

In Figure S1 we show an additional 3D crustal model of central Europe where the synthetic bodies have the same magnetization of  $2 \text{ A m}^{-1}$ , but differ in crustal thickness. Therefore, here we are only assuming a structural origin of the magnetic field. The  $T$  map shows a very low-intensity anomaly (Figure S1a), as result of the variation from the thin southwestern crust to the thicker one to the northeast. Such a structure is also imaged in the total gradient map (Fig. S1b) by an extended maximum amplitude along the contact line. These results, compared to those of the model in Figure 7, suggest that two magnetized crusts differing exclusively in structural features may contribute to the magnetic field but cannot completely explain such a magnetic anomaly.