

Correlation Between Clouds and Cosmic Rays: Is It Real?

ILYA USOSKIN¹, MIRELA VOICULESCU², GENNADY KOVALTSOV²,
KALEVI MURSULA⁴

¹*Sodankyla Geophysical Observatory, University of Oulu, Finland*

²*Dunarea de Jos University of Galati, Romania*

³*Ioffe Physical-Technical Institute, St. Petersburg, Russia*

⁴*Dept. of Physical Sciences, University of Oulu, Finland*

The investigation of the relation between solar activity and the cloud coverage is an important issue for understanding the global climate change. Recent results have suggested that the low cloud amount has a high degree of correlation with the flux of galactic cosmic rays impinging on the Earth. Because of the scarcity of ground based cloud observations, satellite-based cloud data collected in the ISCCP database are commonly used in such studies. Lately, doubts have been cast on the purity of low cloud data in ISCCP, suggesting that they may be obscured by middle and high clouds in the satellite view. If this is the case, most of the earlier results based on ISCCP data would be devaluated. Here we reanalyse the ISCCP cloud coverage data in 1984-2004 and its relation with the cosmic ray induced ionization, and show that the correlation between low clouds and cosmic rays is affected by higher clouds in some geographical regions, but not everywhere. In turn, our results show that low clouds also may affect the relation of higher clouds with cosmic rays in some regions. Accordingly, correlation analysis can be performed only when the strong relation between clouds of different types is taken into account. In particular, studies based on global or latitudinal (zonally averaged) cloud data should be revised.