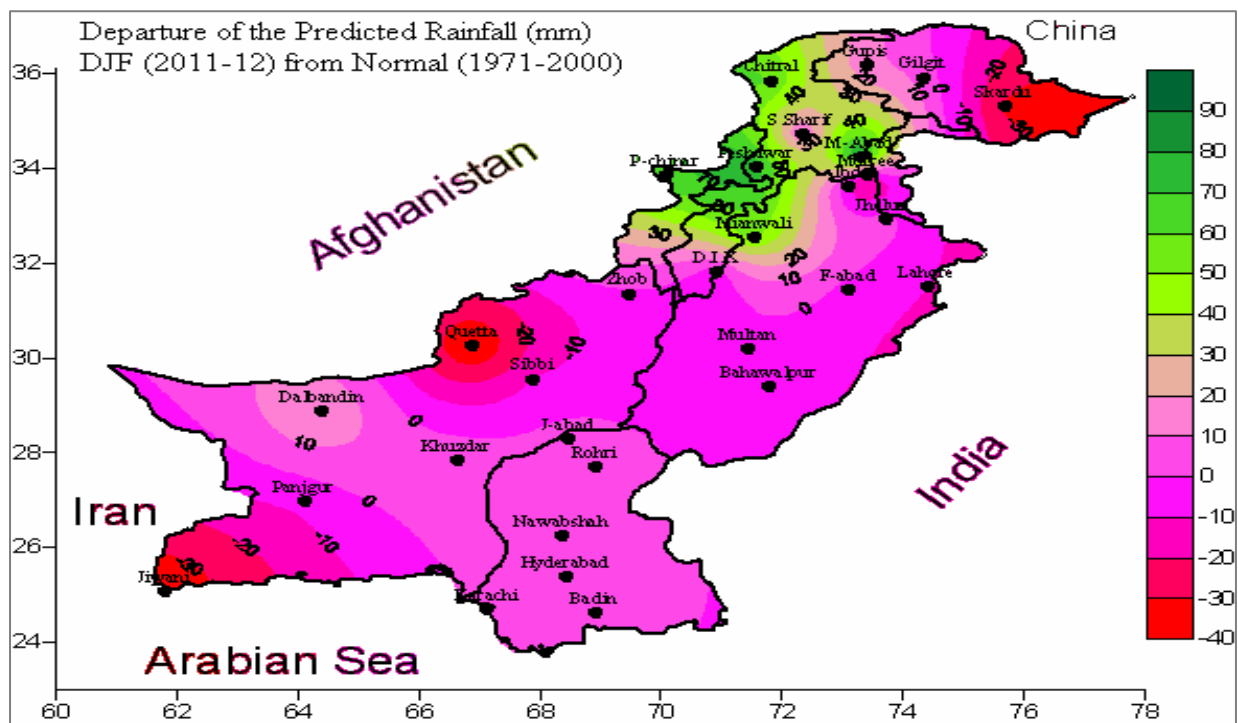
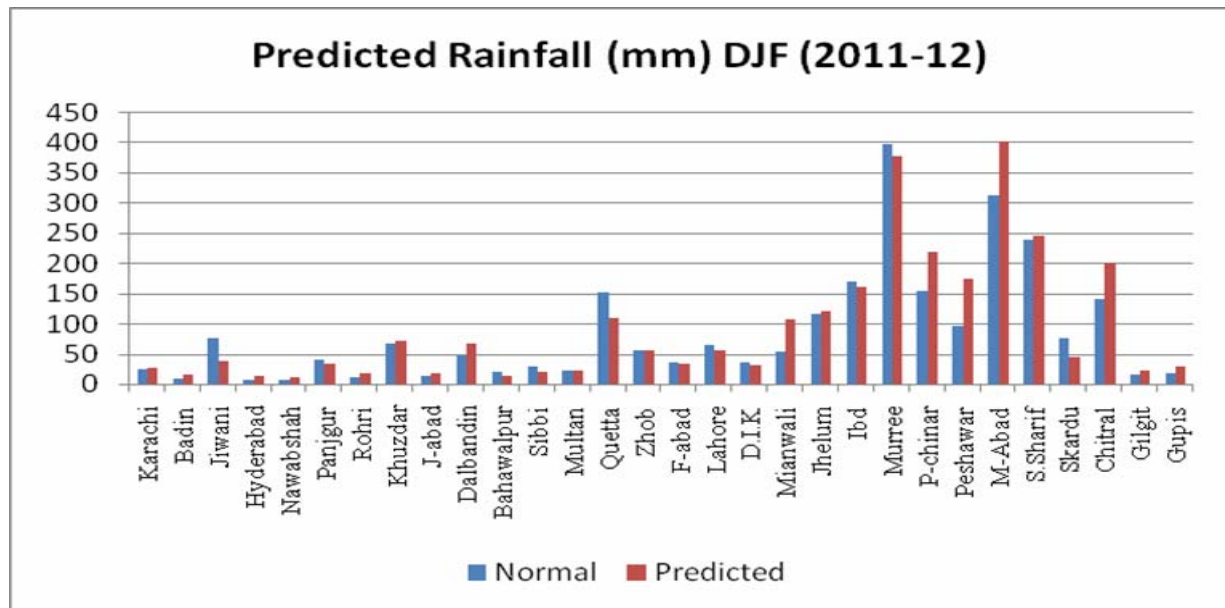


## Seasonal Precipitation Forecast of Pakistan Dec, Jan & Feb (DJF), 2011-12

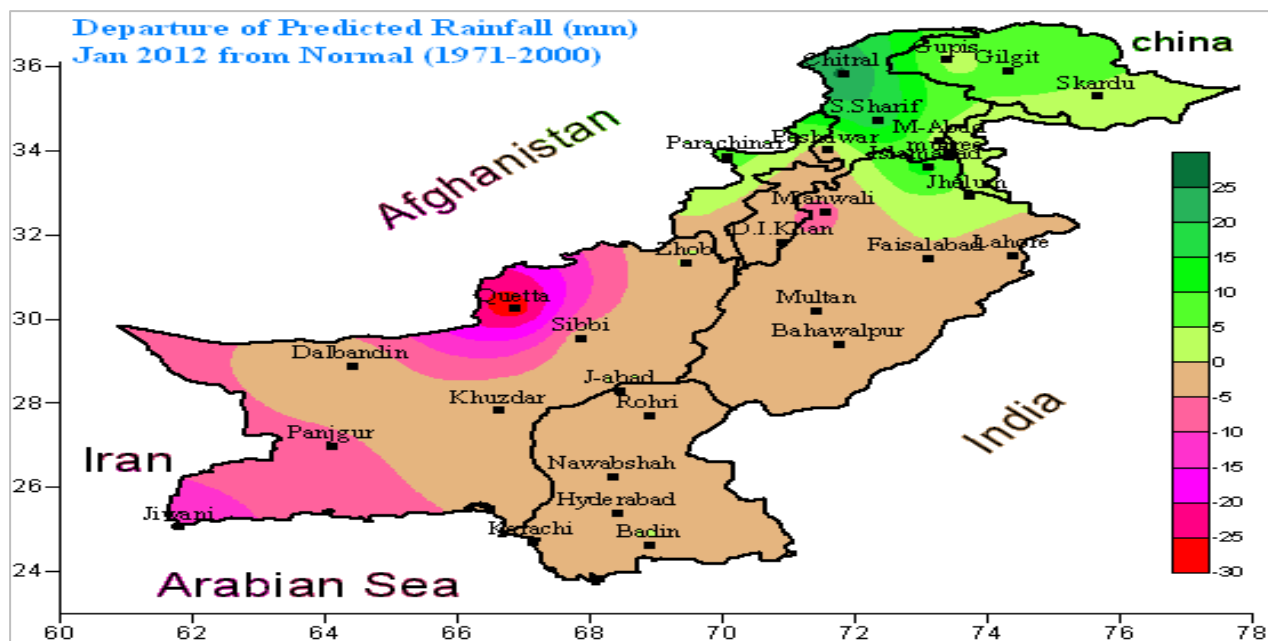
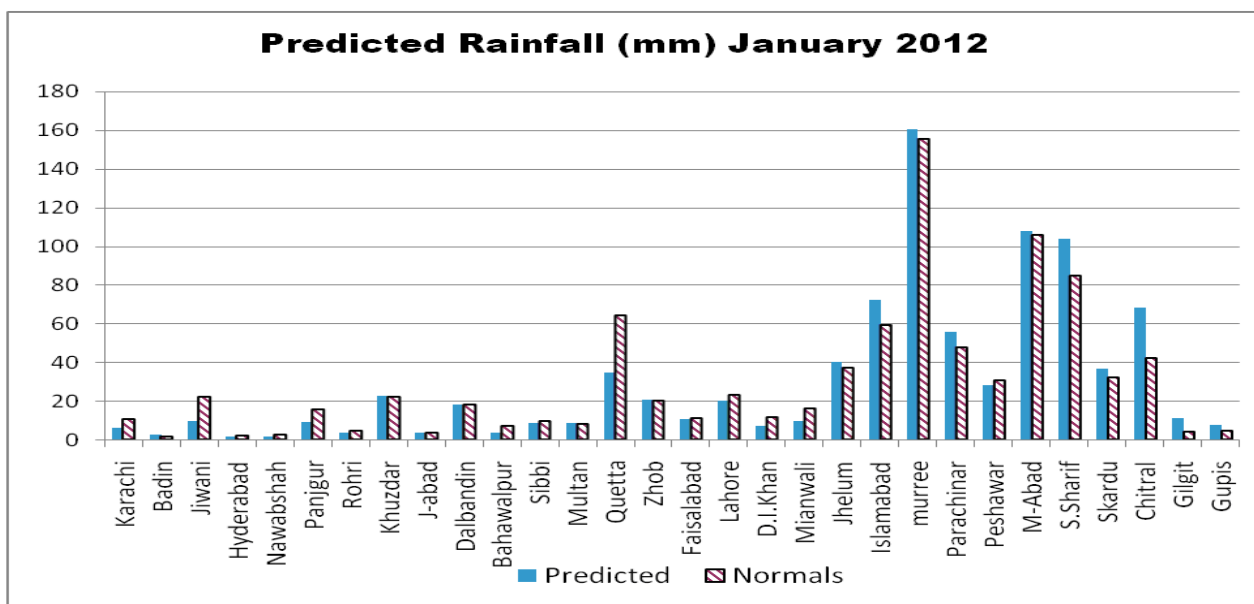
A statistical downscaling technique has been employed to prepare the Seasonal (DJF 2011-12) precipitation forecast of Pakistan. It has been observed that above normal rainfall is expected in most parts of Khyber Pakhtoon Khwa including the adjoining areas of north-western Punjab and Azad Jammu & Kashmir. High elevation planes of Quetta, south-western parts of Balochistan and eastern parts of Gilgit Baltistan including Himalayan region are expected to receive below normal rainfall. However normal rainfall is expected in the rest of the parts of country.



