MODELLING THE GRAVITY ANOMALY OF THE ROCHECHOUART IMPACT STRUCTURE.

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The Rochechouart structure in west-central France is a heavily eroded impact crater that has no morphological expression [e.g. 1, 2]. It was formed ca. 200 Ma ago [3] in intrusive and metamorphic Variscan rocks. The structure is mainly characterized by the occurrence of impact melt, suevite, polymict and monomict lithic breccias and fractured basement rocks in an area about 18 km in diameter.

Gravity measurements were carried out at 720 stations between 1977 [4] and 1984 with an emphasis on the central part. They were merged with 670 stations from the Carte gravimétrique de France into a Bouguer gravity anomaly map (40 x 40 km). The gravity map shows a negative anomaly of about 10 mgal centered on the geographical distribution of the above mentionned impact related rocks and the area with the highest shock effects. The regional field has a complex structure and for a separation of the anomaly caused by the impact structure several assumptions have to be made. The resulting anomaly is characterized by a central minimum of about 12 km diameter, a relative maximum around the central minimum and an additional ringlike weak relative minimum. The overall diameter of the gravity anomaly is ca. 28 km. This is also indicated on horizontal and vertical gradient maps derived from the Bouguer anomaly map. Modelling was made with a program for ring structures for 4 half profiles centered on the structure in the N, E, S and W directions. Modelling shows that a reduced density may reach down to several km

A comparison with the gravity signature of other mid-sized impact structures shows that the original diameter of the eroded Rochechouart structure possibly was about 10 to 20 % larger than the ca. 28 km diameter obtained from the gravity anomaly modelling.

References: [1] Lambert P. 2010, Geological Society of America Special Paper 465, 509-541. [2] Sapers H.M. et al. 2014, Meteoritics & Planetary Science 49, 2152-2168. [3] Schmieder M. et al. 2010, Meteoritics and Planetary Science 45, 1225-1242. [4] Pohl J., Ernstson K. and Lambert P. 1978, Abstract, Meteoritics 13, 601-604.