



Royaume du Maroc
Ministère de l'Équipement et de l'Eau



Direction Générale de la Météorologie

CENTRE AFRICAIN POUR LES APPLICATIONS
DE LA METEOROLOGIE AU DEVELOPPEMENT



AFRICAN CENTRE OF METEOROLOGICAL
APPLICATIONS FOR DEVELOPMENT

Institution Africaine parrainée par la CEA et l'OMM

African Institution under the aegis of UNECA and WMO

SEVENTEENTH AFRICAN CONTINENTAL CLIMATE OUTLOOK FORUM (ACCOF-17):

Extreme climat events: Drought & Heatwaves in Morocco

Moutia sara
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30-31 MAY 2024
Addis Ababa (Hybrid mode)



High spatial and temporal variability of precipitation

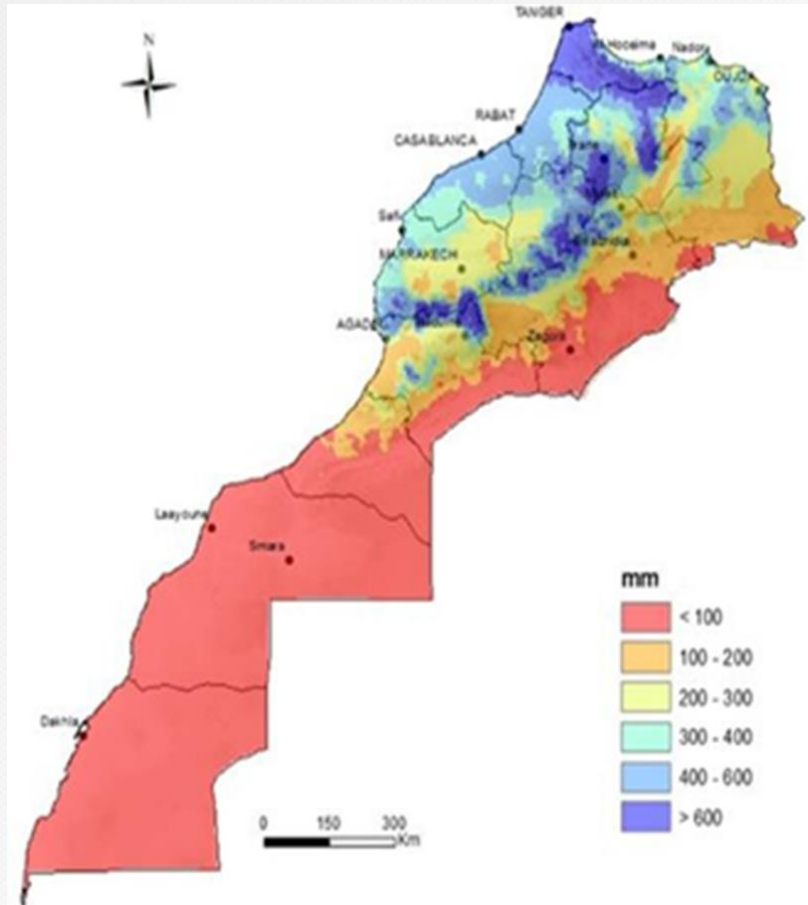
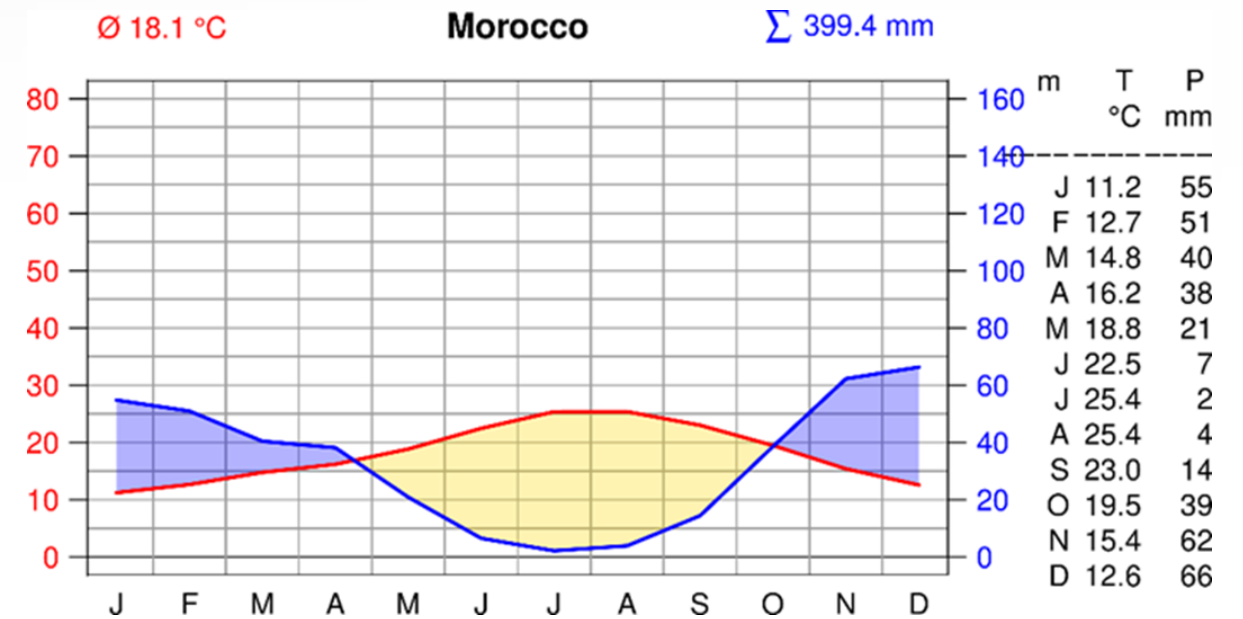


