



Disturbance of polluted ocean's thermodynamic balance

V. Merzlikin (1), V. Timonin (2), Y. Ilushin (3), and J. Klappacher (4)

(1) Department of Physics, Moscow State Technical University MAMI; Department of Technological Innovations, Plekhanov Russian University of Economics, Russian Federation (merzlikinv@mail.ru), (2) Moscow State Technical University MAMI, Russian Federation, (3) Department of Physics of Atmospheric and Land, Lomonosov Moscow State University, Russian Federation, (4) Technical University of Munich, Germany

The theoretical approach and numerical simulation allowed to state that natural complex heat exchange could be destroyed by mean of redistributions of reflected, absorbed and emitted radiate thermal fluxes because of occurrence of oil pollution at the ocean - atmosphere interface. It was derived how variability of scattering, absorption and emitting coefficients (inherent optical properties — IOP) leads to the essential increasing of polluted ocean's reflectance, transmittance, absorptance and emittance. These characteristics influence on the formation of unusual oceanic temperature profiles depending also on evaporation limited by surface oil film or subsurface water-oil emulsion (WOE). The paper is devoted to study short-term technogenic deviations of the sea surface temperature (SST), subsurface overheating, warming deep seawater, and as consequence the new scenario of weather anomaly transformation was stated. For the first time WOE is examined as thermal barrier coating, e.g. technogenic origin interfering natural radiate - convective heat exchange of ocean. The simulation of SST growth on the spectral region from ~ 300 to ~ 1200 nm and losses of heated surface seawater by mean of strengthen hurricanes at storm weather, heating reduction of deep seawater by solar radiant on ~ 300 to ~ 600 nm were carried out. It has been forecast by authors: that Gulf Stream polluted with oil spill in the Mexico Gulf after 2010 would become unheated inside deep seawater by solar radiation flux along its streaming in Atlantic during oil pollution disappearance; it led to partially freezing of Barents Sea and Norwegian Sea 2010-2011' winter. The suggested analysis can become an important and useful subject of researches for oceanologists and climatologists.