Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10536, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10536
EGU General Assembly 2008

Basin-scale elevation changes across Antarctica from five years of ICESat (2003-2007)

T. Urban (1), G. Catania (2), R. Harpold (1), B. Schutz (1), C. Webb (1)

(1) Center for Space Research, University of Texas at Austin, Austin, TX, USA (urban@csr.utexas.edu), (2) Institute for Geophysics, Jackson School of Geosciences, University of Texas at Austin, Austin, TX, USA

The primary mission of the Ice, Cloud, and land Elevation Satellite (ICESat) is to determine long-term elevation changes with cm/a accuracy. We show average Antarctic elevation changes and accuracies resulting from five years of ICESat data. West (decreasing) and East (nearly stable) Antarctica are compared and dissected into basins. The largest areas of elevation decrease (more than 50 cm/a) occur along the West Antarctic coast, particularly the Pine Island catchment. Some West Ant. Ice Streams can also be delineated by their elevation changes: Whillans (B) decreasing near 20 cm/a, Kamb (C) increasing about 40 cm/a. Other areas are generally in balance or have slightly positive changes, except for the northern Ant. Peninsula and a few continental outlets with decreases of 10-20 cm/a. In total, the continental balance is negative. Crossover and repeat-track methods are utilized, and comparisons illustrate the benefits and limitations of both methods with regard to their spatial sampling. Elevation change accuracies are compared to the ICESat science requirements. From surfaces having slopes < 0.6 degrees, the requirements dictate accuracy levels of: (a) 1.5 cm/a within (100 km)ˆ2 areas in the WAIS, (b) 0.5 cm/a within (450 km)ˆ2 areas in central EA (below 80 deg.), (c) 1.5 cm/a within (200 km)ˆ2 areas in northern EA (above 80 deg.), and (d) 4.5 cm/a within (50 km)ˆ2 areas along coasts. Common temporal sampling issues also exist due to seasonal variability. ICESat operates in a modified science mission scenario whereby data are collected in 33-day campaigns two or three times per year (approximately Feb-Mar, Oct-Nov, and sometimes May-Jun). In 2006, the May-Jun campaigns were dropped in favor of extending the mission lifetime in

support of the primary mission’s cryosphere goals, i.e. long-term change detection.