

Modulation of Solar Activity on Tropical Pacific SST Anomalies by the Wintertime AO-like Variability

WENJUAN HUO^{1,2}, KATJA MATTHES², ZINIU XIAO¹, LIANG ZHAO¹

¹ *State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China.*

² *GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany*

A delayed response to the solar variability has been found in the tropical Pacific that resembles the pattern of El Niño Modoki, it also been noted that this response connects to the atmosphere circulation anomalies over mid-high latitude. Here we use the multiple reanalysis data to detect the indirect route of solar activity modulation on tropical Pacific SST anomalies through the atmosphere anomalies at mid-high latitude. The results suggest that high solar activity enhances the atmosphere-to-ocean forcing from the higher extratropical Arctic Oscillation (AO)-like atmospheric anomalies to the El Niño Modoki-like SST anomalies in the tropical Pacific one year later. During high solar activity years, a meridional dipole pattern of wintertime sea level pressure anomalies over the North Atlantic and America can trigger an El Niño Modoki-like SST warming in the tropical Pacific during the following seasons and the next year. However, during low solar activity years the AO-like pattern is weak and hence the El Niño Modoki-like SST response disappears in the tropical Pacific.

Key words: Solar activity; Sea level pressure; Arctic Oscillation; El Niño Modoki; Singular value decomposition