

THE MAÂDNA METEORITIC CRATER (TALEMZANE, ALGERIA): GEOPHYSICAL AND GEOLOGICAL INVESTIGATIONS. A. Lamali¹, A. Abtout¹, N. Merabet¹, S. Maouche¹, P. Rochette², H. Boukerbout, E. H. Meziane¹ and M. Ayache¹. ¹CRAAG, B.P. 63, Bouzaréah 16340 Algiers, Algeria. E-mail: lamali_atmane@yahoo.fr. ²CEREGE (CNRS/University of Aix-Marseille), BP80, Aix-en-Provence Cdx4, 13545 France

Introduction: Qualitative geophysical and geological investigations at terrestrial impacts structures can reveal that a variety of signatures can result from impact-induced physical changes in targeted rocks. Any conclusion about their extraterrestrial origin depends on the reliability of the information provided by field data collection and analysis. At Maâdna meteoritic crater, several aspects of the cratering process and shock metamorphism phenomena remain until now poorly known. Previous works described this crater as one with a meteoritic impact origin [1, 3, 4] but a few studies reported conclusive impact evidence by analyzing the form of shock metamorphosed mineral grains [2]. In order to recognize and quantify the local or regional post-impact processes and effects at this crater, we carried out various and detailed geophysical and geological surveys. Maâdna crater being a simple impact crater, it represents an excellent opportunity for such a study. We performed a ground magnetic and magnetic susceptibility surveys along profiles from inside to outside of the crater. We sampled rock, breccias and soil for magnetic properties, paleomagnetic and petrographic study. The micrometeorites identification was explored by gradiometer and magnetic separation of collected samples. The geological investigations were based on detailed structural and stratigraphic studies.

Discussions of the preliminary results: The Maâdna (Talemzane, Algeria) meteoritic crater is located approximately 400 km south of Algiers, at 33°19' N, 4°19' E. The crater is formed in sedimentary rocks (sub-horizontal limestones) ranging from Senonian to Eocene.

The anomalies defined by the total magnetic field and magnetic susceptibility of gridded data, we calculated after correction for other survey parameters, are mostly positive at the central zone of the crater depression. The data power spectrum shows a depth of 15 m to the high magnetic disturbance by the magnetic anomaly. We can suggest a concentration of magnetite in this zone which may represent extraterrestrial fragment due to the impact melting targeted rock which embedded there after alluvial filling of the crater.

Based on geological investigations, we carried out a numerical modeling which allowed us to map the distribution of ejectas [5]. The structural and stratigraphic investigations enable us to highlight the meteoritic origin of the crater and to exclude other assumptions such as collapsing, diapirism, eroded anticline, tectonic, volcanism and gas explosion.

References: [1] Karpoff R. 1953. *Meteoritics* 1:31-38. [2] Lambert P. et al. 1980. *Meteoritics* 15:157-179. [3] McHone J. F. Jr. and Greeley R. 1987. *Meteoritics* 22: 253-264. [4] Belhai D. et al. 2006. *Bulletin du Service Géologique de l'Algérie Vol. 17, n°2, pp.95-112*. [5] Collins G. S. et al. *Meteoritics & Planetary Science* 40:Nr 6, 817-840.