

Dynamics of the intertropical convergence zone over the western Pacific during the Little Ice Age

With the support of the National Natural Science Foundation of China, Prof. Yan Hong's laboratory at the Institute of Earth Environment, Chinese Academy of Sciences, reported the dynamics of the intertropical convergence zone (ITCZ) over the western Pacific during the Little Ice Age (LIA, AD 1400—1850), which was published in *Nature Geoscience* (2015, 8: 315—320).

The mean position of the ITCZ over the western Pacific has been proposed to have shifted southwards during the LIA, which would lead to relatively dry LIA conditions in the northern extent of the ITCZ, such as the East Asian Summer Monsoon (EASM) area, and wet conditions around its southern limit, such as the Australian Summer Monsoon (ASM) area. However, the result of the comprehensive analysis of palaeo-hydrology records from the Asian-Australian monsoon area showed that the rainfall distribution distinctly violates the expected pattern. The research team documented synchronous retreat of the EASM and the ASM into the tropics during the LIA, therefore, the contraction of the ITCZ during the LIA was proposed. The contraction of the ITCZ during the LIA may best be explained by the decreased solar irradiance during the LIA and the different specific heat capacities between the sea and the land. A decrease in irradiance during the LIA, plus the unique land-sea distribution in the west Pacific region would thus produce the decreased seasonal extremes of the monsoon moisture transport and the consequent contraction of the west Pacific monsoon/ITCZ.

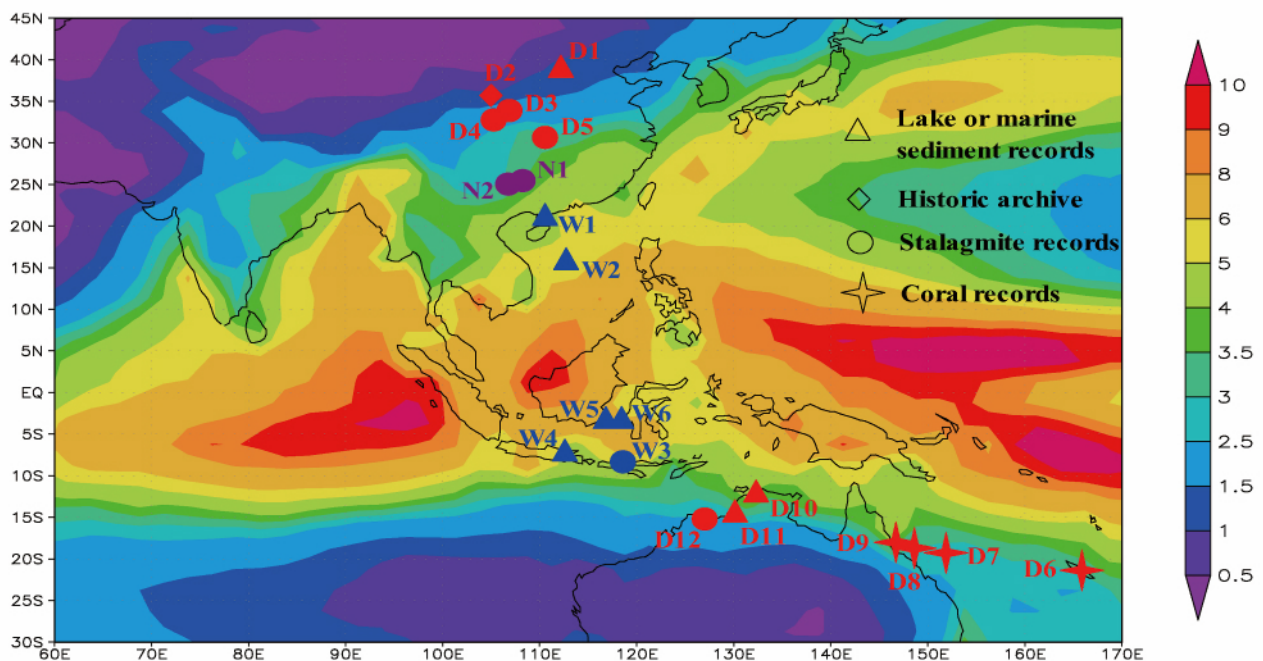


Figure Contraction of the western Pacific ITCZ and the synchronous retreat of the EASM and the ASM into the tropics during the LIA. The colour shading on the map indicates the annual mean precipitation (mm/day) in the EASM area and the ASM area as derived from NCEP reanalysis2 from January 1979 to December 2010. Locations of proxy-hydrology records in the EASM area and the ASM area are indicated. Locations that were dry, without apparent change and wet during the LIA relative to the Medieval Climate Anomaly period (MCA, AD 800—1300) and the most recent 150 years are marked in red, purple and blue, respectively.