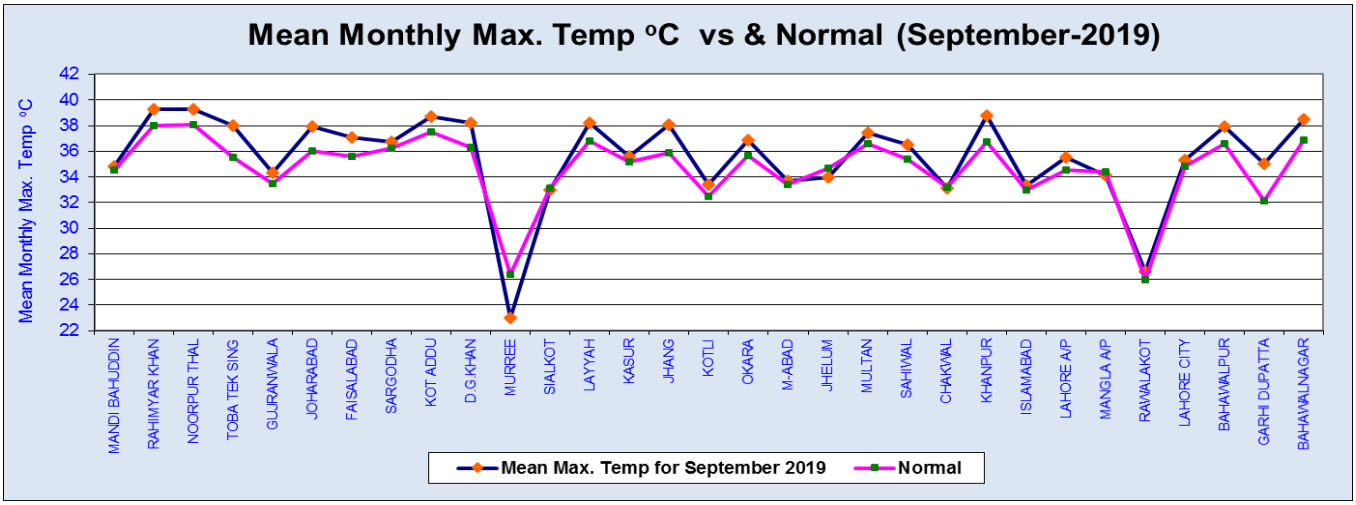


Climatology of the Region

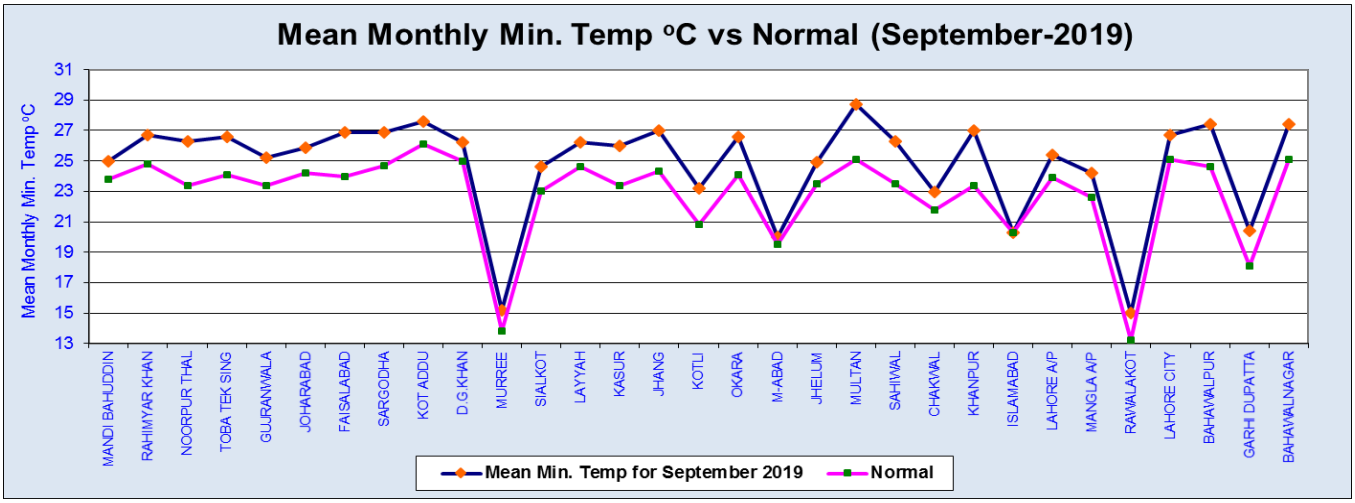
Graphical Presentation of Met Data for September -2019



