WEATHER SUMMARY FOR THE PERIOD FROM OCTOBER TO DECEMBER, 2019.

Actual rainfall with departure from normal at Met. Office, Lahore Airport during the quarter as under:

<table>
<thead>
<tr>
<th>MONTH</th>
<th>ACTUAL RAIN</th>
<th>DEPARTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>October, 2019</td>
<td>16.7 mm</td>
<td>+06</td>
</tr>
<tr>
<td>November, 2019</td>
<td>9.8 mm</td>
<td>+4</td>
</tr>
<tr>
<td>December, 2019</td>
<td>23.4 mm</td>
<td>+11</td>
</tr>
</tbody>
</table>

Maximum gust of 84 Km/hr was recorded at Met. Office Lahore Airport on 07-11-2019 and lowest minimum temperature – 4.5°C was recorded at Met. Observatory, Chakwal, on 28-12-2019.

Heaviest rainfall, 88.0 mm, in a day was recorded by Met. Observatory, Garhi Dupatta on 07-11-2019.

(Contributed by RMC/M.O Lahore)

National Seismic Monitoring and Tsunami Early Warning Center, Karachi.

National Seismic Monitoring & Tsunami Early Warning Centre, Karachi successfully participated in the six monthly communication test on 11th December, 2019. The test was scheduled by the Indian Ocean Tsunami Warning Mitigation System (IOTWMS). All the countries situated at the rim of the Indian Ocean participated in the test. Bulletins issued by Regional Tsunami Service Providers (RTSPs) were received through GTS, email and mobile phone.

The objectives of the test were to:

1. Validate the RTSPs dissemination process for tsunami bulletin notification messages to National Tsunami Warning Centres NTWCs.
2. Validate the reception of the notification messages by NTWCs.
3. Validate the access by NTWCs to RTSPs password protected websites containing bulletins.
4. Validate the reporting by NTWCs of national warning status information back to RTSPs, via a web-based warning status report form.

Test logs were prepared during the test and then sent to IOTWMS secretariat for evaluation.

EARTHQUAKES.

| EARTHQUAKES LOCATED IN PAKISTAN / NEIGHBORING REGIONS (AS SHOWN IN PICTURE BELOW) |
|-------------------------------------------------|-----------|
|                                                 | 191       |

October to December, 2019
EARTHQUAKE REPORTS

♦ A total of 533 earthquakes were recorded by the Seismological Network of Pakistan Met. Department, Regional Met. Centre Peshawar during the quarter.

Post-Monsoon 2019 Rainfall
CDPC / Pakistan Meteorological Department

Highlights:
♦ During the year 2019, country rainfall was above normal (28%).
♦ During post-monsoon season (OND) 2019, country rainfall was above normal (113%). On regional scale, the rainfall was above normal over all provinces.
♦ In December 2019, country rainfall was below normal (-41%). On regional scale, the rainfall was below normal over all provinces except Sindh & Punjab where it was above normal.
♦ November 2019, country rainfall was highly above normal (509%). On regional scale, the rainfall was largely above normal in provinces.
♦ During October 2019, country rainfall was largely above normal (114%). On regional scale, the rainfall was above normal in all provinces except AJK & GB where it was close to and below normal respectively.
**OZONE LAYER**

Ozone layer monitoring continued regularly at ozone layer monitoring station Quetta. No significant change has been observed over Pakistan during the quarter under review. The ozone values remained between 110 to 320 Dobson Unit.

**October, 2019.**

**FLOOD FORECASTING DIVISION LAHORE.**

**GENERAL:**

- The flood season 2019 was terminated on 15.10.2019. During the flood season, the routine daily weather and Flood Forecasting bulletins and significant warnings (as and when required) were issued to various Government, Semi Government departments, print and electronic media and Focal Person to update them about the prevailing condition of weather and floods across the country.

**MEETING:**

- Mr. Sahibzad Khan, Chief Meteorologist, FFD, Lahore:
  2. Attended Second Meeting of Ministerial Committee on “SMOG Issues throughout the Province of Punjab”, held under the Chairmanship of Minister for Finance, Punjab, at Lahore on 14th November, 2019.
  3. Attended Executive Board Meeting Army Post Flood Coordination Conference 2019 on 19th November, 2019, held at Headquarters Engineers 4-Corps, Lahore.

- Mr. Muhammad Aslam, Director, FFD, Lahore attended Post Flood Coordination Conference on 27th November, 2019 at HQrs. 30 Corps at Gujranwala Cantt.

