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Field investigations of sea surface and atmospheric near-surface layer variability above a depth “dumping”

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Started earlier experiments [1,2] on research of characteristic variability of a sea surface and atmospheric surface layer in shelf border regions were prolonged in 2004. The measuring was conducted in the Black sea on three polygons near to town Geledzhik, which are characterized by abrupt depths dumping (fall 50 - 1250 m), and irregularity of a bank vault (numerous canyons). Such bottom topography at the presence of alongshore or tidal currents creates conditions appearance of hydrodynamic perturbations on a thermocline and corresponding anomalies on sea surface and in atmospheric surface layer characteristics. The measuring was conducted at various meteorological conditions at wind velocities up to 7 m/s and surface wave height up to 0.5 m.

The experiments were carried out from the vessel "«Aquanaut" (Institute of Oceanology RAS) as in a ship drift, and on the move with velocity 4.5 - 8 knots. The bottom configuration was registered by echo-sounder, the current parameters on depth 3.5 - 4 meters were recorded in drift by ultrasonic Doppler 3D sensor. The surface wave characteristics in length range 4 mm - 5 m were measured by X and Ka Doppler radar, optical spectrum analyzer and linear array of CCD sensors. Besides the infrared imager recording temperature distribution of sea surface was used. Air temperature, relative humidity, atmospheric pressure, wind velocity and direction were measured. Two acoustic anemometer-thermometers for recording pulsations horizontal and vertical components of the wind and temperature in atmospheric surface layer were used.

It was explored, how the features of bottom topography, transforming a field of currents, call variability of surface waves in a wide frequency range. Surface wave trans-

formation, in turn, gives in variability of mesoscale component of meteorological fields in atmospheric near-surface layer. The streams of heat and impulse above surface wave were determined from direct measurements of temperature, horizontal and vertical wind velocities pulsations [3]. Changes of pulsation intensity determine modify structure of an atmospheric turbulence above surface region.

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