



GPS-PPP processing accuracy improvement for Antarctic ice studies

Lydie Lescarmontier (1,2), Benoît Legrésy (1), Félix Perosanz (3), Flavien Mercier (3), Sylvain Loyer (4), and Richard Coleman (2)

(1) LEGOS, Toulouse, France (lydie.lescarmontier@legos.obs-mip.fr), (2) University of Tasmania, Ace-CRC, Hobart, Australia, (3) CNES, Toulouse, France, (4) CLS, Ramonville-St-Agne, France

We present our investigations on the accuracy of the GPS processing for ice studies. To this end, we used data from geodetic receivers both on rock sites and on a fast moving glacier in Antarctica, the Mertz glacier.

From raw data to accurate position, we tried several GPS processing strategies and software in order to evaluate the accuracy level. We used the CSRS-PPP online processing tool from NRCAN, the GINS geodetic software from CNES-GRGS and the TRACK-GAMIT MIT tool. The processing strategies were based on the double difference (DD) or Precise Point Positioning (PPP) mode depending on the capabilities of these software. In any case, PPP kinematic series were computed at a 30 seconds sampling using IGS and GRGS-IGS precise orbits and (30s) clocks products.

The GINS-PPP processing showed the best accuracy level with a floating PPP but with various spurious signals (random, periodic, jumps...) that appeared on our series. We investigated the impact of PPP ambiguities fixed to integer values using the GRGS IGS products on the “non-geophysical” signals and the sub-daily scale movements of our glacier.

The Mertz glacier ice tongue is floating on the ocean, so the two main signals were the glacier flow (approximately 3 meters a day) and the tidal signal. Thanks to this accurate processing and the flexibility offered by the PPP processing, we succeed in looking at sub hourly signals with few centimeters amplitude.