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ANALYSIS OF THE KUROSHIO EXTENSION DECADAL VARIABILITY : Internal Mechanisms and External Forcings

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The Kuroshio Extension (KE) is the eastward-flowing, free, inertial meandering jet formed by the confluence of the Kuroshio and Oyashio western boundary currents. The KE jet is known for its low-frequency variability (LFV) which connects a zonally elongated, fairly stable and energetic meandering jet (elongated state) and a much weaker, highly variable and convoluted jet with a reduced zonal penetration (contracted state). The LFV of the KE is therefore often referred to as being bimodal (Qiu, 2002). The nature of this variability is still under debate; some authors suggest that non-linear internal oceanic mechanisms can play a fundamental role in the phenomenon (Pierini, 2006) but there is also evidence from the observations that the KE LFV is connected with changes in atmospheric patterns of variability as the Aleutian Low and the North Pacific Oscillation (Nathan J. and Mantua Steven R. Hare, 2002; Qiu B., 2003; L. Ceballos et al, 2009; S. Pierini, 2014; M. Newman et al, 2016). In the first part of our analysis, we assess the impact of model resolution on the low-frequency variability of the KE jet. Results from two present-climate coupled simulations differing by their atmospheric component resolution are compared. For this analysis, results from the CMCC-CM2 model are used, under the CMIP6 HighResMIP protocol. Several aspects of the KE LFV are inspected, including the KE bimodality and the role of ocean weather (mesoscale oceanic eddies) in modulating the air-sea interactions. In the second part of the work, the role of the intrinsic variability and atmospherically-forced variability of the KE LFV is investigated taking advantage of the OCCIPUT ensemble of 1/4° global oceanic hindcasts provided by the Institut des Géosciences de l'Environnement (IGE). This dataset is built in order to simulate simultaneously both contributions (intrinsic and forced) and to allow their separation via ensemble statistics.