Geophysical Research Abstracts
Vol. 13, EGU2011-11671, 2011
EGU General Assembly 2011

HALO GPS Software Development for Use in Long Range Airborne Measurement: Strategy, Realization and Results

Qianxin Wang (1) and Tianhe Xu (2)

(1) School of Info-Physics and Geomatics Engineering, Central South University, Hunan Changsha 410083, China (wangqianxin8012@163.com), (2) Xi' an Research Institute of Surveying and Mapping, Shanxi Xi' an 710054, China (xtianhe@263.net)

One of the most important problems in airborne gravimetry is to determine the position, velocity and acceleration of the gravimeter. For a resolution of the gravity field of 1mgal, accuracies of 10cm, 7cm/s and 0.001cm/s2, respectively, are required. The GPS system provides a powerful tool to directly determine the position, velocity and attitude of the moving gravimeter. As a first step of Geo-HALO project, a project of German airborne remote sensing system, a new GPS software has been developed in GeoForschungsZentrum (GFZ) Potsdam, and named as HALO_GPS. Due to the airplane will has longer range, higher altitude and higher speed in HALO project than the former airborne project, some new strategies and algorithms of GPS positioning, velocity and attitude determination have been developed in this software. They include that adaptively changing reference station, combing Doppler and carrier phase observations for velocity and acceleration determination, automatically detect cycle slips, outliers, potential large jumps in the receiver clock for complex environmental conditions and so on. For validation of this software, various kinds of real GPS observation data have been tested, such as static station kinematic processing, sea buoy experiment, antenna movement experiment, MEXAGE2001, NorceGrace2007, AlpinAero2008 airborne gravimetry project and airborne INSAR, etc. The results of numerical examples and internal tests as well as external comparisons are presented. The results show the kinematic positioning, velocity and acceleration determination accuracy of HALO_GPS is better than 5 cm, 1cm/s, 0.0007cm/s2, respectively.