



Physical Research Laboratory, Ahmedabad

Colloquium 15-11

Speaker: Mr. Kaustubh Thirumalai
Institute for Geophysics, The University of Texas at Austin, TX, USA

Title: “Centennial-scale links between Atlantic Ocean dynamics and hydroclimate: a spotlight on the Little Ice Age”

Time: Wednesday, 05 August 2015, 16.00 hrs.

Venue: K. R. Ramanathan Auditorium, PRL

Abstract

The Gulf of Mexico (GOM) is an integral component of tropical-to-extratropical heat transfer in the Western Hemisphere. Sea-surface temperature (SST) and sea-surface salinity (SSS) in the GOM strongly influence the moisture budget of North America. Oceanographically, the GOM is dynamically complex owing to the Loop Current, a surface current that transports 23 Sv (1 Sv = 10⁶ m³s⁻¹) of warm Caribbean waters through the Yucatan Strait into the GOM and ultimately flows out of the Florida Straits as a precursor to the Gulf Stream. The signature of the Loop Current is manifest as SST and SSS anomalies in the northern and western GOM through eddies. The brief length of the observational record however, limits us from knowledge of long-term (century-scale) variability in GOM oceanography. Understanding variability of GOM SSTs and SSS on these timescales is crucial in understanding North American hydroclimate variability and equally importantly, can give us key insights into Atlantic Ocean dynamics. Here, using a suite of well-dated sediment cores collected from the Garrison Basin, GOM, we reconstruct local SST and SSS variability during the late Holocene by employing planktic foraminiferal geochemistry. I will make a case in this talk that the reconstructed temperature and salinity variations at Garrison Basin are representative of large-scale climatic processes on centennial timescales. With a multiproxy analysis, we show that proxy data during the Little Ice Age (1450-1850 AD) display a spatially consistent pattern compared to low-frequency spatial field correlations of observational data. Our study provides strong evidence for a tight coupling between Atlantic Ocean dynamics and hydroclimate in the Western Hemisphere, during a time period where climatic background conditions were similar to the preindustrial era.

The Speaker

Mr. Kaustubh Thirumalai is a PhD scholar at the University of Texas at Austin in the Jackson School of Geosciences. He is affiliated with the Institute for Geophysics and work with Terry Quinn. He obtained his MS in Geosciences in 2012 from the University of Texas at Austin. In 2010, he graduated with a major in chemical engineering (and a minor in procrastination) from the National Institute of Technology Karnataka in Surathkal. Areas of his research interest are Paleoclimate/Paleoceanography, Paleogeodesy and Proxy Uncertainty to understand how climates changed in the past, what caused them to change, and how this information can tell us about future climate change. Mr. Kaustubh is a recipient of the UTIG Ewing-Worzel Fellowship (2014, 2015).

Tea at 15:30 hrs.

ALL ARE WELCOME

