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Spatiotemporal variability of sea level fluctuations according to IMMOAD SSHA data after additional correction of the tidal component

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Abstract. Seasonal and interannual variability of sea level fluctuations in the northwestern Pacific Ocean and the Far Eastern seas was analyzed using the empirical orthogonal function decomposition of the original data series. The study is based on a data set of altimetric observations from the IMMOAD SSHA for the period 1993–2021, which included additional tidal correction and monthly averaging of data at each point along the satellite tracks. It was shown that the first three modes of decomposition have a similar spatial structure with opposite patterns of sea-level variations in the northern (the coast of the Bering and Okhotsk Seas) and southern (the zone influenced by the warm Kuroshio Current) regions. The variations in the temporal function of the first mode are dominated by an annual cycle, with a maximum in autumn and a minimum in spring. While this pattern is also dominant in the second mode (with maximum in winter and minimum in summer), there are weaker oscillations with periods of 10–11 and 21–22 years as well. The third mode characterizes interannual variations with a period of 10-11 years, which are correlated with the variability of the Pacific Decadal Oscillation (PDO) index. The fourth mode describes complex processes in the area influenced by the Kuroshio Current.

Keywords:
altimetry, empirical orthogonal functions, spectral-temporal analysis, Northwest Pacific Ocean, Sea of Okhotsk, Bering Sea, Kuroshio Current

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