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# TPE Newsletter

April, 2023

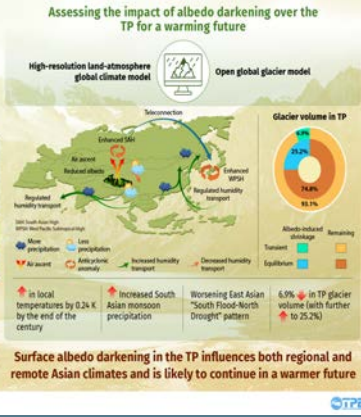
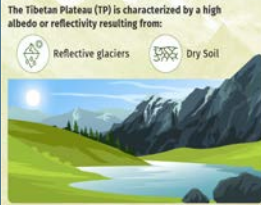


Revealing the 'Invisible' Glacier Loss Underwater

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### Effect of Tibetan Plateau Surface Darkening on Local and Remote Climates



However, glacier melting and greening have led to a reduced albedo (darkening) and increased radiation absorption

What is the effect of surface albedo darkening on regional and remote Asian monsoon systems?

Surface albedo darkening in the TP influences both regional and remote Asian climates and is likely to continue in a warmer future

## Third Pole Darkening Affects Local and Remote Climates

The loss of land surface reflectivity in this region could impact glacier volume and the Asian monsoon rainfall

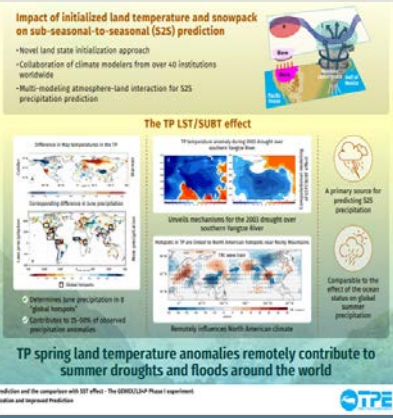
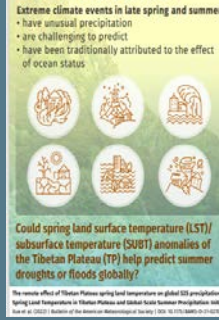
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## Uncovering the Missing Link in Extreme Climate Event Prediction: The TRC Wave Train

A new climate phenomenon called TRC wave train was discovered which could improve our ability to predict extreme hydroclimate events

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### Remote Influence of Tibetan Plateau Spring Land Temperature on Global Summer Precipitation



## EDITOR'S PICK



## STEP HOT WORDS

10 most studied words derived from

**4679** publications

STEP hot words identified the top 10 most studied words within the TPE-related research project by analyzing its 4679 publication abstracts (as of Nov. 2022) using natural language processing (NLP) techniques.

[+ more](#)



## STEP Hot Words

# TPE HIGHLIGHTS

Get ready for the most exciting stories going on at TPE.

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## Uncovering the Missing Link in Extreme Climate Event Prediction: The TRC Wave Train

a new climate phenomenon called TRC wave train was discovered which could improve our ability to predict extreme hydroclimate events

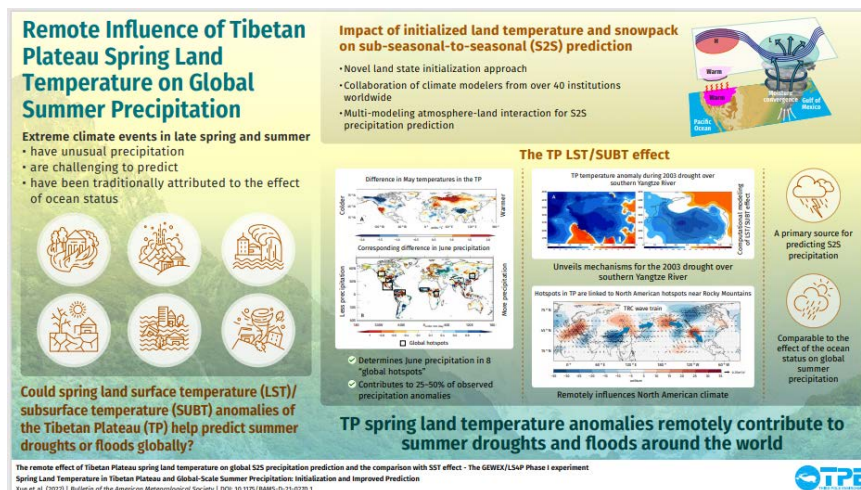
March 20,2023 | [Deep Sarkar,XIA Cuihui](#)



Print



The scientific team from TPE and their international collaborators have made a groundbreaking discovery in climate science that could improve our ability to predict extreme hydroclimate events. The team has discovered a new climate phenomenon called the [Tibetan Plateau-Rocky Mountain Circumglobal \(TRC\) wave train](#).



The TRC wave train is a previously unknown oscillation between the surface temperatures of the Tibetan Plateau (TP) and the Rocky Mountains. The researchers have found that the TRC wave train has a significant impact on global summer precipitation in the Northern Hemisphere, leading to droughts, floods, and other extreme climate events, such as the 2003 drought over the southern Yangtze River. The

researchers are further working on to evaluate whether this discovery is comparable in importance to the well-known El Nino-Southern Oscillation (ENSO) in forecasting weather patterns.

By developing a new modeling methodology, the researchers have explained the mechanisms behind previously observed extreme climate events and can now predict future events with substantially improved accuracy. They identified eight "hotspot" regions around the world where summer precipitation was significantly related to the anomalies of TP land temperature during May. The numerical simulations showed consistency in the hotspot regions along the TRC wave train, where the perturbations produced by the TP spring land temperature anomalies modulate the TRC wave train from TP through northeast Asia and the Bering Strait to the western part of North America, generating significant consequences on the North American climate.

"The TRC Wave Train is a significant milestone in climate science. With it, we can take steps to mitigate effects of extreme hydroclimate events and protect our communities from the impacts of climate change," said lead researcher Prof. Yongkang Xue from the University of California, Los Angeles, USA, a partner of the Global Energy and Water Exchanges (GEWEX) program in the investigation of the "Impact of Initialized Land Temperature and Snowpack on Subseasonal-to-Seasonal Prediction (LS4P) which consists of top scientists from over 40 institutions from around the world.

This breakthrough opens up a new avenue for subseasonal-to-seasonal (S2S) prediction, which has been extremely challenging in northern hemisphere regions. The current global land-atmosphere coupled models using sea surface temperature (SST) as a predictor are unable to accurately predict many severe droughts or floods events. However, the TRC wave train has been identified as a consistent, asynchronous "out-of-phase" oscillation that can help us predict unusual summer precipitation and subsequent extreme hydroclimate conditions worldwide.

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