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Short Communications

Dominating Trends of the Anomalies of the
Gravity and Magnetic Fields in NE France
and SW Germany

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The map presented in Fig. 1 is a result of a general interpretation of a number of maps available for the gravity and geomagnetic fields of NE France and SW Germany. Details of that interpretation as well as correlations with tectonics and petrography will be presented in a later paper.

The map showing roughly the Bouguer anomalies in the investigated area was compiled from the following documents: in France, the “Carte Gravimétrique de la France” (Bureau de Recherches Géologiques et Minières, Orleans) with a density for the Bouguer correction of 2.3 g/cm^3 in the Basin of Paris and 2.7 g/cm^3 in the area of the Vosges; in Germany, the “Schwerekarte von Westdeutschland” (Gerke, 1957) with a density for the Bouguer correction of 2.67 g/cm^3 . The correction from the Basin of Paris to the area of the Vosges is approximately $+5 \text{ mgals}$. The correction between the area of the Vosges and SW Germany has been neglected.

The map shows also the lineations corresponding approximately to the maximum gradient in the linear high-gradient zones. These lineations can be interpreted as limits of the structures causing the gravity anomalies.

The short dashed lines represent linear interruptions of gravity or/and magnetic anomalies.

The black thick segments correspond to magnetic anomalies whose width does not exceed 10 to 20 km and which show only one clear axis. The documents used for that representation are the “Carte Magnétique de la France” (1/1.000.000, 1/200.000) (Bureau de Recherches Géologiques et Minières), the magnetic map of the upper Rhinegraben published by

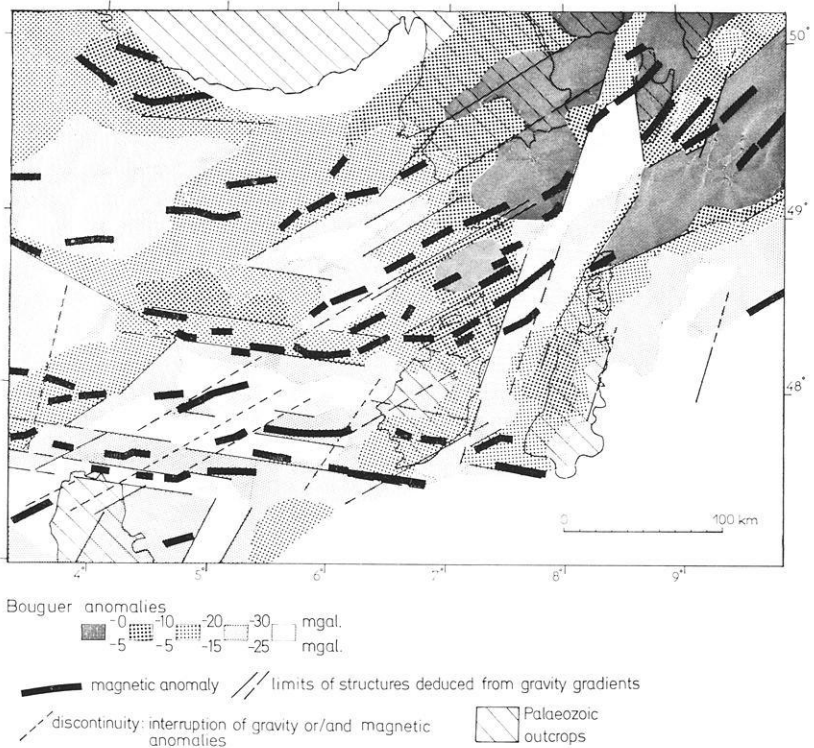


Fig. 1. Carte Gravimétrique de la France (d = 2.3). Carte Gravimétrique de la France (Vosges) (d = 2.7). Schwerekarte von Westdeutschland

Bosum and Hahn (1970) and the "Aeromagnetische Karte der Bundesrepublik Deutschland" (Eberle, 1973).

The superposition of the gravity and magnetic anomalies shows a good agreement of their main directions. The parallelism between the axis of the geomagnetic anomalies and the gravity gradients is obvious. From East to West the direction changes several times: it is N 45–50° in the Kraichgau (NE of the map); N 55–60° in the Rheinische Schiefergebirge, the Pfälzer Wald, the northern part of the Vosges, the Black Forest and the NE of the Basin of Paris; N 95–100° in the southern part of the Vosges and the SE of the Basin of Paris and N 115–125° in the NW.

The N 55–60° trend which is the direction of the structures in the middle and northern part of the map, becomes a direction of discontinuities (interruption of gravity or/and magnetic anomalies), which cross the N 95–100° trend of the structures in the southern part. The flanks of the Rhinegraben are mainly characterized by a N 20° direction. That same trend can be observed in SW Germany toward the east.

In general the magnetic anomalies are located at the border of the large gravity anomalies. Often in case of small gravity anomalies (width ≤ 20 km) they can be superposed. This is not shown on the map because only the large gravity anomalies are presented here.

So the Variscan direction (N 45°–N 60°) can only be followed as a direction of gravity and magnetic structures up to a line Arras (Northern France)-Basel (N 130°). Beyond that line the structures follow the N 95–100° direction. Nevertheless, the 55–60° trend continues southward in form of discontinuities.

Both main directions can be observed in the Vosges where the basement is outcropping (Lauer and Taktak, 1971; Edel, 1972; Edel and Lauer, 1974). Correlation between the anomalies of the earth gravity and magnetic fields, rock density and rock magnetism measurements and observations from geology will be presented in a later paper.

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