
Exploring of the role of atmospheric versus oceanic forcings leading to Marine Heatwaves in East Asian marginal seas during boreal summer using an ocean general circulation model

Lee Sang-Bin^{*1} and Sang-Wook Yeh^{†1}

¹Department of Marine Science and Convergence Engineering, Hanyang University, ERICA – 55, Hanyangdaehak-ro, Sangnok-gu, Ansan-si, Gyeonggi-do, South Korea

Abstract

Marine Heatwaves(MHWs) are receiving much attention because it has the potential to devastate marine ecosystems worldwide, cause economic losses to the fishery market as well as , a secondary natural disaster. However, there are few studies to examine the detailed physical processes in association with MHWs in East Asian marginal seas. In this study, we conducted three idealized model experiments using Modular Ocean Model version 5(MOM5) to understand the relative role of atmospheric versus oceanic forcings on the MHWs occurrence in East Asian marginal seas during boreal summer (June-July-August). One is a control experiment (Exp_CTL) in which all historical boundary variables are used to force a MOM5. The other is the same as in Exp_CTL except that thermodynamic are used to force a MOM5 (referred to as Exp_THER). Another is the same as in Exp_CTL except that dynamic variables are used to force a MOM5 (referred to as Exp_DYN). By analyzing three experiments, we investigated the role of atmospheric versus oceanic forcing on the most dominant mode of MHW occurrence frequency, It is found that the increasing trend of MHWs frequency occurrence in East Asian marginal seas largely attributes to the atmospheric forcing compared to the oceanic forcing.

Keywords: marine heatwave, sea surface temperature, ocean general circulation model, East Asia

^{*}Speaker

[†]Corresponding author: swyeh@hanyang.ac.kr