Decadal variability of the Kuroshio extension in a high-resolution ocean-atmosphere coupled model

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Decadal variability of the Kuroshio Extension (KE) jet is examined by using a 42-yr output of a high-resolution ocean and atmosphere coupled model (Community Earth System Model; CESM).
A comparison of the path length change between the model and the satellite observations shows that the model can reproduce realistic stable and unstable states of the KE jet on decadal timescales.
The path length of the KE jet on decadal timescales is negatively correlated to the speed of the KE jet, consistent with observations.
Interestingly, the speed change of the KE jet propagates eastward with an phase speed of few centimeter per second, suggesting the importance of the advection or higher-modes of the Rossby wave.
Similar eastward propagation can be seen in the satellite observations.
On the other hand, the path length change is not related to the latitude change of the KE jet, which is not consistent with satellite observations. The latitude change of the KE on decadal timescales results from the westward propagation of the jet-trapped Rossby wave, which is induced by wind-stress curl variability over the eastern North Pacific.

Keywords: Kuroshio Extension, Decadal variability, Rossby wave, air-sea interaction, ocean-atmosphere coupled model

