Inaugural Session of the 3rd Pole Climate Forum & Meeting of the 3rd Pole RCC-Network Task Team

4-6 June 2024
Lijiang, China

Presented by: Climate change in Afghanistan, Soma Popalzai

Organization: Afghanistan Meteorological Department

General Overview

Afghanistan is located in Central Asia. The central and northwest is characterized by highland and mountain terrain. The region to the south is classified as desert terrain.

The southwestern part of Afghanistan has a combination of a warm steppe climate and a warm desert climate. The north eastern part has a cold steppe climate.

Afghanistan experiences all four seasons. Wide diurnal temperature ranges and low humidity are experienced year-round.

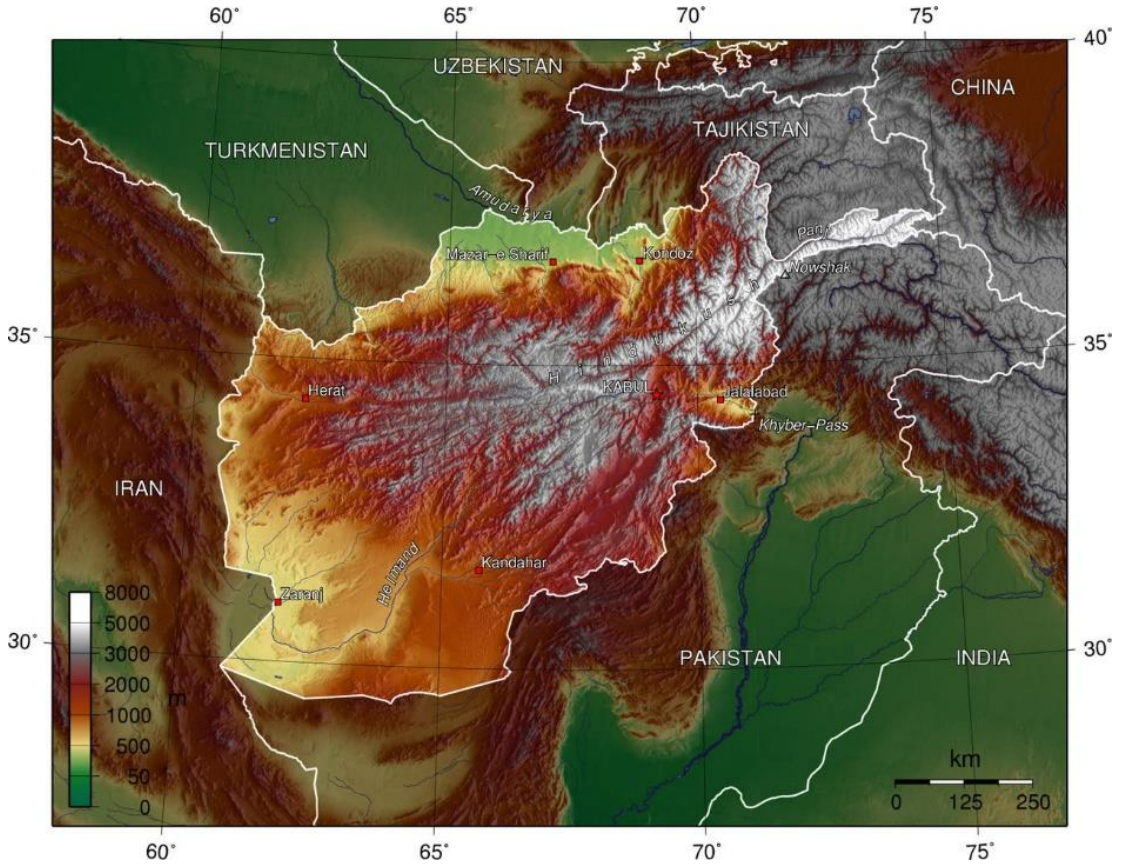


Fig 1. Afghanistan terrain elevation (Meters).
Source: https://en.wikipedia.org/wiki/Geography_of_Afghanistan

Extensive snowfall is experienced in parts of the mountain region in the winter and many communities are isolated from the outside world for up to 4 months. Irrigated agriculture is largely dependent on snow runoff that melts in the spring. In many places, irrigated agriculture is dependent on sufficient snow in the mountains. Snow runoff that occurs in spring is the primary source of water into summer, and can result in flood conditions in the northern regions. Typically 25.4mm of snow cover in the mountains north and east is left in June.

The main dust source regions affecting Afghanistan include the Amu Darya valley and Karakum desert to along the northern borders with Turkmenistan, Uzbekistan, and Tajikistan, as well as the Balkh desert in the Balkh Province. In the Southwest, the dry Hamounlake, Margow desert, Regestandesert, and Kash desert, located in Sistan Basin, serve as primary dust source regions.

Afghanistan Climate Regions:

Afghanistan is divided into five climate regions:

- The Hindukush Region
- Northern Plains
- Central Highlands
- Eastern Slopes.
- Southern Plateau

Afghanistan's National Adaptation Program of Action for Climate Change (NAPA) lists,5 main climatic hazards:

Drought

Flood

Warming, heat/cold waves

Thunder

Monsoon, 120 day wind

Climate change in Afghanistan

- Afghanistan, located in the south part of central Asia, is a mountainous country with generally cold winters and hot summers
- The country has an extreme continental arid climate that is characterized by desert, steppe, and highland temperature regimes
- Temperatures vary on average from -10°C in winter to 34°C in summer, with extremes reaching as high as 49°C in the desert regions and as low as -25°C in the higher mountain areas
- Farmers, mostly in least developed countries (such as Afghanistan), are relatively more affected by the impacts of climate change and extreme weather events

