Kuznetsov V V, J Earth Sci Clim Change 2014, 5:6
http://dx.doi.org/10.4172/2157-7617.S1.016

Reversals and excursions of geomagnetic field: Geophysical factors impact upon climate and life evolution

Kuznetsov V V
Russian Academy of Science, Russia

Here we discuss geophysical characteristics of reversals and excursions of the Geomagnetic Field (GMF) which are shown to affect the Earth life evolution, human one specifically. Their main feature is that the geomagnetic field terminates its protection activity in relation to cosmic radiation, the cosmic rays charged particles usually diverged by the geomagnetic field or accumulated in radiation belts penetrate into the Earth atmosphere. The resulting abrupt rise of the radioactivity is revealed to be high. As it follows from our estimations the tenfold decrease of GMF module inherent to Laschamp excursion causes a few orders increase of cosmic rays particles flux density and the induced radiation dose impact on biological objects is significant. By model of Kuznetsov during reversal or excursion phenomenon unique to the whole Earth the Global Magnetic Anomalies are responsible for different levels of the radiation over various regions of the Earth surface. The GMF fall magnitudes are recorded to be less in the Americas, Asia and Australia, than in Africa and Europe. As the duration of reversal or excursion so the field intensity fall differ from one event to another. It is revealed that the duration of a polarity transition is shorter than this of the field intensity fall. Global climate changes and geomagnetic field excursions are well known to be synchronous. The problem is that different climate effects associated with excursions are not explicable now. The model when during reversals and excursions the geomagnetic field loses a lot in its module value making cosmic rays penetration into the Earth atmosphere possible with resulting destruction of stratosphere aerosols which are backscattering incoming solar radiation at the time of glaciation is proposed. The following atmosphere transparency enables the Sun rays to warm the Earth surface with resulting wane of the ice sheets and global climate warming. If the excursion is starting in transparent atmosphere conditions such as now then the penetrating cosmic rays generate ionization, condensation nuclei and eventually the solar radiation shielding i.e., cooling. The extent to which the geophysical factors of the GMF excursions develop determines their correlation with events in biota evolution. Nowadays as the continuing decrease of the GMF intensity so the directions of the magnetic poles drift correspond to the field polarity change during an excursion.

vvkuz38@mail.ru