



Remote sensing of phytoplankton blooms and oil spill contaminations

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Introduction

Marine phytoplankton is sensitive to oceanic environment; it can be affected by marine contaminations, including oil spill. Oil spillage is a big concern of the world with increases of oil spill accidents. In the study, we investigate how oil spill contamination affected the marine phytoplankton.

Study areas and method.

Two major oil spill accidents: Lebanon oil spill in Mediterranean Sea in 2006 (Fig 1,4) and Montara offshore (Fig.3, 4) oil spill in Timor Sea in 2009 were studied, and another 15 oil spills in different locations in the world (Fig.4) were also investigated. Multi-source remote sensing data were used to study the aftermath of the two oil spills.

Data and Results

The temporal and spatial variability of Chlorophyll a concentration (Chl-a) and Sea Surface Temperature (SST) in the study area were investigated using Sea-viewing Wide Field-of-view Sensor (SeaWiFS) and Moderate Resolution Imaging Spectroradiometer (MODIS) data. MODIS 250m data and Synthetic Aperture Radar images were used to delineate the oil spill extent; QuikScat data were used to derive the wind field.

No significant changes were found in marine phytoplankton in the first few months after the Lebanon oil spill. However, a big phytoplankton bloom was observed after 10 months, when Chl-a increased from 0.1 to 1.0 mg m⁻³ (Fig 2).

In another case, time series data suggested a decrease in Chl-a following the Montara oil spill, but an increase occurring in May 2010. A 4000 km² patchy phytoplankton bloom with a high concentration of 13.8 mg m⁻³ occurred southeast of the platform (Fig 3), which coincided with the location the residual oil spill finally moved.

Conclusion