COMBINING SATELLITES AND BIOINFORMATICS TO ACTIVELY TRACK AND MONITOR OCEAN WATER MASSES FROM REGIONAL TO GLOBAL SCALES

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ABSTRACT

Understanding the time-dependent distribution of ocean water masses is critical in a variety of water quality applications; from regional tracking of river outflow to detecting long-term climactic change. In the work presented here, we show a water mass analysis and classification technique that objectively describes the locations of water masses and their boundary conditions. This technique combines multivariate cluster analysis with a genetic expression algorithm to objectively determine the number of water types in the region based on ocean color and sea surface temperature measurements. The use of multiple satellite platforms provides high resolution maps of the spatial distribution of water masses. Applications of this technique on regional and global scales are useful in establishing long-term baselines of water mass distributions. These baselines provide critical context for evaluating the importance of future events such a large river discharges. In addition, near-shore applications of this technique illustrate how river outflow can be objectively tracked across political boundaries. This technique is also useful in determining over what spatial range any particular point measurement can be applied, and therefore is useful in multiple water quality management and public health scenarios such as beach closures.

KEYWORDS

Water masses. Objective coastal tracking.

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