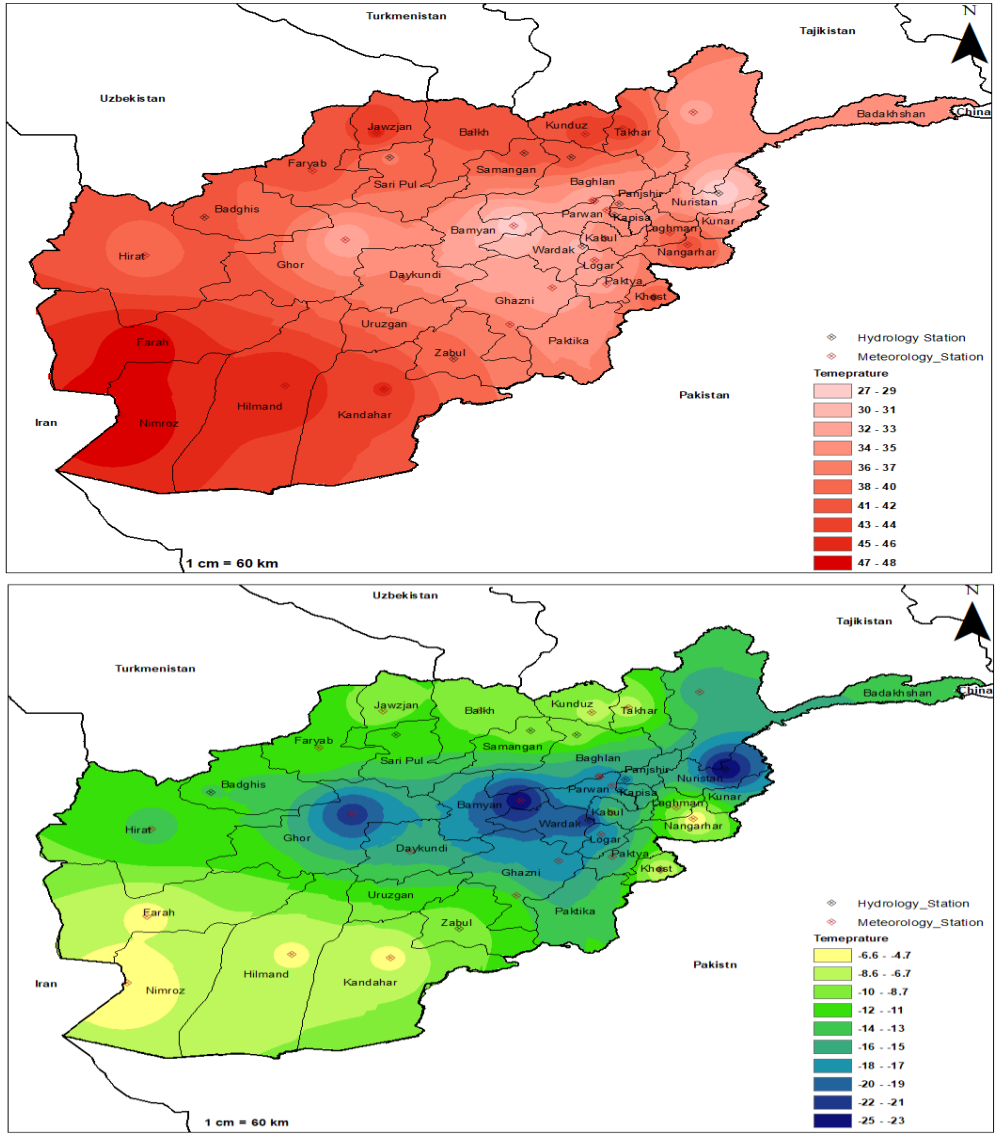
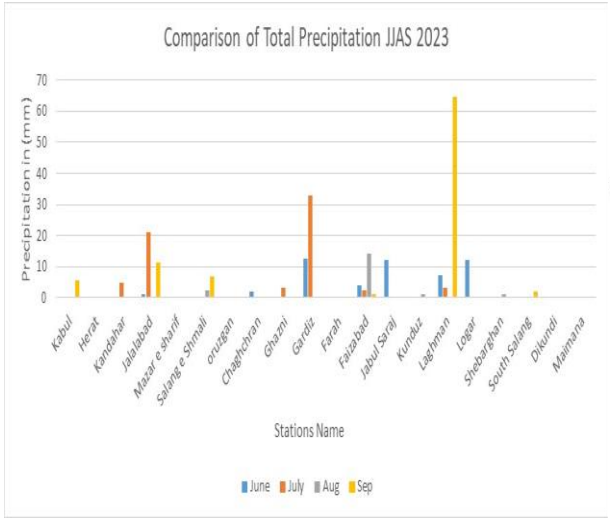
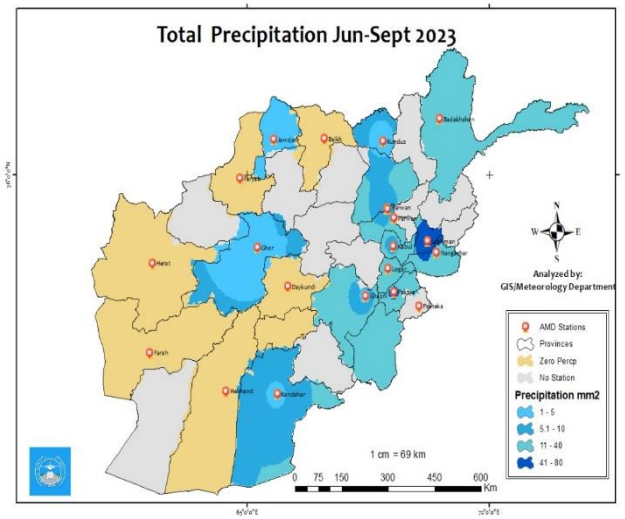


Fig 2. Maximum & Minimum temperature average from 1993-2023. *Source, AMD.*

JJAS 2023 Observed Variables

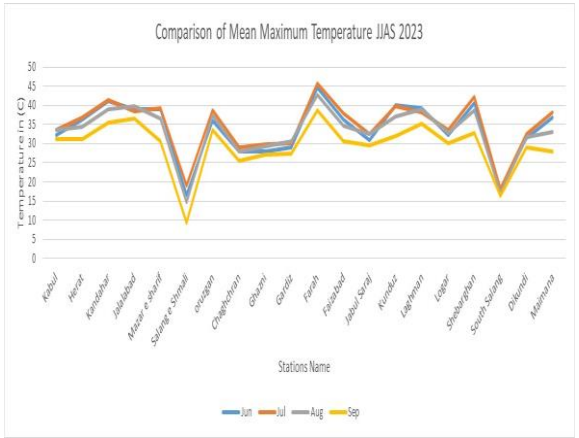
(i) Precipitation

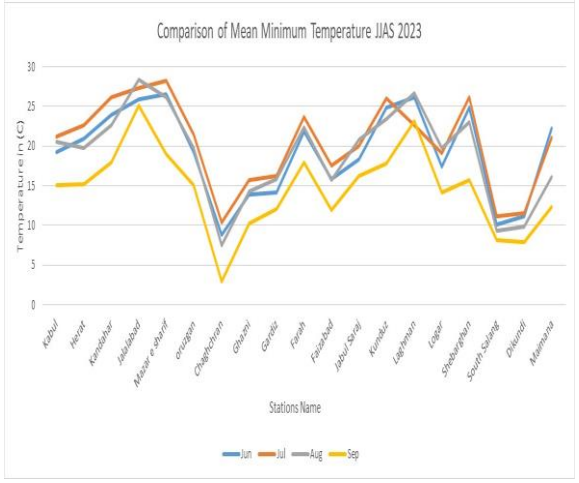


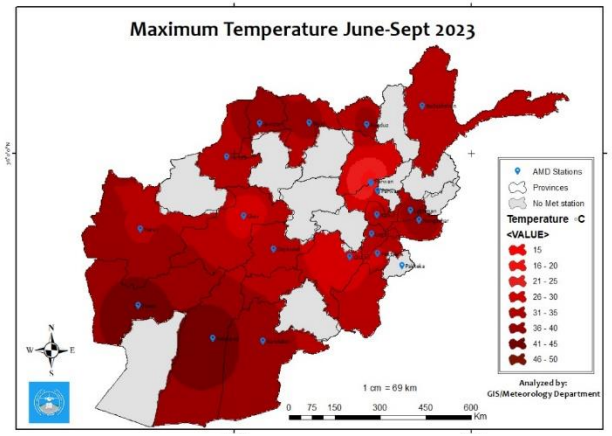


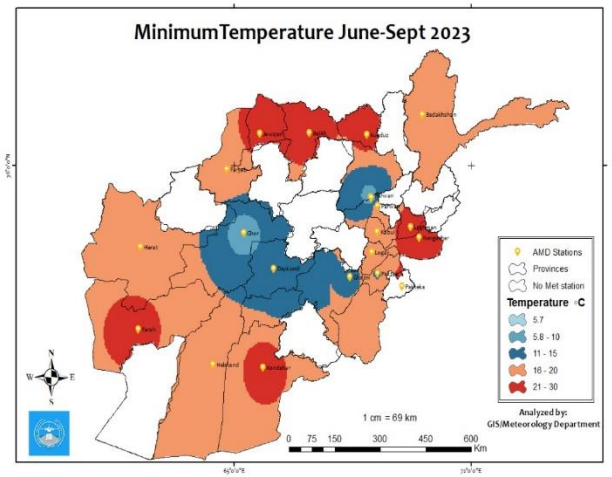
These are the accumulated rainfall and temperature JJAS 2023 and we can not compare the 1981-2010 because we have data gap from 1977-2005