## Precipitation Forecast for January 2012(Experimental):

General Circulation Models (GCM's) are used for extended time seek predictions. But these models are of coarser resolution as compared to Numerical Weather Prediction Models. Therefore Regional Climate Models are used for downscaling GCM outputs to city scale. Precipitation forecast for the month of January 2012 has been prepared by using the statistical down scaling technique and anomaly of the predicted and long term normal (1971-2000) was compared. It is expected that rainfall during the month of January 2012 will remain above normal in the hilly areas of KPK, Gilgit Baltistan and upper Punjab. However, below normal rainfall is expected over high elevation plains of Balochistan and coastal belts of Sindh Makran. Rest parts of Balochistan, central and lower Punjab, Sindh and lower parts of KPK are expected to get normal rainfall during the month. The amount of precipitation is minimal.

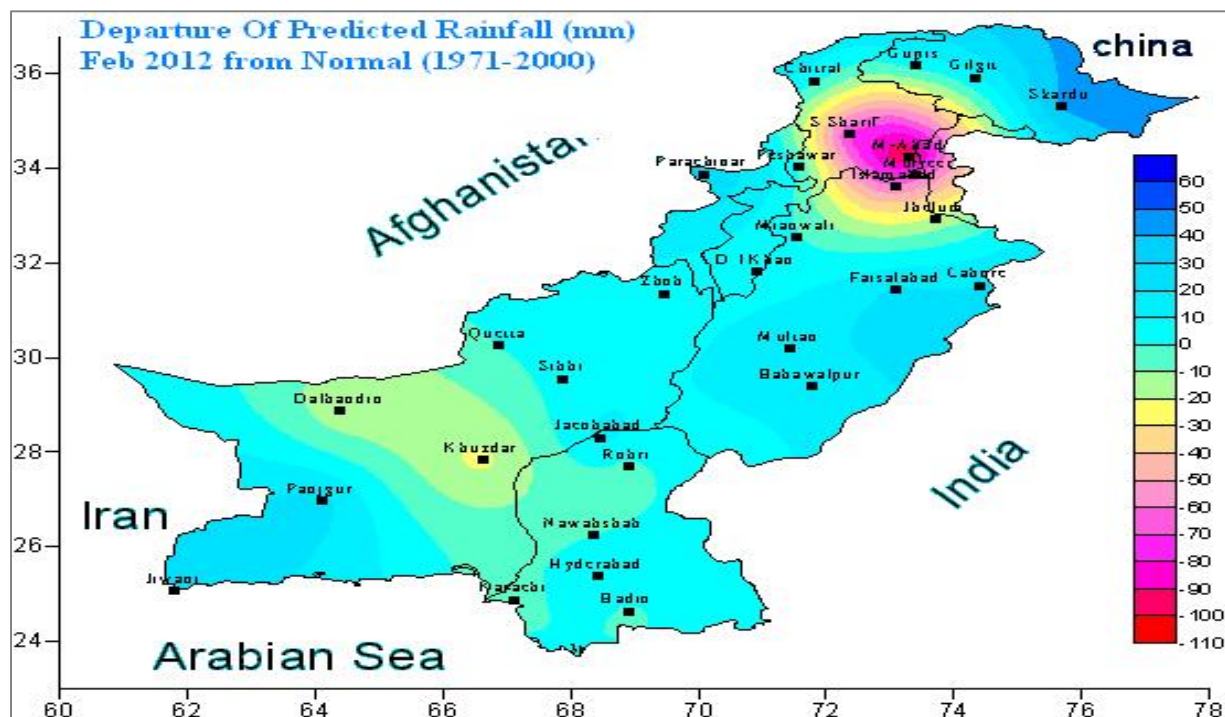
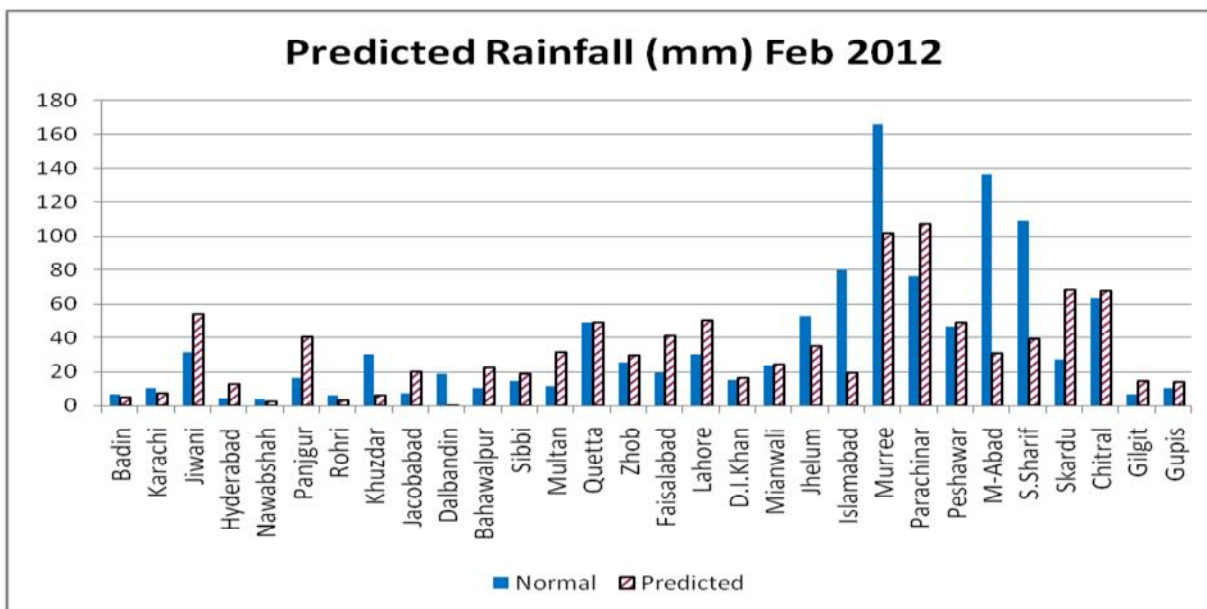
According to area weighted rainfall analysis on provincial basis, KPK, AJK/ Gilgit Baltistan and Punjab are expected to receive 22%, 11% and 2.5% respectively above normal rainfall. Sindh and Balochistan may receive about 28 % below normal rainfall, during the month of January. The correlation coefficient between the predictors and predictands is more than 70% for all the stations.



