**CAI AND CHONDRULE SIZES AND ABUNDANCES IN THE CO3 CHONDRITES KAINSAZ AND COLONY**. D. S. Ebel[1], M. Lu[1,2], I. R. Erb[1], M. K. Weisberg[1,3]. [1]Dept. Earth and Planetary Sciences, American Museum of Natural History, New York, NY 10024 (debel@amnh.org). [2]Stuyvesant High School, New York, NY 10282. [4]Dept. Physical Sciences, Kingsborough College, City University of New York, Brooklyn, NY 11235 (mweisberg@kbcc.cuny.edu).

**Introduction:** The sizes of Ca-, Al-rich inclusions (CAIs), chondrule subtypes, and amoeboid olivine aggregates (AOAs), and their relative abundances compared to surrounding matrix, are fundamental parameters that constrain theories of clast origin, accretion into chondrite parent bodies, and models of nebular evolution, transport, and the complementarity of components in chondrites. Abundances in CO3 have not been measured comprehensively since [1]. New techniques [2] revealed differences in clast/matrix ratios between reduced and oxidized CV subtypes [3]. Significant differences from earlier work [4] on CV chondrites [2,3] prompted us to re-examine the CO chondrites.

**Procedure:** Surfaces of Kainsaz (CO3.2 fall, 24 $mm^2$ at 2 microns per pixel) and Colony (CO3.0 find, 8 $mm^2$ at 2 μm/pxl, 16 $mm^2$ at 6 μm/pxl,) were mapped in x-ray emission by EMP [2]. Element, BSE, and red-green-blue composites as registered layers in a drawing program were examined to outline clasts digitally and determine their type [2]. From these outlines, pixels in each clast type over the entire map were counted to yield relative component abundances. Clast size distributions were measured separately using the same digital outlines.

**Results:** Our preliminary findings for Colony (at 6 μm/pxl) are consistent with the average reported by [1] for six CO chondrites: 33.7% matrix, 39.5 chondrules, 11 AOAs, 2.1 CAIs, 5.7 metal + sulfide, 8% lithic fragments [1], after adjusting for differences in the clast definitions of [1]. Maps at 2 μm/pxl allow better resolution between AOAs and chondrules, and between chondrule subtypes. The apparent (uncorrected) size distribution for all clasts ($n$=976) in Colony is log-normal, with mean radius 158 μm for circles of equivalent area to each clast. This is much larger than the 67 μm mean radius measured by [5] for round, obviously identifiable Colony chondrules ($n$=238). Correction for 3D effects will reduce mean clast size in both cases [6].

**Conclusions:** New methods allow counting and analyzing clasts efficiently over large areas, and produce a record allowing later re-analysis, unlike previous methods. Our preliminary findings for CO chondrites are similar to [1] for clast abundances. Our mean size is larger than [5], even if we omit AOAs and CAIs from our data set. Clast/matrix ratios in CO are more similar to reduced CV than to oxidized CV. We suspect that clast type abundances, including chondrule subtypes, differ between Kainsaz and Colony. By analysis of our 2 μm/pxl maps, we will quantitatively test this hypothesis.

**References:** [1] McSween H. Y. Jr. 1977. *Geochimica et Cosmochimica Acta* 41:477-491. [2] Brunner C. E., Ebel D. S. & Weisberg M. K. 2008. *Meteoritics & Planetary Science* 43:A28. [3] Ebel D. S., Leftwich K., Brunner C. E. & Weisberg M. K. 2009. Abstract #2065. *40th Lunar and Planetary Science Conference*. [4] McSween H. Y. Jr. 1977. *Geochimica et Cosmochimica Acta* 41:1777-1790. [5] Rubin A. E. 1989. *Meteoritics* 24: 179-189. [6] Eisenhour D. D. 1996. *Meteoritics & Planetary Science* 31: 243-248.