

# NOMADS AND DROUGHT IN THE MONGOLIAN STEPPE

In Mongolia, much of the population survives by raising livestock that can be herded, such as sheep, goats, horses, camels and yaks. They move these animals over long distances to find better pastures for the animals to graze on. Recently, however, rising temperature and frequent droughts have caused devastating livestock losses, which threaten the nomadic lifestyle. Tree-ring records are used to better understand patterns of drought over the past several hundred years.

## 1. Nomadic People Of Mongolia



Nomadic herders live in light-weight, portable, 'gers'. They typically move four times a year to find better pastures for their animals. A dry summer (drought) followed by a harsh winter (called a Zuud) can make grazing very difficult for the animals and cause large-scale livestock mortality. Droughts in 1999-2001 devastated Mongolian livestock, the sole source of livelihood for many families.

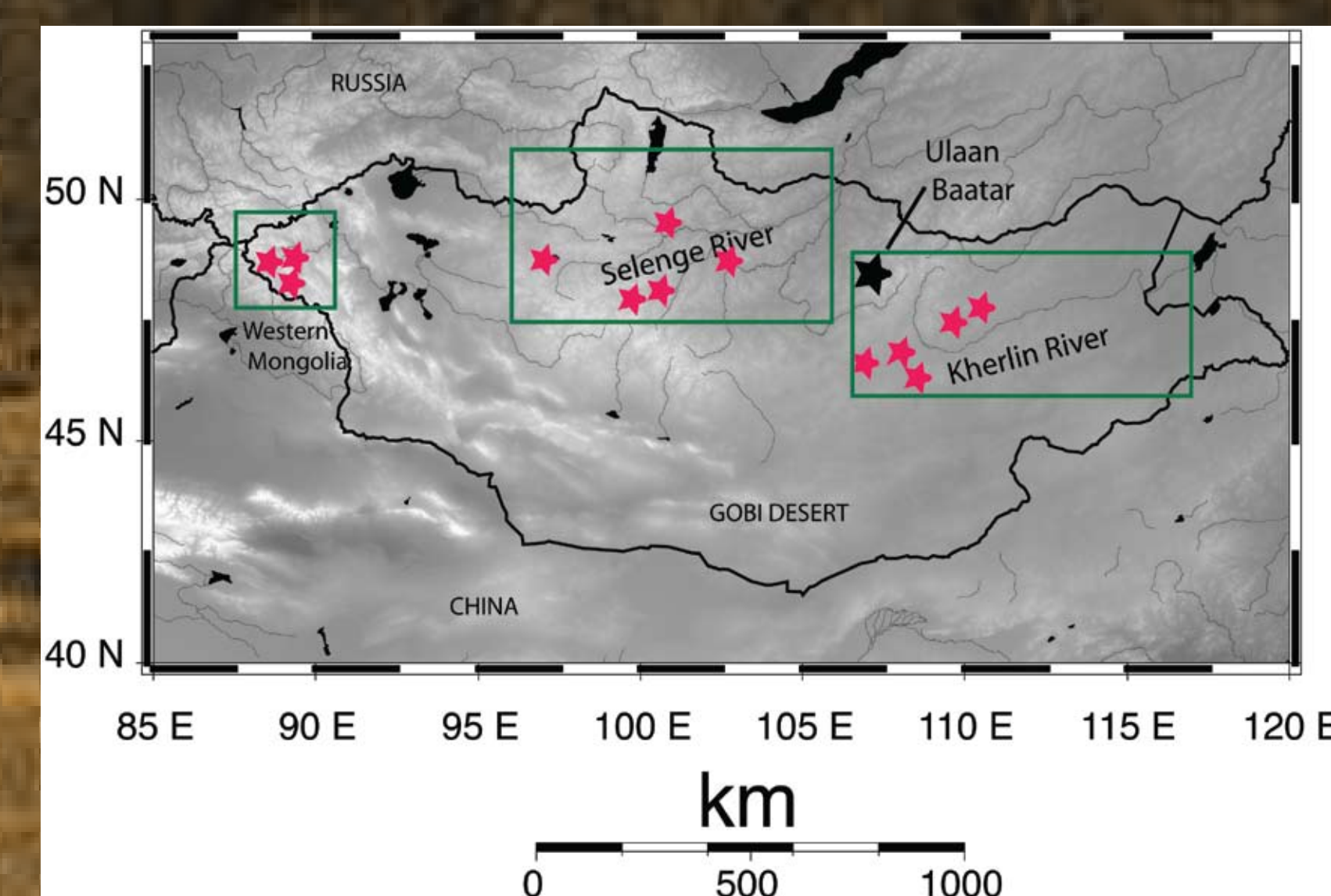
## 2. Long-lived Trees Growing In Dry Climates



