THE USE OF GEORADAR TO EXPLORE THE IMPACT EJECTA LAYER AROUND THE MAÂDNA STRUCTURE (TALEMZANE, ALGERIA).

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Introduction: Nowadays a large number of confirmed impact structures on Earth were first identified as geophysical anomalies, whereas their impact origin only established later through detailed petrophysical investigations. Although the complexities of geophysical characters and the lack of unique signatures for terrestrial impact craters, geophysics continue to play a critical role in the future discovery of these structures, even when they are deeply eroded or are completely buried under ground. In the case of Maâdna crater (33°19' N, 4°19' E), the previous works [1, 2, 3] was based on a more limited data set to ascertain the formation process and its origin. More recently, a geological and geophysical study conducted by Lamali et al (2016) [4] on this structure do not confirm an impact origin for this structure and suggested a dissolved diapir with inverted relief as an alternative to the impact hypothesis.

Results and discussion: In contrast to previous investigations, the crater was investigated again using several other geophysical surveys including Ground Pentrating Radar (GPR) technique. Though the limited use of this method in the case of the impact structures, it has been mostly used to detect the ejecta-bedrock contact, as well as subsurface lithological contacts and faults. According to our obtained results in the case of the Maâdna crater, its efficiency was tested to discriminate the electromagnetic signature of supposed ejectas that widely supported at Maâdna. However, GPR allowed the confirmation of nonexistence of such as signature at Maâdna crater. Moreover, our different scans were interpretative against the structural context of the Maâdna structure. Therefore, most of the analyzed profiles allowed us recognizing the typical deformation effects at Maâdna structure, which should be related to a diapiric system rather than to the meteoritic impactism as supported in Lamali et al (2016) [4].

References:

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