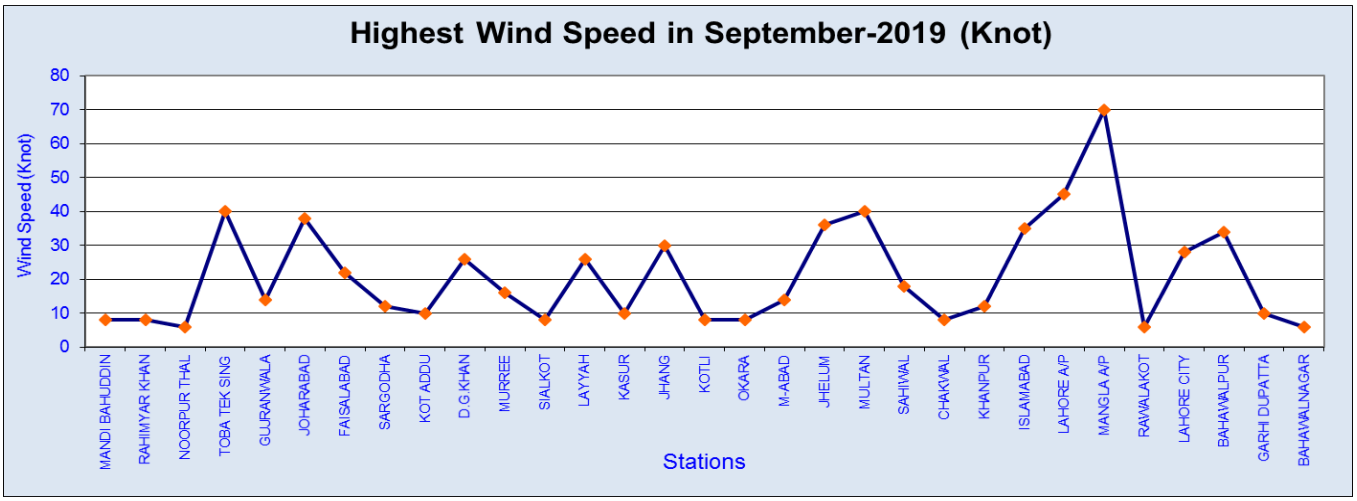
- -11.4% from Normal has been recorded by Met. Stations of RMC, Lahore.



- 1 °C Mean Max. Temp. more than Normal has been recorded by Met. Stations of RMC, Lahore.

