عنوان مقاله:

Inter-comparison of single-sensor and merged multi-sensor ocean color chlorophyll-a products in the shallow turbid waters - case study: Persian Gulf

محل انتشار:

فصلنامه بین المللی مهندسی سواحل و فراسواحل, دوره 7, شماره 2 (سال: 1401)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

Ocean color satellite sensors provide the only long-term Essential Climate Variable (ECV) globally that targets Chlorophyll-a concentrations (Chl-a) as the most important biological factor in the oceans. It is difficult to develop the long-term and consistent ocean color time-series for climate studies due to the differences in characteristics, atmospheric correction, Chl-a retrieval algorithms, and limited lifespans of individual satellite sensors. Therefore, the merged multi-sensor ocean color datasets were developed by merging data from different satellite sensor products. The performance of the commonly used single-sensor and multi-sensor merged ocean color datasets is a challenging issue over highly turbid coastal waters and dusty atmospheric conditions. In this study, we compared the common single-sensor [Sea-viewing Wide Field-ofview Sensor (SeaWiFS), Moderate Resolution Imaging Spectroradiometer (MODIS), Medium Resolution Imaging Spectrometer (MERIS), Visible Imager Radiometer (VIIRS), and Sentinel-۳ Ocean and Land Colour Instrument (OLCI)], and merged multi-sensor [Ocean Colour Climate Change Initiative (OC-CCI), and GlobColour weighted average (GC-AVW) and Garver-SiegelMaritorena (GC-GSM)] Chl-a datasets over the Persian Gulf, known as optically complex and highly turbid water bodies in a dusty atmospheric condition. The results indicate that the OC-CCI dataset provides more spatial and temporal coverages than the other datasets. Temporal consistency between single-sensor and merged datasets was made in two different timespans during the common period of sensors and during the continuous lifespan intersection between individual two-paired of datasets. The statistical metrics were calculated to show the temporal consistency between Chl-a datasets during the common and continuous time periods. Correlation between OC-CCI and the other datasets showed that the relationships between datasets did not change significantly during the proposed time periods. Further, it was indicated that the OC-CCI product is more constant than the other single-sensor and merged products. It was shown that OC-CCI datasets were more consistent with MERIS and GC-GSM datasets, and SeaWiFS and GC-AVW were not significantly correlated to the other datasets. The results revealed that the single sensor products that use POLYMER atmospheric correction algorithm (e.g. MERIS), and merged multi-sensor product that performs the GSM blending algorithms (e.g. GC-GSM) .are more consistent and stable than the other products over the study area

کلمات کلیدی:

Remote Sensing, phytoplankton, spatial coverage, complex waters, dusty atmosphere