**VISITS:**

- Malik Muhammad Ameen Aslam, Advisor to Prime Minister for Environment, Govt. of Pakistan visited Flood Forecasting Division, Lahore on 3rd November, 2019. Mr. Sahibzad Khan, Chief Meteorologist briefed him about functioning of different units of FFD, Lahore and the prevailing situation of smog (Air Quality Index Rate).
- A number of students of different institutions visited FFD, Lahore. They were briefed about functioning of different units of FFD, Lahore.
Drought Monitoring

New drought monitoring tools/techniques were used by NDMC during this period whose maps are available on [http://ndmc.pmd.gov.pk/ndmc.php](http://ndmc.pmd.gov.pk/ndmc.php), which show:

- Cumulative Precipitation Anomaly (CPA)
- Percent of Actual to Normal Rainfall
- Percentage Departure of Rainfall
- Soil Moisture Anomaly
- Normalized Difference Vegetation Index
- Land Surface Temperature
- Temperature Vegetation Dryness Index (TVDI)

Cumulative Precipitation Anomaly (CPA) is made on monthly Basis
MISCELLANEOUS POINTS / MATTERS:

♦ Mr. Sarfaraz, Chief Meteorologist, Karachi, attended the following meetings during the quarter:-
  
i. with Project Director, New Gwadar International Airport with regard to the establishment of Met. Office at New Gwadar International Airport on 17-10-2019.
  
ii. A seminar and gave presentation on “Drought Monitoring and early warning system at NDMC-PMD” at Mehran Hotel on 16-12-2019.
  
iii. Attended the Pakistan Maritime Security Agency opening brief of Exercise BARRACUDA-X on 2nd December, 2019 at Avari Tower Karachi and for Sea-Day on 4th December, 2019 onboard PMSS KASHMIR.
  
♦ Mr. Muhammad Ajmal Shad, Director, RMC, Lahore, visited Islamabad and Faisalabad Airport, on 15-10-2019 and 18-10-2019 respectively, for QMS documents / audit, also visited Multan on 22-10-2019, for site selection of radar and visited on 18-11-2019 to attend the workshop of Agromet data and advisories in relation to climate change scenario.
  
♦ Syed Mushtaq Ali Shah, Director, RMC, Peshawar and Dr. Muhammad Fahim Ahmad, Deputy Director, attended Capacity Building Training and Experience Sharing workshop on 3rd December, 2019 at PC Hotel, Peshawar followed by a field visit UNDP’s GLOFF-II Project to Swat from 4-5 December, 2019.
  
♦ Mr. Zubair Ahmed Siddiqui, Director, RMC, Karachi, proceeded on tour to all Met. Units located in Sindh from 14-10-2019 to 19-10-2019, regarding inspection of observatories.
  
♦ Dr. Muhammad Fahim Ahmad, Deputy Director, visited to District Manserh and Kohistan for the assessment of vulnerable glaciers lakes on 04-11-2019 and visited to GLOF-II project sites at Gilgit Baltistan with other stakeholders to exposure for experience sharing from 1-7 November, 2019.
  
♦ Dr. Muhammad Fahim Ahmad, Deputy Director, attended Post Flood Conference on 28th November, 2019 at Headquarters Engineers visited to GLOF-II project sites at Gilgit Baltistan Corps (Baba Road Peshawar Cantonment).
  
♦ Mr. Zahir Shah, Assistant Meteorologist, attended the meeting of the provincial Climate Change Policy Implementation Committee (PCCPIC) on Climate Change on 06th November, 2019 at office of the Director General, Pakistan Forest Institute, Palosi Road Peshawar.
  
R.M.C Quetta welcomed the students from School, College and University. The visitors were briefed about the role of Pakistan Meteorological Department and importance of R.M.C Quetta, and were taken around various sections located in the premises of R.M.C Quetta and sectional incharges briefed them about the technical / scientific work carried out in their sections.
  
W.M.O Monitoring was completed successfully from 1-15 October, 2019.
  
50 Female students of the Suffah School Dalazak Road, Peshawar, visited to Regional Meteorological Centre, Peshawar.
  
Students of BS Geography of Government Postgraduate College, Kohat, visited to Regional Meteorological Centre, Peshawar, for briefing on the title of “How to Forecast the daily Weather of Pakistan on 24-11-2019.
  
31 Students of Government Postgraduate College Nowshera visited to RMC, Peshawar on 06-11-2019, for briefing on Introduction to Climatology.
  
Students of RACINES School System, Peshawar visited to RMC, Peshawar.
  
The 7th Higher Preliminary Meteorological Course for PAF personal was completed on 28-11-2019.
68th Initial Meteorology Course was commenced on 02-12-2019.

