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Recirculation gyre south off Japan: Its detection and strength changes related to the Aleutian Low activity

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Temporal variations of recirculation gyre (RG), defined as an area with high sea surface height (SSH) exceeding 260 cm, in the south of Kuroshio (RG-K) are investigated, using satellite-derived altimetry SSH dataset from January 1993 to December 2008. The RG-K strength reveals some long-term variation and the changes in magnitude have significant relations with the central positions (longitudinal and latitudinal positions) of RG-K: the RG-K strengthens (weakens) concomitantly together with the shift of the RG-K location west (east) in longitude and south (north) in latitude. The roles of the Aleutian Low (AL) activities on the RG-K strength are investigated using a wind-induced hindcast Rossby wave model. Resultantly, variations of RG-K strength are forced directly by the oceanic Rossby wave formed as a result of first-mode baroclinic ocean response to wind stress curl variations associated with AL: especially, the meridional movement of AL imparts larger influence than the intensity variation of AL.