Geophysical Research Abstracts,
Vol. 11, EGU2009-4187, 2009
EGU General Assembly 2009

Paleomagnetic and cosmogenic nuclide records of the Laschamp « event » in pleistocene sediments and chronological implications.

N. Thouveny (1), L. Ménabréaz (), F. Demory (), and D.L. Bourlès ()

(1) CNRS-CEREGE, Geophysics and planetology, Aix-en-Provence, France (thouveny@cerege.fr), (2) Rock Magnetic Analyses,13009, Marseille, demoryrma@free.fr

More than 40 years after its discovery (Bonhommet and Babkine, 1967) and 40,000 years after its occurrence, the « Laschamp Event » remains a major « hot spot » of geomagnetic research. Intensive discussions still concern : i) its precise age in the window 37 - 42 ka BP, ii) its duration from few centuries to several millenia, iii) the worldwide variability of its records [VGP paths, connection with the Mono lake excursion], iv) consequences of the dipole field decrease on atmospheric C-14 and radiocarbon chronologies. In 1980, as the geomagnetic origin of the « event » was still questioned, Norbert Bonhommet encouraged our paleomagnetic quest for geomagnetic paleosecular variation (PSV) in pleistocene Maar lake sediments of the Velay region (1̃00 km south from Laschamp). No excursional direction appeared in PSV records of Lac du Bouchet for the PSV dispersion recorded by these sediments was attenuated by 20% compared to the PSV dispersion lava flows of Chaîne des Puys. The normalization of NRM intensities by susceptiblity, ARM, synthetic post-depositional RM revealed a remarkable interval of low relative paleointensity interval between 30 and 40 ka BP. Higher sedimentation rates in the nearby Maar of St Front allowed the record of the excursion during this low RPI interval. Paleomagnetic studies of sediment cores collected in the North East Atlantic and West equatorial Pacific oceans by the R.V. Marion Dufresne from 1995 to 2004 have revealed large amplitude PSV and excursions linked with such low RPI interval. The reconstruction of the cosmogenic beryllium production performed in this time interval along the same sediment cores, revealed a large spike at this time, which confirmed the occurrence of a dipole field collapse lasting about two millenia. In the N.E. Atlantic cores, these signatures are all stratigraphically located 20 to 30 cm beneath the IRD layer of Heinrich event 4. If this excursion, in this weak dipole field interval, is identified to the Laschamp « event », which makes little doubt, then the later occurred prior H4, during the Dansgaard-Oechger interstadial #10, i.e. at an age of 40-42 ka BP, according to ice laminae countings in the Greenland ice cores, and in agreement with the most recent radiometric determinations. The dipole collapse at this time is likely to be the origin of the atmospheric enhancement of C-14 documented after 40 ka BP. (Full References to all the cited studies are in Thouveny et al. EPSL, 275, 269-284, 2008).