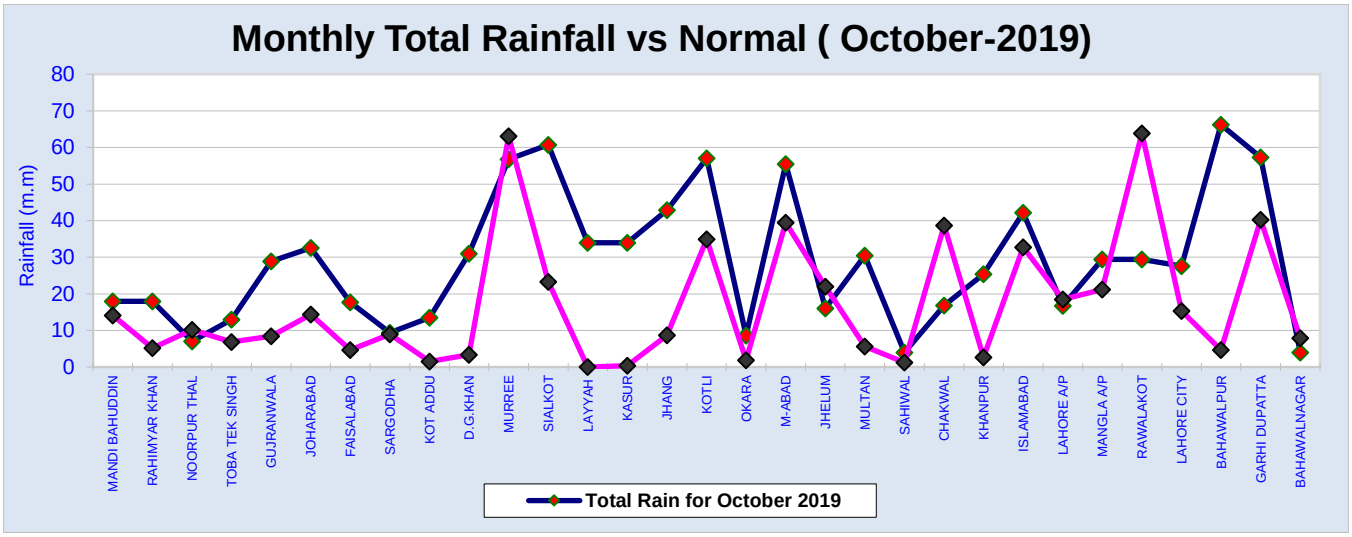


- 2 °C Mean Min. Temp. more than Normal has been recorded by Met. Stations of RMC, Lahore.

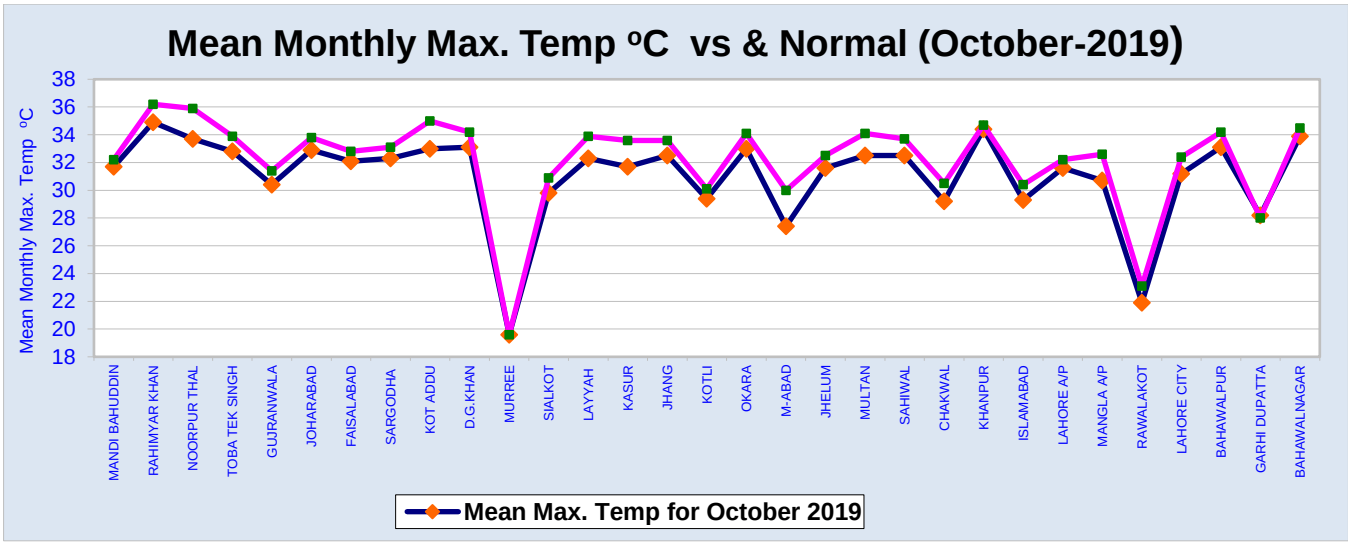


- Highest wind speed 70 knot was recorded by Met. Observatory, Mangla A/P.

