

Motivation

The existence of 1000 and 2500-year periodicities found in reconstructions of total solar irradiance (TSI) and a number of Holocene climate records has led to the hypothesis of a causal relationship^[1-3]. However, attributing Holocene millennial-scale variability to solar forcing requires a mechanism by which small changes in total irradiance can influence a global climate response. One possible amplifier within the climate system is the ocean. If this is the case, then we need to know more about where and how this may be occurring. On the other hand, the similarity in spectral peaks could be merely coincidental, and this should be made apparent by a lack of coherence in how that power and phasing are distributed in time and space.

The plausibility of the solar forcing hypothesis is assessed through a Bayesian model of the age uncertainties affecting marine sedimentary records that is propagated through spectral analysis of the climate and forcing signals at key frequencies^[4].

KEY POINTS

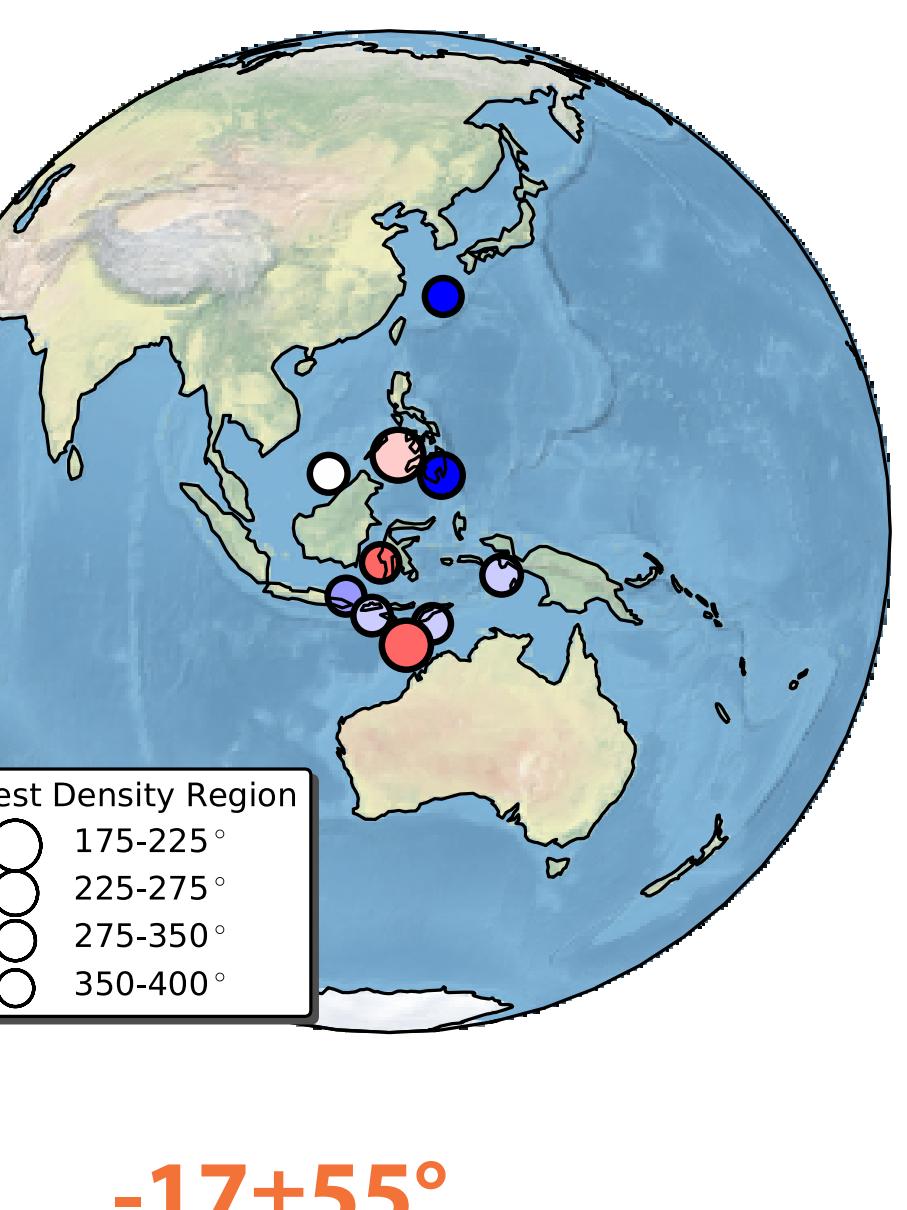
1. The large age model uncertainty inherent to paleoceanographic reconstructions prevents meaningful analysis of periodicity from one single record.
2. Synthesis of multiple records suggests robust periodicities centered around ~1,000 years, ~1,500 years, and 2,500 years in sea surface temperature variability within the Indo-Pacific Warm Pool.

