The influence of radar look direction on precise identification of rice-planted fields using RADARSAT data

K. Takahashi, A. Rikimaru

Nagaoka University of Technology, JAPAN (ktakaha@nagaokaut.ac.jp/+81-258-47-9673)

Satellite radar sensors, like RADARSAT, have capability to acquire data regardless of cloud cover. The capability can estimate rice-planted fields independent of weather conditions. It is important for estimation of the rice-planted fields to discriminate the low backscatter area as inundated paddy fields on the radar image. However, there is a possibility that the backscattering from an inundated paddy field increases due to corner reflection between the water surface and a ridge of paddy. It causes an error in estimation of rice-planted fields. By assuming the shape of a paddy field to be a rectangle, this paper examined the influence of the radar look direction for identifying an inundated paddy field using RADARSAT image. The radar look direction is almost uniform in a same RADARSAT image. However, the influence of the radar look direction is depended on the longitudinal direction of paddy field in inundated paddy fields. The radar look direction for each paddy field was calculated by the farmland outline vector data which expressed numerically the shape and the spatial location of paddy field in this paper. The farmland outline vector data was created by delineating the boundary of a paddy field in the test site using QuickBird image. Paddy fields in the test site were classified to several longitudinal directions. First, it was determined by visual interpretation of QuickBird image whether a paddy field was rice-planted or not. Then, the averaged RADASAT backscatter coefficient for each paddy field was calculated using the farmland outline vector data. Finally, in order to examine whether an inundated paddy field can be discriminated, the averaged RADARSAT backscatter coefficient of an inundated paddy field and a non-inundated field was compared in the paddy fields which have the same longitudinal direction. As a result of comparison, the averaged RADARSAT backscatter coefficient of an inundated paddy field and non-inundated field was closed in the paddy fields which have the longitudinal direction was near north.