

USING EARTH'S ELECTROMAGNETIC FIELD RADIATION TO DETECT OCEAN CURRENTS FROM SPACE

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Study of ocean dynamics is one of important aspects in physical and bio-geochemical oceanography because it helps to understand the mechanisms of large scale changes in ocean circulation. This research based on using of quasistationary areas (QSA) is directed on detection of global ocean currents and other dynamic processes using multi satellite data as images of Earth's electromagnetic field radiation. Method of QSA is based on the statistical treatment of seasonal composites of sea surface temperature and phytoplankton pigments concentration satellite imagery. Correlation analysis of such characteristics, sea surface temperature on the one hand and phytoplankton pigments on the other allows to reveal fundamental processes of ocean hydrology and detect global ocean currents. QSA allows to detect the location of currents and estimate changes of it boundary during time period. Using different parameters of algorithm we can reveal dynamic processes with different time and spatial scale. Another part of the research is to check a hypothesis of global thermohaline circulation. Analysis of absolute gradients of weekly sea surface temperature data allows to detect a global path of heat-and-mass transfer in the ocean. Comparison of biological and physical components of the global ocean is capable to reveal anomalous events, which are impossible to see with standard oceanological methods. Nine years of SeaWiFS satellite data from 1997-2005 were used to produce seasonal means and standard deviation estimates of chlorophyll-a concentrations for the global ocean. Seven years of MODIS imagery for 2002-2008 and twenty one years of AVHRR imagery for 1981-2001 were used to produce seasonal means and standard deviations of sea surface temperature for the global ocean. Digital map of ocean currents and oceanic frontal features was generated using QSA method. Correlation of sea surface temperature and chlorophyll concentration was estimated. Special software using IDL language for statistical treatment was developed.

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