We cannot discard the possibility that the sun might have paced millennial-scale climate variability over the Holocene.

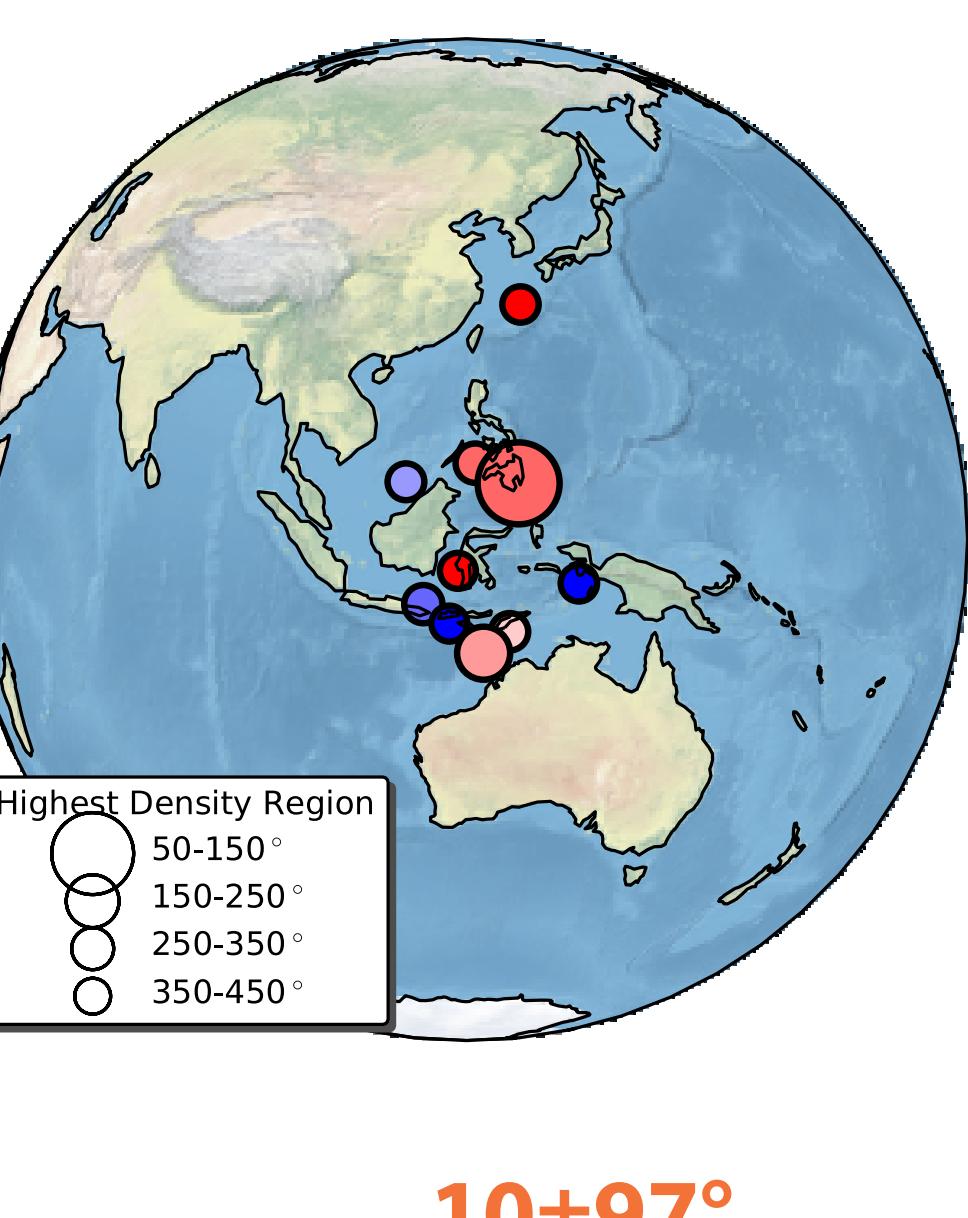
3. Refuting or accepting the solar forcing hypothesis will require additional records with a global coverage.
4. LinkedEarth aims to facilitate synthesis work to answer pressing questions in paleoclimatology.

