Geophysical Research Abstracts
Vol. 20, EGU2018-1246, 2018
EGU General Assembly 2018

Assessing impacts of decadal climate variability: The Little Ice Age in Central and southern Colonial India

Ranjini Ray (1), Keyle Horton (2), Amir Bazaz (1), Atreyee Bhattacharya (1,2)

(1) Indian Institute of Human Settlements, India (rray@iihs.ac.in), (2) University of Colorado, Boulder, United States of America (Keyle.Horton@colorado.edu)

Climate variability, originating due to the complex interplay of forcing and feedback mechanisms, impact the Earth on timescales ranging from annual to hundreds of millions of years. Of all the forms of climate variability, there are few that impact human societies most directly, namely, inter-annual, sub-decadal, decadal, multi-decadal, and centennial. Of theforms of climate variability, of relevance to human societies, the decadal variability-often arising from variations in sea surface temperature, propagated through atmospheric circulation patterns, and often exacerbated by vegetation cover - is of critical importance; research shows that it is on decadal timescales that collective human decision manifests most strongly. In this study, we investigate climate-human interaction focused, but not limited to, decadal timescales in the context of climatic systems in central and southern India.

Our areas of focus are climatic regions of central India-from the western coast of India (formerly the seat of the Bombay Presidency in Colonial India) to the southern coast (formerly the Madras Presidency). The region allows us to access a strong moisture gradient in the context of a governance domain. To investigate decadal connections in climate-human interactions, we focus on the 200 years between 1700-1900, which is the most intense phase of the Little Ice Age (a one-degree global cooling event that had put enormous pressure on existing infrastructures across the world) and spans the Colonial Period in India. The 200 years between 1700-1900 is thus one of the most critical phases that require attention not just from a human-climate interaction standpoint, but also in understanding how and why some institutional decision-making may have exacerbated climatic pressures. There are lessons to be learned from such studies.

We present new data from archival documentary material, and analysis of the new data in relation to previously published historical and paleoclimate data. Our initial research shows that an urban center (Madras) situated in semi-arid regions, characterized by high frequency year-to-year climate variability, were at risk from climatic pressures in the 18^{th} century; that risk was comparable to an urban area of similar scope (Bombay), situated in more equitable climatic regions and characterized by lower degrees of climate variability over the 19^{th} century.

Anthropogenic climate change will be one of the biggest social and economic disrupters over the 21^{st} century, particularly in tropical regions: Statistical studies are already warning that in a 2^0C warmer world, tropical regions could face up to a 40% increase in risk of conflict as well as increased probability of long-distance ($>$ 500 km) migrations [Hsiang and Sobel, 2016]. Such findings translate to a potential for severe social and economic instability in south Asia, particularly in India. In order to understand how this changing climate will impact societies around the world, there must be an understanding about historical climate variability and the mechanisms society once used to adapt to it.