(ii) Temperature









We can see in graph and Map of Precipitation that we have more Precipitation in month of September in Laghman Station.

Maximum and Minimum Temperature all over the Stations

Absolute Maximum Temperature

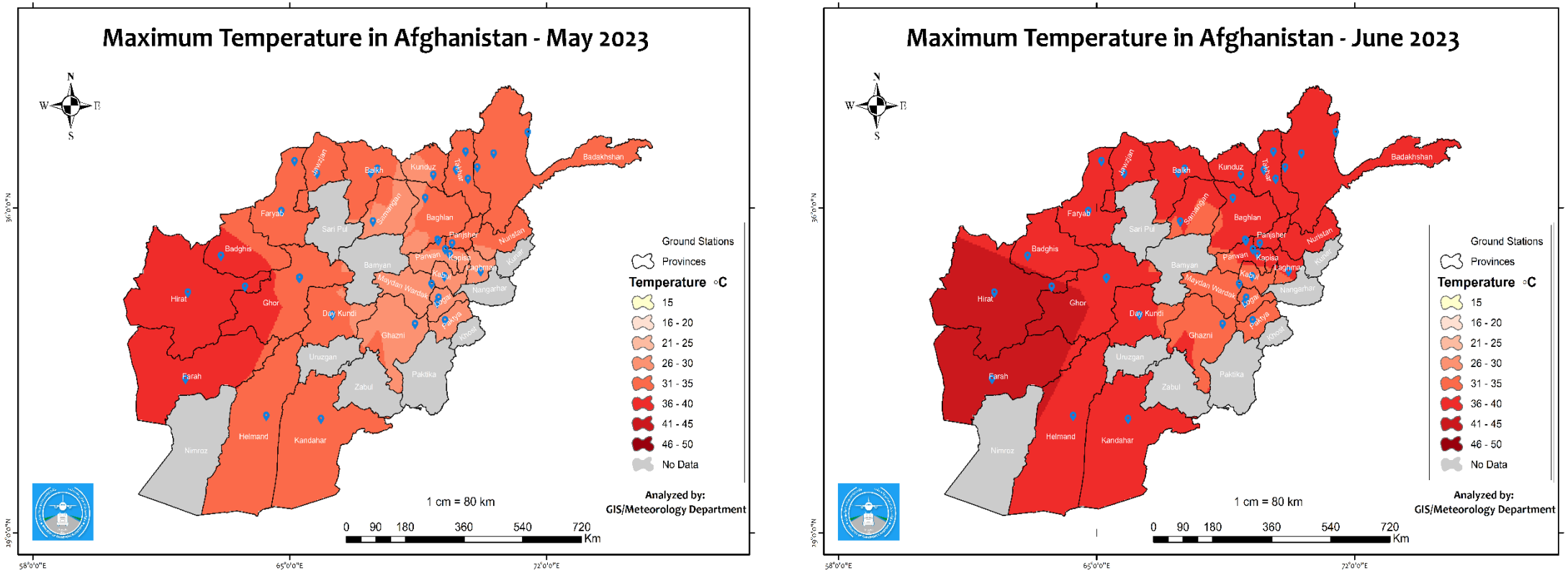


Fig 5. In both May & June months, the south west and west areas of the country recorded the highest temperature, specially in June it was more than 40+ °C . *Source: AMD*

Absolute Maximum Temperature

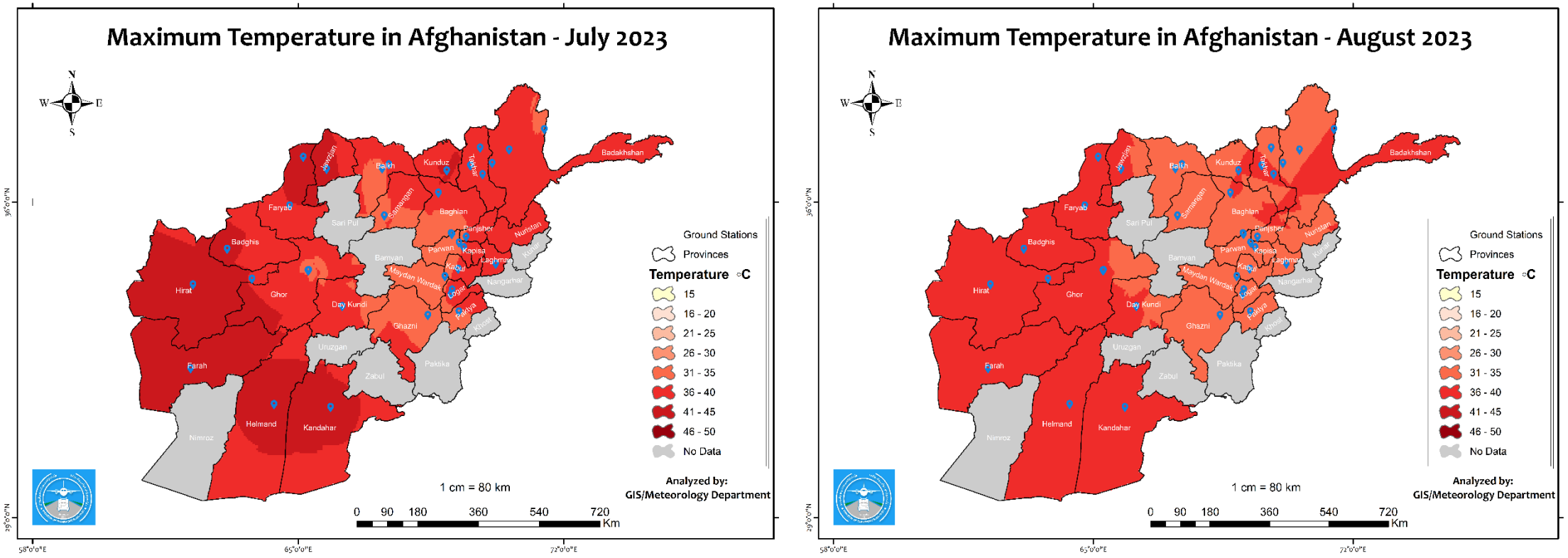


Fig 6. July and August are the hottest months in 2023, the, south, south west and west, north, north west areas of the country recorded the highest temperature, specially in July it was more than 45+ °C . *Source: AMD*

Seasonal forecast prediction

For seasonal forecast prediction we use NASA & CMC1 maps, and extract maps from CPT, FOCUS2(RIMES) etc.

