

A CONTRIBUTION OF GAMMA RAY SPECTROMETRIC DATA IN UNDERSTANDING THE STRUCTURE OF THE MAÂDNA CRATER (TALEMZANE, ALGERIA).

A. Lamali^{1,2}, L. Hamai^{1,2}, S. A. Mokhtar³, A. Yelles-Chaouch¹, A. Abtout¹, N. Merabet¹, S. Bentriddi², L. Djadia¹ and A. Nadjemi², ¹Centre de Recherche en Astronomie Astrophysique et Géophysique, Route de l'Observatoire, BP 63, Algiers, Algeria (lamali_atmane@yahoo.fr), ²Laboratoire de l'Énergie et des Systèmes Intelligents (LESI), Université Djillali Bounaâma Khemis Miliana, Faculté des Sciences, et de la Technologie, Route de Thénia El Had, 44225 Khemis Miliana, Ain Defla, Algeria, ³Centre de recherche nucléaire de DRARIA, BP 43, Sebala, Draria, Algiers, Algeria.

Introduction: The Most of the used geophysical methods on terrestrial impacts craters often focus on exploration of anomalies caused by changes in physical properties or by structures associated with the formation of the crater. Among these geophysical methods, gamma-ray spectrometry is not widely used in the context of impact cratering, despite its efficiency to evidence the physical/chemical changes in the country rocks, thus including the impacted rocks. The Maâdna crater in southern Algeria [1, 2, 3], at which the meteoritic impact origin has not yet been completely established, we have used this method as a marker of any modification in the composition of target rocks that may be related to the impact cratering process in this structure.

Results and discussions: Numerous in situ measurements were carried out using a field portable gamma-ray spectrometer (PGS-2-21). These data revealed that most of surface lithologies which are predominantly calcareous, outcropping on the rim and flanks of the crater, give a very low radiometric response in all three channels (K, Th and U). The recorded total numbers of counts did not exceed 90 Cps inside and outside the crater. This rate is expected to slow significantly in these types of sedimentary rocks with low clay content that generally appear to have very much lower radioelement concentrations. In contrast, the constructed radioelement concentration maps showed an anomalously high gamma response with Potassium-dominated peaks in the central part of the crater and in its surrounding wadis. However, a good correlation is observed between this central part Potassium anomaly and the magnetic one that has been described in earlier studied [4]. This anomalously high radioactivity levels in this zone may be associated with post-emplacment accumulation weathered deposits, since there is no objective criterion allowing us to link these results to an impact event at Maâdna structure.

References:

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