#0020

From 2D to 3D chondrule size data: some ground truths.

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In order to characterize the relation between apparent chondrule sizes (2D) and true chondrule sizes (3D) three ordinary chondrites of the H (NWA 2465), L (Saratov), and LL (NWA 7545) group have been investigated in detail. The diameter of a large number of chondrule cut faces in thin sections (2D; n=2037) and of separated chondrules from the same meteorites (3D: n=2061) have been determined. The obtained 2D (3D) median values (µm) for the H, L, and LL chondrule sizes are 370 (420), 450 (530), and 580 (730). The data clearly show that there is a cut-off for small chondrule sizes in each sample. Possibly characteristic minimum chondrule sizes exist for the various groups, increasing in the (3D) sequence H (~90 µm) <L (~180 µm) <LL (~240 µm). No consistent systematics was found for the maximum chondrule sizes. An important finding is that 2D sectioning consistently leads to a steepening of the true (3D) size-frequency distributions and their shift toward *smaller* sizes. This effect increases in the sequence H<L<LL and leads to an underestimation of the values for (1) the true mean chondrule size by 8-18%, (2) the true chondrule median value by 12-21%, (3) the true mode value of the size-frequency distribution by 12-17% (50 µm binning) and (4) the true minimum chondrule size by 22-28% (except H). This is the exact opposite of what some popular 2D-3D correction models predict (e.g. [1]).

[1] Eisenhour D. D. 1996. MAPS 31:243-248.

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