## Precipitation Forecast for February 2012

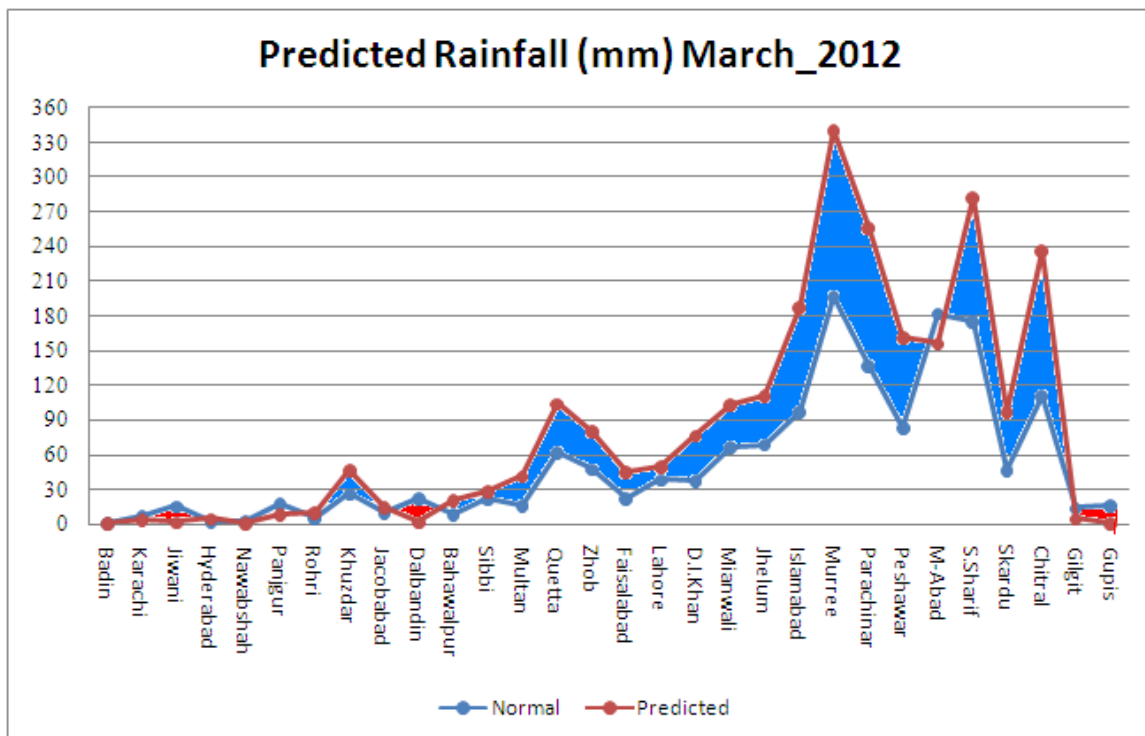
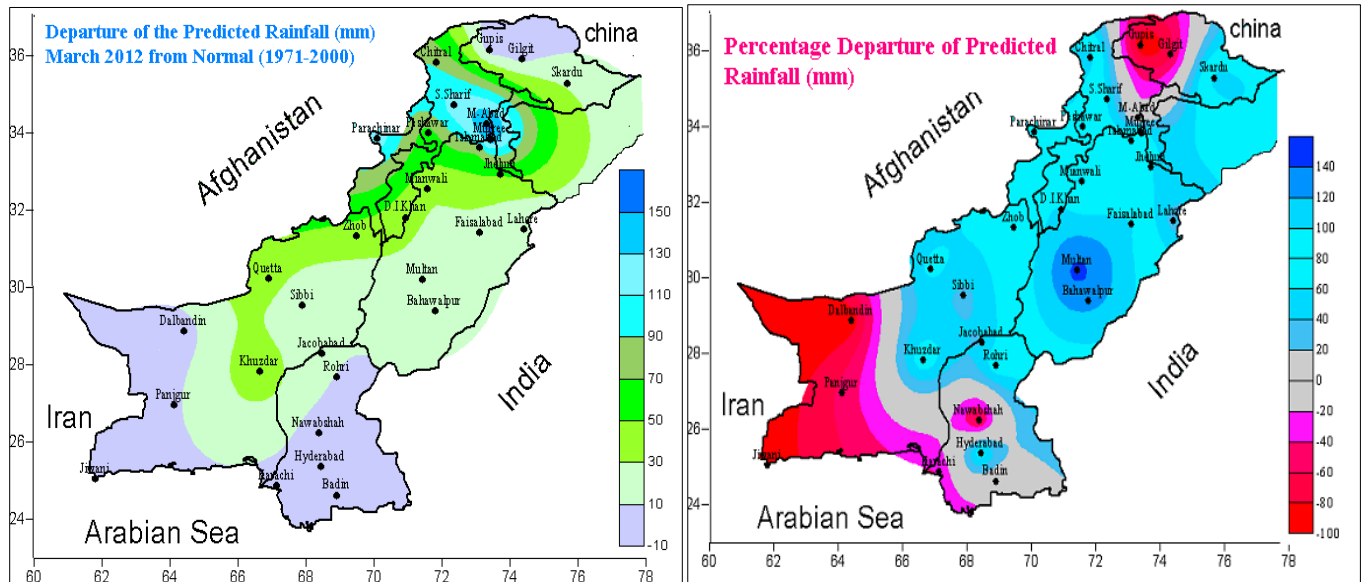
Global Climate Models have been used to predict monthly Pakistan rainfall using regional downscaling technique on the basis of prevailing atmospheric circulation and global weather conditions. This is the part of an experimental process for long range forecasting in PMD extending from a month to a season. Here, possible amount of rainfall (mm) for the month of February 2012 is predicted.

It is expected that above normal rainfall will occur in Gilgit-Baltistan, North-Western & lower parts of KPK, central & lower Punjab, eastern Sindh and upper & coastal parts of Balochistan. However, below normal rainfall is expected in Azad Jammu & Kashmir (AJK), adjacent parts of KPK and Punjab and central parts of Baluchistan and Sindh.



## Precipitation Forecast for March 2012

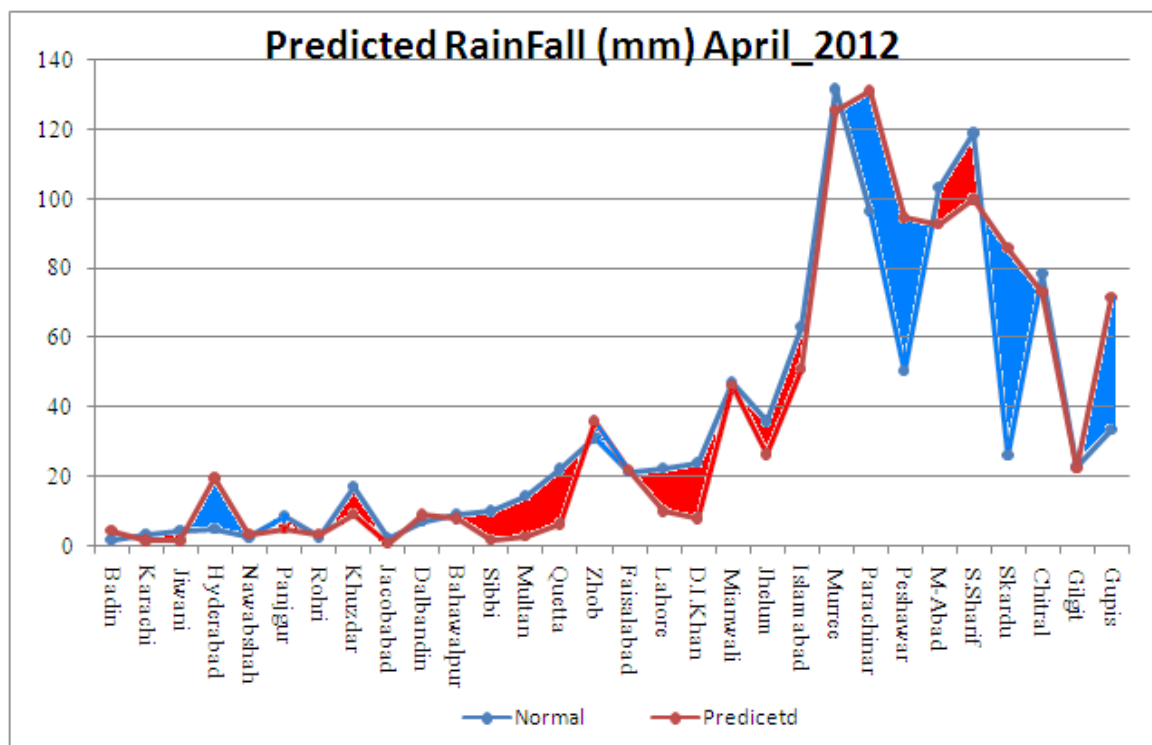
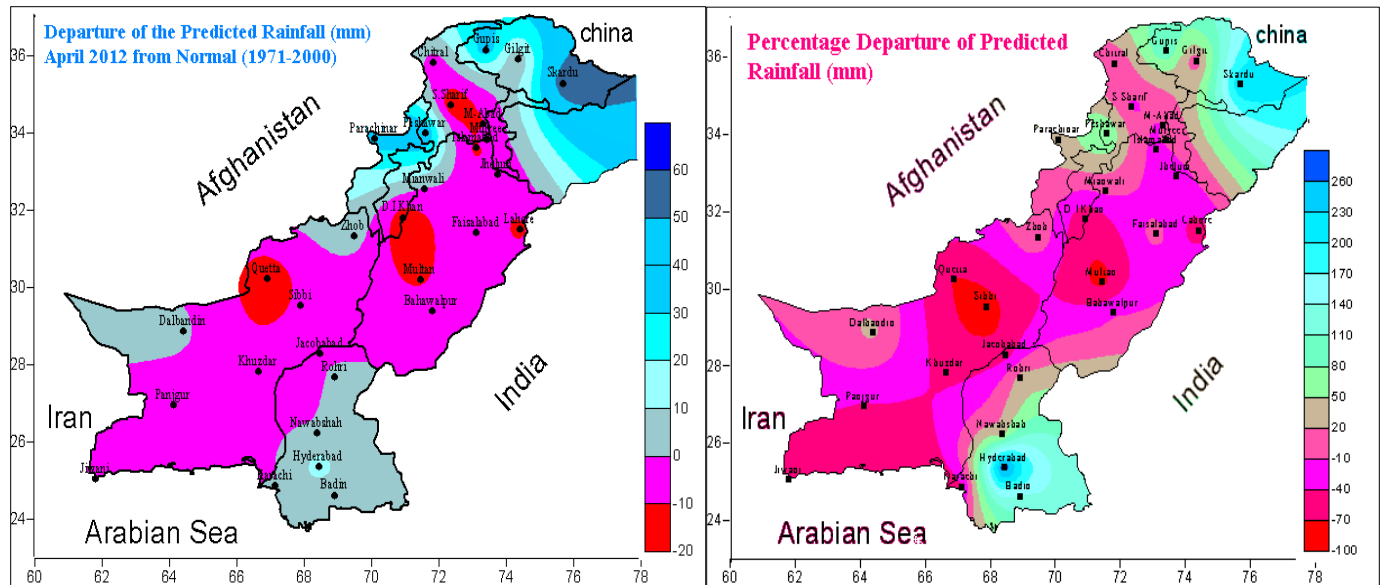
The statistical technique has been used to downscale the output of C.G.C.M (Combined Global Circulation Model) in order to prepare the precipitation forecast for the month of March & April 2012. The best correlation between the predictor and predictand is incorporated. It has been observed that above normal rainfall is expected in most parts of Pakistan during March 2012. The high concentration of rainfall is expected in KPK, central parts of AJK and adjoining areas of Punjab. High elevation planes of Balochistan may receive above normal rainfall. However lower parts of Sindh, southwest parts of Balochistan, and northern most parts of Gilgit Baltistan may get normal rainfall during this month.



