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## Interannual-to-decadal variability of the Kuroshio extension: Analyzing an ensemble of global hindcasts from a Dynamical System viewpoint.

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The Kuroshio Extension (KE) is the inertial meandering jet formed by the convergence of the Kuroshio and Oyashio currents in the Northern Pacific. It is widely mentioned in the literature that the KE variability is bimodal on the decadal time scale. The nature of this low frequency variability (LFV) is still under debate; some authors suggest that internal oceanic mechanisms play a fundamental role in the phenomenon but there is also evidence from the observations that the KE LFV is connected with changes in broader patterns of variability such as the Pacific Decadal Oscillation.

We first inspect the interplay between the ocean and the atmosphere in the KE by taking advantage of the OCCIPUT 1/4° model dataset: it consists in an ensemble of 50 global ocean–sea-ice hindcasts performed over the period 1960–2015 (hereafter OCCITENS), and in a one-member 330-yr climatological simulation (hereafter OCCICLIM). In this context, OCCITENS simulates both the intrinsic and forced variability and allows for their separation via ensemble statistics, while OCCICLIM simulates the "pure" intrinsic variability of the jet. We then explore some features of the KE dynamical system attractor in the quasi-autonomous (OCCICLIM) and nonautonomous (OCCITENS) regimes: we thus assess the KE predictability in the OCCIPUT dataset in order to better understand the ocean-atmosphere interactions and the source of the associated predictability.

Our analyses show that both oceanic and atmospheric drivers control the KE LFV variability. In this framework, the results suggest that the jet oscillates between the two intrinsic oceanic modes with transitions triggered by the atmosphere.