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Extended record of ^{10}Be at EPICA Dome C during the last 800 000 years and its synchronization with geomagnetic paleointensity variations from marine sediments

Alexandre Cauquoin (1), Grant Raisbeck (2), Jean Jouzel (1), Edouard Bard (3), and Aster Team (4)

(1) Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), Orme des Merisiers, 91191 Gif-sur-Yvette, France , (2) Centre de Spectrométrie Nucléaire et de Spectrométrie de Masse (CSNSM), Bat 108, 91405 Orsay, France, (3) Aix-Marseille University, CNRS-IRD-Collège de France, UM 34 CEREGE, Technopole de l'Arbois BP80, 13545 Aix-en-Provence, France, (4) ASTER Team : M. Arnold, G. Aumaître, D.L. Bourlès, K. Keddadouche, Aix-Marseille University, CNRS-IRD-Collège de France UM 34 CEREGE, Technopole de l'Arbois, BP 80, 13545 Aix-en-Provence, France

Polar ice cores are exceptional archives that permit the reconstruction of many parameters (variations of temperature, atmospheric composition...) and the reconstitution of the past variations of the Earth climate and environment. They also give access to beryllium-10 (^{10}Be) fallout, an isotope of cosmogenic origin, created by the interaction of Galactic Cosmic Rays (GCR, constituted of high energy charged particles) with the upper atmosphere. The cosmic rays being modulated by solar activity and Earth's magnetic field intensity, the ^{10}Be production is inversely related to the intensity of these two parameters. Most ^{10}Be produced is quickly removed from the atmosphere (residence time in the stratosphere $\sim$1-2 years) and, on the Antarctic plateau, falls mainly by dry deposition as aerosols.
So, ^{10}Be can be used as a proxy of paleointensity. It has allowed the improvement of ice cores chronologies thanks to absolute stratigraphic markers linked to excursions and inversions of the geomagnetic field such as the Laschamp excursion [1] or the Matuyama-Brunhes reversal [2, 3].
EPICA Dome C (75° 06' S, 123° 21' E) is a 3270 meter ice core drilled in East Antarctica in the framework of an international project. It offers a complete climate record over the last 800 000 years. As shown at the IPICS 2012 meeting, for the 355 – 800 ka period [4], a continuous high-resolution (11 cm) ^{10}Be profile in this core can be synchronized with continuous variations of paleointensity (PISO-1500) recorded in marine sediments [5] in order to obtain a continuous relative chronology of climate proxies (δD and δ^{18}O respectively) for these two reservoirs. Here, we extend this synchronization down to 269 ka, thus including termination IV and interstadial MIS 9.

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[5]. Channell et al. (2009) Earth and Planet. Sci. Lett., 283, 14 – 23.