

Atlantic Niño-Pacific connection and its implication for prediction under greenhouse warming

*wenju cai¹, Fan Jia², Lixin Wu²

1. Centre for Southern Hemisphere Oceans Research (CSHOR), CSIRO Oceans and Atmosphere, Hobart 7004, Tasmania, Australia, 2. CAS Key Laboratory of Ocean Circulation and Waves, Institute of Oceanology, Chinese Academy of Sciences and Qingdao National Laboratory for Marine Science and Technology

Atlantic variability interacts with variability in the Pacific. For example, sea surface temperature (SST) variability in the equatorial eastern Atlantic, which is referred to as an Atlantic Niño (Niña) at its warm (cold) phase and peaks in boreal summer, dominates the interannual variability in the equatorial Atlantic. By strengthening of the Walker circulation, an Atlantic Niño favors a Pacific La Niña, which matures in boreal winter, providing a precursory memory for El Niño-Southern Oscillation (ENSO) predictability. How this Atlantic impact responds to greenhouse warming is unclear. Here, we show that greenhouse warming leads to a weakened influence from the Atlantic Niño/Niña on the Pacific ENSO. In response to anomalous equatorial Atlantic heating, ascending over the equatorial Atlantic is weaker due to an increased tropospheric stability in the mean climate, resulting in a weaker impact on the Pacific Ocean. Thus, as greenhouse warming continues, Pacific ENSO is projected to be less impacted by the Atlantic Niño/Niña and more challenging to predict.

Keywords: Atlantic Niño, El Niño Southern Oscillation, greenhouse warming