The role of the sun

1000-year cycles



2500-year cycles



Future Work

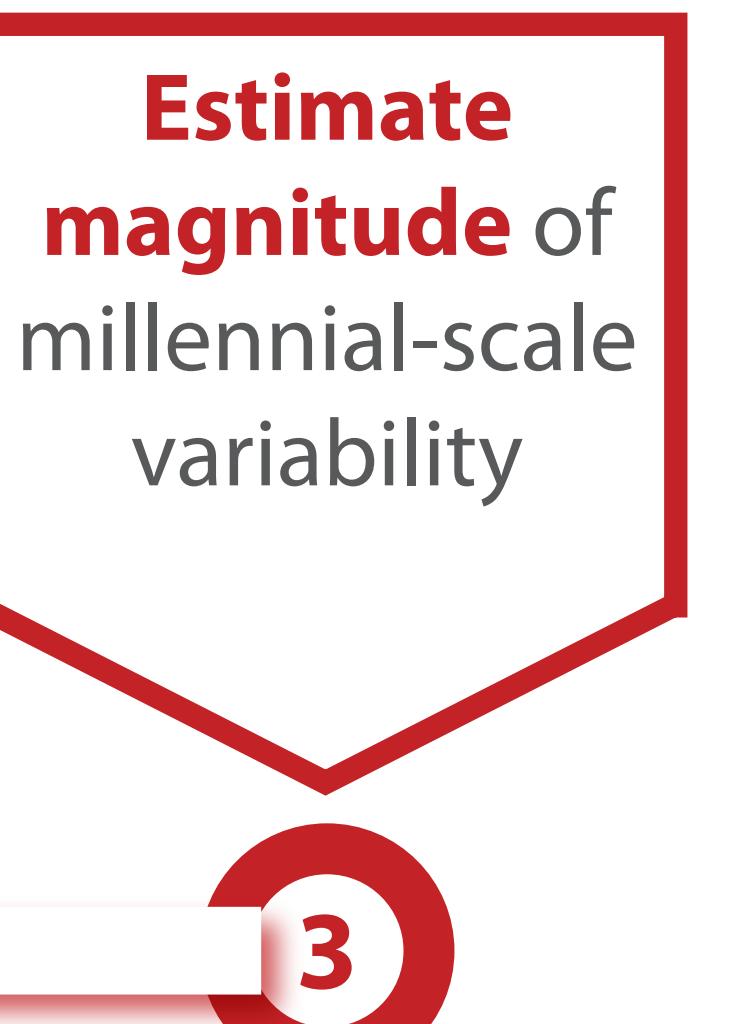
Expand the database to global coverage



Explore lead-lag relationships among various regions



Estimate magnitude of millennial-scale variability



Testing the Millennial-Scale Holocene Solar-Climate Connection in the Indo-Pacific Warm Pool

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Acknowledgements and references

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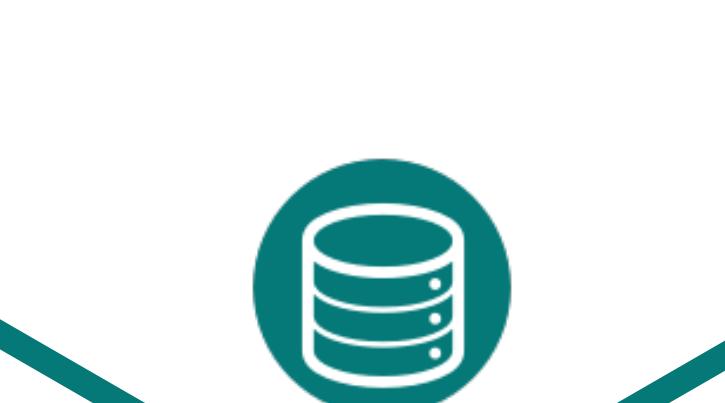
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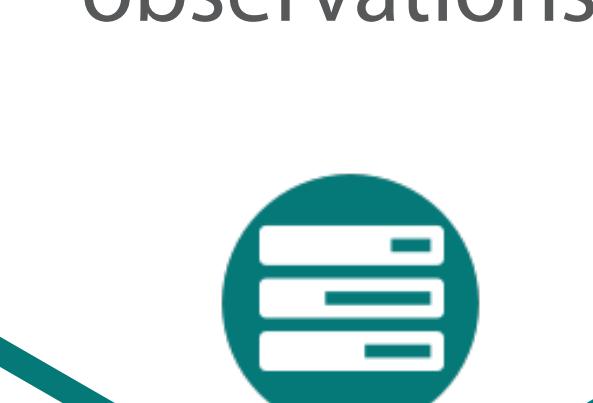


LinkedEarth and the future of paleoclimatology

Crowdsourcing data curation through a wiki platform



Develop web standards for paleoclimate observations



Develop social codes to accelerate scientific discovery