Tree rings, from old age trees, are used to create records of rainfall, and can give scientist insight into patterns of drought for the past several hundred years. An old (600 year) Siberian larch tree (above right) from central Mongolia grows on an old lava flow, trees from eastern Mongolia (above left) live about 4-500 years. Both sites are located in extremely dry areas causing tree growth to be very sensitive to changes in rainfall.

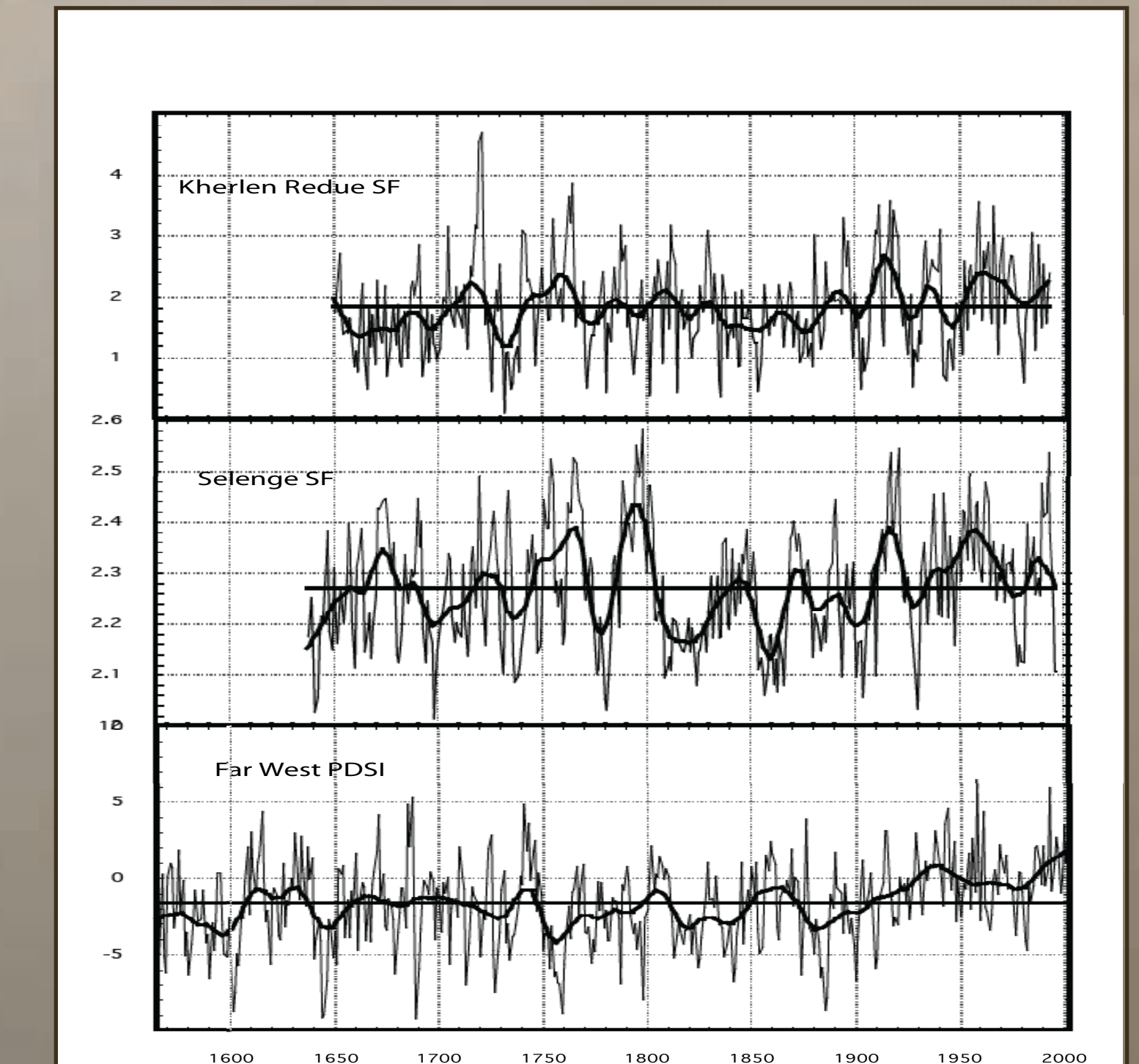
## 3. Map Of Study Regions

Map of Mongolia showing the three regional study region (green boxes): The Kherlen River in eastern Mongolia, the Selenge River in central Mongolia and far western Mongolia. Red stars represent tree-ring sampling sites. Black star represents Ulaan Baatar, the capital of Mongolia.



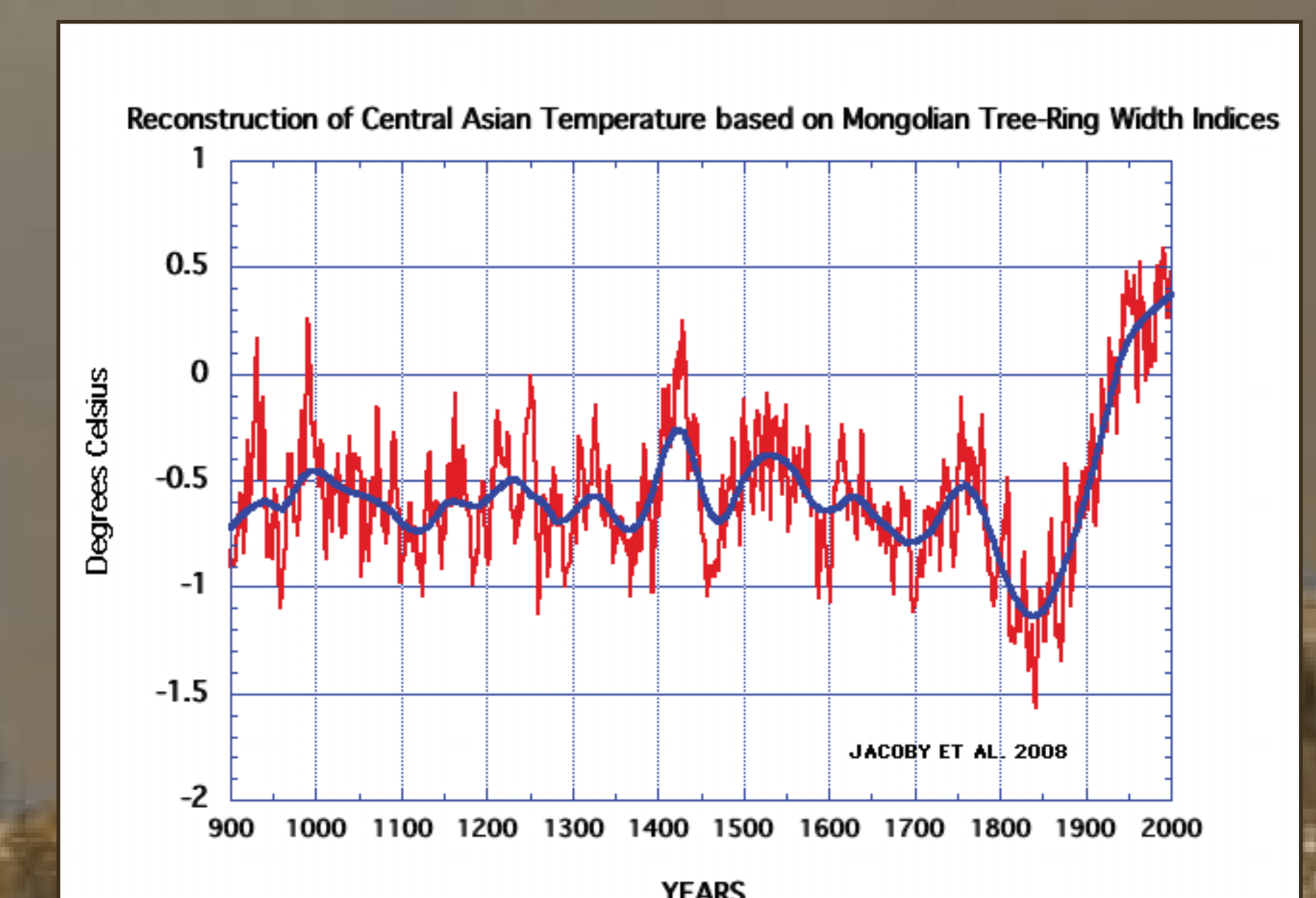
## 4. 400 + Year Records Of Drought From Tree Rings