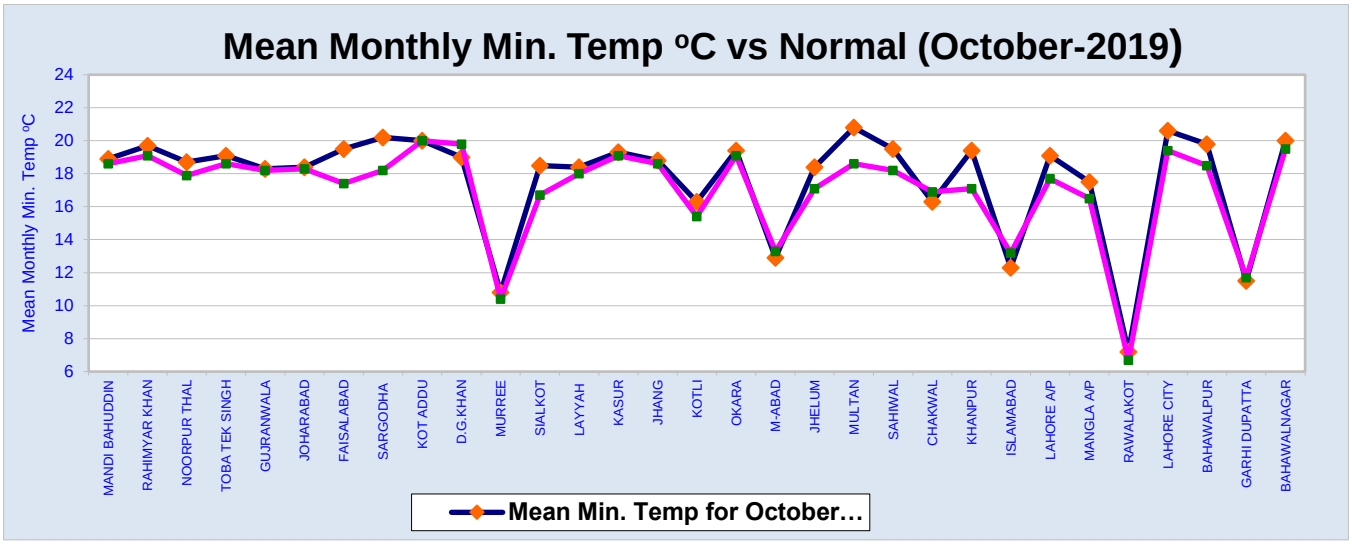
Graphical Presentation of Met Data for October -2019



