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Constraining the meteorite flux on Earth during the last 2 Ma

CARINE SADAKA JR.[1], JÉRÔME GATTACCECA[2], FLORIAN DUMAS[1], DILYARA KUZINA[3], RÉGIS BRAUCHER[1] AND MATTHIEU GOUNELLE[4]

[1]Aix-Marseille Univ., CNRS-IRD-INRAE, UM 34 CEREGE, Technopôle de l'Environnement Arbois-Méditerranée

[2]CNRS, Aix-Marseille Univ, IRD, INRAE, CEREGE

[3]Institute of Geology and Petroleum Technologies, Kazan Federal University

[4]IMPMC, CNRS - UMR 7590, Sorbonne Université, Muséum national d'Histoire naturelle

Presenting Author: sadaka@cerege.fr

Deserts are the most fruitful areas on Earth to collect meteorites. Besides Antarctica, one desert stands out: the Atacama Desert in Chile, because of its exceptional long-term aridity and associated surface stability, which favors the preservation of a large number of meteorites. Systematic collection work over the last decade showed that this desert has the highest meteorite density among hot deserts [2,3]. With an average terrestrial age of 710 ka, the meteorite collection from the El Médano area is the oldest in the world [1], and provides the opportunity to study the meteorite flux over a longer timescale compared to other deserts. This previous study showed apparent variations in the composition of the meteorite flux with time, with a significant increase in H chondrites abundance relative to L chondrites abundance, between 500 ka and 1 Ma [1]. Our goal is to further study the intensity and the composition of the meteorite flux on Earth during the last two million years, and their possible variation with time. For this, we focus on meteorites from the Atacama Desert in two other independent meteorite dense collection areas, the Calama area (280 km to the North) and Catalina area (53 km to the South-East), where hundreds of meteorites have been collected. We estimated the terrestrial ages of a random selection of 25 meteorites from each area by measuring the ^{36}Cl concentration in the metal grains extracted from these meteorites.

Preliminary results on Calama meteorites indicate an average terrestrial age of 630 ka, similar to the average age measured in the El Médano area (710 ka). This confirms that the Atacama meteorite collection is the oldest on Earth, and can indeed help to constrain the meteorite flux over the last two million years. Additional ^{36}Cl measurements in progress combined with the statistics of meteorite recovery in these two areas will be used to constrain the meteorite flux and its possible evolution with time.

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