KEEPING UP WITH THE LUNAR METEORITES – 2015. R. L. Korotev[1] and A. J. Irving[2], [1]Department of Earth & Planetary Sciences and McDonnell Center for the Space Sciences, Washington University, Saint Louis MO 63130; [2]Department of Earth & Space Sciences, University of Washington, Seattle, WA 98195; korotev@wustl.edu

Since our abstract of last year [1], a remarkable 24 new lunar meteorite stones with a total mass of 14.690 kg have been announced in the Meteoritical Bulletin online database [2] (and we have studied another 10 yet unnamed stones). We obtained the compositional data presented here on multiple subsamples of 19 of the stones by INAA [3]. Unless otherwise noted, all of the new meteorites are fragmental or regolith breccias.

Abar al' Uj 012 (123 g) [plot symbol # in Fig. 1] is the first lunar meteorite from Saudi Arabia [4]. It is a typical feldspathic lunar meteorite in composition (Fig. 1) and an impact-melt breccia.

Dhofar 1980 (6 stones, 23.5 g total) [1], an impact-melt breccia, is compositionally identical to Dhofar 1627 and was found nearby. **Dhofar 1983** (57 g) [2] and **Dhofar 1984** (32.1 g) [3] are likely pairs to Dhofar 1673 [5,6].

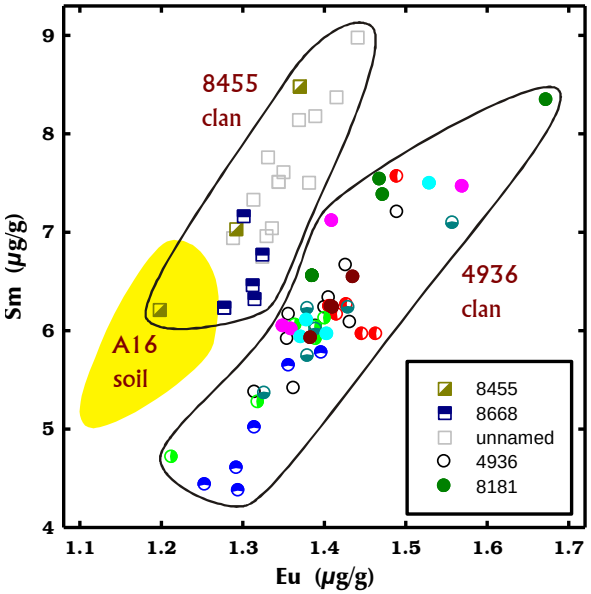


Figure 2. NWA 8455, 8668, and several yet unnamed meteorites plot with the NWA 4936 clan (4936, 5406, 6221, 6355, 6470, 6570, 6687, 7190, 7986, & 8181) in Fig. 1 but have a distinctly greater Sm/Eu ratio, one that is similar to mature soil from Apollo 16 (yellow field).

Most of the new lunar meteorites are from northwestern Africa. Several, on the basis of similar composition and texture, are likely pairs to previously discovered meteorites. **NWA 8181** (18.2 g) [A] is the 9th stone in the NWA 4936 pair group, a group that has a composition similar to Apollo 16 soil (Fig. 2) and a glassy matrix. **NWA 8277** (773 g) [D], the most mafic of the breccias studied here (14.8% FeO), is likely a terrestrial pair to NWA 7611 and perhaps a launch pair to NWA 4884, QUE 94281, and Yamato 793274/981031 [7]. **NWA 8306** (1389 g) [E] appears to be paired with NWA 7834 and NWA 7948 [1]. **NWA 8599** (36.5 g) [J] is paired with NWA 5744, a granulitic breccia of troctolitic anorthosite composition [8]. We have not yet studied NWA 8651 (598 g) or NWA 8687 (563 g), but from the descriptions [2] these two stones are probably also part of the NWA 5744 pair group. (The other three new stones that we have not yet studied are Mount DeWitt 12007, NWA 8607 and NWA 8609.)

