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Uplift in the Prince Charles Mountain: A perspective from GPS, GRACE and GIA models

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Starting in 1998, a network of remote GPS sites has operated in the Prince Charles Mountains in East Antarctica to measure the present-day glacial isostatic adjustment (GIA) rates. Prior to the commencement of this experiment, predicted uplift rates from available GIA models were as high as 10-15 mm/yr. With substantial improvements in the accuracy of GPS analysis over the past decade, we can now estimate uplift rates with accuracies of $\sim$1 mm/yr. However, such levels of accuracy require careful understanding of all aspects of the GPS analysis, including the definition of the origin of the reference frame. We will present the results of our GPS analysis and comparisons with available GIA models and estimates of uplift derived from GRACE observations. We show that the positive rate anomaly in Enderby Land detected by GRACE is most likely not related to GIA and highlight the difficulties of estimating small rates of uplift from observing techniques in the presence of significant non-linear surface motions.