In above figure Station mentioned on X-axis are arranged accordingly the increasing latitude from left to right. Red shaded area represents below normal precipitation & blue shades are used for above normal precipitation for March 2012.

## Precipitation Forecast for April 2012

During the month of April, model shows that Punjab, major parts of Balochistan, adjoining areas of Sindh and some high elevated parts of KPK will receive below normal rainfall. However lower parts of Sind, Zhob and Nokundi in Balochistan and lower KPK may receive slightly above normal rainfall. Departure of the predicted rainfall shows that Gilgit Baltistan and in central parts of KPK precipitation may be above normal.



In above figure Station mentioned on X-axis are arranged accordingly the increasing latitude from left to right. Red shaded area represents below normal precipitation & blue shades are used for above normal precipitation for March 2012.

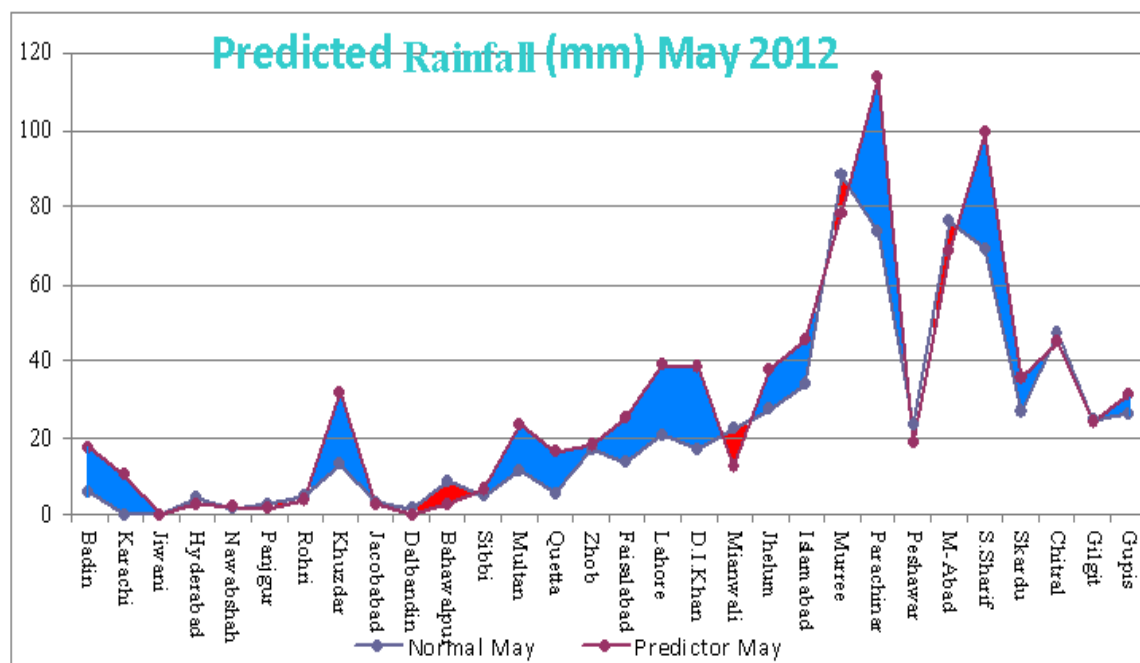
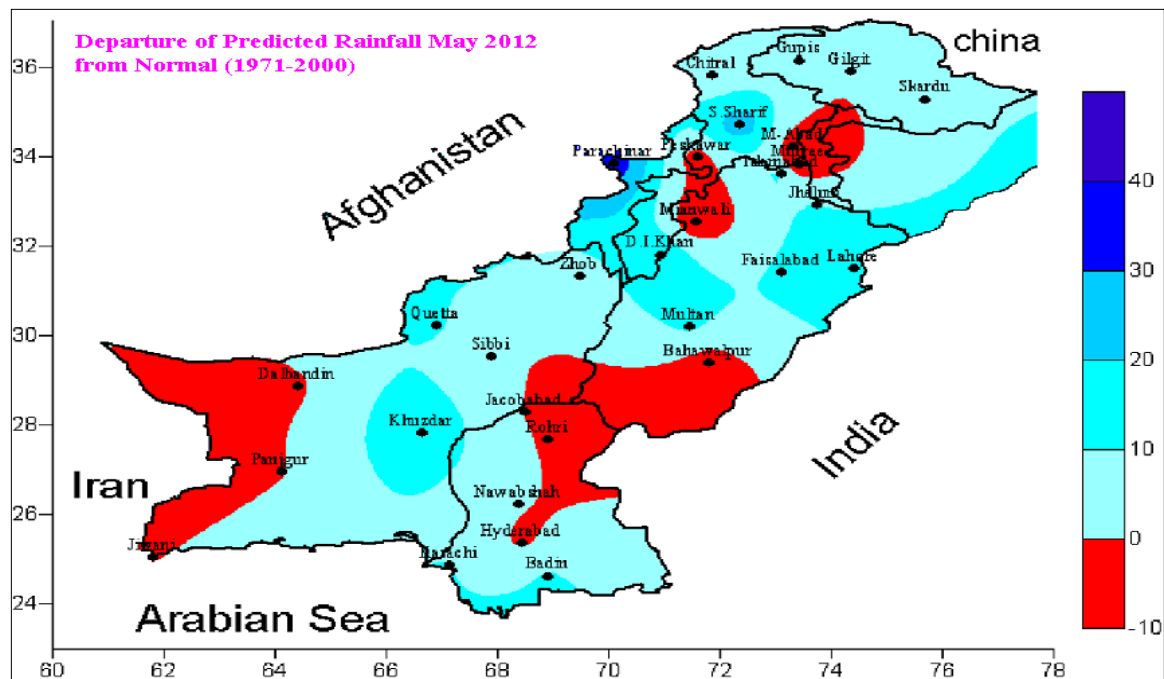
## Summary

In aggregate, the total precipitation during March and April is likely to remain in normal range over the country. Agricultural plains of Punjab, Sindh and Balochistan are expected to receive less than average rainfall during last fortnight of March and the month of April. Dry conditions are desirable during the period to avoid pre and post harvest losses of Rabi crops. However, April is not going to be totally dry month. Some rains of heavy intensity associated with dust storm are expected. Farmers are advised to carry out their field operations in accordance with weather forecasts.



# Precipitation Forecast for May 2012

Experimental seasonal forecast is issued every month on monthly and seasonal time scales. Output of the combined general circulation model (CGCM) is used to predict the rainfall amount over the selected stations of Pakistan. Punjab is likely to receive above normal rainfall except in the south. Further upper region of the country, KPK and lower Sindh are expected to experience above normal rainfall. Baluchistan may also experience similar signals of rainfall except in the adjoining areas of Iran. However, upper parts of Sindh and adjoining areas of Baluchistan show a negative departure from normal (1971-2000). In general anomalously wet conditions are expected in the month of May.



In above figure Station mentioned on X-axis are arranged accordingly the increasing latitude from left to right. Blue shaded area represents above normal precipitation & red shades are used for below normal precipitation for May 2012.

