# Geology of the Bath area: Geological structure and regional geophysics

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> **This topic provides a summary of the geology of the Bath area – covered by the British Geological Survey 1:50k geological map sheet 265.**
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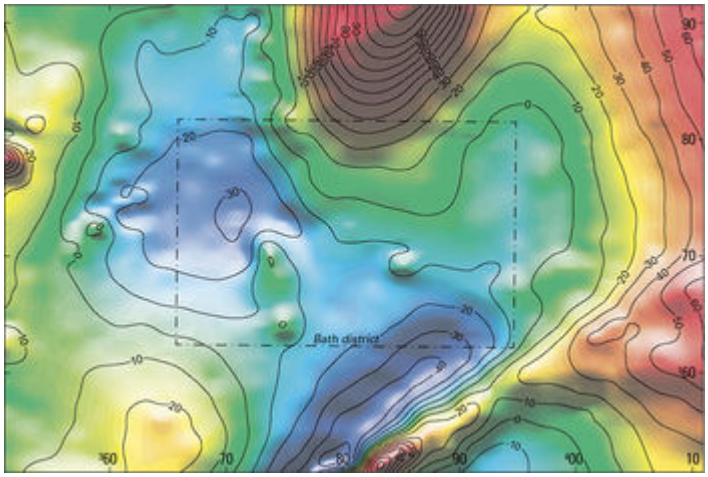
The rocks of the Bath district present a long record of earth movements, represented by faults and folds in both the Palaeozoic and Mesozoic strata. Structural interpretation of the district has been undertaken by study of seismic reflection profiles, and is aided by colour-shaded Bouguer gravity anomaly **(P785915)** and aeromagnetic anomaly maps **(P785918)**.



Aeromagnetic anomaly map of the Bath district and adjacent areas. P785918.

## Folding and faulting

The major, regional-scale folds of the district are developed in the Palaeozoic rocks **(P785914)**, and represent deformation associated with the Variscan Orogeny, at the close of the Carboniferous; a consequence of the collision of Laurasia with the southerly continent Gondwana. This compressional tectonic regime deformed the rocks of southern Britain into a series of open folds. Within the present district, the two most prominent folds seen at outcrop are the Coalpit Heath Syncline and the Kingswood Anticline **(P785914)**. Both folds involve relatively young (Bolsovian–Asturian) Carboniferous strata, and it is possible that deformation was already taking place as these end-Carboniferous rocks were being deposited. Both folds are markedly asymmetrical; the eastern limb of the Coalpit Heath Syncline dips west at around 40°, whilst the western limb dips east at only 10°. Cave (1977)[1] suggested that the syncline may have been developed as a result of buckling in association with the Variscan reactivation of older faults along the Malvern Fault Belt. The latter is a north–south trending fracture zone cored by Precambrian rocks and with a history of movement extending into the Proterozoic. Fault reactivation during the Variscan was widespread in southern Britain, with many older extensional structures being reactivated as reverse faults; however, the sense of movement on most major faults of the district, including the Coalpit Heath, Kidney Hill, Bitton–Tadwick, Newton and Pennyquick faults is normal. This is exemplified by Early Jurassic synsedimentary growth-faulting associated with extension, leading to differential thickening across

these structures. Several thrust fault belts are recognised in the ground to the south and west of the district (Barton et al., 2002), and it is known from subsurface workings that a zone of intense deformation associated with the Avon Thrust (Kellaway and Hancock, 1983)[2] extends into the district, occupying the core of the Kingswood Anticline. The Farmborough Thrust (or Fault Belt) seen in the Somerset Coalfield (Barton et al., 2002)[3] can be traced from the south-west in the seismic data towards the Warleigh Fault, and the Southern Overthrust (Green, 1992)[4] may continue east as the Trowbridge Fault **(P785914)**. These thrusts are thought to have vertical throws of 300 m and horizontal displacements of over 1 km.

In comparison with the Palaeozoic rocks, the Mesozoic rocks of the district are little deformed, showing a gentle tilt to the south-east. In the south-east the dominant fault trend is north-east to south-west, seen in the Warleigh, Corsham and Monkton Farleigh faults and the Atworth–Lacock Fault Belt. Some of these define minor grabens in the Mesozoic cover, but are also expressions of significant displacements in the basement which may be manifest as changes in the gravity field **(P785915)**. The Warleigh Fault downthrows south-east, and from seismic reflection profile evidence appears to influence thickening in Triassic rocks. A prominent anticline in both Carboniferous and Mesozoic rocks is formed in the hanging wall of the probable antithetic fault to the Warleigh Fault and these structures can be traced at depth into the fault belt around Lacock **(P785914)**.

The Radstock Basin is well defined by a magnetic low in the west of the district **(P785918)**, whilst to the east the progressively stronger magnetic response indicates the presence of Lower Palaeozoic volcanic rocks at shallow depths uplifted where the Variscan trend meets that of the Worcester Graben.

## References


1. ↑ Cave, R. 1977. Geology of the Malmesbury District. Memoir of the Geological Survey of Great Britain, Sheet 251 (England and Wales).
2. ↑ Kellaway, G A, and Hancock, P L. 1983. Structure of the Bristol district, the Forest of Dean and the Malvern Fault Zone. 88–107 in The Variscan Fold Belt in the British Isles. Hancock, P L (editor). (Bristol: Adam Hilger Ltd.)
3. ↑ Barton, C M, Strange, P J, Royse, K R, and Farrant, A R. 2002. Geology of the Bristol District. Sheet Explanation of the British Geological Survey, Sheet 264 (England and Wales).
4. ↑ Green, G W. 1992. British regional geology: Bristol and Gloucester region. Third edition. (London: HMSO for British Geological Survey.)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