

Observation of the water level fluctuation at Ozegahara by ALOS-2/PALSAR-2

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The SAR can measure the phase and the amplitude of the reflected wave from the surface object. This phase contains information on the round trip distance from the antenna to the surface of the earth in general, and more precisely the fraction of the above distance off the wave length. By differentiating two individual measurements, it can detect a slight distance difference. By using this InSAR technique, we can see the change of the Earth's surface due to earthquakes and volcanic eruptions in a visible form. On the water surface such as river, sea, lake, it is always moving by waves, so it is difficult to measure in places where the reflecting surface is not constant. However, in wetlands where grass and reeds are growing on top, the radar signal emitted to the water surface may reflect back from the grass and reeds, and return to the satellite.

Therefore, our research themes were defined to verify the possibility of observation on the water level change during two different observations. The target area was selected from the Honjou's largest Ozasegahara in wetlands. This Ozegahara is located in the Oze National Park, around the border areas of Fukushima, Tochigi Prefecture, Gunma, and Niigata Prefectures, and it is composed of 2,000 m class mountains. The observation was carried out using the period from September 2014 to May 2018 of PALSAR - 2 installed in JAXA 's Daichi 2 (ALOS 2). Since it is told that the water level of Ozegahara decreases, if the numerical value obtained by using the interference SAR technique shows a decrease, we can verify the possibility of observation on the water surface. In fact, we got an average of about -6.6 cm as a annual decreases. Comparing rainfall, etc., we can see that the water level goes down, and it was possible to show that the water level observation in the wetland zone is possible.

As future developments, it is conceivable to conduct verification in terms of accuracy from the possibility. One way to do this is to observe it using GPS or water gauge.

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