

## Seasonal change of water environment in snowy marshes indicated by ALOS/PALSAR data

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One of the difficulties of monitoring marshes in the cold areas in Japan is heavy snow in winter. In snowy marshes, on-site survey during winter is very limited. If possible, the acquired on-site data would be time-discontinuous and spatially sparse. It is generally hard to induce the whole water environment of marshes on those data.

Earth observation satellites get the data covering the wide area and all the seasons. We can monitor the water environment of whole area of marsh through a year in long-terms by using the satellite data.

For the last few years, we introduced Advanced Land Observing Satellite (ALOS) data analysis for water monitoring of snowy marshes. We used the data from Phased Array type L-band Synthetic Aperture Radar (PALSAR) onboard ALOS.

We found considerable decrease of backscattering (NRCS: normalized radar cross section) of ALOS/PALSAR data during winter in some marshes. The decrease of NRCS means existence of more water. So the observation data showed that more water exists under the snow cover compared with no-snow seasons. One of the possibilities to explain such phenomenon is infiltrated water due to snow load. We proposed that snow layer should force water out of the peat layer.

The objective of this study is to verify and refine the above proposed model. We take 3 steps for that: (1) Examine whether the same phenomenon, which is significant decrease of NRCS during winter in marshes, could be observed in other marshes based on the ALOS/PALSAR data analysis; (2) Constrain the necessary condition for water infiltration during winter in marshes; (3) Find supporting evidence, if any, for the response of peat layer to the snow load, resulting in water infiltration.

We summarize and show the results of (1) and (2) and try quantitative discussion. We further propose and discuss the simple physical model for the process based on (3). We also refer to the other possibility for the origin of the observed water under the snow cover: melt water.

Keywords: snowy marsh, monitoring of water environment, ALOS/PALSAR, normalized radar cross section