Cosmogenic nuclide study of large iron meteorites.

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We selected four large iron meteorites from Europe, Morasko (Poland), La Caille (France), Mont-Dieu (France), Saint-Aubin (France), and two from Africa, Agoudal (Morocco) and Gebel Kamil (Egypt). Our aim here is to extensively study cosmogenic nuclides, which have not been measured for most of these meteorites.

Approximately 300mg of each meteorite were processed following a procedure adapted from Vogt and Herpers (1988) [1] and Merchel and Herpers (1999) [2] to extract Be, Al, Cl and Ca fractions. Isotopes ratios were measured at the French AMS national facility ASTER (CEREGE, France). Approximately 100mg of each meteorite were processed in Berne University for noble gases (^{3}He, ^{4}He, ^{20}Ne, ^{21}Ne, ^{22}Ne, ^{36}Ar, ^{38}Ar, ^{40}Ar) using two self-made mass spectrometers and following the procedure described in [3,4]. This procedure includes heating the samples in a single step up to ≈ 1800°C, cryogenically separation and purification of the extracted noble gases using getters.

Results were then analyzed using a physical model for cosmogenic nuclide production rates in iron meteorites [3].

We present the interpretation of the cosmogenic nuclides ratios, in terms of cosmic-rays exposure ages, pre-atmospheric sizes and shieldings, and terrestrial ages. From these results, we can infer some useful information. For example, it is interesting to know if most of the meteorite has already been recovered, or if we can hope to get other pieces, if a careful search is conducted. Another example is to know if craters on the meteorite strewnfield are craters from the impact, from another impact of only artifacts.

References: [1] Vogt S. and Herpers U. 1988. *Analytical Chem*istry 331:186-188. [2] Merchel S. and Herpers U. 1999. *Radiochimica Acta* 84:215-219. [3]Ammon K. et al. 2009. *Meteoritics & Planetary Science* 44:485-503. [3] Ammon K. et al. 2008. *Meteoritics and Planetary Science* 43:685-699. [4] Ammon K. et al. 2011. *Meteoritics and Planetary Science* 46:785-792.