Figure 1. Annual monthly accumulated precipitation normals for 1981-2010 in Morocco (Moutia 2024)



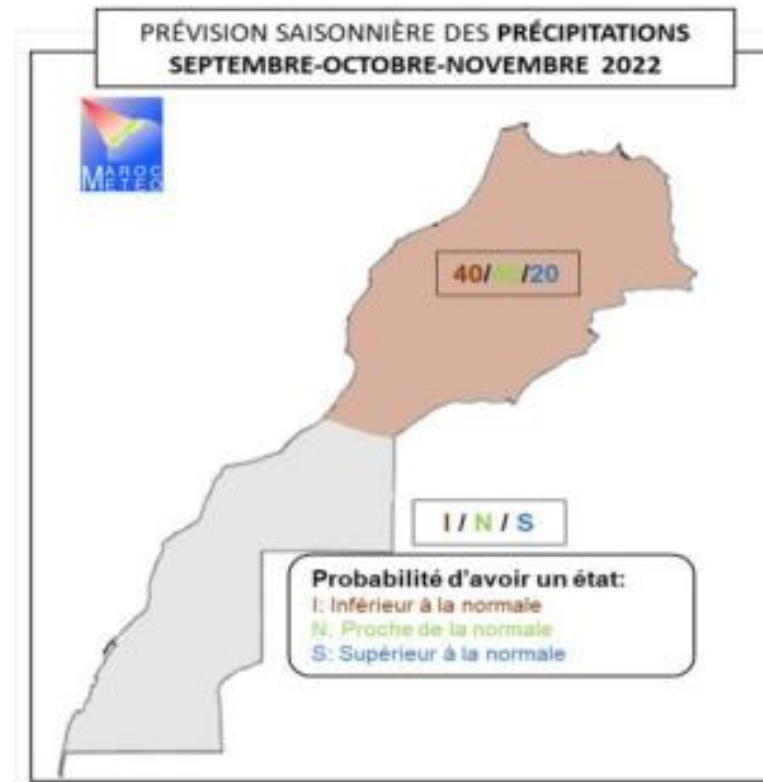
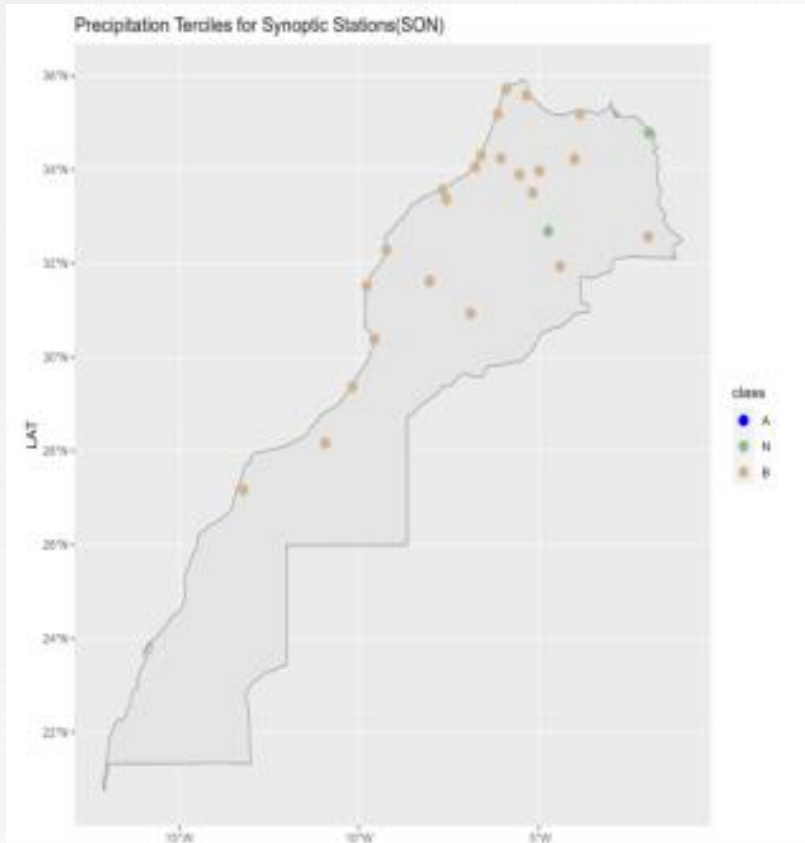
The Walter-Lieth diagram for Morocco covering the climatic period 1981-2010 (Moutia 2024)