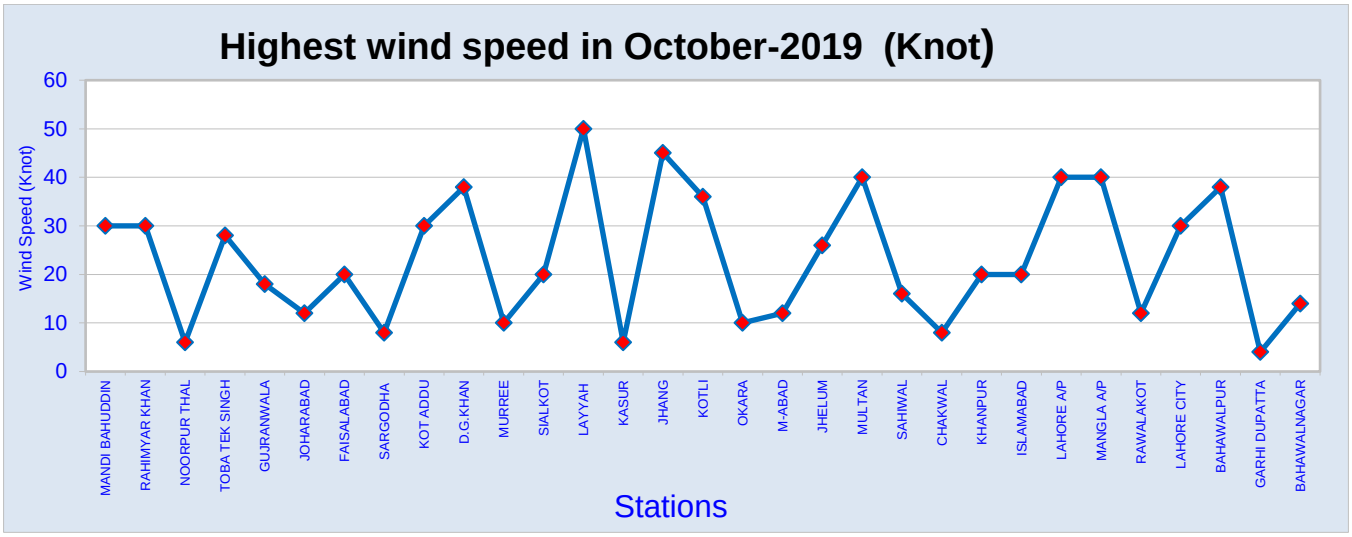
- -11.4% rainfall from Normal has been recorded by Met. Stations of RMC, Lahore.
- Highest rainfall 66.2 mm was recorded by Met. Observatory Bahawalpur.



- Mean Max. Temp was recorded 1.1 ºC below from Normal by Met. Stations of RMC, Lahore.
- Mean Max. Temp was recorded 2.6 ºC below from Normal by Aeromet observatory Muzaffarabad A/P.



- Mean Min. Temp was recorded 0.7 ºC above from Normal by Met. Stations of RMC, Lahore.
- Mean Min. Temp was recorded 2.3 ºC above from Normal by Met. Observatory Khanpur.



- Highest wind speed 50 knot was recorded by Met. Observatory. Layyah Karor.

Regional Data Collection System (RDCS)

Regional Meteorological Centres are responsible to collect and manage Meteorological data of all observatories under their respective regions. There are five major types of Meteorological products that are being received at their respective time intervals.

1. Metar
2. Synop
3. Tafor
4. Pilot
5. Pocket Register

In the past, RMC's had adopted following communication mediums for data communication between Main Communication Center (A Section which is responsible to collect data from observatories and upload to website) and Observatories.

1. Tele printers
2. Radio communication (SSB)
3. Landline
4. Telephone

Currently observatories are sending data via SMS and following flaws are observed.

1. No User Information
2. No Location information and confirmation
3. User can send Bogus Data
4. No feedback for reception of Data
5. No Read Status

