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The dimple onset for a point mass in planar and spherical models in 2D truncation filtering when using gravity anomaly approximated by the vertical component of the gravity disturbance

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A b s t r a c t : This paper deals with the approximation of the rigorous gravity anomaly with the vertical component of the gravity disturbance from the viewpoint of the two-dimensional truncation filtering methodology and the instant of the dimple onset in terms of the planar and spherical models of one point mass anomaly. It is shown, that the vertical component of the gravity disturbance may be used as a replacement for the rigorous gravity anomaly in the inversion of 2D gravity data by means of the truncation filtering methodology when working with realistic point mass anomalies. The term realistic point mass anomaly is defined in the paper. The relationship between the instant of the dimple onset and the depth of the point mass using the 2D truncation filtering methodology is derived for both the planar and spherical models. It is shown, that from the viewpoint of the gravity inversion/interpretation by means of the truncation filtering methodology, it is justified to replace the spherical model with the planar model when dealing with shallow point masses. Shallow in terms of a spherical model with a reference sphere with radius that of the mean earth means up to 100 kilometers.

Key words: inverse problem, gravity inversion, gravity data interpreting, profile data, dimple onset, point mass

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