JJA is climatologically very dry and hot season

Forecasting Meteorological drought

Meteorological drought is an negative anomaly, characterized by a period of time with precipitation values lower than normal in the area

Typologies: Meteorological, agricultural, hydrological, & socio-economic Drought



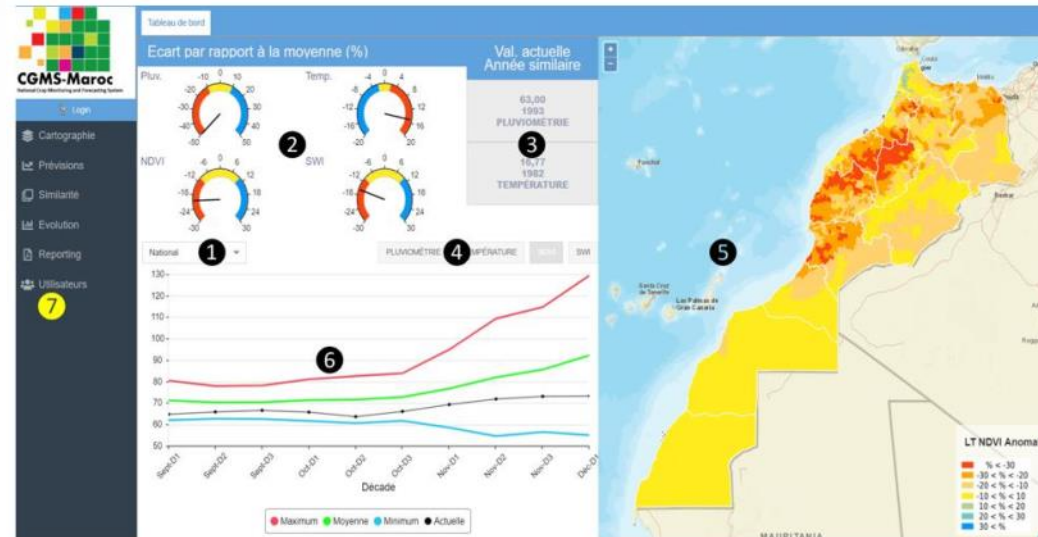
Wafae Badi 2022

Analysis of all precipitation forecasts from the various Climate models, with the monitoring of the global climate system, give for the SON 2022 season: Probably a state below seasonal normal precipitation on the Half North of the Kingdom so an episode of drought

Forecasting Agricultural drought



- Integration and Interpolation of multi-source data, To the current configuration of the grid with a resolution of **4.5 km** in the agricultural areas and **9 km** in other parts of the country, Each grid cell contains a multitude of attributes.
- Cereal yield forecasting to anticipate wheat and barley yields production at the provincial level, by Similarity Analysis: A Method Based on Past Experience and Relationships between agro-climatic variables and cereal yields historical series of returns exploited by a range of mathematical models.
- Visualizing Results via interactive user to deliver immediate results and generating automatic reports providing essential seasonal indicators for each administrative region.

