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Secular variation and evolution of the geomagnetic dipole moment in western Europe for the last two millennia. Comparison with global geomagnetic field models.

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Recently a first secular variation (SV) curve for the Iberian Peninsula was computed by hierarchical Bayesian method using a total of 134 archaeomagnetic directions with ages ranging from -775 to 1959 AD. A general agreement is observed between the Iberian curve and the French and German SV curves, although some interesting differences were found, such as the occurrence of lower inclinations between the 11^{th} and 14^{th} centuries in the Iberian curve. The analysis of these three reference curves indicates that SV in Western Europe is characterised by three major directional changes at -125, 200 and 1350 AD. It is suggested that these cusps are regional features of the geomagnetic field. Archeointensity studies on 21 kilns, a group of jar fragments and a collection of baked bricks dated between 1000 and 1959 AD, along with one roman pottery kiln, have been conducted in order to obtain high quality intensity data to enhance the western European database. The Thellier method with corrections for anisotropy of thermoremanent magnetization (TRM) and for cooling rate dependence of TRM acquisition was used. The new Spanish data together with previously published results were used to obtain, also by Bayesian modelling, the geomagnetic field intensity over the past two millennia for western Europe. The results indicate that

geomagnetic intensity remained more or less constant between the 1^{st} and 4^{th} centuries AD, and between the 14^{th} and 16^{th} centuries (mean values, at Paris, around 65 and 57 μT, respectively), whereas an important decrease occurs between the 17^{th} and 19^{th} centuries. The detailed evolution of geomagnetic field intensity during the High Middle Ages is not yet well established. The curves obtained have been compared with global models. Despite their differences, even for the dipolar terms, geomagnetic global models predict the directional and intensity results reasonably well. This work indicates the need to obtain a large number of archaeointensity data for each time interval in order to reliably record variations of the geomagnetic field and to test whether any relationship exists between field intensity and climate.