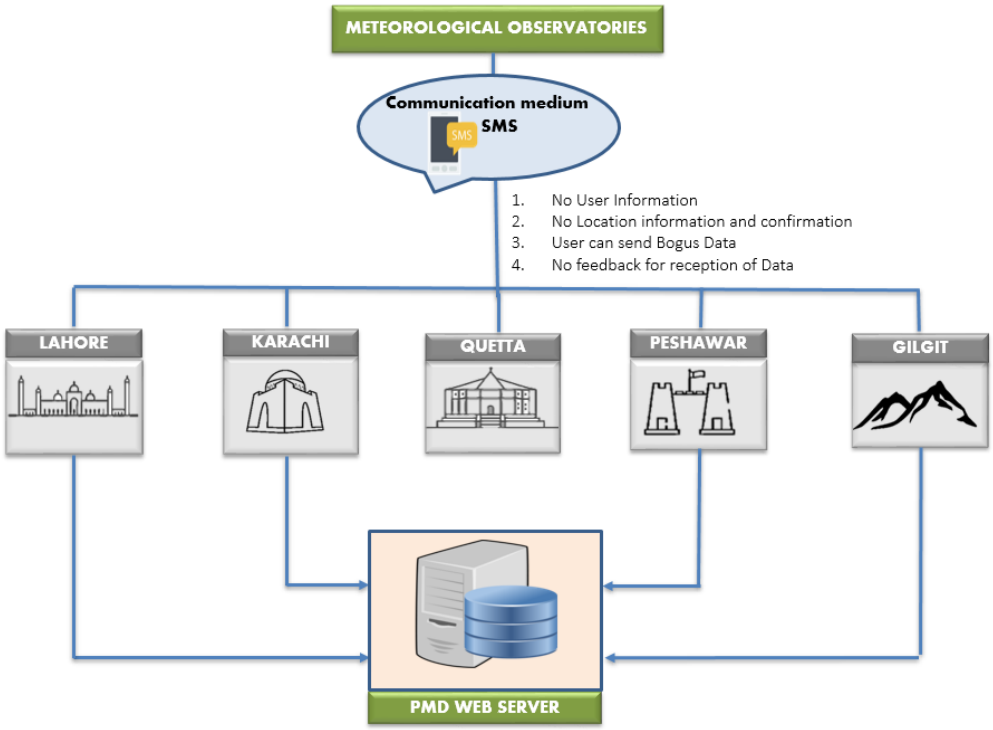
Objectives

The upgradation of Communication System and Data Management is based on the following major objectives.

- Centralize Database Management System

The major objective is to develop a centralize Database Management system for all Regional Meteorological Centres to

- Manage Stations Information
- Manage Users Information
- Manage Meteorological data
- Log all Users Activities



- **Authenticate User Location**

The second objective is to authenticate the location of the user which is detected and verified by the RDCS server.

- **Quality Assurance and Quality Control**

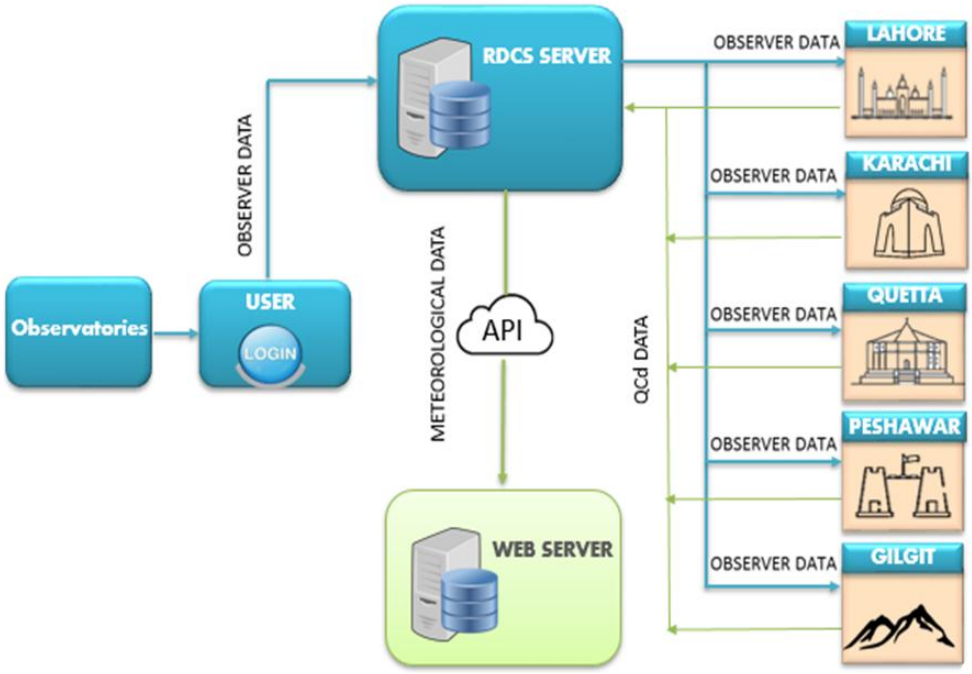
A centralized validation process to fix all inconsistencies and anomalies and Missing / Unknown entries in the data. After quality assurance RDCS will enable a centralize quality control process to improve Incompleteness, Accuracy, threshold values and group validation.