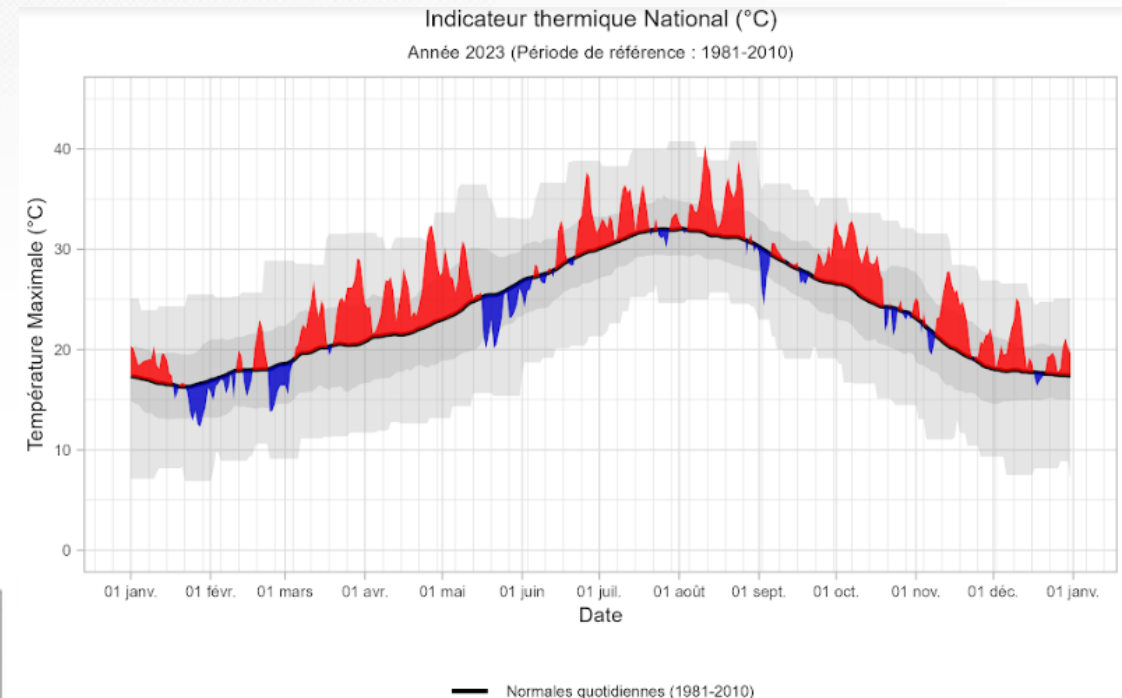
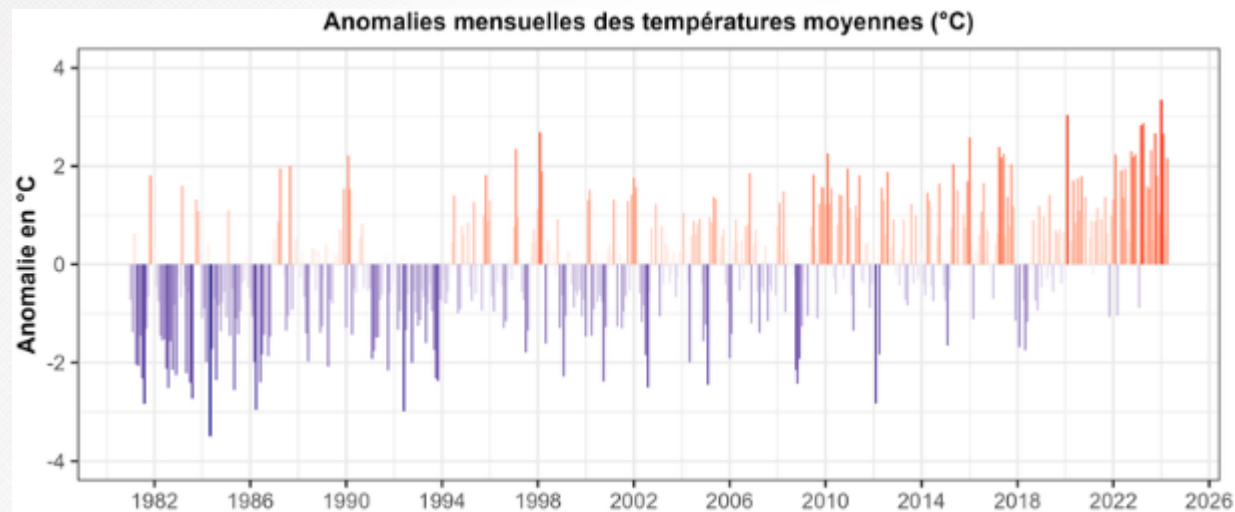


