

Detection of surface displacement of Lake Vostok due to air-pressure change by InSAR

Koichiro Doi[1], Kazuo Shibuya[1], Shigeru Aoki[1], Tsutomu Yamanokuchi[2]

[1] NIPR, [2] Research Dept.,RESTEC

The Lake Vostok, which is the largest subglacial lake in Antarctica, was discovered with airborne radio-echo sounding in the beginning of 1970s (Oswald & Robin, 1973). Subglacial lake is cover by thick ice sheet and fresh water exists under the ice sheet. Therefore surface displacement due to lake tides occurs as well as gradual ice sheet motion. Dietrich et al. (2001) found the vertical surface motion caused by lake tides by applying SAR interferometry to the ERS-1/2 tandem mission data.

On the other hand, Schneider and Simon (1976) observed solid earth tides for about 5 month in 1969 with a gravimeter Gs 11 No. 140 at Vostok station, which is on an ice sheet over the Lake Vostok. We reanalyzed the gravity data and estimated the response in gravity to atmospheric pressure changes (Doi et al. 2002). The obtained value is remarkably large and it means upward displacement of ice surface under the condition of pressure increment.

We will detect surface displacements by SAR interferometry and compare them with expected vertical displacements due to atmospheric pressure change. In the investigation we will use some interferometric scene pairs observed by ERS-1 and ERS-2 over the Lake Vostok, and atmospheric pressure data from the NCEP/NCAR reanalysis data.