Validation and Using for Study Seasonal Variation of SeaWiFS-derived Chlorophyll-a and NOAA/AVHRR-derived Sea Surface Temperature in Gulf of Tonkin

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Abstract

Gulf of Tonkin located between 16°10’-21°30’N, 105°40’-110°00’E, in continental shelf of Vietnam and China. Due to locating between two countries, so it is very difficult to carry out field survey in the Gulf. In this paper, SeaWiFS and NOAA/AVHRR satellite data was used to calculate Chlorophyll-a (Chl-a) concentration and sea surface temperature (SST). Field survey Chl-a data collected from April 29th to May 30th, 1999 of multi-government SEAFDEC project, SST data collected from 8-13 January and 29th October to 2nd November, 2003 was used to compare and register with satellite data. SeaWiFS-derived Chl-a was processed by OC4 algorithm. NOAA-derived SST was calculated by nonlinear McClain algorithm. Seasonal changes of Chl-a and SST distribution was assessed by comparing the longitude and latitude cross sections in specific month. Study results show that OC4 algorithm for calculated Chl-a obtained high accuracy for Vietnam water ($R^2=0.888$). Some area near the coast, due to high concentration of suspended solid was decreased the accuracy of derived Chl-a concentration. Nonlinear McClain algorithm for processed NOAA data provided high accuracy for Vietnam waters ($R^2=0.9026$). Distribution of Chl-a in the Gulf depended on nutrient sources, climate and season. In winter season, Chl-a concentration in center of the Gulf was higher than in summer. SST field vary by location and season. The difference of SST was high at transitional period of seasons. Variation of SST was low in summer and high in winter. SeaWiFS-derived Chl-a by OC4 and NOAA-derived SST by McClain algorithm was standardized in method and accuracy. These data can be used for study the physical and biological processes in Vietnam waters. Strengthen utilizing these data set for different purposes such as fishing ground prediction, water circulation, pollution monitoring.