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Elevation change (2000-2004) on the Malaspina Glacier, Alaska

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The glaciers of the southeastern Alaska coastal region are the largest temperate glacier meltwater source on Earth and may contribute one third of the total glacier meltwater entering the global ocean [*Arendt et al.*, 2002]. Since melt onset and refreeze timing in this region show a tendency toward earlier onset and longer ablation seasons [*Ramage and Isacks*, 2003],accelerated glacier wastage may be occurring. In this study we focus on one of the largest temperate glacier systems on Earth, the Malaspina Glacier. This glacier, with a length of $\sim$110 km and an area of $\sim$5,000 km^2, has the largest piedmont lobe of any temperate glacier. The entire lobe, which lies at elevations below 600 m, is within the ablation zone. We report and interpret ice elevation change between a digital elevation model (DEM) derived from the Shuttle Radar Topography Mission (SRTM C-band) observations in Feb. 2000 and ICESat Laser 1-3 observations between Feb. 2003 and Nov. 2004. We use these elevation change results, along with earlier studies, to address the spatial and temporal variability in wastage of the piedmont lobe. Between 2000 and 2004 ice elevation changes of -10 to -30 meters occurred across the central Malaspina piedmont lobe. From 1972/73 (USGS DEM) to 1999 (SRTM corrected for estimated winter snow accumulation) Malaspina's (Agassiz, Seward Lobe, and Marvine) mean ice thinning was estimated at -47 m with maximum thinning on parts of the lobes to -160 m [*Muskett et al.*, 2003]. The Malaspina's accumulation area is only slightly larger than its ablation area (2,575 km^2 vs. 2,433 km^2); unfortunately few glaciological observations are available from this source region. Snow accumulation rates have been largely inferred from low-altitude precipitation and temperature data. Comparing sequential ICESat observations in the Malaspina source region,

we estimated short-term elevation increases of up to 5 meters during the winter of 2003/04.