Multiscale study of the Adriatic magnetic anomaly

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The complex geological setting of the Adriatic region is still an interesting subject of debate and interpretation. The north-eastern portion of the Adriatic Sea is characterized by a wide magnetic anomaly extending up to the coast of Croatia. In this work we presented a new model of the main source of the Adriatic magnetic anomaly using the Multiridge and DEXP methods. A multiscale dataset was built by upward continuing the high-resolution grid of the total magnetic field up to 20 km altitude. We employed the multiridge method along a profile and used a geometric approach to obtain the depth of the deep sources by considering the high-altitude portion of the ridges. The singular points retrieved were compared with previous magnetic models showing a good agreement with the depth of the magnetic basement. In particular, the intersection points seem to be related to local changes of the basement morphology, probably coincident to the horst and graben structures formed during the extensional movements and crustal thinning of the Middle Triassic. The nature of such magnetic sources was evaluated by employing the 'scaling function' method along the ridges of the Multiridge section and estimating the homogeneity degree 'n'. The structural index values retrieved are typical of finite fault or sill structures suitable to interpret the shape of a basement or a magnetic interface. The DEXP method was applied to the Multiridge profile and the results are fairly well coincident to the depth carried out by the geometric approach. By fitting the depth solution of the Multiridge section we modeled the trend of the basement beneath the Adriatic magnetic anomaly confirming that the uplift of such magnetic structure is to be assigned as the main source contribution to the magnetic anomaly field up to high altitude.