

The map of the Brabant Massif for off-shore Belgium

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Abstract

The cartographic boundary of the Brabant Massif in the northwest is the North Sea, which is an observational limit. Nevertheless the Lower Palaeozoic rocks continue as part of a larger unit, referred to as the Anglo-Brabant Deformation Belt. Maps of the Brabant Massif largely rely on borehole data. The latest map of the Brabant Massif (Piessens et al., 2005) uses structural concepts and direct information, rather than geophysical information. Nevertheless, an aeromagnetic survey and gravimetric data corroborate the large scale distribution of the units.

This map is extrapolated to the off-shore territory of Belgium. Direct information from drillings is not available for the off-shore region, and it is therefore not possible to draw this map at the same stratigraphic resolution. The formations are therefore grouped into Cambrian, Ordovician and Silurian units. Magnetic susceptibility is high for the Cambrian, which allows tracing their continuation from on-shore to off-shore. The formations at subcrop level along the central axis of the Brabant Massif are on-shore Cambrian in age, but young in a WNW direction. Also the magnetic pattern becomes less intense, likely corresponding to an increasing depth of the more magnetic lower Cambrian units. This trend continues off-shore, indicating that the Cambrian units disappears at subcrop level. Superimposed on this general trend an aeromagnetic anomaly about 15 km off-shore of Ostend marks the probable local reappearance of the Tubize Formation. A secondary and less continuous Cambrian axis passes near Diksmuide. A second isolated off-shore aeromagnetic anomaly, indicative of the Cambrian unit, lies along the trace of this secondary axis.

The gravimetric map shows a low gravimetric anomaly of which the circular shape suggests a genetic link with the chain of gravimetric lows that underlie the southern part of the on-shore part of the Brabant Massif. The higher densities in the northern part of the off-shore territory confirm, in continuation of the on-shore formation boundaries, the presence of the Silurian unit.

The validity of the inferred distribution of the stratigraphic units was verified with the structural 3D concept that was developed for the on-shore part of the Brabant Massif, concluding that the inferred distribution of the geological units is in agreement with the structural model derived on-shore. It for example explains the positions of the two magnetic anomalies relative to each other. A central element in the structural model is the Asquempont Detachment System of which a limited number of possible traces is possible.

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