Analysis of Antarctic VLBI experiment carried out in Syowa station

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http://vldb.gsi.go.jp/sokuchi/vlbi

The Japanese Antarctic Research Expedition (JARE) started regular VLBI experiments at Syowa Station (69.0 deg S and 39.6 deg E) on East Ongul Island, Antarctica from 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 the session. The purpose 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 experiment, development of a tape copy system, which converts the data-recording format, enabled us to correlate the 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 been participating in the experiment since 1999 with the aid of another tape copy system. This is the first VLBI observation with the intra-Antarctic plate baseline.

Until the end of 2002, 16 sessions from August 1999 to February 2002 have been analyzed. The analysis was performed with the software CALC/SOLVE developed by the NASA Goddard Space Flight Center, and the baseline lengths Syowa-Hobart, Syowa-HartRAO and Syowa-O'Higgins were calculated. The length of the Syowa-Hobart baseline is increasing linearly with a rate of 63.8+-4.5 mm/year. The Syowa-HartRAO baseline shows slight increase with a rate of 12.1+-3.3 mm/year. These results approximately agree with the GPS result. On the other hand, we cannot find obvious change in the Syowa-O'Higgins baseline.

The coordinates of Syowa station were determined with a precision of 8 mm for X component, 6 mm for Y component, and 15 mm for Z component, respectively. These values are approximately 1.4 times smaller than the precisions of ITRF2000.

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