



Marine slicks due to inhomogeneous currents. Field observations.

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Studies of the origin of natural marine slicks on the sea surface and, in particular, their relation to near surface currents were studied in the coastal zone of the Black Sea in 2004-2006. A new methodology of measuring the current velocities in a thin upper water layer (the thickness of about 5 mm) was developed based on the use of floating markers and GPS receivers. The methodology was used to measure a structure of surface currents near edges of slicks. Sampling of surfactants from the surface microlayer in slicks and in surrounding nonslick areas was carried out simultaneously with current measurements and the slicks were shown to be associated normally with damping of short wind waves due to enhanced surfactant concentration. The values of wave damping coefficient measured for the sampled films were obtained to be several times larger in slick zones than in nonslick areas. The slicks were shown to be located in the shear current zones, and transverse current velocity components in the shear zones directed towards the slick boundaries were revealed. One of the studied slicks was a spiral slick, associated with an eddy, presumably generated by the general Black Sea current, temporal evolution of the spiral slick was studied from panorama images of the sea surface. Theoretical analysis of redistribution of surfactants due to inhomogeneous surface currents is presented. The work was supported by INTAS (Project 03-51-4987, "SIMP") and RFBR (Projects 05-05-64137, 06-05-79018).