OPST-8 meeting Science Day November 9, 2023
SD11

Local Stratification Preconditions the Marine Heatwaves in the Yellow Sea

Dong Eun Lee[1], Eun Young Lee[1], Young-Gyu Park[2], Hyunjin Kang[1], Haedo Baek[1]
[1]Chungnam National University, Republic of Korea
[2]Korea Institute of Ocean Science and Technology, Republic of Korea
(e-mail: dlee@cnu.ac.kr)

Vertical stratification is a prerequisite for marine heatwave (MHW) events in marginal seas. The major events since 1982 in the marginal sea area west and south of the Korean Peninsula have been triggered by unusually strong stratification in the vicinity, detected at least two months in advance. This robust coincidence provides substantial control over midsummer events through local stratification in early summer. Such heatwave-inducing stratification can be attributed to several early summer oceanic factors, including anomalous SST, freshwater flux, and wind mixing. Knockout experiments using a 1-dimensional ocean model showed that upper ocean stratification in the preceding months, mainly through wind mixing, can regulate MHW. Meanwhile, the longer historical records showed a gradual decrease in the intensity and frequency of daily wind gusts, possibly as a mixed result of anthropogenic climate change and strong natural variability in the mid-latitudes. This may have been dominance in increasing the occurrence of MHWs, combined with the increasing background surface temperature.