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^{10}Be in Black Sea sediments around the Laschamp geomagnetic excursion

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Cosmogenic radionuclide production changes induced by varying geomagnetic field strength leave their signature in natural environmental archives. Detecting and aligning the cosmogenic radionuclide production signature provides the possibility for synchronizing the time-scales of different environmental archives using curve fitting methods and investigating the dynamics of climate variations in space and time, with minimized uncertainties in the relative timing.

Variations of the cosmogenic radionuclide ^{10}Be in Black Sea sediments reflect a well-preserved record of the Laschamp geomagnetic excursion around 41000 a BP. Our time-series confirms the double-peak structure inferred from relative paleointensity changes in sediments of the same archive, connected with an about 400-year full polarity reversal. Synchronizing the Black Sea ^{10}Be time-series around the Laschamp event to a ^{10}Be record from Central Greenland (based mainly on the GRIP ice core) using lag-correlation analysis reveals a temporal offset between both records of 172 (+136/–123) years (max. $r=0.68$, $p<0.01$). The synchronized records allow us to directly compare climate proxy records reflecting Dansgaard-Oeschger events seen in Black Sea sediments and Greenland ice cores and investigate the evolution of these rapid climate changes on a hemispheric scale.