

Integrated interpretation of microgravity data using analytic signal and Euler deconvolution to delineate cavities in limestone area

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In this paper, we propose a new interpretation method of gravity data by means of combining analytic signal and Euler deconvolution. Euler deconvolution is widely used to analyze potential data without any prior information. However, since Euler deconvolution tends to make so many spurious solutions, it is hard to pick up real solutions. Avoiding these ambiguous problems, we utilized a combined method between analytic signal and Euler deconvolution. Analytic signal can give us horizontal information of isolated anomalous bodies. We carried out Euler deconvolution not only gravity data but also analytic signal of gravity data. It gives us clearer solutions than using Euler deconvolution only. We verified the proposed method by synthetic data and applied it for microgravity data. We carried out gravity survey using Scintrex CG3, CG5, and ZLS Burris meter. The target area is a small urban area nearby coal mines. This area has some cases of subsidence problem due to cavities in limestone bedrock. We set up 10 profiles and measured every 4 m. And the some part of area was collected by scattered points because it is impossible to make a profile due to existence of buildings. We gathered totally about 1100 points. Low Bouguer anomalous zones coincided well with drill logs. We applied integrated interpretation method to microgravity data of limestone area by means of analytic signal and Euler deconvolution simultaneously. Results from the combined method showed indications of cavities.

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