More information on the seasonal forecast and other information about weather and climate are available in the website of the AMD in Pashto, Dari and English languages.

http://www.amd.gov.af

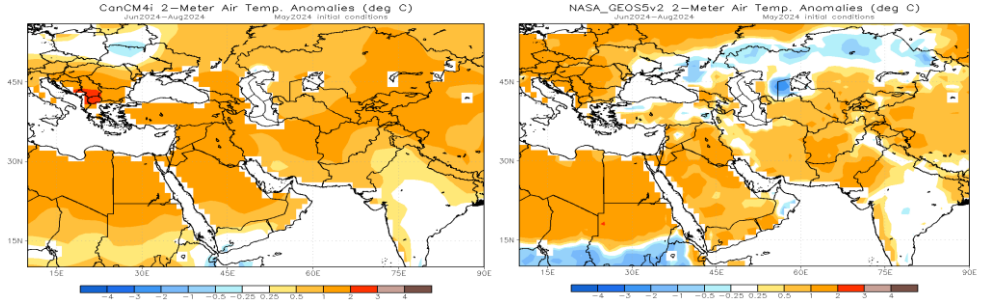
امارت اسلامی افغانستان
وزارت ترانسپورت و هوانوردی
ریاست هواشناسی

د افغانستان اسلامی امارت
د ترانسپورت او هوایی چلند وزارت
د هوا پیژندني ریاست

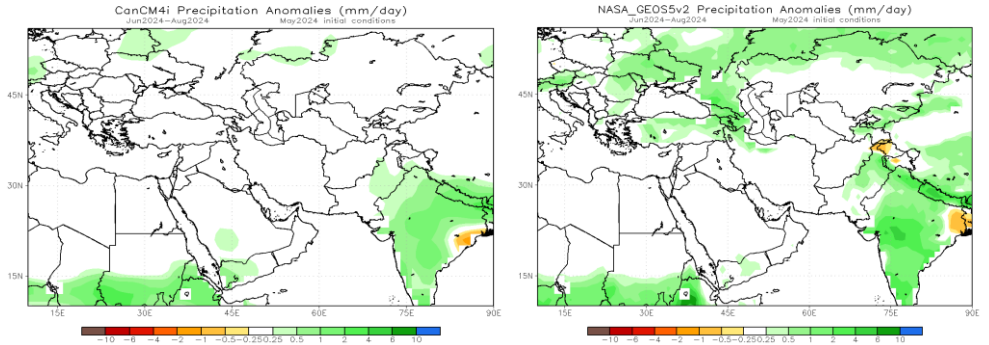
Afghanistan Islamic Emirate
Ministry of Transport & Aviation
Meteorology Department
Research Division

Date: 01/06/2024

Afghanistan Seasonal Temperature and Precipitation Forecast



Based on NASA model in next 3 months (Jun, July, Aug) Mean temperature variation is likely to remain 0.5°C to 1°C in North, East, Northeast, Northwest, and some Southern part of the Country and mean temperature variation is likely to remain 1°C to 2°C in Southwest, west, Northwest and some central parts of the Country during these months. Based on CMC1 Model indicate that Mean temperature variation is likely to remain between 0.5°C to 1°C in East, south, south east and some north-eastern part of the country and mean temperature variation is likely to remain 1°C to 2°C in north, northeast, northwest, west and some Central part of Afghanistan.



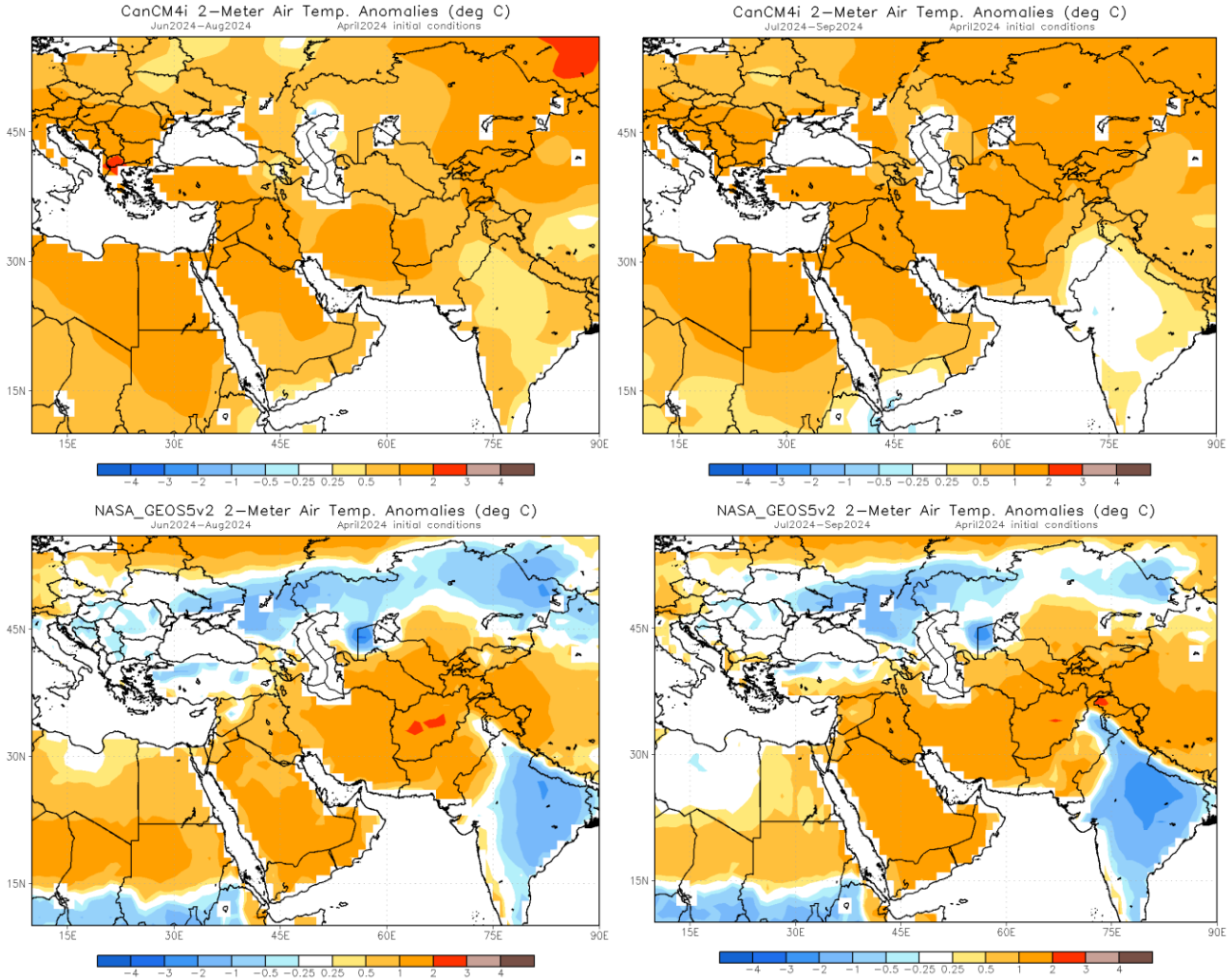
Based on NASA model precipitation in next three months (Jun, July, Aug) will be normal for the most of areas only some parts of northeast precipitation will be Below normal. Based on CMC1 Model Precipitation will be normal for the most of areas in these three coming months.