Students of different Public Schools and Government Organizations visited PMD, Karachi Office. They were briefed about the functions and objectives of Pakistan Meteorological Department (PMD) and shown various units of P.M.D at Met. Complex, Karachi.

36 students of different Universities of Sindh completed their internship program during the quarter at Pak. Met. Department, Met. Complex, University Road, Karachi. The certificates have been issued accordingly.

VISITS ABROAD.

Mr. Muhammad Riaz Director General attendant WMO High Mountain Summit on 29-31 October, 2019, at Geneva, Switzerland.

Dr. Muhammad Hanif, Chief Meteorologist, R&D attendant Second South Asia Hydromet Forum on 19-21 November, 2019 at Kathmandu, Nepal.

Dr. Zaheer Ahmad Babar, Director and Dr. Shahzad Sultan, Deputy Director visited the Global Flash Flood Guidance System Workshop and Flash Flood Guidance System Regional Centres meeting, on 3-8 November, 2019, at Antalya, Turkey.


Mr. Fayyaz Ahmed, Assistant Meteorologist, attendant TCC Training Seminar on Climate Analysis Information on Extreme Climate Events on 25-29 November, 2019 at Tokyo, Japan.


RETIREMENT:

The following employees retired during the quarter:-

Mr. Rashid Ali Khan, Met. Assistant (BS-14) on 24-11-2019.

Mr. Muneer Ahmed, Senior Observer (BS-09) on 06-11-2019.

RESIGNATION:

The following officials resigned during the quarter:-

Mr. Mamood Ali, Met. Assistant (BS-14) on 14-10-2019.

DEATH:

The following officials expired during the quarter:-

Mr. Muhammad Amjad, Met. Assistant (BS-14) on 11-11-2019.
Following purchase orders were issued for the purchase of different items during quarter:

<table>
<thead>
<tr>
<th>S. Nos.</th>
<th>Description of Stores</th>
<th>Quantity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Photostat Papers (A4 and Legal Size)</td>
<td>500 Reams +120 Reams</td>
<td>Rs.401,540/-</td>
</tr>
<tr>
<td>02.</td>
<td>Ferrosilicon</td>
<td>7,000 Kgs.</td>
<td>Rs.1,533,000/-</td>
</tr>
<tr>
<td>03.</td>
<td>Packing Materials</td>
<td>Different</td>
<td>Rs.75,472/-</td>
</tr>
<tr>
<td>04.</td>
<td>Toners for Photocopier Machines</td>
<td>Different</td>
<td>Rs.239,651/-</td>
</tr>
<tr>
<td>05.</td>
<td>Computer Continuous Sheets</td>
<td>200 Boxes</td>
<td>Rs.149,800/-</td>
</tr>
<tr>
<td>06.</td>
<td>Office Stationery Items</td>
<td>Different</td>
<td>Rs.130,811/-</td>
</tr>
<tr>
<td>07.</td>
<td>Workshop Materials</td>
<td>Different</td>
<td>Rs.569,000/-</td>
</tr>
<tr>
<td>08.</td>
<td>Solar Panels</td>
<td>12 Nos.</td>
<td>Rs.126,888/-</td>
</tr>
<tr>
<td>09.</td>
<td>Miscellaneous Workshop Items</td>
<td>Different</td>
<td>Rs.51,086/-</td>
</tr>
<tr>
<td>10.</td>
<td>Caustic Soda</td>
<td>9,000 Kgs.</td>
<td>Rs.1,278,000/-</td>
</tr>
<tr>
<td>11.</td>
<td>Wood</td>
<td>Different</td>
<td>Rs.1,060,100/-</td>
</tr>
<tr>
<td>12.</td>
<td>Inverters</td>
<td>Different</td>
<td>Rs.221,000/-</td>
</tr>
<tr>
<td>13.</td>
<td>Brass Rods</td>
<td>Different</td>
<td>Rs.1,291,973/-</td>
</tr>
<tr>
<td>14.</td>
<td>DC Inverter Airconditioners(02 Tons)</td>
<td>08 Nos.</td>
<td>Rs.856,440/-</td>
</tr>
<tr>
<td>15.</td>
<td>Photocopier Machine</td>
<td>01 No.</td>
<td>Rs.162,000/-</td>
</tr>
<tr>
<td>16.</td>
<td>Dry Batteries</td>
<td>12 Nos.</td>
<td>Rs.397,800/-</td>
</tr>
<tr>
<td>17.</td>
<td>Electric Water Cooler, Dispenser, Water Filter</td>
<td>Different</td>
<td>Rs.93,800/-</td>
</tr>
</tbody>
</table>