

## **Indo-Pacific Influences on Tree-Ring Stable Isotopes in Vietnam**

KEVIN J ANCHUKAITIS<sup>1\*</sup>, MICHAEL N EVANS<sup>2</sup>,  
ALLEGRA N LEGRANDE<sup>3</sup>

<sup>1</sup>School of Geography and Development, University of  
Arizona, Tucson, AZ 85721, USA (\*correspondence:  
kanchukaitis@email.arizona.edu)

<sup>2</sup>Department of Geology & ESSIC, University of Maryland,  
College Park, MD 20742, USA (mnevans@umd.edu)

<sup>3</sup>NASA Goddard Institute for Space Studies, New York, NY  
10025, USA (allegra.n.legrande@nasa.gov)

Oxygen isotopes can provide a proxy for atmospheric circulation and therefore offer the potential to examine the broad-scale processes that influence terrestrial rainfall variability in the Asian Monsoon system. Here we develop a five century-long and well-replicated chronology of the stable oxygen isotope ratio of cellulose from the annual growth rings of trees growing at two locations in Vietnam. We observe a coeval association with the tropical Pacific via changes in upstream precipitation processes, winds, and water vapor, particularly in the Indo-Pacific Warm Pool. Significant decadal-scale variability is also present, with the most pronounced anomaly of the last half millennium occurring during the 'Strange Parallels' megadrought of the late 18th century, when the isotope chronology records a sustained period of anomalously negative isotope ratios. We use a proxy system model and an isotope-enabled general circulation model to validate our statistical analyses.