Fig 8. Seasonal forecast for June-August of 2024.

Seasonal Forecast

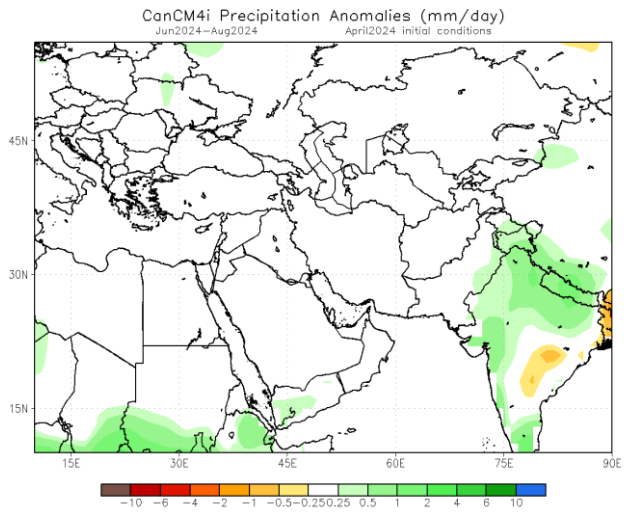
1. Temperature

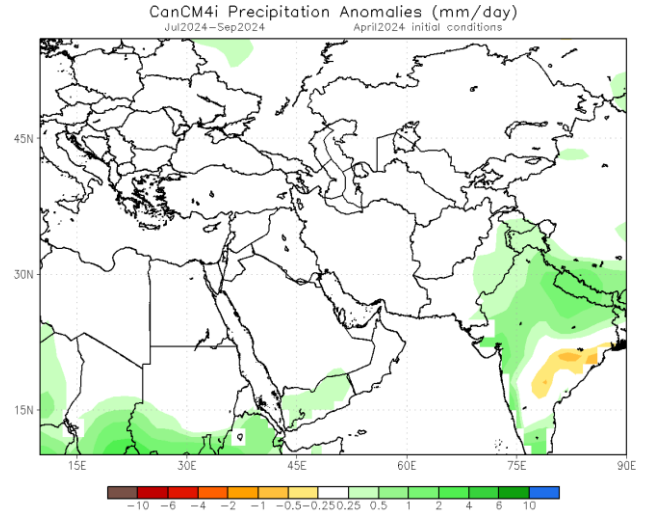
Based on NASA model in next 4 months (JJAS) Mean temperature variation is likely to remain 0.25 to 2ºC in North, Northeast, Northwest and East. However, in South West mean temperature variation will likely to remain between 0.25 ºC to 1 ºC during these months. Based on CMC1 Model indicate that Mean temperature variation is likely to remain between 0.25 ºC to 1 ºC in west, East, south, south east, North, Northeast, Northwest and south west part and in Some Parts of Afghanistan Mean Temperature variation is likely to remain 1 ºC to 3 ºC in part of Afghanistan

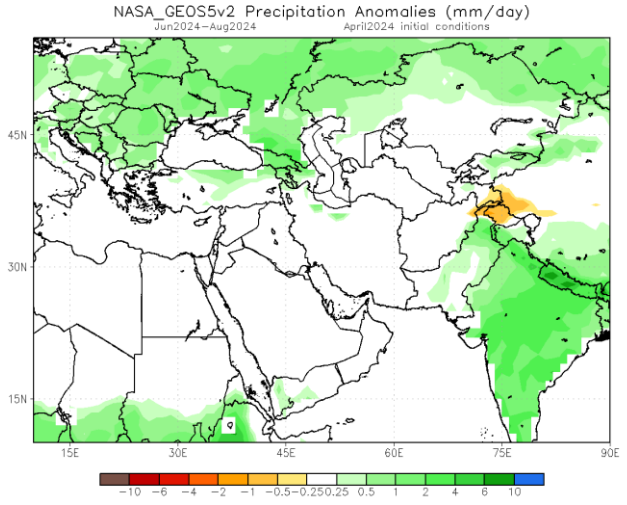


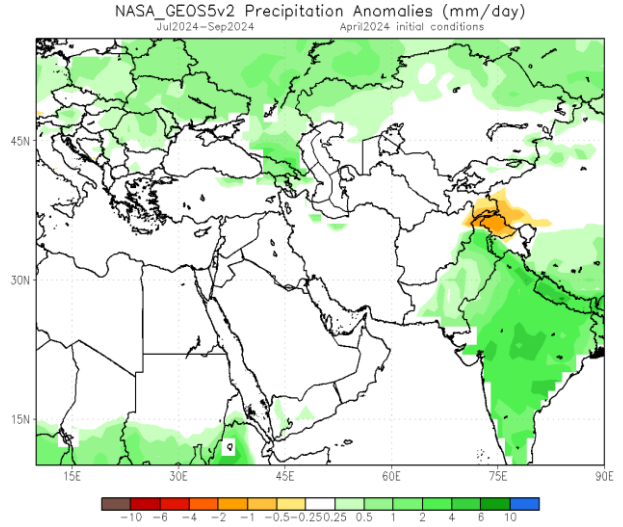
2. Precipitation

Based on NASA model precipitation in next Four months (JJAS) will be normal for the most of areas only some parts of North East precipitation will be Below normal. Based on CMC1 Model Precipitation will be normal for the most of areas in these Four coming months.





