



Description of the Vertical Density Structure obtained from Internal Waves Observation at the Black Sea Shelf

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The study is focused on the internal waves observation at the shelf of the Crimean Peninsula. Their horizontal structure was studied by processing the Sentinel-2 and Landsat-8 data for 2017. Internal waves appear as periodic, intermittent variations in the surface optical reflectivity, and thus are detectable from satellite sensors data. Previous studies showed that the source of the internal waves is the shallow pycnocline at the edge of the continental shelf. A numerical study of the wave characteristics yields considerable insight into the physics of their generation, propagation, and dissipation. Wave packets were observed frequently between Sevastopol and Yevpatoria in the shallow Kalamita bay. The direction of their propagation is mostly north-eastern; mean wavelength is around 0.4 km. The available satellite images allowed us to observe a variation in wavelength from frontal to rear pairs of waves in the packet, due to a combination of frequency dispersion and nonlinear amplitude effects. For a few wave packets, quasi-synchronous images were available (two satellites passing within a time range 15-30 minutes), which allowed us to estimate phase velocity for these wave packets. The internal waves dispersion characteristics and the normal mode vertical profiles were estimated by solving the boundary value problem numerically. The calculated vertical density structure is in good agreement with in situ data from the Bank of Oceanographic Data of Marine Hydrophysical Institute of RAS. This study is supported by RFBR and Government of Sevastopol according to the research project #18-45-920036.