

# PHYSICS COLLOQUIUM.



## **Beyond mean climate change: Using paleoclimate archives to constrain climate variability**

**Prof. Thomas Laepple**  
**Alfred Wegener Institute Potsdam**

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To adapt to the changing climate, not only changes in the mean climate state but also its variability has to be known. Variations on weather on inter-annual time-scales are well documented and can be modelled well, much less is known about the amplitude and the mechanisms of natural climate variability on time-scales from decades to centuries. This variability is important for the identification of the anthropogenic component and constrains the range of plausible future climate scenarios. Paleo-climate archives ('proxies') such as ice-core and marine sediment records provide long records of past climate evolution. However, they are sparse, inherently noisy and at times contradictory. But several advances have been made recently, based on lab and field studies, proxy system models and novel statistical techniques.

I will give an overview on how we reconstruct past climate variations from natural archives, discuss recent advances in teasing out climate variability from marine and ice-core based climate archives and show how to use of the paleo-climate record for quantitatively constraining present and future climate variability.