THE NEW LUNAR METEORITE DEW 12007.

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Introduction: In January 2013 a 7% crusted 94.2 g ellipsoidal stone was collected on a blue ice patch 40 km WSW of Mount DeWitt (Victoria Land) during the XXVIII PNRA Antarctic Campaign. The official name of the meteorite is Mount DeWitt 12007 (DEW 12007).

Methods: Petrography by optical microscopy and SEM. Mineral chemistry by EPMA. Bulk chemistry by XRF and ICP-MS. Oxygen isotopes by Laser Fluorination MS.

Petrography and geochemistry: DEW 12007 is a polymict breccia consisting of glassy impact-melt breccia particles, gabbroic clasts, feldspathic clasts, glass beads, basaltic clasts, mingled breccia clasts and numerous crystal fragments (pyroxene, plagioclase, olivine, silica polymorphs). Clasts are embedded in a matrix dominated by very fine-grained crystals; vesicular glassy veins and rare agglutinates are also present. Main minerals are plagioclase, clinopyroxene, olivine, ilmenite, Cr-bearing ulvöspinel, troilite, and Ti-bearing chromite; minor phases include silica polymorphs and tiny grains of baddeleyite, tranquillityite, phosphates, FeNi-metal and schreibersite. Plagioclase composition is An% > 85. Olivine crystals show forsterite contents either below Fo_{16} or between Fo_{50}-Fo_{90}. Pyroxenes are pigeonites and augites, often exsolved; a pyroxene-like Al-rich phase is observed in several feldspathic clasts. Oxygen isotopic chemistry: $\delta^{18}O$=6.05‰; $\delta^{17}O$=3.13‰. REEs data: La=29.7 times CI abundance; (La/Sm_n)=1.3; Eu/Eu*=0.78.

Discussion and Conclusions: FeO/MnO ratios in olivine (*ca.* 91), pyroxene (*ca.* 65) and bulk rock (*ca.* 77) indicate a lunar origin for DEW 12007. This is confirmed by its oxygen isotopic composition. DEW 12007 is classified as a lunar mingled (i.e., containing material from both highlands and maria) regolithic breccia. DEW 12007 is by now unpaired.

Glass particles consist of both Al-rich impact melt splashes and picritic glass beads with VLT chemical affinities. Plagioclase-rich clasts are highland rocks rich in HSE-bearing phases (comprising schreibersite). They are texturally indistinguishable from the meta-melt clasts described by [1] and, on a Mg# (in pyroxenes) *vs.* An% (in feldspars) diagram, they fall within the Mg-suite trend. Pyroxenes from the crystalline basalts plot within the VLT or LT fields on the Fe/(Fe+Mg) *vs.* Ti/(Ti+Cr) diagram proposed by [2]; an unusual subophitic fragment plots within the highland field and could be cryptomare-related. Gabbroic clasts are microgranular fragments dominated by clinopyroxene (augite and pigeonite, zoned and not interspersed) and plagioclase with minor silica (tridymite?), chromite and a single particle of tranquillityite plus withlockite; they lack ilmenite. Pyroxene chemistry shows no relationships between gabbroic clasts and highlands materials, suggesting instead an association of the former with the VLT-like mare volcanics, in agreement with textural and mineralogical features. Gabbroic clasts in DEW 12007 could therefore represent part of a shallow intrusion within a volcanic complex with prevailing VLT affinity.

References: [1] Koeberl C. et al. 1996. *Meteoritics & Planetary Science* 31:897-908. [2] Nielsen R. L. and Drake M. J. 1978. In *Mare Crisium: The view from Luna 24*. 1:419-428.