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NATIONAL CENTRE FOR HYDROLOGY AND METEOROLOGY
THIMPHU: BHUTAN

"Centre of Excellence in Hydrology, Meteorology and Cryosphere Science and Services"



09 February, 2024

Extended Range Prediction for Bhutan

Background

Extended Range Prediction (ERP) for Bhutan is prepared with the support from the Indian Meteorological Department (IMD), Government of India. The model used for the system is CFSv2 coupled model (Atmospheric and Ocean model) which runs once every week (Wednesday), with the 16 Ensemble Members at the horizontal resolution of around 25 km, and the products are made available the next day (Thursday). Therefore, the ERP products for Bhutan will be generated every Friday. ERP for Bhutan is carried out for two climate variables, rainfall and temperature.

Generally, the forecast output is produced on a weekly basis for a period of a month for both the variables. The current products available from NCHM are on pilot basis which needs further studies and validation with the ground observations until the product is fully operationalized.



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Observed weather over last week

Most of the stations across the country showed an increase in maximum and minimum temperature throughout the week except for the last day. No rain was observed over the most part of the country for the last week except for the isolated rain in the northern, central and southern parts. The table below displays observed real time rain and temperature data from regional meteorological stations over the last week.

Station	Parameter	02 Feb	03 Feb	04 Feb	05 Feb	06 Feb	07 Feb	08 Feb
Babesa	Tmax (°C)	8.5	15.0	11.0	8.0	13.0	14.0	14.0
	Tmin (°C)	1.0	-2.0	0.0	4.0	-3.0	-5.0	-5.0
	Rain (mm)	0	0	0	0	0	0	0
Dagana	Tmax (°C)	15.5	16.0	16.5	8.0	17.5	17.5	12.0
	Tmin (°C)	6.0	5.0	5.0	6.5	6.0	3.5	5.0
	Rain (mm)	2.0	0.2	0	0	0	0	0.1
Chamkhar	Tmax (°C)	6.5	10.0	10.0	6.0	10.5	11.0	10.0
	Tmin (°C)	0.0	1.5	1.0	1.5	0.0	0.0	1.5
	Rain (mm)	0	0	0	0	0	0	0.0
Deothang	Tmax (°C)	20.0	16.0	26.0	19.0	19.5	18.0	17.0
	Tmin (°C)	11.0	9.0	9.0	12.0	11.5	8.5	10.0
	Rain (mm)	8.0	0	0	0	0	0	0
Gasa	Tmax (°C)	1.0	7.0	5.0	3.0	7.0	11.5	4.5
	Tmin (°C)	-2.5	-5.0	-2.5	-2.0	-1.5	-3.5	-2.0
	Rain (mm)	7.0	0	7.0	2.0	0	0.4	0



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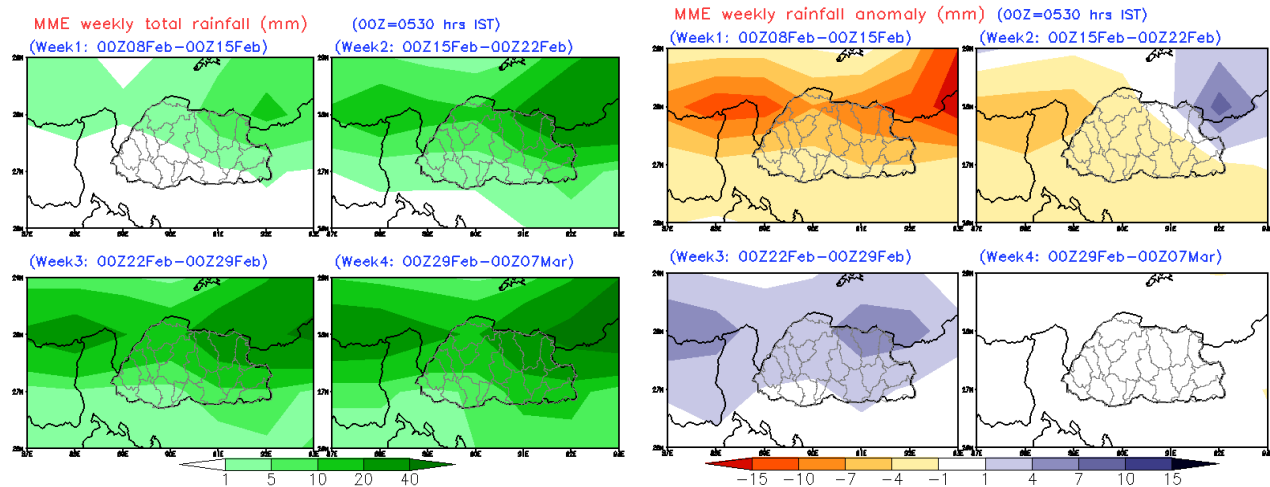
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Weekly forecast for Bhutan

1. Rainfall Prediction



Week 1 (08 February - 14 February)

Above normal rainfall is expected throughout the region.

Week 2 (15 February - 21 February)

Above normal rainfall is expected throughout the region except for northeastern parts.

Week 3 (22 February - 28 February)

Below normal rainfall is expected throughout the region.

Week 4 (29 February - 7 March)

Normal rainfall is expected throughout the region.