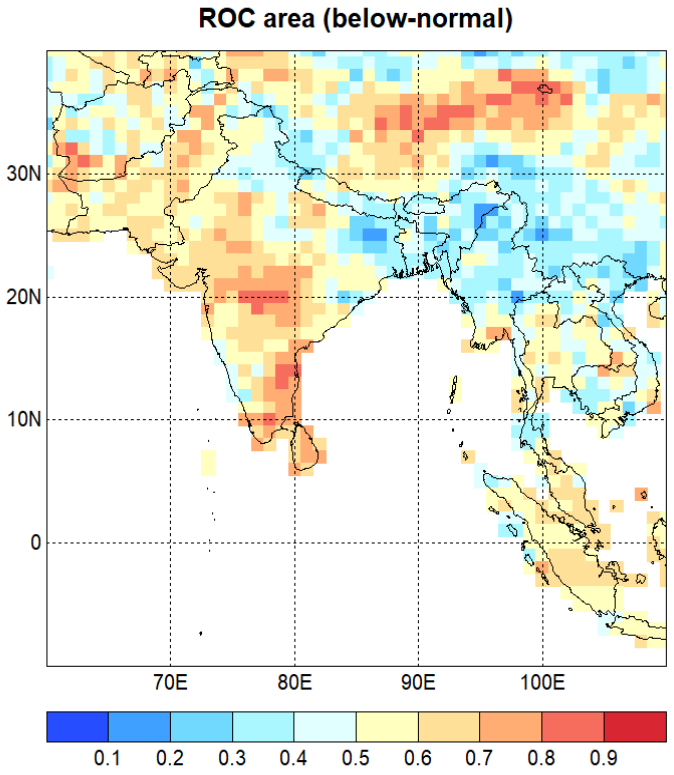


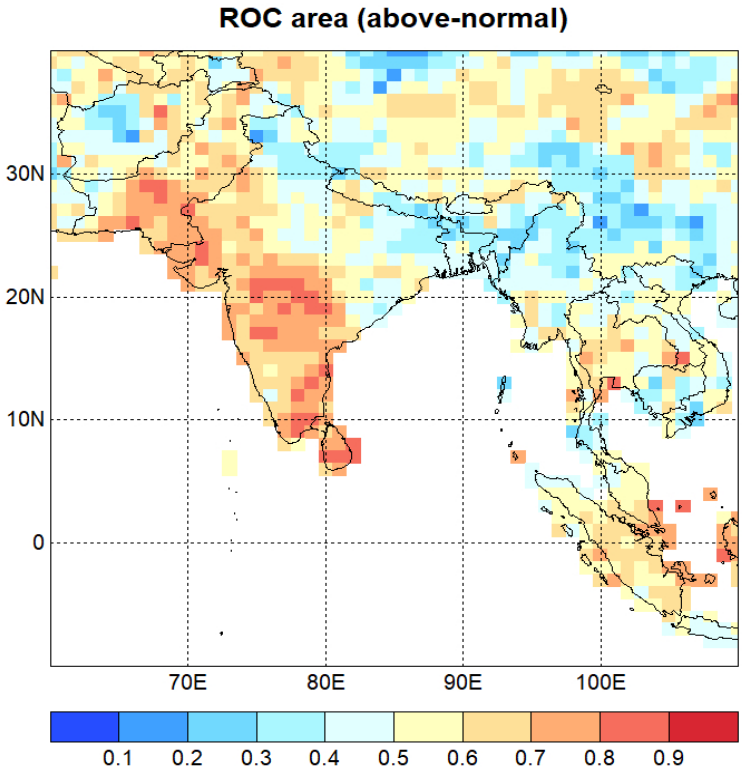


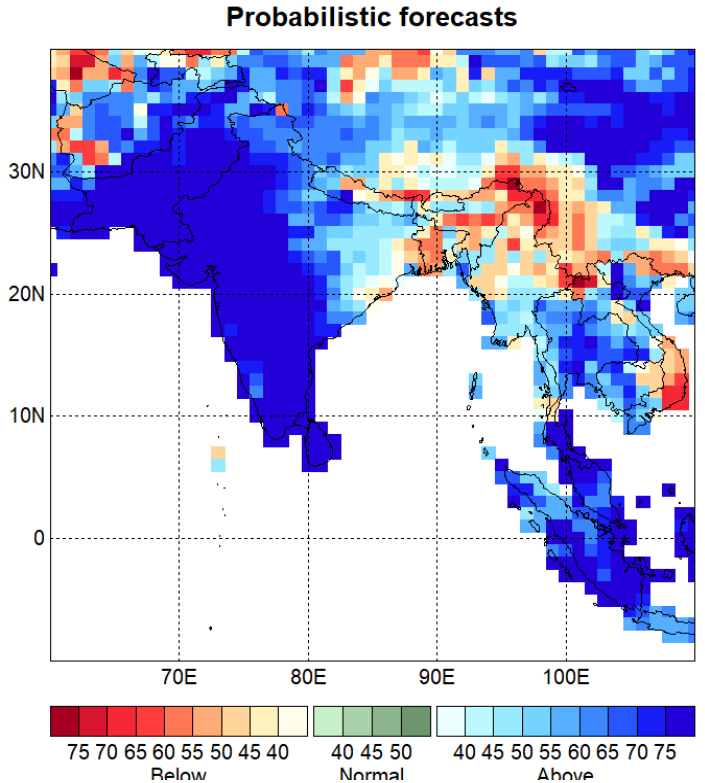
National Precipitation Outlook – CPT Output

MODEL PREDICTAND (from April)

Goodness=?, NX=?, NY=?, NCC=?



