Investigation of the crust of the Pannonian Basin, Hungary using low-altitude CHAMP horizontal gradient magnetic anomalies.

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The Pannonian Basin is a deep intra-continental basin that formed as part of the Alpine orogeny. It is some 600 by 500 km in area and centered on Hungary. This area was chosen since it has one of the thinnest continental crusts in Europe and is the region of complex tectonic structures. In order to study the nature of the crustal basement we used the long-wavelength magnetic anomalies acquired by the CHAMP satellite. The SWARM constellation, scheduled to be launched next year, will have two lower altitude satellites flying abreast, with a separation of between *ca.* 150 to 200 km. to record the horizontal magnetic gradient. Since the CHAMP satellite has been in orbit for eight years and has obtained an extensive range of data, both vertically and horizontally there is a large enough data base to compute the horizontal magnetic gradients over the Pannonian Basin region using these many CHAMP orbits. We recomputed a satellite magnetic anomaly map, using the spherical-cap method of Haines (1985), the technique of Alsdorf et al. (1994) and from spherical harmonic coefficients of MF6 (Maus et al., 2008) employing the latest and lowest altitude CHAMP data. We then computed the horizontal magnetic anomaly gradients (Kis and Puszta, 2006) in order to determine how these component data will improve our interpretation and to preview what the SWARM mission will reveal with reference to the horizontal gradient anomalies. The gradient amplitude of an 1000 km northeast-southwest profile through our horizontal component anomaly map varied from 0 to 0.025 nT/km with twin positive anomalies (0.025 and 0.023 nT/km) separated by a sharp anomaly negative at 0 nT/km. Horizontal gradient indicate major magnetization boundaries in the crust (Dole and Jordan, 1978 and Cordell and Grauch, 1985). Our gradient anomaly was modeled with a two-dimensional body and the anomaly, of some 200 km, correlates with a 200 km area of crustal thinning in the southwestern Pannonian Basin.