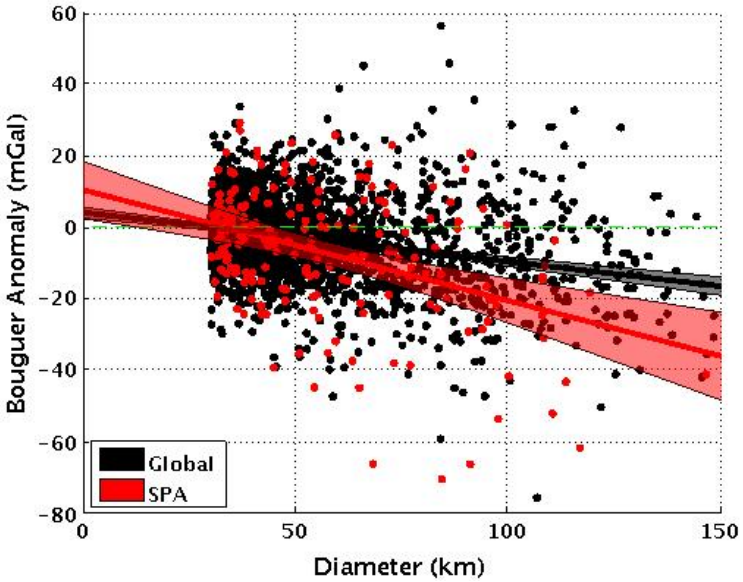
# Crater Bouguer anomalies as probes into the structure of the lunar crust

Carver J. Thomason,[1] Roger J. Phillips,[2] Francis Nimmo[1]

[1]*Department of Earth and Planetary Sciences, UC Santa Cruz, Santa Cruz, CA 95064*
[2]*Southwest Research Institute, Boulder, CO 80302*
CThomas1@UCSC.edu

Since Apollo there have been efforts to understand the Bouguer anomalies associated with lunar craters[1]. The Gravity Recovery And Interior Laboratory (GRAIL) mission has provided us with the first high resolution gravity field over the whole lunar surface[2]. The Bouguer signal of individual craters is often overwhelmed by long wavelength regional signals. To remove this we apply a high-pass filter in the spherical harmonic domain that scales with the crater diameter.

With this filtering method we have compiled a database of >4000 craters. The effects of mantle uplift start at crater diameters D=180±30km evidenced by a sharp rise in the central crater Bouguer anomaly[3]. In order to isolate crustal processes we use craters with 30km<D<150km. In this population crater Bouguer anomalies are negatively correlated with the Crater diameter. This correlation varies regionally over different lunar terranes. This is most evident South Pole-Aiken Basin (SPA) where a the Bouguer anomaly is a stronger function of diameter. This may reflect important characteristics of the basin structure.




[1]J. Dvorak, R. J. Phillips. *Geophysical Research Letters* 4.9 (1977)
[2]M. T. Zuber et al. *Science* 339.6120 (2013)
[3]J. M. Soderblom *Lunar and Planetary Institute Science Conference Abstracts.* Vol. 45. 2014