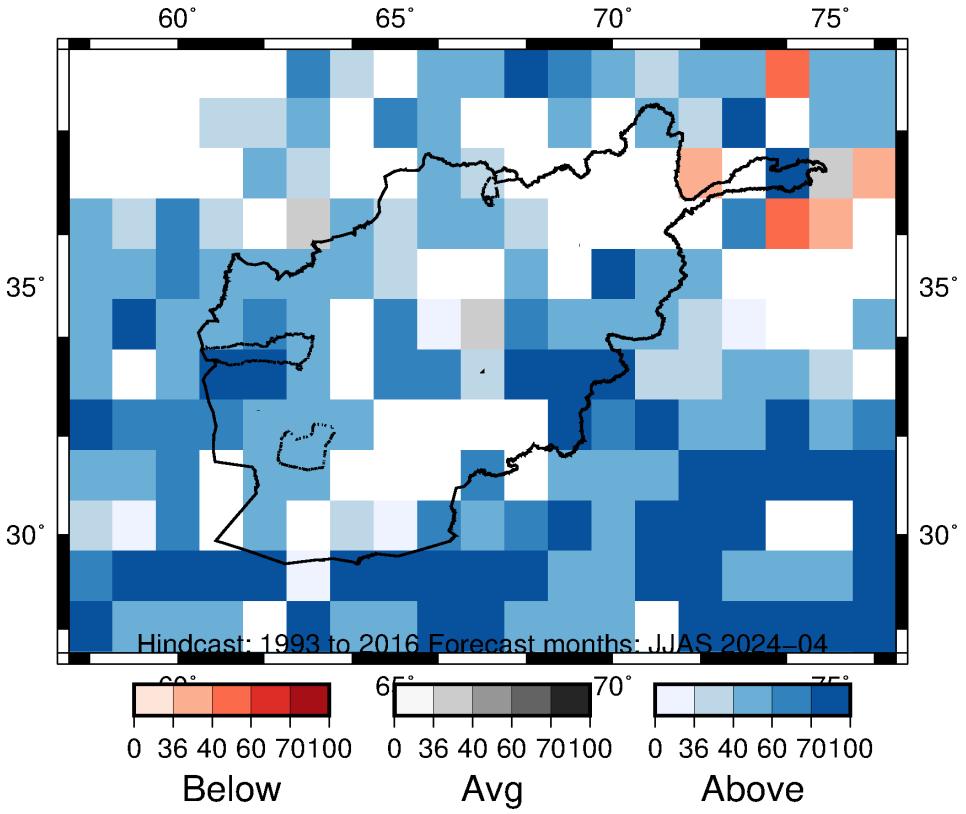




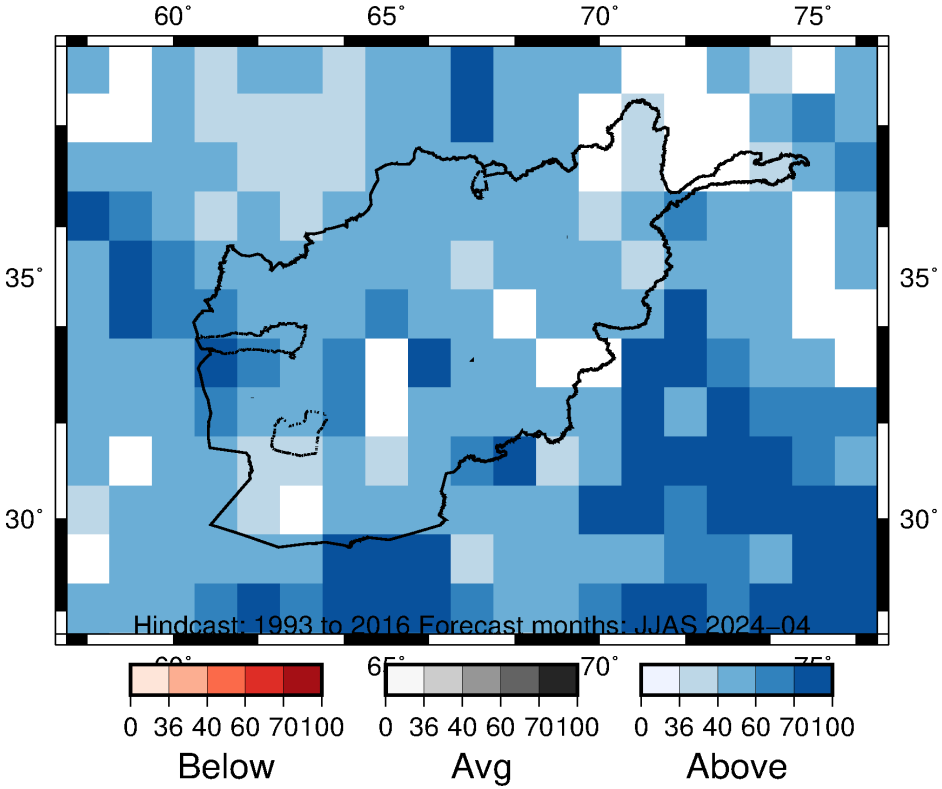
We can see that we will have above normal precipitation in north east, south east and east part of the Afghanistan and Below Normal Precipitation in some part of south west and west part of Afghanistan.

5. Precipitation Outlook - FOCUS JJAS 2024

Skilled Weighted Average

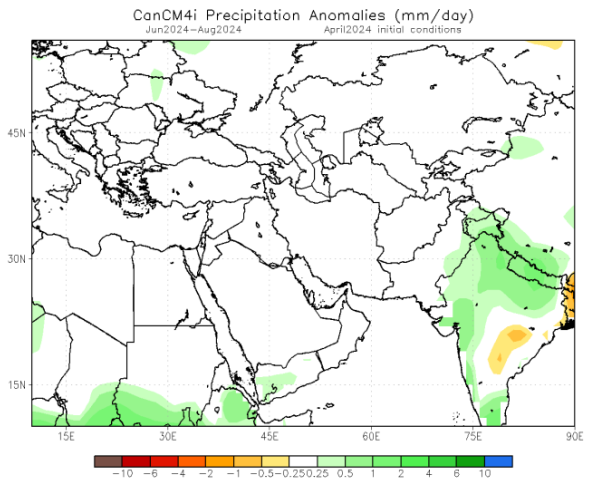


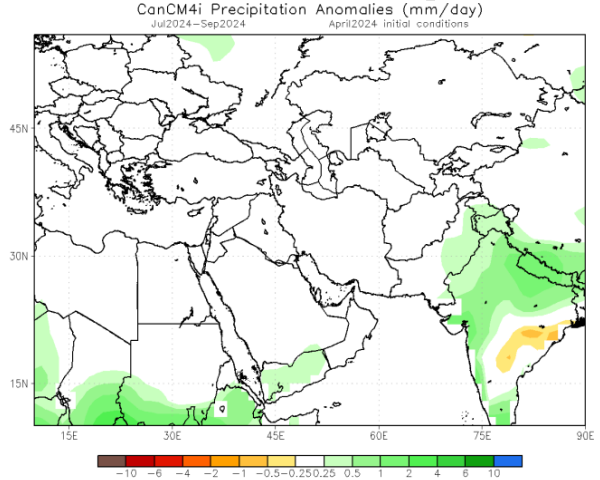
Simple Mean

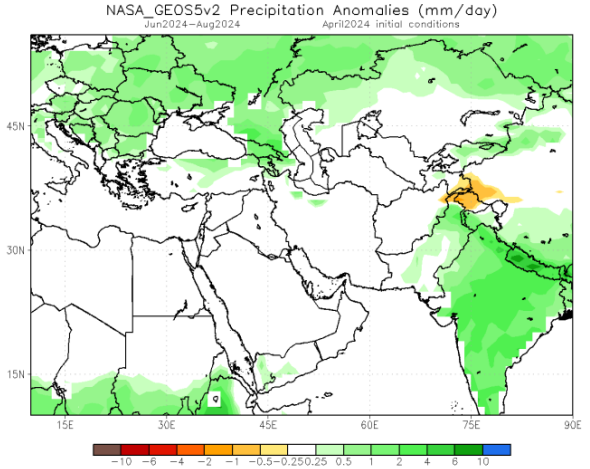


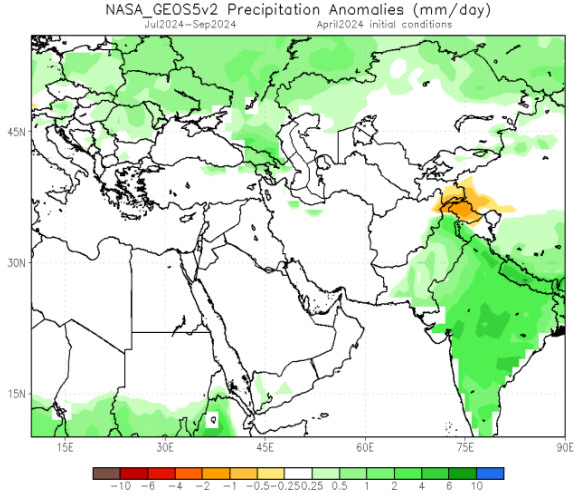
Focus Shows Normal and Above Normal Precipitation During that Period

