

Variabilities of the Sea Surface Height in the Kuril Basin of the Okhotsk Sea: Coherent shelf-trapped mode and Rossby wave-like mode

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Time series analysis of Sea Surface Height anomaly (SSHa) is conducted in the Kuril Basin of the Sea of Okhotsk. The mapping methodology of the satellite-derived SSHa data is optimized to mitigate the effects of sea ice on the SSHa field during winter and the early spring. In particular, we found that conducting an objective mapping of along-track SSHa data with correlation length and time scales adapted to the Kuril Basin considerably reduces the number of missing data days in this region. A Complex Empirical Orthogonal Functions (CEOF) is then used to analyze the SSHa field, and the first 3 modes, representing 54 % of the total variability are delineated here. The focus is brought on the first and third modes. The first mode mainly represents the coherent variability trapped over the shelves all along the coast and Kuril Islands. Both seasonal (high over the shelves in winter) and interannual variations are strongly correlated with the alongshore wind stress. These variations can be well explained by the arrested topographic waves. The third mode is a propagating mode, with trains of southwestward propagating anomalies. Their characteristics are consistent with those of westward propagating Rossby waves, whose energy propagates from the Kuril Straits towards the Kuril Basin.

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