

Evaluation of land cover classification methods targeting unmanaged farmland

MISHIMA, Yoshio^{1*} ; FUKASAWA, Keita¹ ; YOSHIOKA, Akira¹ ; KUMADA, Nao¹ ; OGUMA, Hiroyuki¹ ;
YAMANO, Hiroya¹

¹National Institute for Environmental Studies

In order to reveal the impact of evacuation on biota, National Institute for Environmental Studies is monitoring biota in areas evacuated as a result of nuclear disaster, and the surrounding areas in Fukushima Prefecture, Japan. It includes the monitoring of "land cover" in the study area. This involves regular observation of areas that contain "residential area" and "arable land", where humans have historically performed regular maintenance. These are fundamental elements to discuss the change of local ecosystems due to abandonment. Areas of arable land in the study area are much greater than the residential areas. For this reason, priority should be given to the analysis of arable land. Environmental change in unattended farmland associated with evacuation is relatively quick. And the physical environment of arable land typified by moisture condition is different for each paddy and upland field plot. Therefore, it is necessary to monitor field plots with distinguishable spatial resolution in short cycles. This study evaluated land cover classification methods for arable land considering these requirements. Spaceborne satellite imagery was used with revisit time and spatial resolution matched to these conditions. Arable land in the study area was first defined by aerial photo interpretation. Then, using multi-temporal, multispectral imagery (RapidEye, spatial resolution = 5 m) and single polarization of L-band SAR imagery (PALSAR-2, spatial resolution = 3 m), land cover was categorized based on the machine learning classification methods with training data. Comparison of multiple methods and datasets revealed a classification technique that combines SAR data and multispectral imagery provided improved classification accuracy.

Keywords: unmanaged farmland, land cover, remote sensing, machine learning, SAR