6. National Precipitation Outlook JJAS 2024









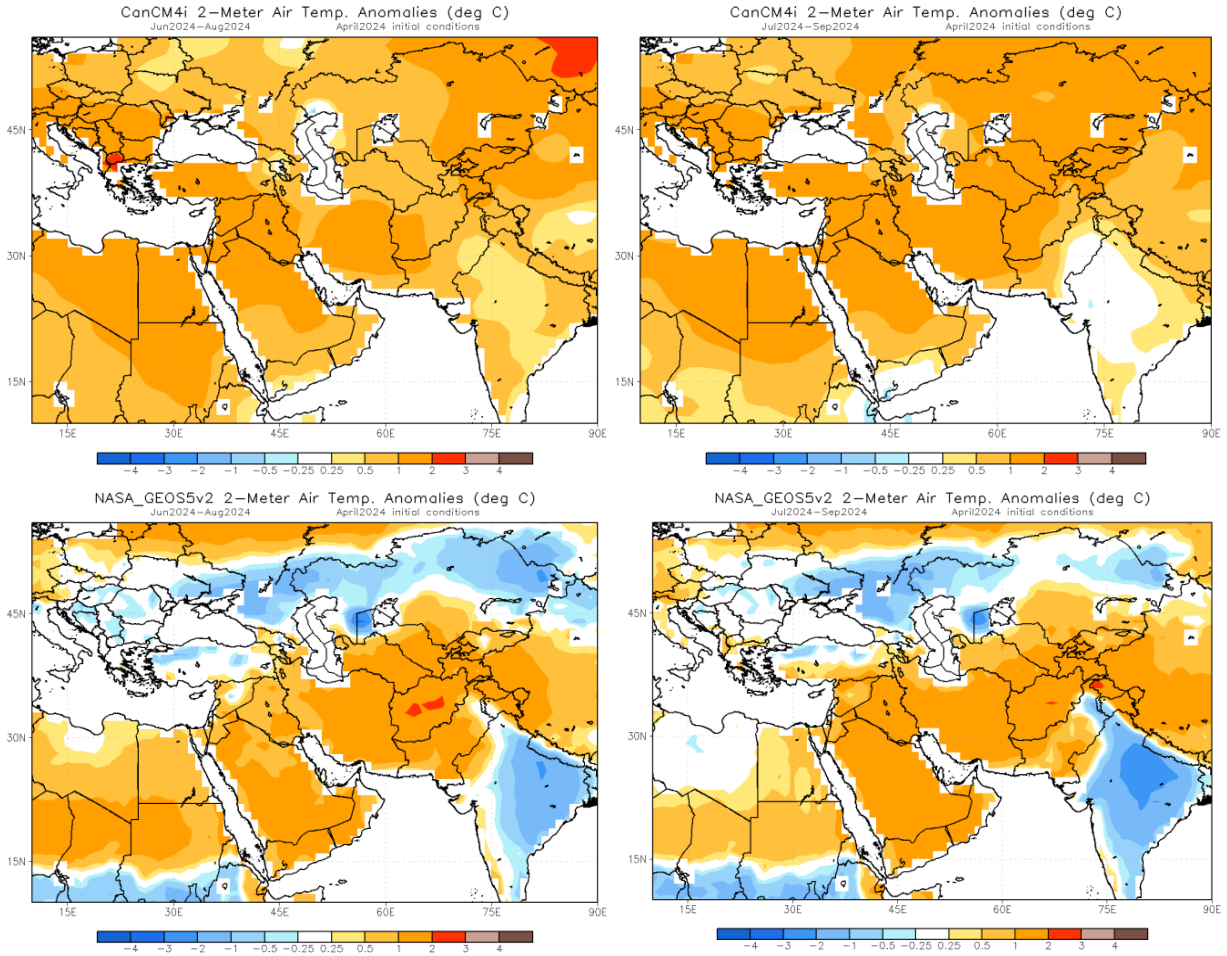
Supporting Information:

Based on NASA model precipitation in next Four months (JJAS) will be normal for the most of areas only some parts of North East precipitation will be Below normal. Based on CMC1 Model Precipitation will be normal for the most of areas in these Four coming months.

Enhanced SCOS input for JJAS 2024:

Based on NASA and CMC1 model its shows normal precipitation all over country just in some north and north east parts it shows Below normal precipitation

8. National Temperature Outlook JJAS 2024



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Based on NASA and CMC1 model its shows temperature variation will likely to remain beetwen 0.5 up to 2 in west south west and north west parts of Afghanistan

Enhanced SCOS input for JJAS 2024:

Extreme Weather Events Data During 2023

- Date: 18-April-2023
- On 18-April-2023, Afghanistan witnessed monsoon rains, the air masses entered the country from the west, and the rainfall, snowfall and milting covered the central regions, north and northeast parts, as well as the south and southeast regions of the country. Meteorologycal staiones has been registered as follows.
- In the central areas, the amount of rainfall is (10 - 35) mm, and it has also snowed in the parts of Bamyan and Ghor province.
- Of the rainfall has been recorded in the east and southeast regions (10 - 30) mm, and Nuristan province has witnessed snowfall.
- of rainfall has been recorded in the northeast regions (7 - 20) mm.
- And in the south and southeast regions, its amount has been recorded as (10 - 30) mm.

Extreme Weather Events in 2024

Best on actual primary Reports ANDMA for 10-11 May 2024 in the Baghlan province. Afghanistan Meteorology Department (AMD) issued warning for 10-11 May 2024 the Baghlan province in high, medium and low level warning.

NO	DISTRICT	KILLED	INJURED	HOUSES DAMAGED	HOUSES DESTROYED
1	Puli khomri	15	5	100	150
2	Central Baghlan	55	75	1500	500
3	Nahrin			80	20
4	Barga	60	120	2000	500
5	jalga	4		50	20
6	Khost			39	33
7	Gozargah Noor	4		250	150
8	Dahani Ghori	2	1	42	50
9	Tala o Barfak		3	5	10
		140	**204**	**4066**	**1433**

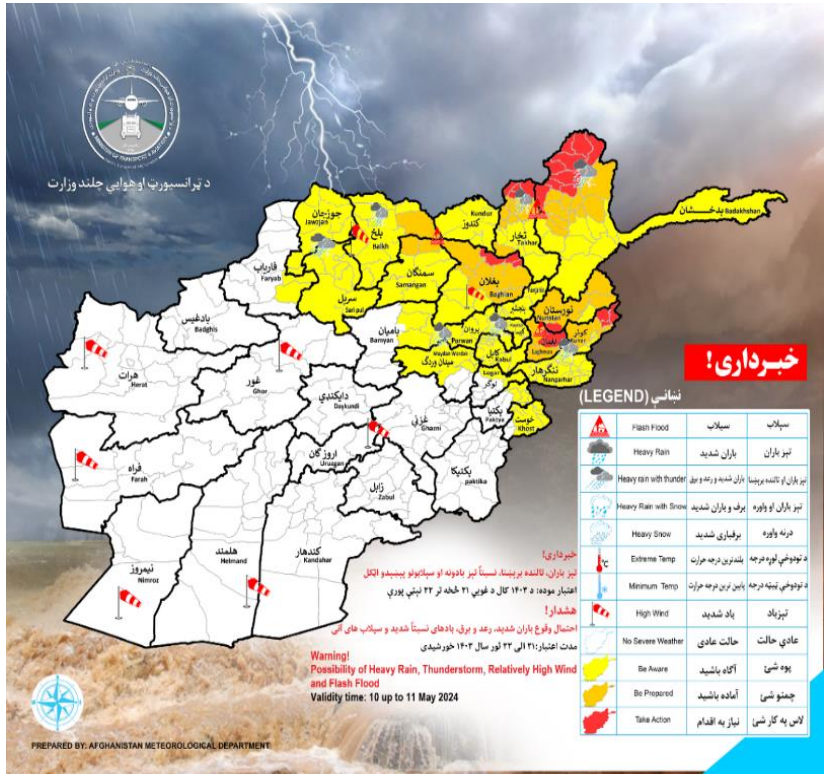

Fig 9. Flash flood warning of Forecast Department of AMD


"Radioi Ozodi" (RFE/RL)


XINHUA
NEWS

Thank you