New interface of CGMS-Morocco

Heat waves

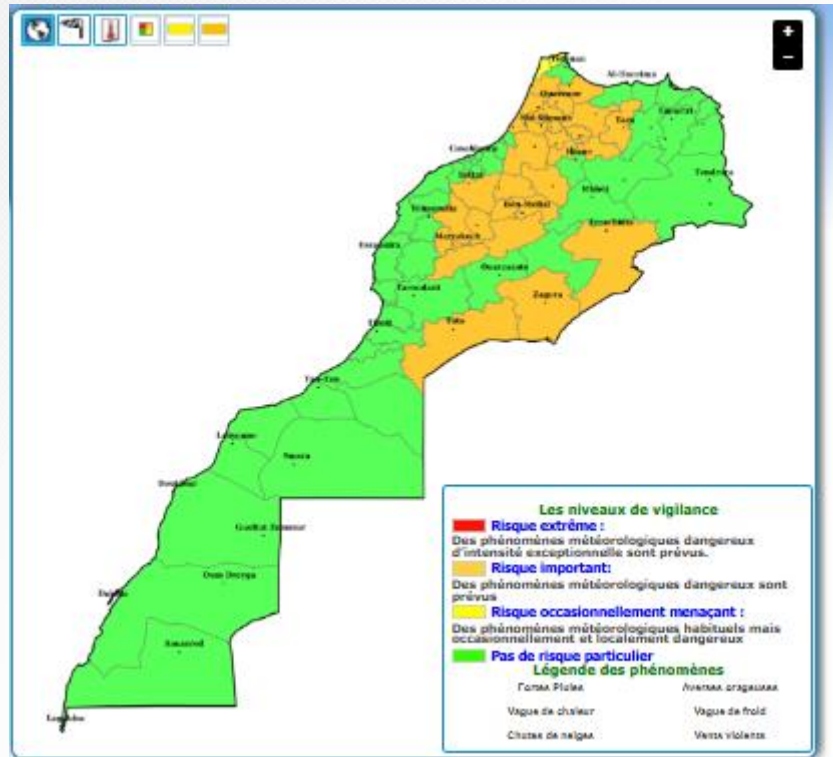
A heat wave is an "event occurring over a prolonged period of time when temperatures are much higher than normal". Specifically, the common ingredients in the definition of a heat wave are:

- * a discriminating variable (Tmax, Tmin, Tmoy a combination of maximum and minimum temperature, EHF...)
- * a limit threshold of this temperature: Absolute or relative
- * a minimum duration (Perkins [2015])



Increased of hot monthly Temperatures over Morocco and occurrence of heat waves.

Forecasting in a provincial level



Les niveaux de vigilance

Risque extrême :

Des phénomènes météorologiques dangereux d'intensité exceptionnelle sont prévus.

Risque important:

Des phénomènes météorologiques dangereux sont prévus

Risque occasionnellement menaçant :

Des phénomènes météorologiques habituels mais occasionnellement et localement dangereux