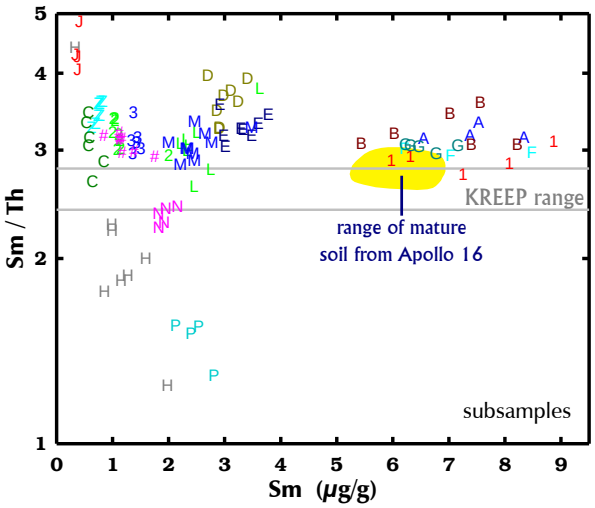


Figure 3. Several feldspathic lunar meteorites have Sm/Th ratios different from KREEP: troctolitic anorthosite NWA 8599 [J] (and its pair, NWA 5744), NWA 8586 [H], NWA 8673 [N], and NWA 8701 [P].

The remaining new stones appear to represent nine new meteorites. Small **NWA 8182** (15.6 g) [B] is compositionally distinct (Fig. 1). **NWA 8222** [C] (208.6 g) and **Oued Awlitis 001** (432.5 g, impact-melt breccia) [Z] [9] are highly feldspathic, KREEP-poor breccias. **NWA 8455** (2814 g) [F] and **NWA 8668** (166 g) [G] are probably paired with each other. Although they plot with NWA 8181 and the 11 stones of the NWA 4936 pair group in Fig. 1, they form a different trend in Fig. 2, one with greater Sm/Eu, and are less glassy. **NWA 8586** (704.5 g) [H] is compositionally similar to many other feldspathic lunar meteorites, except that Sm/Th is low (Fig. 3). **NWA 8641** (5895 g, the largest meteorite studied here) [L] and **NWA 8682** (83 g in 7 pieces) [M] are likely paired. These two along with **NWA 8673** (263 g) [N] and **NWA 8701** (72 g) [P] are 2–3× richer in Sm than most feldspathic lunar meteorites (Fig. 1). The latter two stones (8673 N and 8701 P) are distinct in having Sm/Th less than that of KREEP, suggesting that KREEP is not the cause of the high Sm compared to "typical" feldspathic lunar meteorites (Fig. 1). Finally,

NWA 8632 (23.8 g) [K] is a new mare basalt; see companion abstract [10].

References: [1] Korotev R. L. and Irving A. J. (2014) LPSC45, #1405. [2] http://www.lpi.usra.edu/meteor/metbull.php. [3] Korotev R. L. (2012) *M&PS* **47**, 1365–1402. [4] Mészáros M. et al. (2014) 77th Annual Meeting of the Meteoritical Society, #1216. [5] Korotev R. L. and Irving A. J. (2013) LPSC44, #1405. [6] Hill P. J. A., et al. (this conf.). [7] Korotev R. L., et al. (2003) *Antarctic Meteorite Research* **16**, 152–175. [8] Kuehner S. M. et al. (2010) LPSC41, #1552. [9] Wittmann et al. (this conf.). [10] Korotev et al. (this conference).

