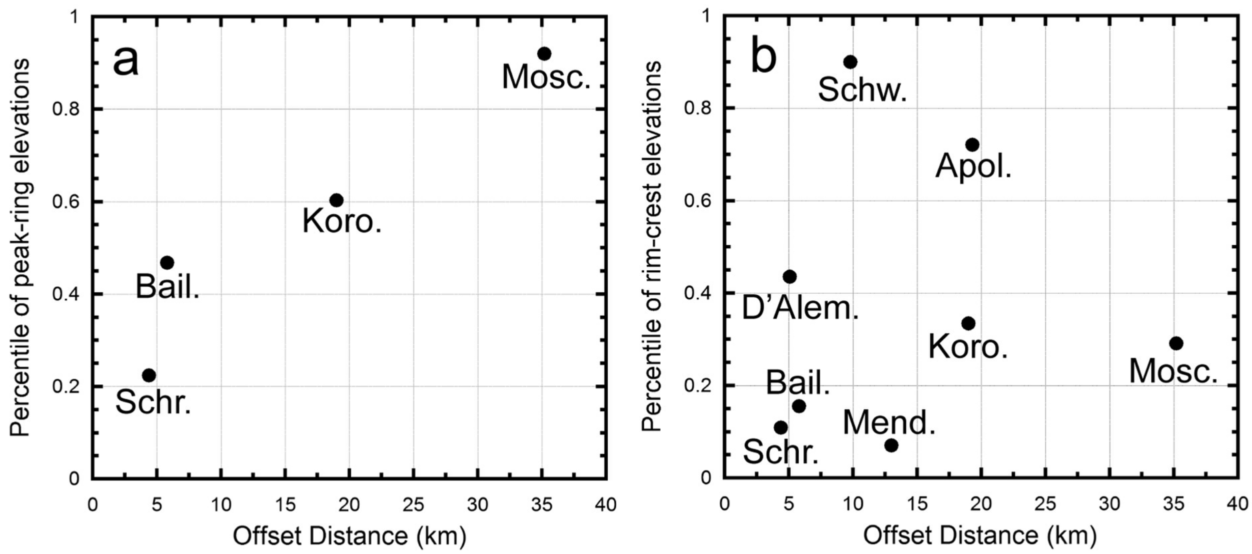

Figure 12. Plots of the percentile of the average elevation of the (a) peak ring and (b) rim crest in the direction of the peak-ring offset, as a function of the magnitude of the peak-ring offset (Table 6). Labels correspond to the first four letters of the names of peak-ring basins in Table 6.

protobasins. For perspective, the smallest peak-ring basin is comparable to the volume of the Caspian Sea on Earth (at 78,200 km^3), with the largest peak-ring basin being a factor of nine larger in volume.

[55] We also compared our calculated volumes for protobasins and peak-ring basins with the predicted volumes of a paraboloid fit to the depths and diameters of excavation cavities determined from gravity and topography observations of lunar impact basins [*Wieczorek and Phillips*, 1999] (Figure 13). The estimated volumes of these excavation cavities are based on an excavation depth-diameter relationship of d_{ex} = (0.115 ± 0.005)D_{ex} from *Wieczorek and Phillips* [1999]. To compare these excavation diameters with the final crater diameters of our measured data, we used the modification scaling relationship of *Croft* [1985] ($D_r \approx (Dsc)^{-0.18}(D_{tc})^{1.18}$, where D_r is the final

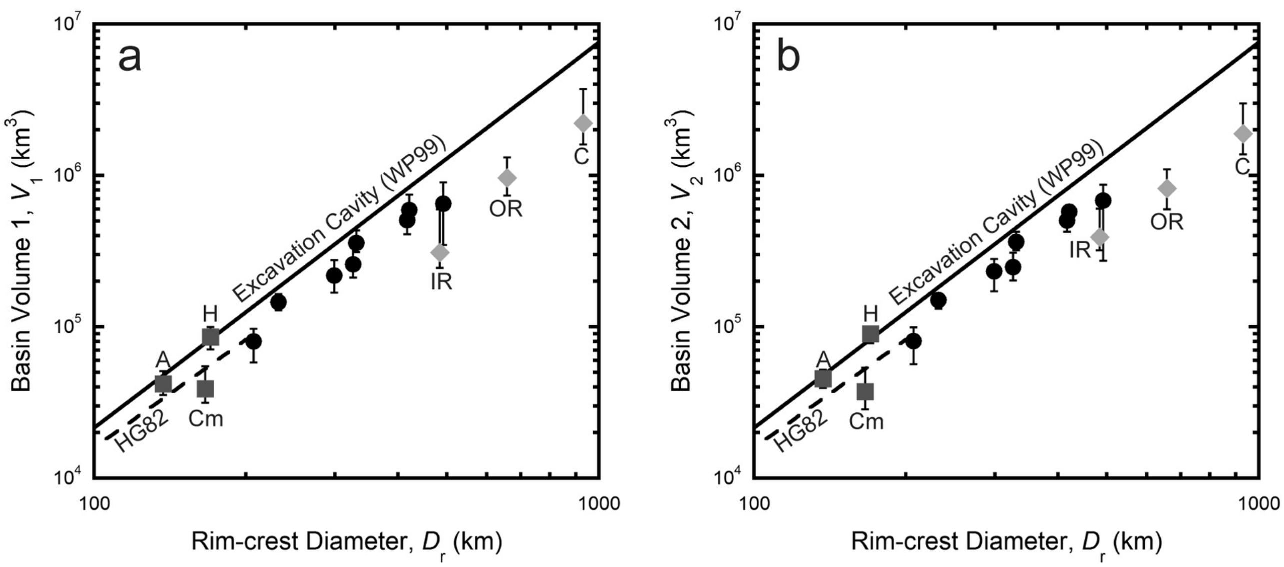

Figure 13. Volumes of protobasins (dark gray squares, A = Antoniadi, Cm = Compton, H = Hausen), peak-ring basins (black circles), and the rings of Orientale basin (light gray diamonds). The volumes are calculated using the (a) double frustum method (V_1, equation (1)) and (b) surface-to-TIN method (V_2) (see section 4.4 for a description of these methods). Also plotted in Figure 13a are the volumes of the excavation cavity for impact basins on the Moon, as predicted from geophysical measurements [*Wieczorek and Phillips*, 1999] (WP99). The trend for the volumes of complex craters on the Moon from *Hale and Grieve* [1982] (HG82) is also plotted in both Figures 13a and 13b.