Pas de risque particulier

Légende des phénomènes

Tornades Foudre

Armeses orageuses

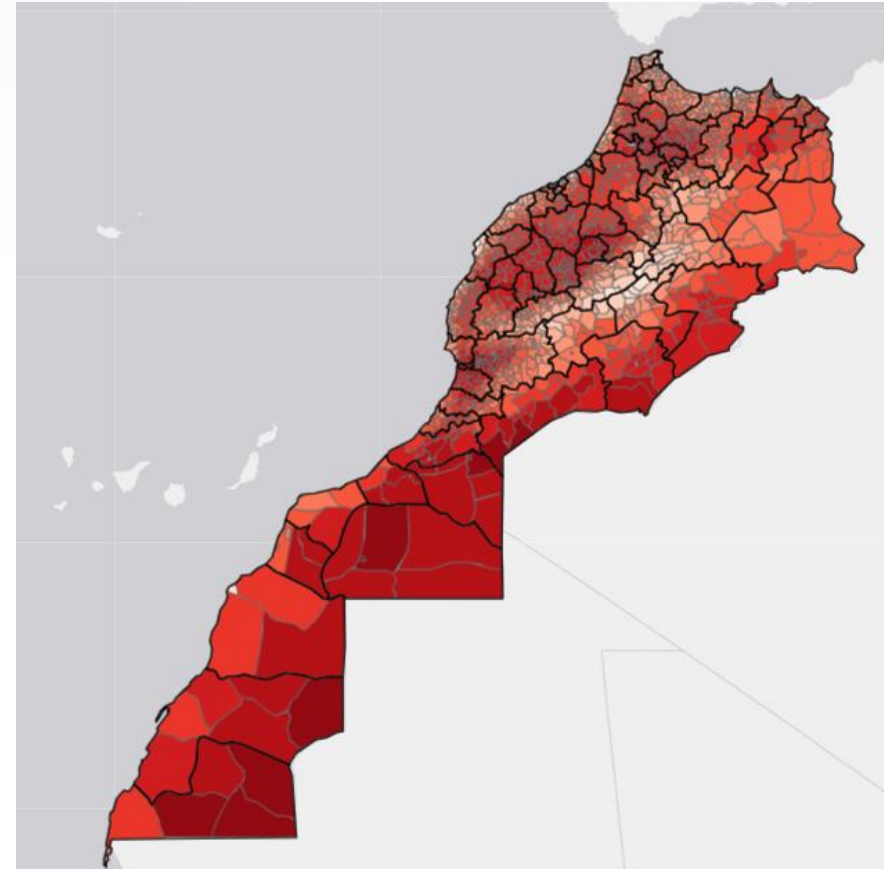
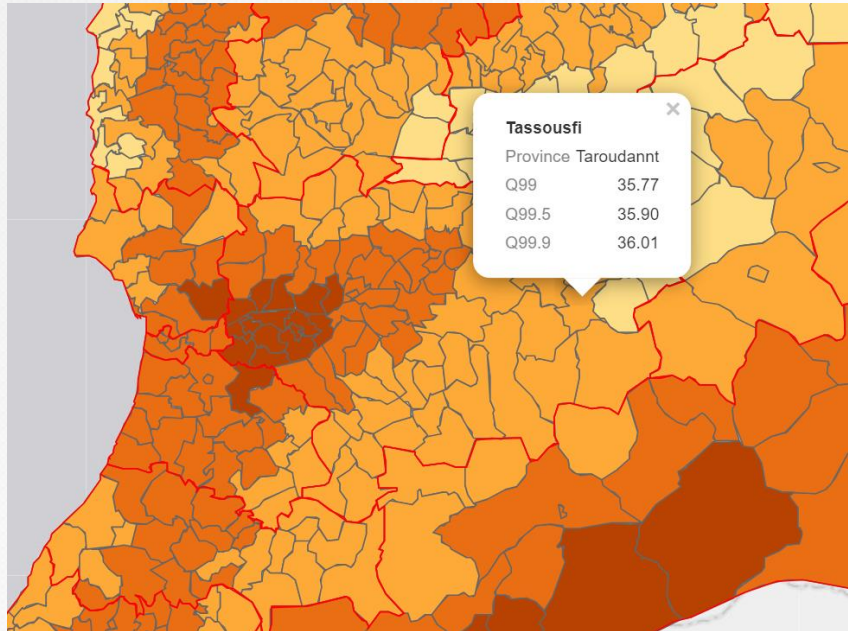
Vague de chaleur

Vague de froid

Chutes de neige

Vents violents

Forecasting in a communal level



Challenges and perspectives

- Strengthening modeling and climate analysis capabilities.
- Involve end-users more in the evaluation of our systems, through wider distribution of products.
- Collaboration between meteorological institutions, policymakers, and local communities for effective risk management.



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