Geophysical Research Abstracts, Vol. 7, 04038, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04038

Evidence against a long term control of earth climate by galactic cosmic rays

L.Lanci (1) , S. Galeotti (2)

(1) Istituto di Dinamica Ambientale, Università di Urbino, Loc. Crocicchia, Urbino, PU 61029 Italy,

It has been proposed that Earth global climate could be affected by galactic cosmic rays (GCR) based on a mechanism of enhanced cloud formation due to ionization of atmospheric aerosol by GCR. The supposed net effect of an increased cloud cover would be a decrease of radiative forcing and thus a climate cooling, which is thus expected in conjunction with enhanced GCR flux. The equatorial regions are the most sensitive to the radiative forcing and, on the time scale from one hundred thousand to one million years, the intensity of geomagnetic field is the most important factor controlling the amount of GCR reaching the Earth at low-latitude regions. Based on the assumption above, periods with high geomagnetic field intensity, which effectively shield the GCR, should therefore, correspond to a warmer climatic record. To test this hypothesis we have compared a 30Myr (lower Oligocene-lower Pliocene) record of relative geomagnetic intensity from nearly equatorial ODP Sites 1218 and 1219 with tropical shallow-water oxygen isotope record. The records have been dated and precisely correlated based on the same geomagnetic polarity time scale whose precision is adequate to the resolution used in this exercise. Results suggest a moderate degree of correlation between the records, however the sign of correlation is opposite to that expected; the warmer period corresponding to low geomagnetic field intensity. Based on our results we suggest that, on a geological (i.e., long-term) time scale, the putative influence GCR and climate is not supported by data. The significance of the weak correlation between geomagnetic field intensity and climate, suggested by the data, needs further investigations to be demonstrated.