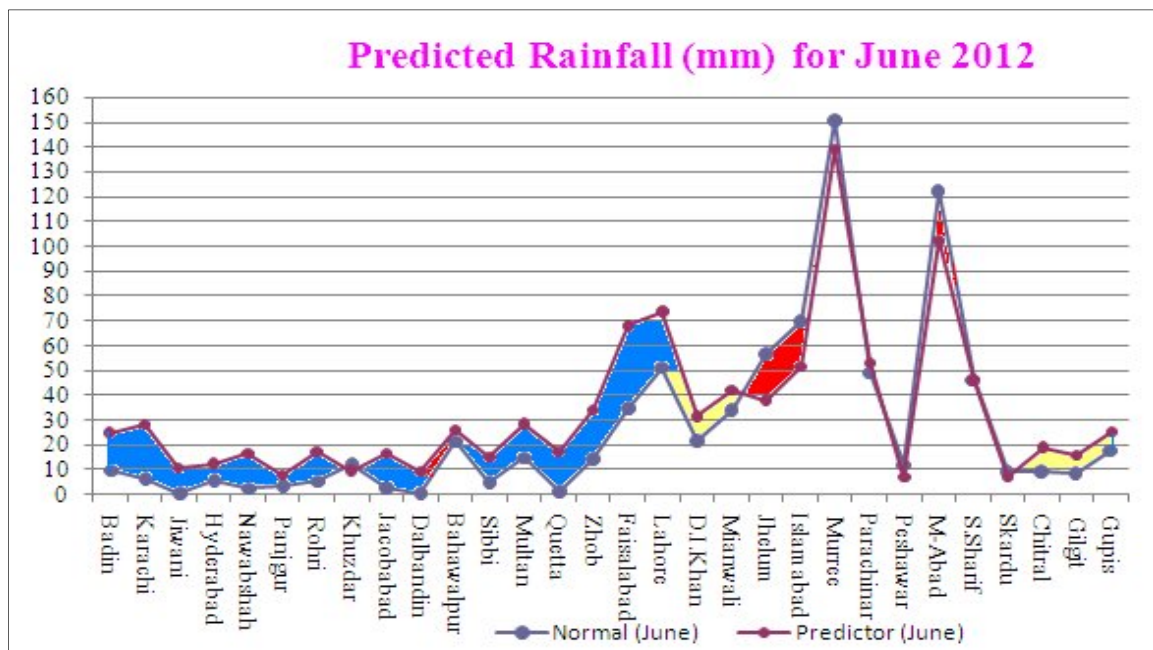
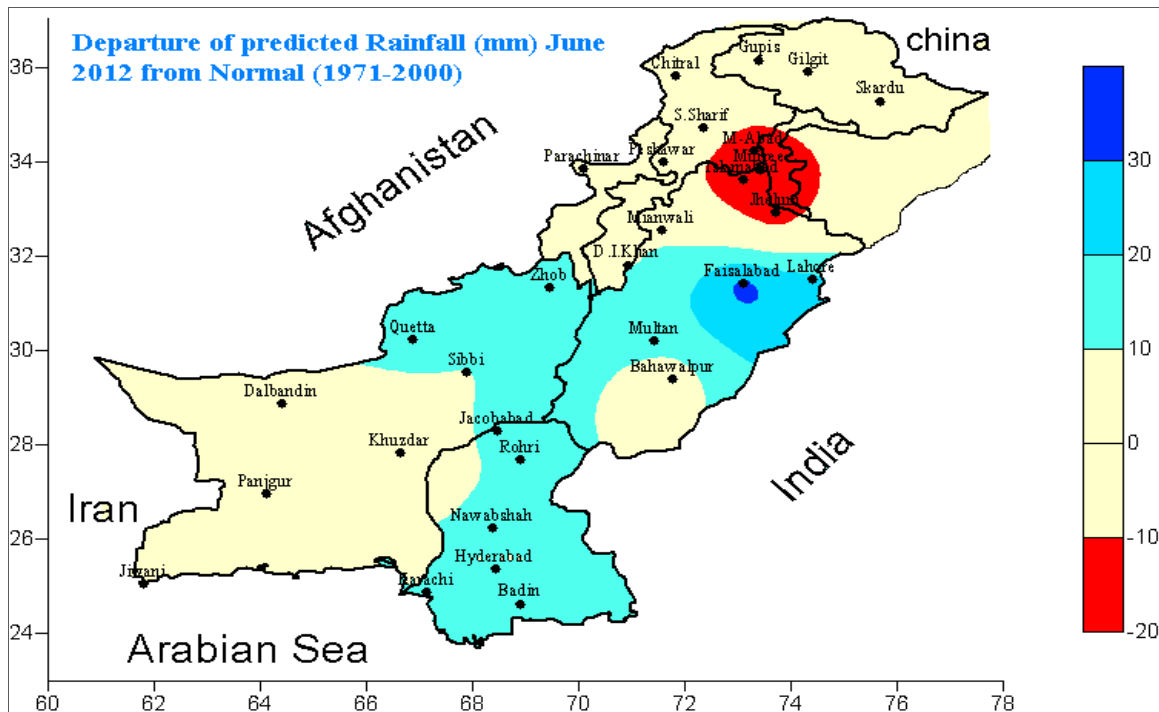
## **Summary**

In May temperature starts increasing. Precipitation spell in April would leave sufficient moisture on the surface and soil which would lead to development of meso-scale convective cells in May. Suitable condition for the formation of convective clouds may result in the thunderstorm and dust storm activities associated with this phenomenon.



# Precipitation Forecast for June 2012

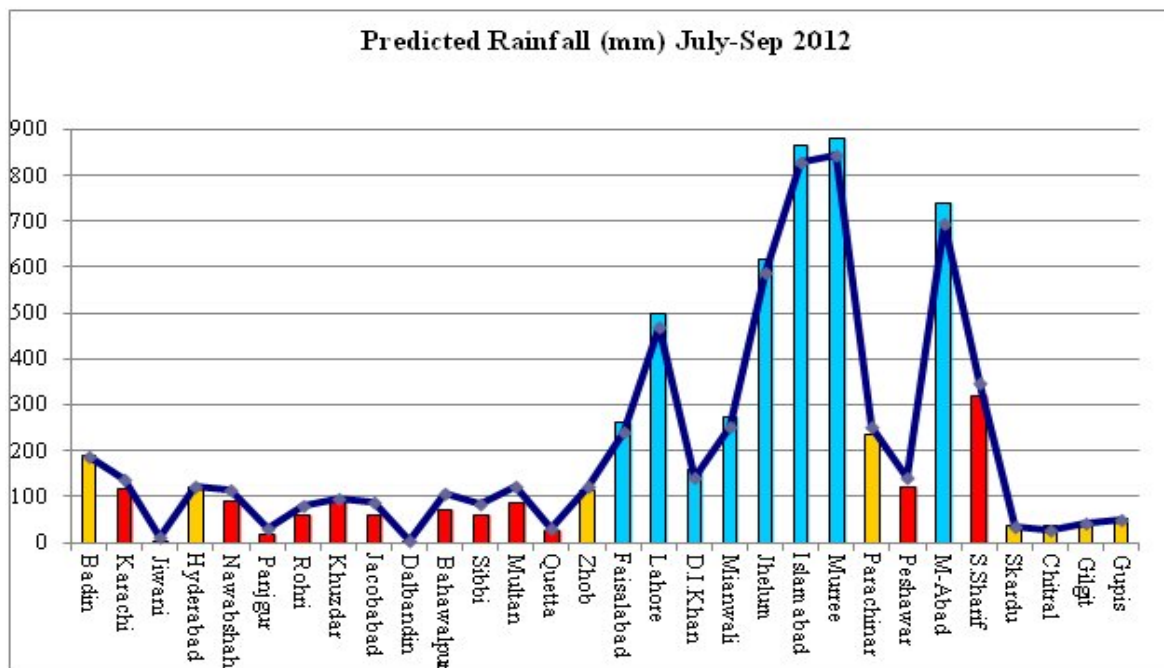
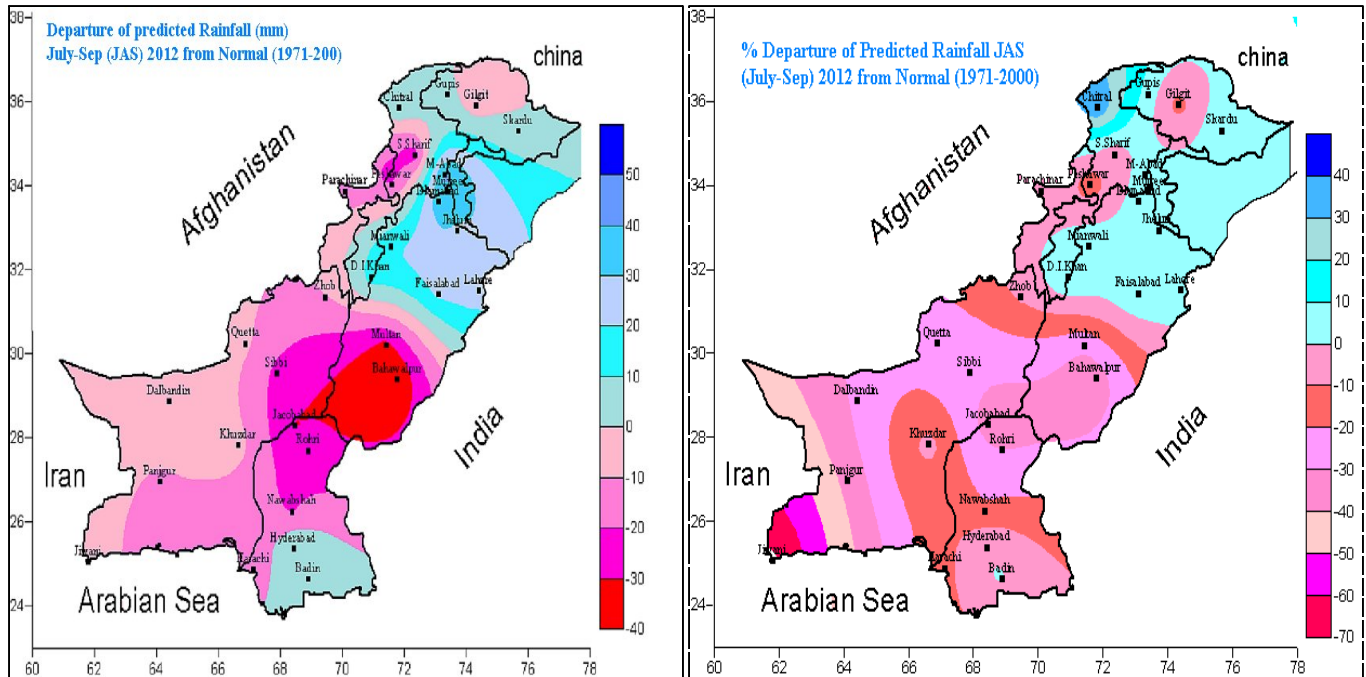
Output of the combined general circulation model (CGCM) is used to predict the rainfall amount over the selected stations of Pakistan on monthly and seasonal time scales. The highlight of the June precipitation forecast is above normal over almost whole of the Sindh province, central and south Punjab (excluding Bahawalpur division) and Northern regions of Baluchistan. Islamabad, Jhelum and Kashmir is expected to receive less than normal (1971-2000) rainfall, although the difference from the normal is not so high. Remaining parts of country which includes KPK, FATA, most of Baluchistan and parts of northern Punjab is expected to receive normal rainfall during the month of June.



