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VALIDATION OF SATELLITE ALTIMETER RANGE MEASUREMENTS OVER SALAR DE UYUNI, BOLIVIA

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The salar de Uyuni in the Bolivian altiplano covers approximately 9600 kmˆ2, and is the largest dry salt lake in the world. This vast, flat stable surface is ideal for estimation of the range bias on altimeter instruments such as the RA-2 on board ENVISAT (launched March 1st 2002) and GLAS on board ICESat (launched 12th January 2003). Here we describe a kinematic GPS survey designed to validate both GLAS and RA-2, that was carried out in August/September 2002. The large portion of the eastern half of the salar was surveyed by driving 8 contiguous grids (24.5km x 13.5km at 2.5km spacing) with car-mounted GPS antennas, with an additional 2 grids providing coverage along ascending and descending ENVISAT orbits (one 44.5 x 9km, the other 18 x 13.5km). The RMS misfit of the GPS elevations with respect to low-order fitted surfaces approached 1 cm, and elevations were consistent between grids and from day to day.

We interpolated our surface models to the locations of GLAS and RA-2 footprints to obtain an estimate of the range bias for each instrument. Two ICESat passes crossed the survey region in late 2003: one on a totally clear day and one on a cloudy day. On the clear day, the GLAS returns were moderately saturated, and we correct for this using an algorithm developed by the GLAS instrument team, obtaining an RMS difference of 2.8cm. For the cloudy day, returns were severely attenuated and there is an unknown bias in the elevations. Three cycles of RA-2

data were compared with the grids along the ascending and descending track, yielding a mean range bias of 51.1+/-17.1cm.