



Interstellar-terrestrial relation

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There is increasing evidence that there exist interstellar-terrestrial relations and that the heliosphere's effectivity to serve as a protecting shield for the Earth, specifically against cosmic rays, is varying in time. Nonetheless, a debate is going on whether, amongst other drivers, the Sun or the cosmic rays are influencing the terrestrial climate, particularly on periods of hundred years and shorter. On very long time scales, e.g. millions to hundred of millions years, varying cosmic rays intensities are in accordance with temperature indices.

As the modeling of the transport of cosmic rays in the heliosphere has evolved from pure test particle simulations to far more consistent treatments, one can explain various correlations within the framework of physical models and one can make quantitative predictions regarding terrestrial indicators of interstellar-terrestrial relations.

Recently, also the connection between the ionization and the cloud condensation nuclei are under investigation. First results indicate such a relation. Therefore, varying cosmic ray fluxes causing changing ionization rates can act as an additional climate driver.

Here we will present the physical concepts of the cosmic ray transport, its variation with time in the heliosphere, magnetosphere and atmosphere and its possible imprints in Earth's archives.