- **System Administrator**

System administrators are responsible to monitor overall operation, daily data management, upkeep and configuration of tablets (Android Devices) installed at observatories, troubleshooting, and planning for new installation.

- **Communication Device**

A communication device (Laptop/ Computer/ Tablet/ Mobile) is required for uploading data to server via internet. The best option is tablet, which includes a full-fledge computer system, low power consumption, screen size, portability, battery life with GPS sensor to get location of users.



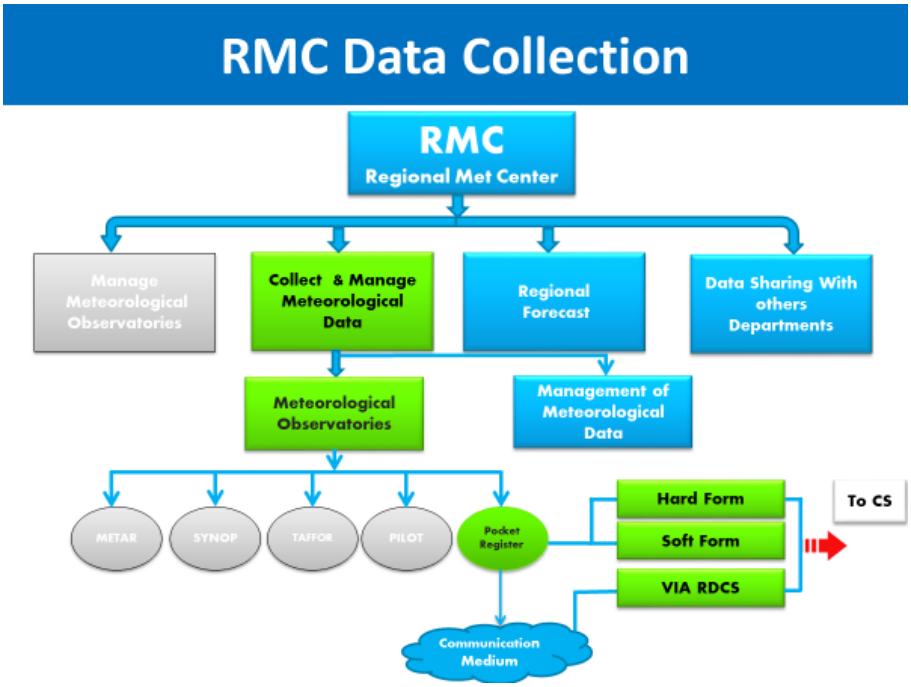
Taking into consideration all the above drawbacks in communication systems, Regional Meteorological Centre Lahore has upgraded its communication system and developed web-based integrated system "Regional Data Collection System (RDCS) to collect and manage all types of Meteorological data Products.

Regional Data Collection System (RDCS) is has following modules.

1. Geo Location
2. Stations Management System (SMS)
3. Users Management System (UMS)
4. Manage Stations Data
5. User Login/Logout Logs
6. MCC Portal
7. Observatory Users Portal

Pocket Register

Pocket register is a record of a whole set of different weather parameters. An observer at an observatory takes readings of weather parameters such as temperature, pressure, precipitation, visibility, wind speed & direction and weather phenomena on hourly interval and keep these records in a register called Pocket Register. These recorded values are being used for generating other meteorological products like Monthly Mean Register (MMR), Aviation Current Weather Register (ACWR), Annual Summary Part (ASP) and Agro Meteorological Data.



On completion of a month these manually filled Pocket Registers are sent to Regional Meteorological Centre, Lahore for computerization and quality assurance. After that these will be sent to Climate Data Processing Centre, Karachi for storage and further processing.

Conventional approach to collect and processing Data is time consuming and have not any information about user identity, data log and user progress.

