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**Frederik J. Simons** ([fjsimons@gmail.com](mailto:fjsimons@gmail.com)), Guyot Hall 321b, Princeton, NJ 08544. *Mapping ice mass loss on Greenland and Antarctica, in space and time.*

The melting of polar ice sheets is a major contributor to global sea-level rise. Antarctica is of particular interest since most of the mass loss has occurred in West Antarctica, however updated glacial isostatic adjustment (GIA) models and recent mass gains in East Antarctica have reduced the continent-wide integrated decadal trend of mass loss. Here we present a spatially and temporally resolved estimation of the Antarctic ice mass change using Slepian localization functions. With a Slepian basis specifically for Antarctica the functions maximize their energy on the continent and we can project the geopotential fields into a sparse set of orthogonal coefficients. By fitting polynomial functions to the limited basis coefficients we maximize signal to noise and need not perform smoothing or destriping filters common to other methods. In addition we determine an empirical noise covariance matrix from the GRACE data to estimate the uncertainty of mass estimation. When applied to large ice sheets, as in our recent Greenland work, this technique is able to resolve both the overall continental integrated mass trend, as well as the spatial distribution of the mass changes over time. (Received September 15, 2013)