Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10203, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10203
EGU General Assembly 2008

Photogrammetric re-analysis of 1985 aerial photography of Ilulissat Glacier (Jakobshavn Isbrae), Greenland: DEM's, orthomosaics, volume change, and ice velocities

R. Motyka (1), M. Fahnestock (2), M. Truffer (1), H. Brecher (3), and M. Luethi (4)

(1) Geophysical Institute, University of Alaska, Fairbanks, AK 99775-7320, United States, (2) CSRC/EOS, University of New Hampshire, Durham, NH 03824, United States, (3) BPRC, Ohio State University, Columbus, OH 43210, (4) VAW/ETH Zurich, 8092 Zurich, Switzerland, (jfrjm@uas.alaska.edu / Fax: +1 907-463-1587)

Two sets of high elevation (∼13,000 m), high resolution (2 m) aerial photographs of Ilulissat Glacier (Jaboshavn Isbrae) were obtained about two weeks apart during July 1985 (Fastook et al, 1995). These historic photo sets have become increasingly important for documenting and understanding the dynamic state of this outlet stream prior to the rapid retreat and massive ice loss that began in 1998 and continues today. In contrast, the terminus of the outlet stream was relatively stable between 1964 and 1998. The original photogrammetric analysis of this imagery is summarized in Fastook et al. (1995). They derived a coarse DEM (3 km grid spacing) covering an area of approximately 100 km x 100 km by interpolating several hundred positions determined manually from block-aerial triangulation. Surface velocities were then determined by tracking natural features between the photo sets. We decided to re-analyze these photos sets using state-of-art digital photogrammetry (BAE Socet Set©) in an attempt to significantly improve DEM quality and resolution (j20 m grid spacing) and produce high quality orthophoto mosaics. The new DEMs will be used to better quantify ice volume changes between 1985 and 2006 NASA ATM measurements and 2005 ASTER images. DEMs and high quality orthomosaics should also significantly improve the accuracy and density of July 1985 surface velocity determinations and

strain rates.

Thus far, we have photogrammetrically analyzed the first photo set (July 10, 1985) and have achieved good success and are now in the process of analyzing the second flight (July 16, 1985). The results from the original block adjustments performed by one of the co-authors (Brecher), has significantly benefited the current analysis. We will present our preliminary findings, including 1985 DEM's, orthomosaics, volume changes, and velocity fields.

Fastook, J.L., H.H. Brecher, and T.J. Hughes, 1995. *J.of Glaciol.* 11 (137), 161-173.