Estimation and modeling of chlorophyll-a using Landsat 8 in Deilam coastal waters

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Abstract

The concentration of chlorophyll-a (Chl-a) is the major water quality parameters that can be retrieved using remotely sensed data. In this study, using satellite images Landsat 8 and field, Chl-a concentration in November 2016 in Deilam coasts of water covered. We have tried to determine the chlorophyll algorithm consists of several experimental algorithms simple and examine the applicability of using Landsat 8 imagery to estimate and map chlorophyll-a concentration in the coasts of Deilam. The statistical parameters used to evaluate the performance of different algorithms, including root mean square error (RMSE) and coefficient of determination (R^2) is. The relationship between the reflectance value of an individual OLI band and in situ chlorophyll-a concentration was examined to identify bands sensitive to chlorophyll-a. We also investigated the performance of ratio-based spectral indices to retrieve chlorophyll-a concentrations in coast of Deilam. POLDER algorithm with the largest amount of R^2 (0.52) and the lowest RMSE (0.85) was selected as the most appropriate algorithm in the area. The spectral ratio index b5/b1 and b5/b2 have the highest correlation with in situ chlorophyll-a. To estimate chlorophyll-a concentration, various regression models were tested with different band ratio. Among the regression models, we choose the best model (R^2=0.43). Spatial distribution of chlorophyll-a concentration in the Deilam was successfully mapped using Landsat 8 imagery for November in 2016. Despite the limitation of this work, our findings suggest that Landsat 8 imagery can be used to estimate chlorophyll-a concentration in coastal.

Keywords: Chlorophyll-a, Landsat8, Deilam coastal waters.