

A 3D MODEL OF THE GRAVITY SIGNATURE OF THE MOONBI AND BENDEMEER ADAMELLITES

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The Moonbi and Bendemeer Adamellites are Permian I-type plutons located at the southern end of the New England Batholith, northeast of Tamworth, New South Wales. The plutons intrude the Tamworth Belt, the Woolomin Beds, and part of the S-type plutons of the Bundarra Batholith. The plutons show a subtle negative anomaly on the regional gravity data for NSW and a detailed gravity survey was conducted over the plutons, as well as their surrounding plutons and country rock, to improve the gravity field resolution of the area, and to also construct a three-dimensional model of the subsurface.

The gravity investigation of the Moonbi and Bendemeer Adamellites has improved the gravity field resolution of the two plutons. The Moonbi Adamellite shows a fairly clear low anomaly, while the Bendemeer Adamellite produces a subtler anomaly. Extensive computational modelling revealed information about the subsurface shape of the plutons, and the density variation with depth of the surrounding country rock. The densities that were used for modelling the plutons and the surrounding country rock were determined from the coring and weighing of representative samples collected within the survey area.

From modelling integrated gravity and magnetic data, it was found that the contacts of the Bendemeer and Moonbi Adamellites predominantly dip outwards. Given the subtle gravity signature of the Bendemeer Adamellite, magnetic traverses over the contact of the adamellite proved valuable when modelling the pluton's contacts. The magnetic traverses surveyed, revealed that the northern contact with the Banalasta Adamellite dipped moderately steeply outward to the north, while the eastern contact with the Woolomin Beds dipped more gently outward to the east.

The 3D model of the subsurface constructed using the gravity data revealed that the Moonbi Adamellite is on average 2-6 km thick, and that the Bendemeer Adamellite is a thinner pluton, typically extending to a depth of 2-4 km. The Moonbi Adamellite contains a ENE-trending granitoid root system, which extends to a depth of approximately 11 km, when modelled within a layered country rock that increases in density with depth. The Bendemeer Adamellite contains no root system.