In above figure Station mentioned on X-axis are arranged accordingly the increasing latitude from left to right. Blue shaded area represents above normal precipitation & red shades are used for below normal precipitation while yellow shaded areas shows normal rainfall for June 2012.

## Rainfall forecast for July, August and September (JAS) 2012

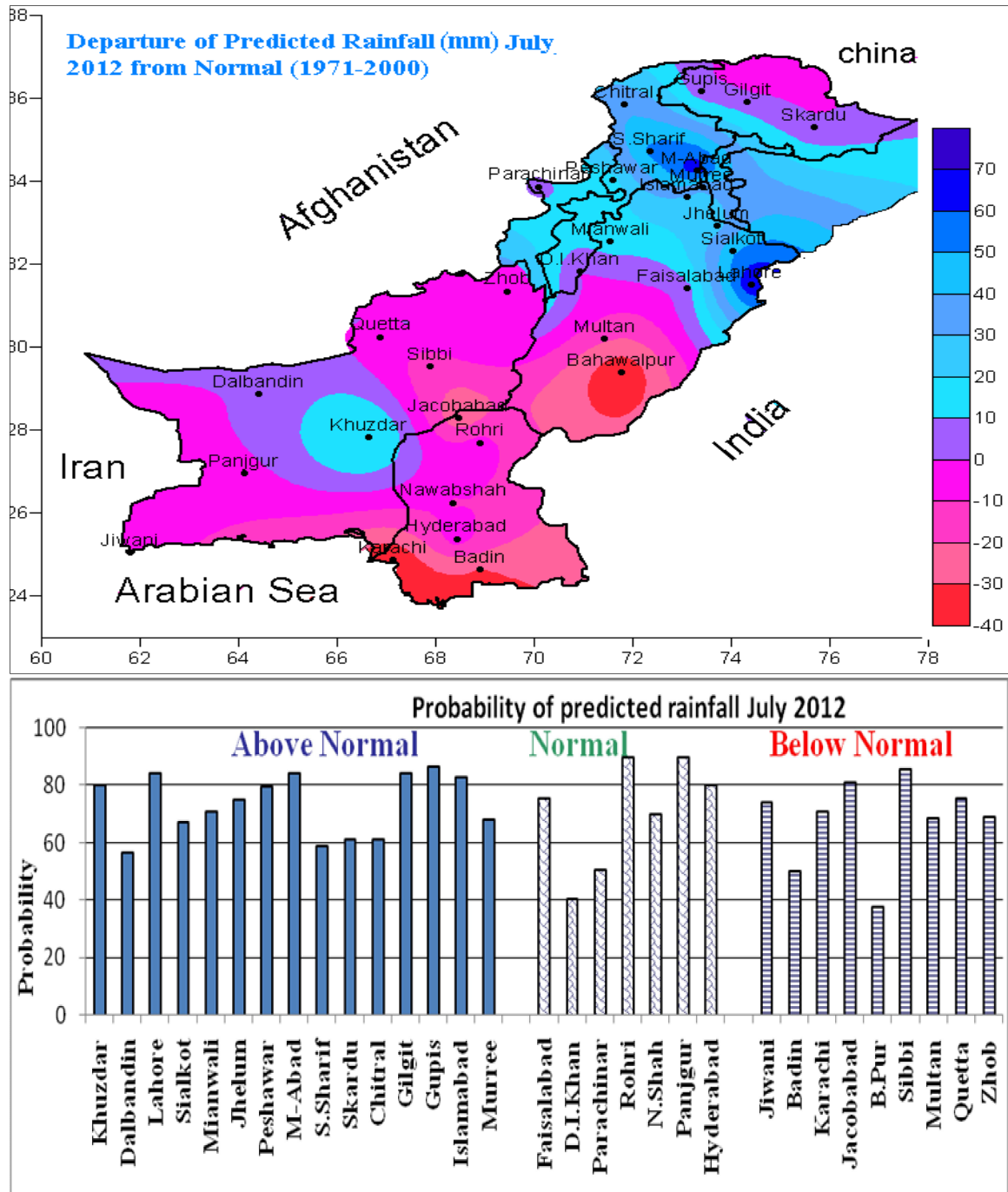
Output of the combined general circulation model (CGCM) is used to predict the rainfall amount over the selected stations of Pakistan on monthly and seasonal time scales. Normal to above normal rainfall is predicted in the northeastern and northern parts of the country as well as the coastal areas of lower Sindh. However Gilgit-Baltistan region is likely to receive below normal rainfall. South Punjab is endangered to face a very dry season. All the remaining parts of the country are forecasted to receive below normal rainfall during the monsoon season.



In the above figure stations are arranged according to the increasing latitude from left to right. The line graph shows the normal values. Blue bar graph is drawn for above normal values, red for below normal whereas yellow stands for normal values.

## Precipitation Forecast for July 2012

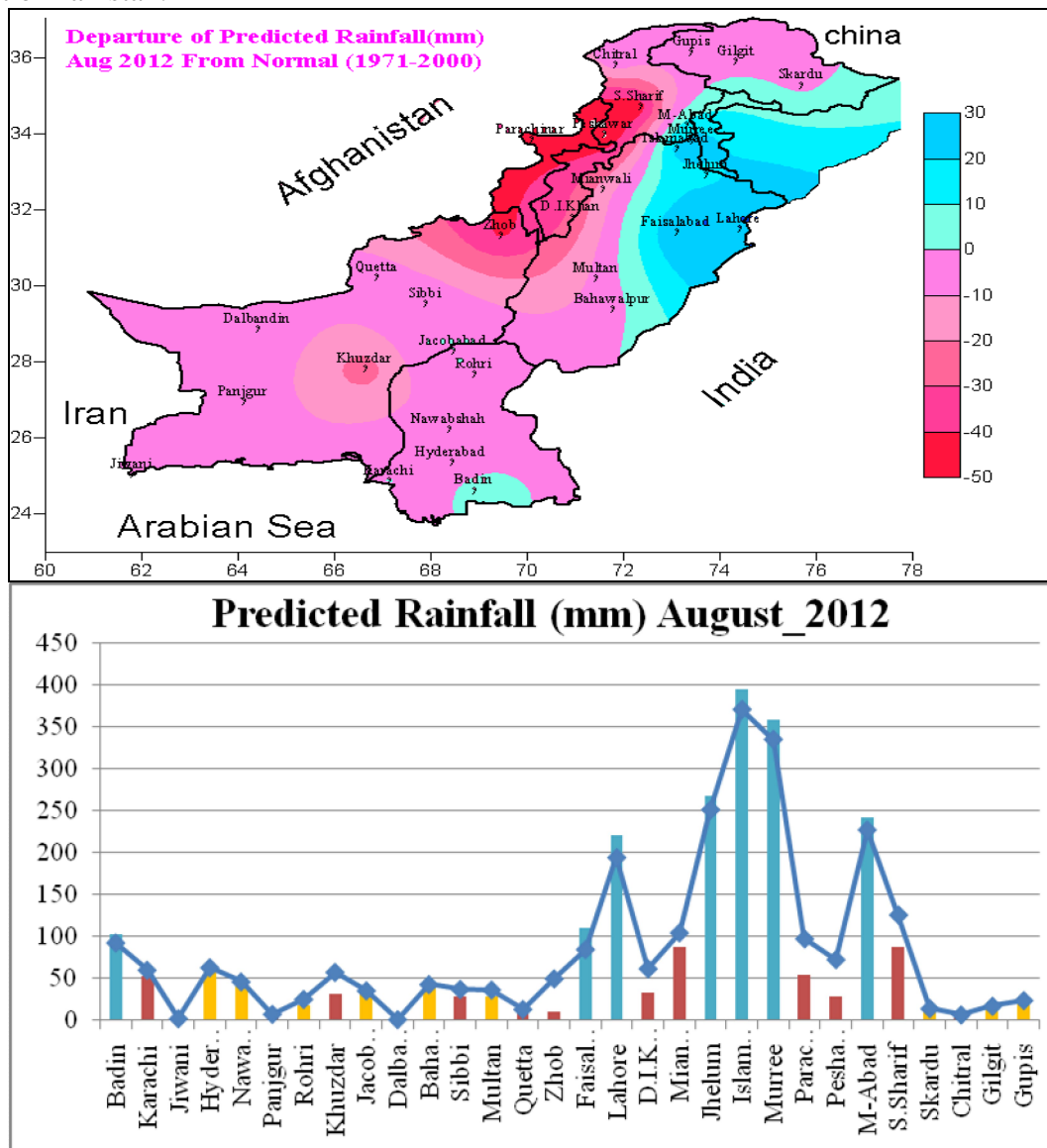
Experimental seasonal forecast is issued on monthly and seasonal time scales by applying the statistical downscaling techniques. Output of the Combined General Circulation Model (CGCM) is used to obtain the predicted rainfall over the selected stations of Pakistan. In the month of July above normal rainfall is expected in Kashmir, eastern and northeastern parts of Punjab, KPK and FATA. The remaining parts of the country including Sindh, southern Punjab and Baluchistan province except central parts is likely to receive below normal rainfall. This forecast is issued with 38-85% probability level. Probability is much higher in case of above normal prediction.