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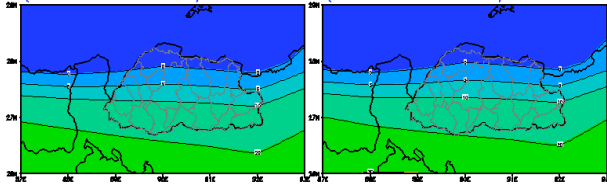


2. Maximum Temperature Prediction

MME weekly mean Tmax(Deg C)

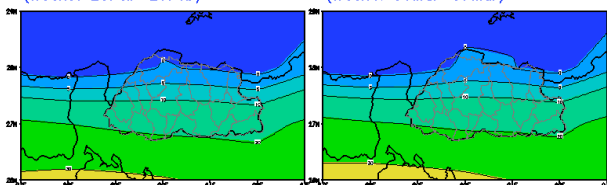
(Week1: 09Feb-15Feb)

(Week2: 16Feb-22Feb)



(Week3: 23Feb-29Feb)

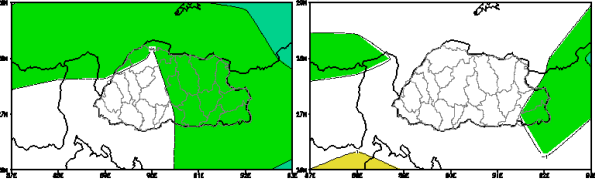
(Week4: 01Mar-07Mar)



MME weekly Tmax anomaly (Deg C)

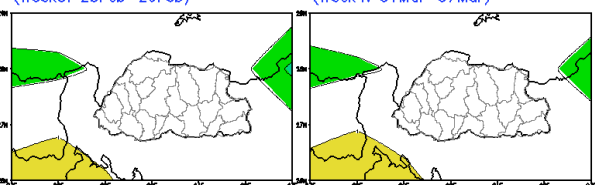
(Week1: 09Feb-15Feb)

(Week2: 16Feb-22Feb)



(Week3: 23Feb-29Feb)

(Week4: 01Mar-07Mar)



Week 1 (08 February - 14 February)

Normal maximum temperature is expected across the region except in the central and eastern region.

Week 2 (15 February - 21 February)

Normal maximum temperature is expected throughout the region except for the eastern region.

Week 3 (22 February - 28 February) and Week 4 (29 February - 7 March)

Normal maximum temperature is expected throughout the region



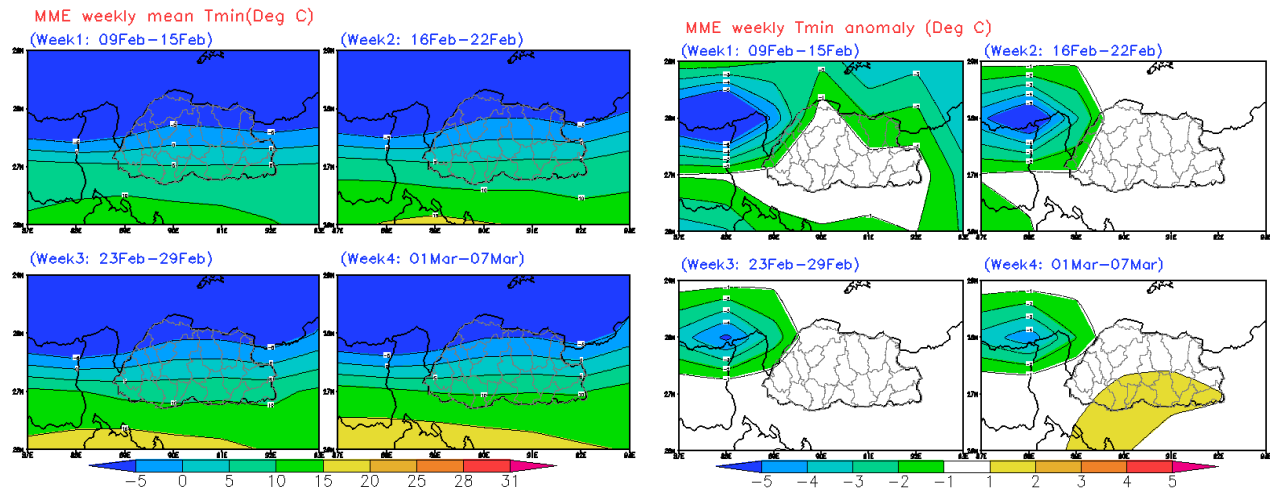
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3. Minimum Temperature Prediction



Week 1 (08 February - 14 February)

Normal minimum temperature throughout the region except in the extreme western and northern parts can be observed above normal minimum temperature.

Week 2 (15 February - 21 February)

Normal minimum temperature throughout the region except in the extreme western part can be observed above normal minimum temperature.

Week 3 (22 February - 28 February)

Normal minimum temperature is expected throughout the region.

Week 4 (29 February - 7 March)

Normal minimum temperature is expected throughout the region except for below normal minimum temperature in the southern part.

Summary



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- The rainfall is likely to be above normal for the first two weeks, normal in the third week and below normal for the last week.
- The maximum temperature is likely to be normal for the first two weeks except for central and eastern parts and normal for the last two weeks.
- The minimum temperature is likely to be normal throughout the month, except for above normal minimum temperature in the northern and western parts in the first two weeks and below normal minimum temperature in the southern part in the last week.

Classification of rainfall for 24 Hours

No rainfall	0.0 mm
Very light rainfall	0.1 to 0.9 mm
Light rainfall	1.0 to 10.0 mm
Moderate rainfall	11.0 to 30.0 mm
Heavy rainfall	31.0 to 70.0 mm
Very heavy rainfall	71.0 to 150.0 mm
Extremely heavy rainfall	Equal or more than 151.0 mm