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## Paleomagnetism of the Cretaceous Alkaline Magmatism of the Lusitanian Basin, Portugal

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The paleogeographic reconstructions of the Iberian plate during the opening of the Atlantic Ocean is still poorly constrained. Major limitations include the paucity of high quality paleomagnetic poles and geochronological constrains, the occurrence of widespread remagnetization events, and controversial seafloor magnetic anomalies. Recent studies provided new high quality paleomagnetic poles from intrusive rocks (sills) dated at 88 and 94 Ma, which contributed to improve the calibration of the apparent polar wander path of Iberia at this time interval. These intrusive rocks are part of the Cretaceous Alkaline Magmatic Pulse that occurred between 72 and 94 Ma, and that is expressed by sills and lava flows cropping out in the Lusitanian Basin of Portugal. Here we provided new paleomagnetic, rock magnetic and anisotropy of magnetic susceptibility (AMS) data of two sills apparently contemporaneous of the Cretaceous Magmatic Alkaline Pulse, namely the Anços sill in the city of Mafra and the Lomba dos Piano sill in the vicinity of the city of Sintra. Rock magnetic experiments consisted in the acquisition and unmixing of isothermal remanent magnetization curves, thermomagnetic analyses, and hysteresis curves, complemented by petrographic analyses. Results indicate that the main magnetic carrier is a mixture of SD to MD titanomagnetite. The magnetic fabric of the Anços sill is oblate in both sills and sub-horizontal  $k_3$  eigenvectors indicate that no major tilting occurred after the intrusion of the rocks. The Lomba do Piano sill shows more scattered eigenvector directions with a mixture of oblate and prolate fabrics. After alternating field demagnetization, all samples show high-quality and reliable magnetic vectors, with a mean characteristic remanent magnetization orientated  $Dec=346.88^\circ$ ,  $I=42.66^\circ$  ( $n/N=219/228$ ;  $k=78.19$ ;  $a95=1.8^\circ$ ) for Anços and  $Dec=351.12^\circ$ ,  $I=48.90^\circ$  ( $n/N=142/143$ ;  $k=94.03$ ;  $a95=1.23^\circ$ ) for Lomba dos Pianos. All magnetic vectors show a normal (positive) polarity, characteristic of the Cretaceous Normal Polarity Superchron. The corresponding virtual geomagnetic poles (VGP) are  $Plong=212.62^\circ$  and  $Plat=72.03^\circ$  ( $N=219$ ,  $K=98.81$ ,  $A95=0.96^\circ$ ) for the Anços sill and  $Plong=212.12^\circ$  and  $Plat=78.35^\circ$  ( $N=142$ ,  $K=74.22$ ,  $A95=1.38^\circ$ ) for the Lomba dos Pianos sill. The Anços VGP plots close to the poles of the Paços d'Ilhas (PI, 88 Ma) and Foz da Fonte (FF; 94 Ma) sills previously published. However, the VGP of the Lomba dos Pianos has a distinct and lower paleolatitude, questioning the contribution of paleosecular variations (PSV). We

applied the method of the A95 envelope and find that PSV has not been minimized in the studied sills, which can be explained by the rapid cooling of this kind of rocks. We compiled paleomagnetic data of all sills to provide a more robust paleomagnetic pole for the interval of 88-94 Ma.

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