

## Sea level variability along the Japanese coast forced by the Kuroshio and its extension

\*Norihisa Usui<sup>1</sup>, Koji Ogawa<sup>2</sup>

1. Meteorological Research Institute, 2. Oita Meteorological Office

Sea level variability along the Japanese coast and its relation to the Kuroshio-Kuroshio Extension (KE) are investigated using ocean reanalysis data. The first mode of an empirical-orthogonal-function for the coastal sea-level represents a simultaneous sea-level change along the whole Japanese coast, which is synchronized with sea levels in the KE region, the Japan Sea and the East China Sea. The second mode is characterized by an east-west dipole pattern at the south coast. The first mode is correlated with the Kuroshio variations around the Izu-Ogasawara Ridge (IOR) and tends to be in a positive phase when the Kuroshio takes a nearshore path around IOR. The Kuroshio's position around IOR is closely related to the KE dynamic state. When the KE jet is in a stable (unstable) state, a nearshore (meandering) Kuroshio path is formed around IOR. A composite analysis suggests that the sea level along the Japanese coast becomes high due to propagation of coastal trapped waves when the Kuroshio takes a nearshore path around IOR. That is why the first mode is synchronized with the KE decadal variability. The second mode has a close relation with the Kuroshio Large Meander (LM). The eastern positive anomaly at the coast between the Izu and Kii Peninsulas is formed by warm Kuroshio water brought by a westward branch flow along the coast. The western negative anomaly is attributed to a southward shift in the Kuroshio south of the Kii Peninsula associated with the LM.

Keywords: sea level, Kuroshio Extension, Kuroshio large meander