

Analysis of Antarctic VLBI experiment carried out in Syowa station (3)

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The Japanese Antarctic Research Expedition (JARE) has started regular VLBI experiment at Syowa Station (69.0 deg S and 39.6 deg E) on East Ongul Island, Antarctica since 1998. This experiment is called 'Syowa VLBI experiment' or 'SYW session.' Three stations in the southern hemisphere, Syowa, Hobart (Australia) and HartRAO (South Africa), have participated in this session. The purpose of this session is to strengthen the geodetic reference frame in the southern hemisphere and to detect the Antarctic plate motion. Though different recording systems were employed between Syowa and other stations in this session, development of a tape-copying system, which converts the data-recording format, enabled us to perform the correlation of the obtained data.

Meanwhile, since 1992, the O'Higgins Station on Antarctic Peninsula has participated in VLBI experiments with most of the VLBI stations in the southern hemisphere. This experiment is now called 'OHIG session.' The Syowa Station has participated in this session since 1999 with the aid of another tape-copying system. This is the first VLBI observation with the intra-Antarctic plate baseline.

Until the end of 2004, 37 sessions from May 1999 to February 2004 have been analyzed. The analysis was performed with the software CALC/SOLVE developed by the NASA Goddard Space Flight Center, and the baseline lengths of Syowa-Hobart, Syowa-HartRAO and Syowa-O'Higgins were calculated. The length of the Syowa-Hobart baseline is increasing linearly with a rate of 55.04 ± 0.98 mm/yr. The Syowa-HartRAO baseline shows slight increase with a rate of 11.10 ± 0.82 mm/yr. These results approximately agree with those of GPS and NNR-Nuvel1A plate motion model. On the other hand, we cannot find obvious change with the Syowa-O'Higgins baseline.

The coordinates of Syowa station were determined with a precision of 1.1 mm for X component, 0.9 mm for Y component, and 2.4 mm for Z component, respectively. These values are approximately 10 times smaller than the precisions of ITRF2000.

In this presentation we report on the details of the analysis result.