A New Geomagnetic Field Model for the last 2k years based on high quality archaeomagnetic and volcanic data

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The knowledge of the ancient Earth's magnetic field is crucial to understand its origin and future evolution. In this context, the palaeomagnetic studies provide useful information about the past geomagnetic field registered in rocks, lava flows, sediments or archaeological materials. The continuous upgrade of the palaeomagnetic database during the last decade has allowed the generation of global geomagnetic field models based on different palaeomagnetic data and techniques (such as the SHA.DIF.14K, ARCH3K.1, CALS3K.4b, pfm9k.1a models, among others). Some recent studies have pointed out that the archaeointensity database might not be reliable enough, by observing high scatter in the records. Here, we present a new global geomagnetic model for the last 2000 years, SHAQ2K, based on high quality archaeomagnetic and volcanic intensity data. For this purpose we classify the palaeointensity data in two quality categories following widely accepted palaeomagnetic criteria based on the methodology used during the laboratory treatment of the samples and on the number of specimens finally used to calculate the mean intensities. Respect to the modelling process, we use the spherical harmonic analysis in space and cubic b-splines in time, also applying a spatial and temporal regularization which minimizes the energy of the geomagnetic field at the core-mantle boundary. The implications of the differences between this new model and other previously published global geomagnetic models are discussed.