ICES CM 2016/I:543

Value of ocean prediction to fisheries management

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Fish populations are strongly influenced by climate variability. The inability of fisheries managers to anticipate such environment-driven fluctuations in fish productivity can lead to overfishing and stock collapses. We show that recent advances in dynamical global climate prediction systems such as the state of the art NOAA Geophysical Fluid Dynamics Laboratory (GFDL) 2.5-FLOR model, allow for skillful sea surface temperature (SST) anomaly predictions at a seasonal scale over many shelf ecosystems. By contrast, multi-annual to decadal prediction skill was more heterogeneous, with the western Pacific Ocean showing the lowest prediction skill, and the North Atlantic Ocean the highest. Utility of SST predictions at this "fishery relevant" coastal scale to fisheries management was assessed using case studies of Pacific sardine and North Atlantic cod for seasonal and decadal predictions, respectively. The value of SST anomaly predictions to management was quantified using a management strategy evaluation framework that compared performance of harvest guidelines differing in their level of integration of SST data and predictions. Results will focus on species-specific outcomes as well as a comparison of forecast requirements in terms of skill, relevant variables, and critical timescales for a short lived Pacific sardine-like forage fish and a longer lived cod-like species.

Keywords: climate prediction, seasonal forecast, decadal forecast, fisheries management

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