PR Modules

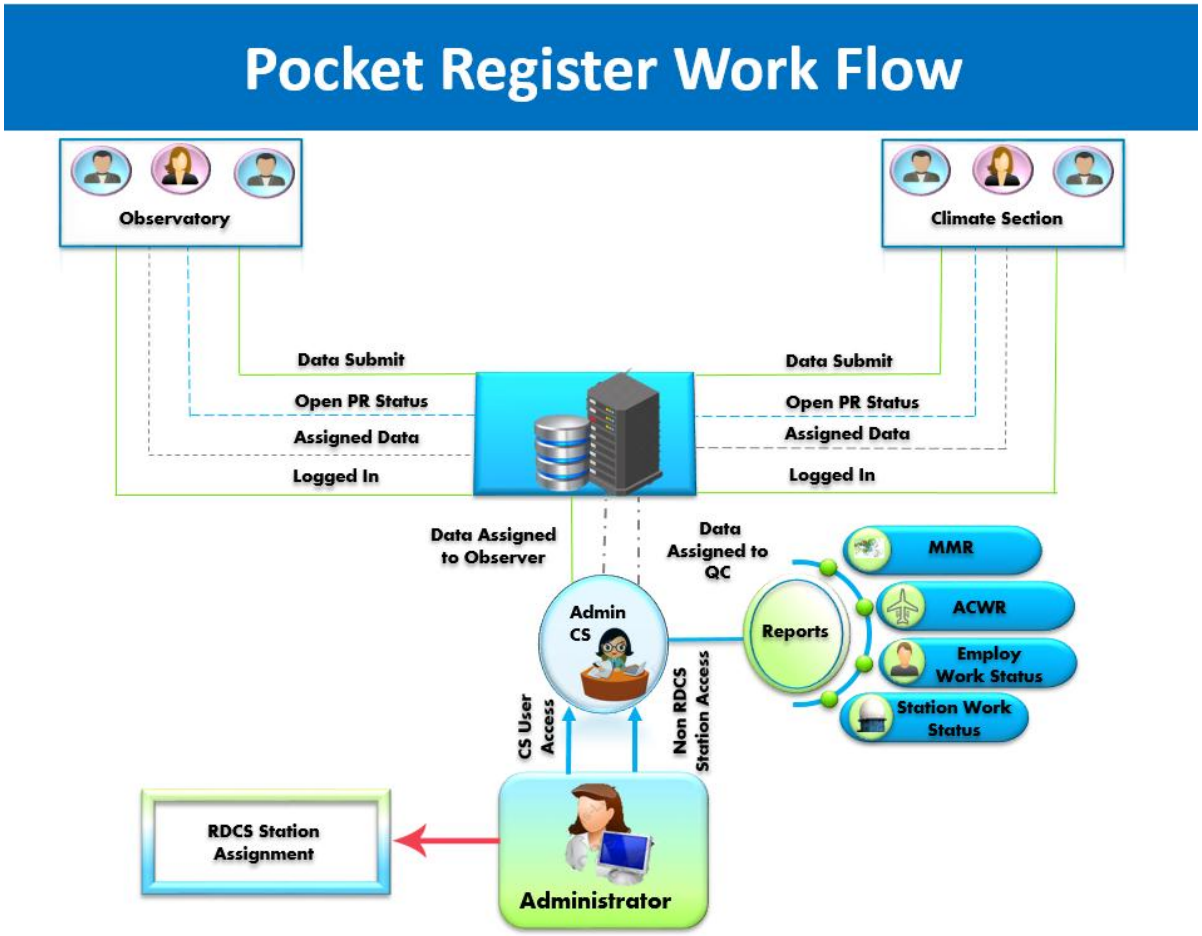
This software consists of three types of Interfaces: -

1. Observer Interface
2. Quality Assurance Interface
3. Data Assignment Interface

- Observer Interface:
  This interface has been developed for observatories users to send Meteorological and Pocket Data on RDCS.

- Quality Assurance Interface:
  This interface has been developed for Pocket Data Quality Assurance to discover inconsistencies and other anomalies in the data.

- CS Admin Interface:
  In this Interface Climate Section admin can assign data, generate reports and monitor work flow.



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Published in February, 2020

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