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The Role of Oceanic Environmental Conditions on Catch of Sardinella spp. In Ghana

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Abstract : Fish stock distribution is greatly influenced by oceanographic environmental conditions. Temporal variations of temperature and other oceanic properties, resulting from climate change have been documented to have a strong impact on fisheries and aquaculture. In Ghana, Sardinella species are one of the most important fisheries resources; they constitute about 60% of the total catch of coastal fisheries and are more predominant during the upwelling season. The present study investigated the role of physical oceanographic environmental conditions in the catches of Sardinella species: S. aurita and S. maderensis, which were landed in Ghana. Furthermore, we examined the relationship between environmental conditions and catches of Sardinella species for seasonal and interannual variations between 2005 and 2015. For oceanographic environmental factors, we used comprehensive datasets, which consist of :(1) daily in situ SST data obtained at two coastal stations in Ghana; (i) Cape 3 Points (4.7° N, -2.09° W) and (ii) Tema (5° N, 0° E), for the period 2005–2015, (2) Monthly SST data (MOAA GPV) from JAMSTEC, and (3) gridded 10 metre wind data from CCMP reanalysis. The analysis of the data collected showed that higher (lower) wind velocity forms stronger (weaker) coastal upwelling that is detected by lower (higher) SST, resulting in a higher (lower) catch of Sardinella spp., in both seasonal and interannual variations. It was also observed that the capture ability of small pelagic fish species such as Sardinella spp. is depend on the intensity of the coastal upwelling. Moreso, the Atlantic Meridional Mode index (climatic index) is now known to be a possible factor to the interannual variation in catch of small pelagic fish species.

Keywords : Sardinella spp., fish, climate change, Ghana
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