



## **A new global geomagnetic model based on archeomagnetic, volcanic and historical records**

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The major challenge of geomagnetic field reconstruction lies in the inhomogeneous spatio-temporal distribution of the available data and their highly variable quality. Paleo- and archeomagnetic records provide information about the ancient geomagnetic field beyond the historical period. Typically these data types have larger errors than their historical counterparts, and investigated materials and applied experimental methods potentially bias field readings. Input data for the modelling approach were extracted from available collections of archeomagnetic, volcanic and historical records, which were integrated into a single database along with associated meta-data. The used iterative Bayesian inversion scheme targets the implementation of reliable error treatments, which allows to combine the different data types. The proposed model is scrutinized by carrying out tests with artificial records. Records are synthesized using a known field evolution generated by a geodynamo model showing realistic energy characteristics. Using the artificial field, a synthetic data set is generated that exactly mirrors the existing measured records in all meta-data, but provides data that would have been observed if the artificial field would have been real. After inversion of the synthetic data, the comparison of known artificial Gauss coefficients and modelled ones allows for the verification of the applied modelling strategy as well as for the examination of the potential and limits of the current data compilation.