MORE TEXTURAL AND MINERALOGICAL STUDIES OF PRIMITIVE ORDINARY CHONDRITES. R.K. Herd[1], M.B. Killgore[2], P.A. Hunt[1], and K.E. Venance[1]. [1]Geological Survey of Canada, Natural Resources Canada, 601 Booth Street, Ottawa, ON K1A 0E8, Canada: herd@nrcan.gc.ca, pahunt@nrcan.gc.ca, kvenance@nrcan.gc.ca ; [2]Southwest Meteorite Laboratory, P.O. Box 95, Payson, AZ 85547, U.S.A: meteoritelab@cybertrails.com .

Introduction: Our research on two primitive ordinary chondrites, Saratov (L4) and an unnamed Antarctic find (L/LL3), was undertaken to compare their mineralogy and textures because they were close in petrologic grade. So far our studies have confirmed that Saratov is at a slightly higher grade, probably L4, while the L/LL3 is probably of grade 3.5 to 3.6 [1]. An unexpected result is the discovery of texturally and mineralogically similar or identical chondrules, and other common features, in the two meteorites. A simple descriptive classification scheme can be derived for chondrules in these meteorites that exhibit similar petrologic grade. Our conclusions may have implications for other ordinary chondrites. Systematic and consistent descriptions, e.g. of the textures and mineralogy of chondrules selected for isotopic analyses, is lacking within the literature.

Methodology and Observations: Polished thin sections of the meteorites were documented with digital colour photomicrographs, and back-scattered electron (BSE) photos and photomosaics from a scanning electron microscope (SEM). The photomosaics allow maps of whole thin sections to be examined. Images of individual chondrules and results from energy-dispersive spectrometry (EDS) spot analyses allow comparison of textures and identification of phases. Chondrules with similar textures and similar contained phases can be grouped.

Results, Photomosaics: There are a few distinct textural components to these meteorites: intact chondrules consistent with their petrologic grade; intact chondrules inconsistent with their petrologic grade; primitive matrix; chondrule fragments resulting from crushing during lithification; secondary matrix resulting from recrystallization of fragments and primitive matrix; late veins or melt zones.

Results, Chondrules: The intact chondrules and the chondrule fragments comprise textural/mineralogical groups of different porphyritic olivine (PO), porphyritic olivine-pyroxene (POP), radiating olivine (RO), and radiating pyroxene types (RP). We have identified at least 6 groups of chondrules that occur in each meteorite, and a category of chondrules whose recrystallization has occurred at a higher grade, but which are embedded in the lower grade meteorites.

Implications, Summary: In a recent bulk trace element study of nonporphyritic micro-objects in primitive ordinary chondrites [2], the classification scheme used was chondrules (C), chondrule fragments (CF), irregular fragments (IF) and unidentified particles (U). Some were also categorized as barred olivine chondrules (BOC) or barred olivine fragments (BOF). Given the ability to image these objects in detail and to determine their mineral components, it is important to describe chondrules and chondrule fragments more completely, possibly as part of a general and consistent scheme, prior to trace element or isotopic analyses. Comparable mineralogy and textures may indicate they are samples from the same chondrule reservoir; this can be tested by subsequent analyses on selected similar objects from different meteorites, as we are trying to identify.

References: [1] Herd et al. (2003) *LPS XXXIV*, #2058. [2] Engler et al. (2003), *LPS XXXIV*, #1689.