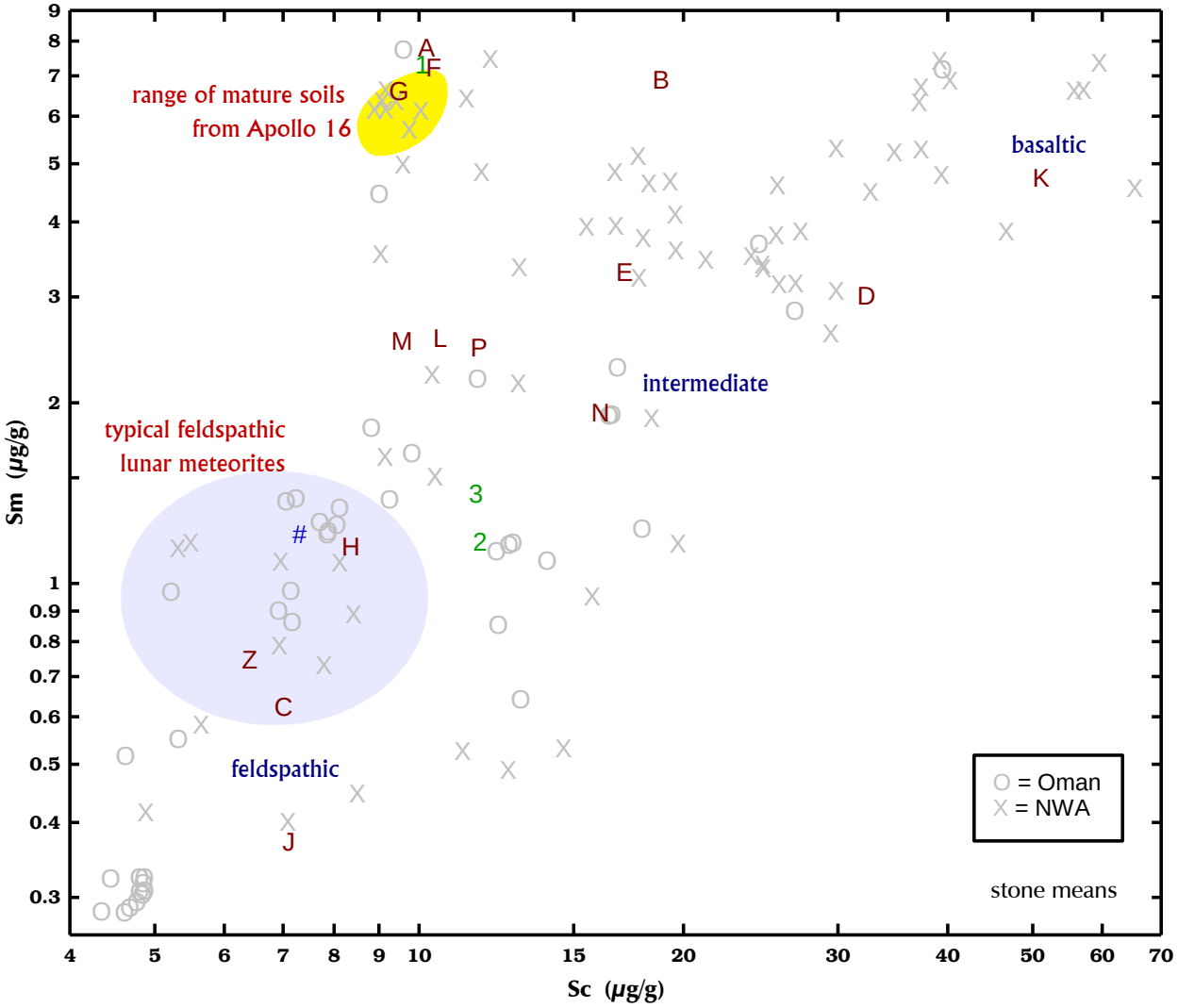
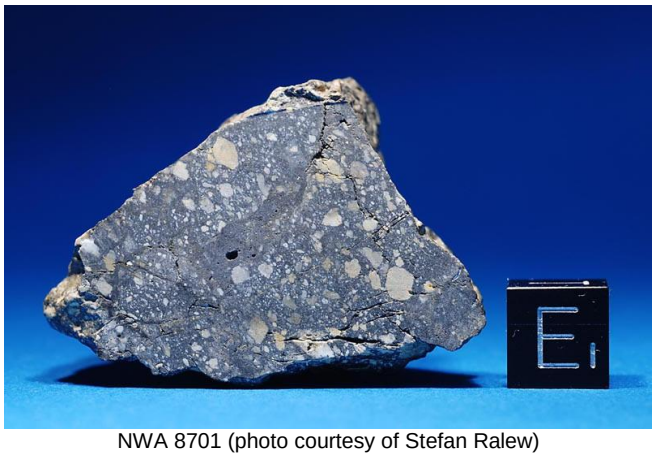


Figure 1. Lunar meteorites from Oman and northwest Africa in Sc-Sm space. New meteorites in color; "old" meteorites in gray.

NWA 8673 (photo courtesy of Greg Hupé)



NWA 8701 (photo courtesy of Stefan Ralew)