



Researching of sea waves influence on a coastal line transformation (based on field observation results)

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The long duration registrations of bottom pressure, temperature and meteorological data took place in June – October 2007 on the shelf near 104th – 110th kilometer of interstate road Yuzhno-Sakhalinsk – Okha. Sediment transport and abrasion processes are observed in this place, it is a dangerous factor for road and railroad constructions, it can also be threat for some buildings of Vzmorie town.

Distributed network of autonomous pressure gauges was installed for wave structure studying. Gauges were installed in tree lines with 100, 150 and 200 meters far from each other. Gathered data contains information about different wave's regimes under different weather conditions, it's allowed us to make analysis. Different data rows for different wave regimes were taken for analysis. Transformation of wave field along shoreline and opposite was observed.

The results of observation are showed that disposition of waves was determined by swell waves with period 8-9 second. Wind waves were weaker than swell waves, conceivably because of big depths in the studied area. Much more interesting results were found in the infragravity waves range (0.5 – 5 min). For example, peaks with period above 150 and 75 seconds are presented in the spectral estimation of record from gauge 23. The same peaks were not observed in other gauges to the North and to the South from 23. However, low frequency peak was much stronger at the storm weather, but 75 seconds peak was stayed non-changed under the different weather conditions. For understanding mechanism of infra-gravitation waves generation group structure of waves were studied. Spectrum characteristics of different data rows for different wave regimes and also for their envelopes were provided. Results of this research allow us to consider that wave packets with common period 7 – 8 seconds make infra-gravitation waves with period above 5 minutes which forcing sediment transport processes.

Satellite images of studied place were used in this research. Beach cusps were found cusps (periodically forms of shore line) on these images, the cusps length place in diapason from 500 to 615 meters. Calculation and results of modeling showed that this cusps was generated by standing edge waves. Calculating of edge waves parameters for obtained bathymetry showed that period of edge waves which generated cusps must be about 4-5 minute. This period agree closely with spectrum estimation of data rows.

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