Do salinity anomalies matter for the evolution of the IOD? –Experimental assessments using a regional ocean model-

Do salinity anomalies matter for the evolution of the IOD? –Experimental assessments using a regional ocean model-

*木戸 晶一郎[1]、東塚 知己[1]、Weiqing Han[2]
*Shoichiro Kido[1], Tomoki Tozuka[1], Weiqing Han[2]

1. 東京大学大学院理学系研究科、2. コロラド大学ボールダー校
1. Graduate School of Science, The University of Tokyo, 2. Department of Atmospheric and Oceanic Sciences, University of Colorado Boulder

The Indian Ocean Dipole (IOD), which is a dominant climate mode in the tropical Indian Ocean, is accompanied by significant surface and subsurface salinity anomalies. These salinity anomalies alter density field and stratification in the upper ocean, and thereby have potentials to affect the evolution of the IOD itself. Though many previous studies have attempted to estimate the impacts of the IOD-related salinity anomalies, no comprehensive assessments have been conducted. To this end, a series of sensitivity experiments using a regional ocean model is conducted with a novel experimental strategy.

Results from these sensitivity experiments show that interannual salinity anomalies associated with the positive IOD tend to suppress the cooling in the eastern equatorial Indian Ocean by about 1.0˚C. Through an on-line heat budget analysis of each experiment, it is shown that weakening of the upwelling in the eastern Indian Ocean, which originates from the upward shift of the Equatorial Undercurrent, is the primary cause of the suppressed cooling there. These changes are induced by enhanced stratification in the eastern equatorial Indian Ocean associated with negative (positive) salinity anomalies near the surface (pycnocline). Momentum budget analysis and additional sensitivity experiments using a linear continuously stratified ocean model further support these ideas. Therefore, salinity plays an active role in the evolution of the IOD, rather than being passively influenced by atmospheric anomalies.

キーワード：インド洋ダイポールモード、塩分偏差、領域海洋モデル
Keywords: Indian Ocean Dipole, Salinity anomaly, Regional ocean model