Tree ring records are used to create 400+ year reconstructions of past drought. These records show how much rainfall has varied in the past, how frequent droughts can occur, and how long droughts can last.

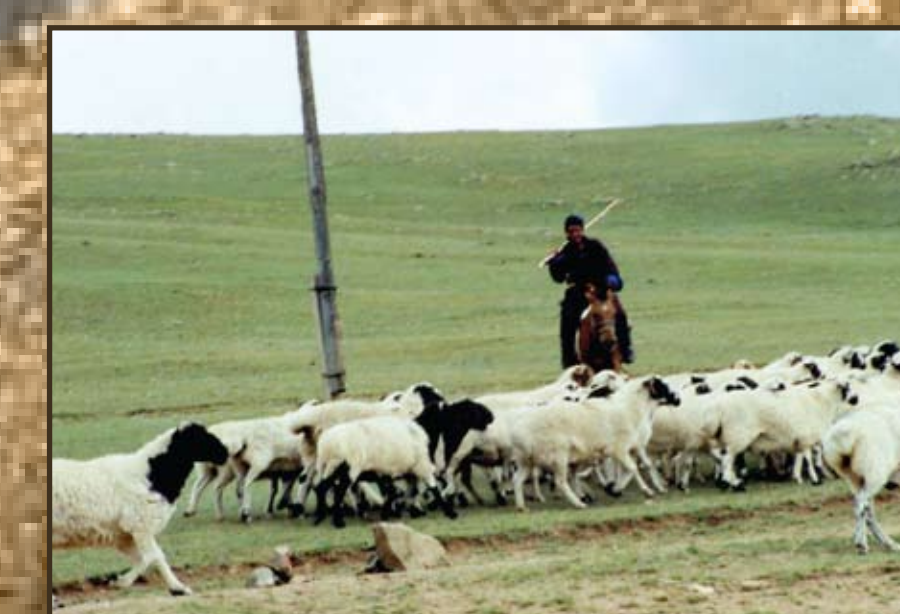


## 5. Global Warming's Effect on Rainfall

A record of temperature (right), based on tree rings, shows that the past few decades are the warmest of the past 1000+ years. Climate models show that temperatures are predicted to continue to warm throughout Asia through this century. Although the effect warming will have on rainfall is currently not clear.



## 6. Risk Management: Index-based Livestock Insurance



Nomads are more vulnerable to climate change and climate extremes because they are directly dependant on animals and grasslands with no reserves in place. To protect herders from financial collapse after extreme drought and livestock losses, a pilot Index-Based Livestock Insurance program was recently developed.

## 7. Scientific Collaboration

Our research in Mongolia is made possible by collaboration with local scientist that have an intimate knowledge of the physical environment and processes. Collaboration with colleagues at the National University of Mongolia and The Inst. of Hydrology and Meteorology, is essential for successful research.