Along X-axis stations are arranged in ascending order of Latitudes from left to right. Blue shaded graphs stand for above normal, yellow for normal and red shows below normal values of predicted precipitation.

## Precipitation Forecast August 2012

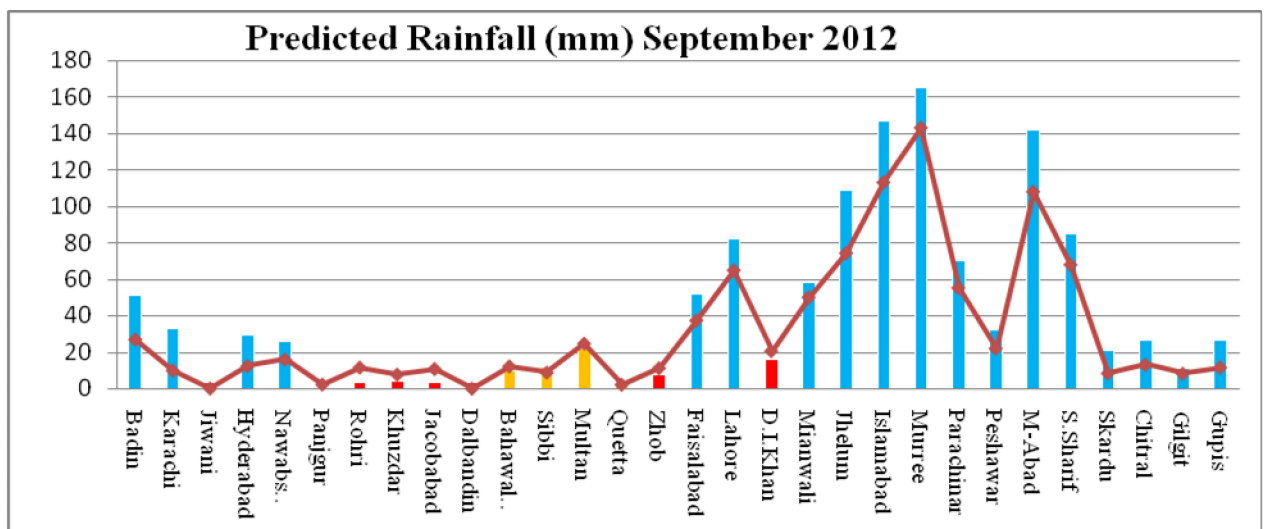
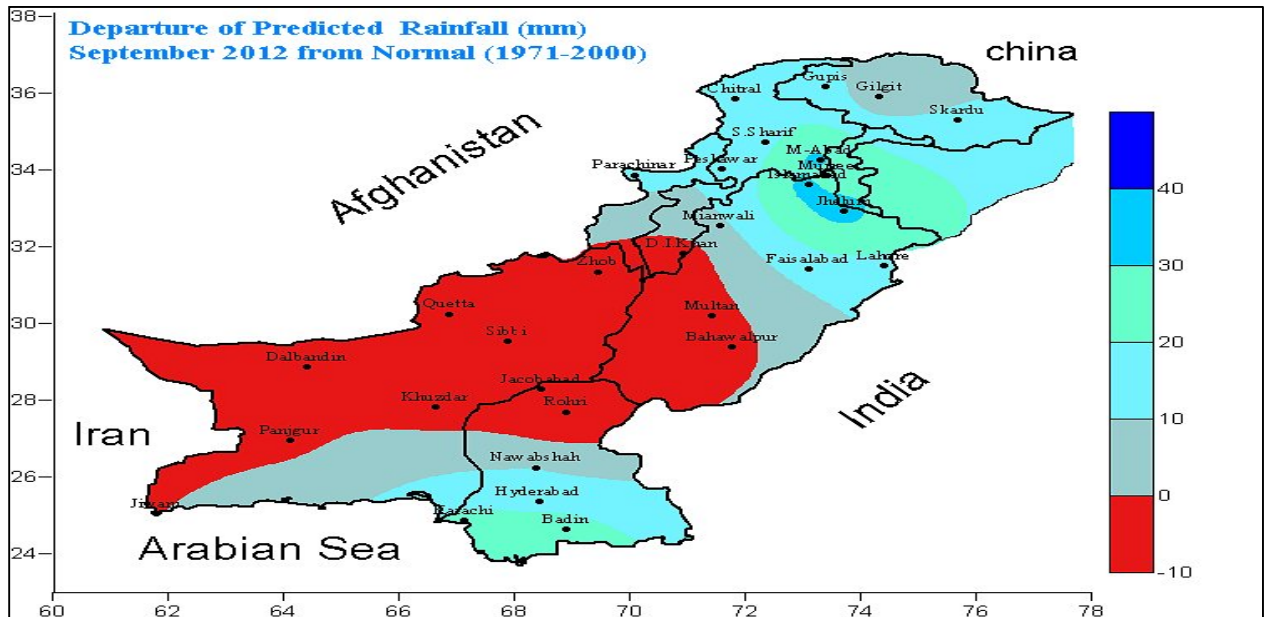
Experimental seasonal forecast is issued on monthly and seasonal time scales. Output of the Combined General Circulation Model (CGCM) is utilized to predict the rainfall amount for the selected stations of Pakistan. Normal to below normal rainfall is predicted in most parts of the country including Sindh except Badin coast, Baluchistan, KPK and southern Punjab. Negative departure from normal (1971-2000) is more prominent in FATA where the monsoon currents do not reach. Kashmir and Northeastern parts of Punjab are likely to receive normal to above normal rainfall as this is the major monsoon belt of Pakistan.



In the above figure stations along X-axis are arranged according to the increasing latitude from left to right. Blue shaded graph stands for above normal; red for below normal and yellow represents normal conditions.

