



## **The London Basin is not a basin: Rethinking a region through multiple lines of evidence**

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The London Basin has historically been interpreted as geologically uninteresting, being a gentle ‘syncline’ comprised of approximately 300 m of Late Cretaceous-Palaeogene sequences. This model predates plate tectonics and the recognition of major inversion in southern Britain. Recent research demonstrates that it is geologically-complex (Royse et al. 2012), with near-homogeneous sequences (Aldiss 2013) masking the structural inheritance and persistent control of faults from the underlying shallow Palaeozoic basement. Furthermore, archaeological evidence exists for possible seismic activity and surface rupture in east London (Meddens & Sidell 1995).

A topographic map of the underlying basement was constructed, demonstrating that it is a flat platform with no evidence of a basin architecture. This is further verified by the sub-horizontal geometry of the cover sequences, only steepening significantly in the North Downs (Ellison et al. 2004), where seismic line RG-001 (Butler & Jamieson 2013) identifies reversed basin-bounding normal faults associated with the adjacent inverted Weald Basin.

The London Basin is a product of Palaeogene compression associated with the Pyrenean orogeny (Parrish et al. 2018), however, the lack of internal deformation invalidates both bulk shortening of the cover, and a regional flexural mechanism. Basement faults compartmentalised the southern region of the London Basin during this time, however, there is no evidence of regional inverted basin-bounding faults either, discrediting an inversion mechanism comparable to those observed in the Wessex Basin (Chadwick 1993).

The findings reflect the comparative stability of the underlying Anglo-Brabant Massif, with compressive strain accommodated by structural inheritance rather than regional inversion. The only area where inversion is evident is the uplifted sequences associated with reversed normal faults that bound the northern margin of the adjacent Weald Basin. This interpretation reiterates Whitaker’s (1875) emphasis that the ‘London Basin’ term reflects the geomorphological trough between the North Downs and Chiltern chalk hills, comprised primarily of weaker Palaeogene sediments.