

高解像度衛星画像を用いたマングローブ被害地域の抽出ースーパー台風ハイエンの事例ー

Detecting of Mangrove Damaged Area caused by Super Typhoon "Heian" from High Resolution Satellite Images

渡辺 一生^{1*}; 小川 裕也²; 神崎 護²

WATANABE, Kazuo^{1*}; OGAWA, Yuya²; KANZAKI, Mamoru²

¹ 総合地球環境学研究所, ² 京都大学 農学研究科

¹Research Institute for Humanity and Nature, ²Graduate School of Agriculture Kyoto University

The Republic of the Philippines is well known as typhoon passing route. One of the largest typhoon in the history has passed Philippines at the beginning of November 2013. This typhoon called "Haiyan" or "Yolanda" in Philippine, has gave massive damage not only to the human's life and infrastructures but also ecological system.

Because of Philippines has long coastal line, ecosystems in the coastal area is very important for people's livelihood. So that, urgent damage assessment of natural resources in the coastal area is very essential once disaster occurred. This study assessed the mangrove destructive situation after super typhoon "Haiyan" in Batan Bay, Panay Island in Philippine by using high resolution satellite image.

Fortunately, we have took the image of QuickBird in 6th September 2012 (before typhoon), and we also have captured ground situation after Haiyan attack by WorldView-2 in 3rd February 2014. The density of mangrove in this area is so sparse that middle and low resolution satellite image cannot detect each mangrove composition. The image resolution of these two images, meanwhile, is approximately 2.0 m and therefore very suitable for recognizing detail of mangrove tree structure. On the other hand, spectrum resolution of these images is much remitted and cannot identify between on land vegetation and mangrove. To solve this limitation, we used topography map, which scale is 1/50,000 (1954), in order to eliminate on land vegetation before the start of image processing. Mangrove area before the typhoon was identified from the image year 2012 using supervised classification method. Then, the image year 2014 (after typhoon) of the same location was extracted for image comparison. The NDVI (Normalized Difference Vegetation Index), which indicates vegetation activity and biomass density, of two images were calculated and used for recognizing mangrove damaged area. Differences of two temporal images were computed by "Change Detection Method", which is provided by ENVI software, and we could detect significant value decrease for the whole target area.

Results showed that mangrove trees were damaged widely, especially those at the edges and along fish pond dikes. We concluded that this image analysis method is suitable for the mangrove damage assessment. Understanding damage level or spatial distribution of damaged areas can support decision making for the recovery and protection of the mangrove area.

キーワード: 高分解衛星画像, マングローブ, 台風, フィリピン

Keywords: High resolution satellite image, Mangrove, Typhoon, Philippines