



Regional cosmic ray induced ionization and geomagnetic field changes

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Cosmic ray induced ionization (CRII) is an important factor of the outer space influence on atmospheric properties. Variations of CRII are caused by two different processes - solar activity variations, which modulate the cosmic ray flux in the interplanetary space, and changes of the geomagnetic field, which affect the cosmic ray access to Earth. Migration of the geomagnetic dipole axis may greatly alter CRII in some regions on a time scale of centuries and longer. Here we present a study of CRII regional effects of the geomagnetic field changes during the last millennium, using a recent reconstruction of the geomagnetic field changes. We show that regional effects of the geomagnetic dipole axis migration may be more important, in some regions in CRII centennial variations, than the global changes due to solar activity variations. In particular, the level of CRII during the last millennium was affected mostly by the geomagnetic field changes in such climate-determining regions as Europe/North Atlantic and Far East. Therefore, it is crucially important for solar-terrestrial relationships to study not only globally averaged effects but also regional variations of CRII.