Chlorophyll and phytoplankton spatial distribution in the Arabian/Persian Gulf and the Sea of Oman

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Spatial distribution of the chlorophyll-a and phytoplankton community composition related to different water masses were studied during regional cruise in February-March 2006 across the Arabian/Persian Gulf and the Sea of Oman, the marginal seas of the Western Indian Ocean.

Chlorophyll-a concentrations were measured using in vitro method with fluorescence detection and also were assessed as in vivo fluorescence measured by submersible fluorometer. Nearly four hundred species of phytoplankton were enumerated and identified using microscopy in the samples collected at the same stations.

High phytoplankton abundance was associated with diatom-dominated phytoplankton blooms in the central and northwestern part of the Gulf, in the Strait of Hormuz and in the Sea of Oman. The average concentration of in vitro measured surface chlorophyll-a in the studied area was 2.5 mg/m³, with the maximum over 9 mg/m³. The relationships between the concentrations of satellite remotely sensed chlorophyll and in vitro measured chlorophyll-a were found to be mostly in good agreement. The highest concentrations of the surface chlorophyll (> 4 mg/m³) were observed in the areas where diatom-dominated blooms were identified. It was revealed a significant relationship between the phytoplankton composition and water masses indexed by salinity.

The main significance of this study is in the first data set of in vitro measured precise chlorophyll-a concentrations that were obtained along with phytoplankton abundance and taxonomic diversity from the entire region of the Arabian/Persian Gulf and the Sea of Oman. This data set can be used for remote sensing measurements validation and as a baseline for future studies of the biological productivity changes in the Western Indian Ocean.