



## **One Small Reversal for the Field, one Giant Leap for Mankind (Petrus Peregrinus Medal Lecture)**

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Despite complex factors governing the acquisition of their magnetization, sediments have allowed us to recover the evolution of the dipole field variations during the past 2 Ma. One dominant feature is the existence of multiple periods of very low field intensity associated with either excursions or reversals. It is reasonable to consider that similar characteristics of the field during the brief transitional and excursions periods emerge from the records of lava flows as well as from very fast deposited sea-sediments. They can be easily simulated by the dominance of a time varying non-dipole field emerging after a long and large decrease of the dipole. Similarities between excursions and reversals are reinforced by the fact that all detailed records of excursions exhibit virtual geomagnetic poles (VGPs) which reach the opposite polarity. In fact, it is impossible to reach the ratio of the number of reversed to intermediate VGPs present in the paleomagnetic records if excursions were not associated with a short period of reversed dipole field. Therefore, most if not all excursions should be regarded as two successive reversals bracketing an aborted polarity interval. A significant example is the Laschamp event which can be seen as the youngest excursion of the field immediately after the Mono Lake event which is not so clearly identified. The age of the Laschamp event is now well constrained by multiple datings that converge at 40 ka B.P. The Laschamp is also the best documented event from volcanic and sedimentary records obtained at distinct geographic locations. During this short period we know that the field reversed completely and remained extremely weak at the surface of the planet.

No attention has been given so far to the puzzling synchronism between the geomagnetic excursion of Laschamp and the demise of the Neanderthal population. The Laschamp has been the most dramatic event that was encountered by the Neanderthals over the past 300 thousand years of their existence. The causes of Neanderthal extinction and the transition with the modern man in Europe and Near East remain largely uncertain. The two main factors currently proposed are the arrival of a modern human competitor and/or the aptitude of the Neanderthals to survive rapidly changing climatic conditions. None of these hypotheses is fully satisfactory because the Neanderthals experienced other large climatic changes and the duration of overlap of the two populations remains largely unknown and even uncertain. We will discuss the habits of the Neanderthals and describe their surrounding environment before investigating the possible consequences of a geomagnetic event such as the Laschamp for this population.