Geophysical Research Abstracts
Vol. 20, EGU2018-1605-1, 2018
EGU General Assembly 2018

Interdecadal change in upper ocean heat content around the late 1990s in the South China Sea: Role of Interdecadal Pacific Oscillation

Fuan Xiao (1,2), Lili Zeng (2), Qin-Yan Liu (2), Wen Zhou (3), and Dongxiao Wang (2)

(1) School of Geographical Sciences, Guangzhou University, Guangzhou, 510006, China(fuanxiao@scsio.ac.cn), (2) State Key Laboratory of Tropical Oceanography, South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou 510301, China., (3) Guy Carpenter Asia-Pacific Climate Impact Centre, School of Energy and Environment, City University of Hong Kong, Kowloon, Hong Kong SAR, China.

Previous studies have demonstrated that the low-frequency sea surface temperature (SST) in the South China Sea (SCS) appears to be a linear warming trend, which is the regional footprint of the global warming. In this study, we use the in situ and reanalysis datasets to reveal a significant interdecadal change in the upper 300 m ocean heat content (OHC) between 1975–1996 and 1998–2010 in the SCS. The OHC change between these two periods is estimated to be 4.22×10^{20} J integrated over the main warming region. An analysis of the upper OHC budget reveals that about 34% of the OHC change may be attributed to a positive net surface heat flux into the ocean. A change in ocean circulation driven by wind forcing is the dominant process and accounts for about 57% of the OHC change. The contribution of Luzon Strait transport ($\sim$6%) to the OHC change in the northern SCS is highlighted. Further analyses demonstrate that all the changes in the net surface heat flux and ocean circulation in the SCS are related to local anticyclonic circulation anomaly. And this local circulation anomaly is driven by the transition of the Interdecadal Pacific Oscillation (IPO) from its positive to its negative phase via a Gill–Matsuno response.