Case Study of Oil Spill Monitoring Caused by Maritime Casualties Using Satellite Data in 2014

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Abstract: Most of marine pollution have been occurred by oil spill accidents resulted from ship accidents in South Korea. This year there were two large oil spill accidents: the Yeosu Oil Spill Accident (2014.01.31.(Fri.) 09:35 LT) and the Captain Vangelis L. Oil Spill Accident (2014.02.15.(Sat.) 14:00 LT). In general, Synthetic Aperture Radar (SAR) is used in monitoring and detection of oil dumping and spilled oils by accident at sea. Therefore it is expected that KOMPSAT-5, launched successfully last year, will take part in that mission during a normal operation mode. After the two accidents, high spatial resolution optical satellite data including KOMPSAT-3 were acquired February 2 and 14, 2014. In this presentation, we analyzed optical properties of spilled oils from optical satellite imagery to estimate the spilled area and the volume at each region. Finally, a satellite application planning for ocean surveillance in South Korea will be presented.

Key words: Maritime Casualties, Oil Spill Monitoring

1. Introduction

Oil spills (it means the release of a liquid petroleum hydrocarbon into the marine environment) in coastal areas affect the ecological system, fisheries, and the economy. Apart from forecasting the oil slick movement, remote sensing using airborne and spaceborne sensors is the most efficient technique for monitoring oil slicks on a regional, as well as global scale, and much effort has been made for accurate detection, identification and classification of oil-covered surfaces.

From Hebei Spirit incident occurred in Taean coastal area on December 7, 2007, two large oil spill accidents were occurred in 2014: 1) the Yeosu Oil Spill Accident (2014.01.31.(Fri.) 09:35 LT) and 2) the Captain Vangelis L. Oil Spill Accident (2014.02.15.(Sat.) 14:00 LT). In addition, capsizing of the ferry Sewol resulted in a leak of loaded fuel oil from April 16, 2014.

In general, Synthetic Aperture Radar (SAR) is used in monitoring and detection of oil dumping and spilled oils by
accident at sea. Therefore it is expected that KOMPSAT-5, launched successfully last year, will take part in that mission during a normal operation mode. After the two accidents, high spatial resolution optical satellite data including KOMPSAT-3 were acquired February 2 and 14, 2014.

2. Summary

In this presentation, we analyzed optical properties of spilled oils from optical satellite imagery to estimate the spilled area and the volume at each region. Finally, a satellite application planning for ocean surveillance in South Korea will be presented.

Fig. 2 Comparison of SAR-based oil spills (areas in yellow) and both cases (Case 1: green, Case 2: red) of the tracer experiment on 11th December 2007. (Courtesy of Yang et. al., 2009)

References
