

Spatial structure of the tides near the southwestern coast of Kamchatka according to coastal observations and satellite altimetry data

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Abstract. Based on the known data on the amplitudes and phases of the main tidal waves in coastal areas of southwestern Kamchatka, their alongshore variability was analyzed. It is shown that they increase from south to north. However, it is difficult to accurately assess these variations due to the fact that coastal tide gauges, which were usually installed at the mouths of rivers, are affected by the distorting effect of bottom friction. Satellite altimetry data were used for a more accurate characterization of the spatial variability of tide magnitude. These data were obtained during the passes of the TOPEX/Poseidon satellite in 1992–2002 on the original and 2002–2005 on the orbits shifted by half the inter-track distance. The amplitudes of both diurnal and semidiurnal waves have been revealed to increase sharply in the north direction, and this increase is limited by the shelf zone of southwestern Kamchatka. Significant spatial variations in the tidal wave characteristics are the cause of strong alongshore currents in this area. Estimates obtained on the basis of calculating the difference in the tidal level at the points of various sub-satellite tracks have shown that the speed of the coastal flow can reach 1–1.3 knot. The main contribution to the formation of tidal currents is made by diurnal components.

Keywords:

tides, diurnal and semidiurnal tidal waves, amplitudes, phases, coastal observations, satellite altimetry

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