COMPARING CHONDRITES AND CONGLOMERATES. R. K. Herd[1], [1]Curator, National Meteorite Collection of Canada (Retired) herdrk@gmail.com

Introduction and Summary: Textural and structural similarities between terrestrial conglomerates and extraterrestrial chondrites are inescapable. The fabrics of each are dominated by rounded to fragmental clasts set in finer grained matrices that bind the clasts in the rocks. Similarities and differences are explored here.

Conglomerates: are the products of erosion of pre-existing Earth rocks, producing pebbles that reflect not only the terranes that have been eroded, but also the history and energetics of the erosion. They may be polymictic or monomictic, reflecting distance from source, source variability, provenance and other factors. They may be matrix- or clast-supported, the former considered somewhat like soils and glacial debris, the latter gravels. The eroding fluids are water, wind or ice. The binding matrix materials are finer grained detritus or minerals precipitated from fluids circulating within sedimentary formations. Conglomerates often mark a change in sedimentary regime, such as the advance or retreat of bodies of water or ice sheets. Conglomerates host placer and other mineral deposits.

Chondrites: are agglomerations, by some process, of mainly spheroidal, mainly silicate, fragments derived from primitive dust or recycled rock and mineral grains that have been heated and cooled perhaps multiple times. They are polymictic, rarely monomictic, reflecting distance from source, source variability, provenance and/or other factors (?). These chondrule pebbles contain textural and isotopic signatures of their histories, as well as evidence of being energetically processed prior to incorporation. Chondrites may be matrix-or clast-supported, the former represented by certain carbonaceous chondrites perhaps derived from comets or ice-rich asteroids, the latter apparently formed by welding together of hot particles in a vacuum, hot gas or plasma. The binding matrix materials of ordinary chondrites are finer grained silicates as in the chondrules, metals, oxides etc. . Chondrites and chondrule formation mark changes, inputs of energy into cosmic dust and gas, followed by ultimate incorporation and cooling into solid rocks. Space-weathered chondrites may concentrate metallic minerals.

Methodology and Perspective: BSE photos of ordinary (and some carbonaceous) chondrites been examined at intra-chondrule and inter-chondrule scales, in addition to determinations of grade and metamorphism typically made on larger scales. Chondrules and their matrix in ordinary chondrites may be used to define sequential textural contexts [1].

Discussion: Simply compiling as above some characteristics of conglomerates and chondrites allows questions to be posed about what features of chondrules and chondrites are being ignored or unexamined, features analogous to data from conglomerates: (1) From what "terranes" might chondrules have been derived, in other words what differences in chondrule composition and texture define chondrules from different cosmic reservoirs, and are they the same in different chondrites? (2) What is the source of the energetic processing of chondrules, the heating and cooling, comminution, sticking together and coming apart, like unto erosion of source rocks and pebbles in conglomerates? (3) What fluids or other material surrounded primitive particles and chondrules as they were heated and cooled? (4) Where are chondrites and chondrules deposited now, in one set of asteroids or as components of many? (5) Was the formation of chondrules and chondrites a marker horizon in the history of our solar system? (6) Was such an event/process part of the formation of every planetary system? (7) Were some particles in our planetary system derived from other systems? (8) What deposits might be found within Chondrites?

References: Herd, R.K. (2018) LPS XLIX, Abstract #2790.