

Full vector palaeosecular variation curve for Italy based on revised data from archaeological material and volcanic rocks

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In this paper we present a revised compilation of directional and intensity Italian archaeomagnetic data, coming from both archaeological material and volcanic rocks. The quality of the data has been carefully investigated, with particular attention on the reliability of the dating of Italian historical volcanic eruptions, and on the quality of the archaeointensity determinations. Data from volcanic rocks with disputable age has not been considered. Comparison between the available archaeomagnetic data from archaeological material and volcanic rocks of reliable age shows very good agreement. Strict selection criteria were applied to gather the most reliable Italian reference data, both from archaeological material and volcanic rocks, in order to guarantee the high quality of the reference data used for curve building. Our selection was limited in the last 3000 years, as archaeomagnetic records from older periods are very scarce for further considerations. To enrich the Italian reference dataset and to cover the time periods that were poorly investigated in Italy, we have also included high-quality archaeomagnetic data available within a 1000 km radius around Viterbo, situated in central Italy. The new directional and intensity secular variation (SV) curves were computed using the Bayesian statistics. The obtained directional curve is very well constrained while the intensity curve is characterized by larger error envelopes, highlighting the need of new high-quality intensity data from Italy. Thanks to the privileged geographical position of the Italian peninsula, situated almost in the center of the Mediterranean, the new SV curves were used to analyze the evolution of the geomagnetic field in Europe by comparing them with other recently published SV curves for Western and Eastern Europe as well as with global geomagnetic field models.