Local Regime Shifts in East/Japan Sea

Young-Heon Jo[1], Seunghyun Son[2], Hyun-Cheol, Kim[3]*, and Dohoon Kim[4]

[1] *College of Earth, Ocean, and Environment, University of Delaware, Newark, DE 19716*

[2] *CIRA, Colorado State University, CO 80523, USA*

[3] *Division of Polar Climate Research, Korea Polar Research Institute 26 Songdomirae-ro, Yeonsu-gu, Incheon 406-840, Republic of Korea, Corresponding Author: kimhc@kopri.re.kr*

[4] *College of Fisheries Sciences, Pukyong National University, Nam-gu, Busan 608-737,Republic of Korea*

Abstract: Geographically uneven linear and non-linear Chlorophyll-a (CHL) trends derived from Ensemble Empirical Mode Decomposition (EEMD) were analyzed in the East Sea/Japan Sea (EJS) region using the monthly mean MODIS CHL and sea surface temperature (SST) data from January 2003 to December 2012. The non-linear CHL trends were used to analyze spatial and temporal changes using the Complex Empirical Orthogonal Function (CEOF) to determine the local regime shift in the region. Based on non-linear time series of CHL, the timing of turning points were specifically determined. We found that the local turning patterns of CHL in last ten years were closely related to changes in the Arctic Oscillation phases and El Nino Southern-Oscillation events, and those of total fish abundance can be an important factor in understanding the changes in fisheries resources using remotely sensed CHL observations.

Keyword: Regime shift, Ocean Color, East/Japan Sea, chlorophyll-a