

Crustal movements based on GPS measurements in Antarctica

Mako Ohzono[1]; Takao Tabei[2]; Koichiro Doi[3]; Kazuo Shibuya[3]

[1] Graduate School of Environmental Studies, Nagoya Univ.; [2] Natural Environmental Sci., Kochi Univ.; [3] NIPR

In order to monitor crustal deformation, various space geodetic observations are conducted in Antarctic plate. There are 9 continuous observation sites of Global Positioning System (GPS) under the program of the International GPS Service (IGS). In Syowa Station (69.01 degrees S, 39.58 degrees E), not only continuous monitoring at SYOG (IGS site), but also campaign observation at 5 outcrops area have been carried out since 1998 by Japan Antarctic Research Expedition. In this study, we will discuss Antarctic plate motion based on GPS continuous data by 9 IGS sites. Calculated rotation pole position and angular velocity from our analysis are estimated at 59.7 degrees N, 132.3 degrees W, and 0.21 degrees/Myr, respectively. From these results, we can understand that the Antarctic plate moves as a rigid plate. We compare observed site velocities with predicted values from several ice models. For example, measured uplift velocity at Syowa Station is approximately 1.4-2.6mm/yr and predicted velocity is about 1.5mm/yr, showing a good agreement. In western Antarctica, on the other hand, some site velocities disagree. Very Long Baseline Interferometry (VLBI) observation has been repeated in Syowa Station since 1998. Those results are discussed by Fukuzaki et al (2004). By comparing our GPS results and those from VLBI, the VLBI velocity is shifted southeastward by 3.6mm/yr. Furthermore, GPS results show uplift but the VLBI vertical component shows 0.1mm/yr subsidence. These differences may be attributed to different observations or different time period of observation.