# Precipitation Forecast September 2012

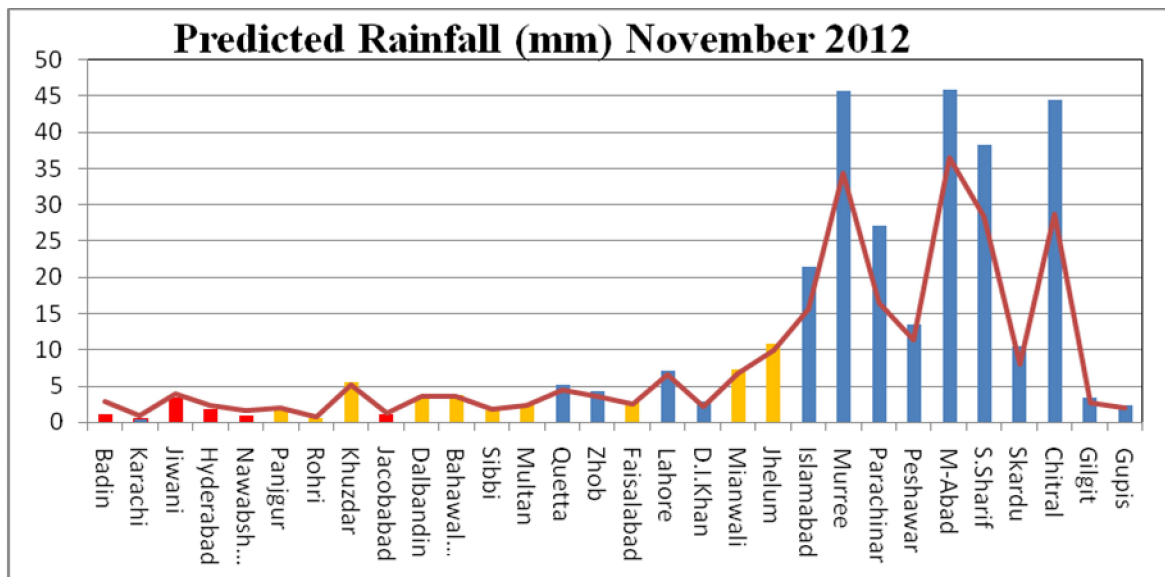
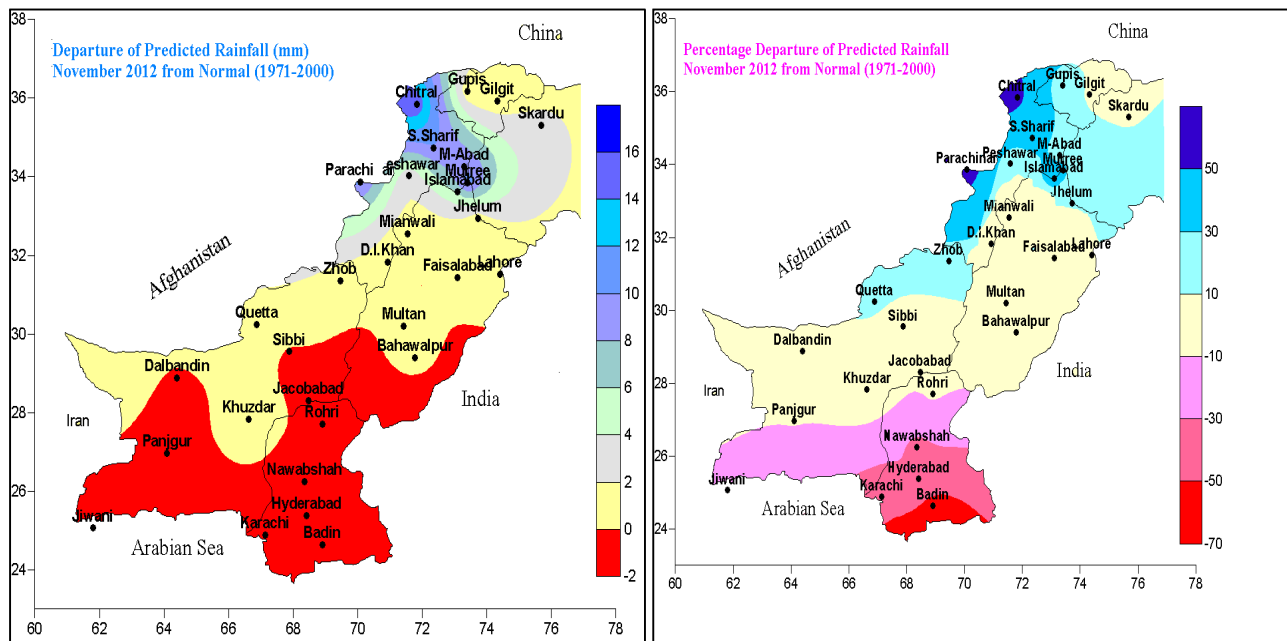
The statistical technique has been used to downscale the output of the CGCM (Combined General Circulation Model) to prepare the precipitation forecast on monthly and seasonal bases. Normal to above normal precipitation is predicted in the Northern half of the country. Positive departure from normal (1971-2000) is more prominent in the Northern parts of Punjab and Kashmir region. Coastal areas of Sindh are also expected to receive above normal rainfall. Whereas almost whole of the Balochistan province and southern parts of Punjab are expected receive below normal rainfall.





# Precipitation Forecast November 2012

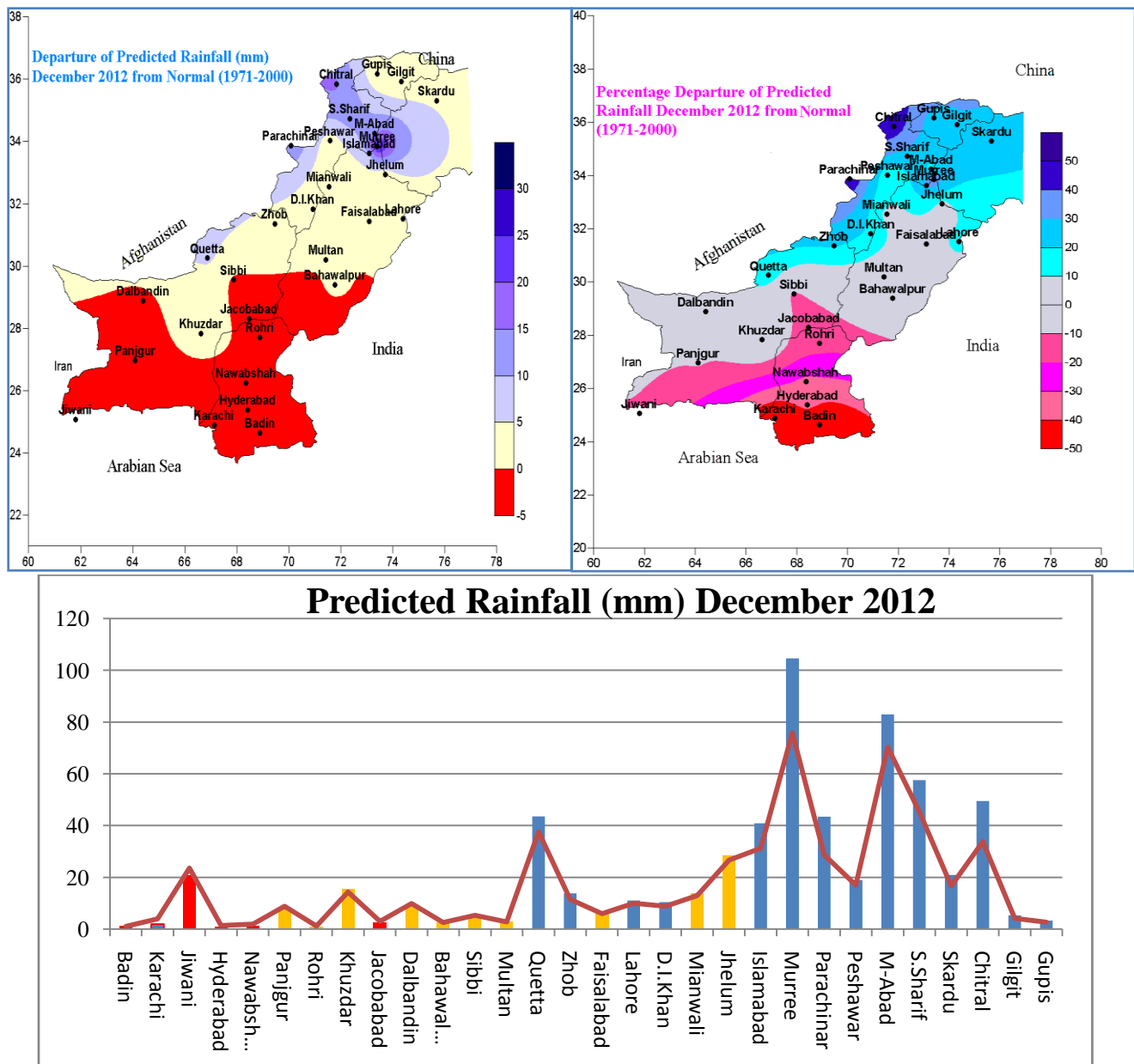
Output of the Combined General Circulation Model (CGCM) is used to predict the precipitation forecast over Pakistan. Statistical downscaling techniques are applied to obtain the forecast. Mainly the Coastal areas of Baluchistan and Sindh along with the adjoining areas of Punjab are likely to receive below normal rainfall. Major part of the country including remaining part of Baluchistan, central Punjab along with bordering areas of Khyber Pakhtunkhaw (KPK) and Gilgit regions are expected to receive normal rainfall. Islamabad and the northern parts of KPK are likely to receive above normal precipitation.



Along X-axis stations are arranged in ascending order of Latitudes from left to right. Blue shaded graphs stand for above normal, yellow for normal and red shows below normal values of predicted rainfall.

# Precipitation Forecast December 2012

Seasonal prediction provides information that how the weather condition is expected as compared to the normal atmospheric conditions. Output of the Combined General Circulation Model (CGCM) is downscaled to obtain the seasonal forecast. Coastal areas of Baluchistan, Sindh province and adjoining Punjab are expected to obtain below normal rainfall. Central and Northern parts of Punjab, rest of the Baluchistan, major parts of Khyber Pakhtunkhwa (KPK) and Gilgit regions are predicted to be normal. Few places including Islamabad, Muzaffarabad, Malakand division, Parachinar and Quetta are likely to obtain above normal rainfall.



Along X-axis stations are arranged in ascending order of Latitudes from left to right. Line graph shows normal rainfall where as bar graph represent predicted rainfall for the month of December 2012. Blue shaded graphs stand for above normal, yellow for normal and red shows below normal values of predicted rainfall.