



Geomagnetic excursions in the Brunhes Chron

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Brunhes was the first to suggest in 1906 that the Earth's magnetic field may have reversed its polarity in the past. In 1929, Matuyama was the first to attempt to differentiate mainly Pleistocene lavas from Pliocene lavas based on the polarity of magnetization, i.e. to use magnetic stratigraphy as a means of ordering rock sequences. The development of the modern polarity time scale began in the 50's and 60's, with the work of Roche, Cox, Mc Dougall, Tarling, Creer, Runcorn, Opdyke... In 1968, Heirtzler et al. produced a polarity time scale for the last 80 Myrs using marine magnetic anomalies and this work was further improved by Cande and Kent .

The reality of geomagnetic reversals was firmly established and detailed studies of how the field reverses were produced, among others, by Fuller, Hoffman, Clement, Valet and Laj. These studies gave rise to still on-going controversies. In the last 15 years or so, the advent of powerful coring tools, such as the ODP hydraulic piston corer or the Calypso corer of the IPEV led to the recovery of long sequences of high-sedimentation rate sediments from the deep sea. Combined with improved age control this allowed to progressively show that brief episodes of geomagnetic polarity reversal, which were previously treated with skepticism, were real global short geomagnetic field variations.

In this presentation we briefly review these developments then give a detailed description of the excursions identified in the Brunhes Chron with particular emphasis on the 5 most studied ones (Mono Lake, Laschamp, Blake, Iceland Basin and Pringle Falls excursions). For the two excursions recorded at different geographic sites worldwide (Laschamp and Iceland Basin) the transitional VGP paths suggest that a dipole component dominates the transitional excursion field. The short duration inferred for most of the excursions studied in detail provides support to Gubbins' suggestion of a difference between field reversals and excursions.