

Field:

Earth Science/Environment

Session Topic:

Solar Activity and Climate

Chair:

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A number of investigations that show linkages between the solar activity and the earth's climate have been reported for many decades. Although some of the observational studies apparently indicate very strong correlations between them, the existence of these linkage are not always accepted broadly in the community of meteorologists, due to the possibility of eventuality and the difficulties in indentifying their physical mechanism. However, the possibility of this linkage should be examined extensively since the quantitative estimations of the solar activity's effects on the atmosphere, if exists, are crucial in considering global climate change including global warming. Actually in this decade the situation seems to changes for sure, namely, many of meteorologists became to pay attention to the progress of this research field, partly because more persuasive results, such as talks in this session, are suggested recently.

Not a few ideas have been submitted to explain the observational results that show the linkage between the solar activity and the earth's climate, though it's too early to conclude which one is dominant at this moment... we may need more careful assessments of those hypothesizes. Most of the stories that explain the linkages can be classified into four categories: 1) Modulation of galactic cosmic ray (GCR) by interplanetary (solar wind) magnetic field, which may produce ions, the origin of cloud particle, 2) Modulation of total solar irradiance (TSI) with an amplitude of order of 0.1 percent which heat the ground directly, 3) Modulation of solar ultra-violet radiation with an amplitude of more than few percent, which may change winds in the stratosphere connected to the troposphere, 4) Modulation of atmospheric electric current by changes of the ionospheric potential and conductivity of the atmosphere caused by high energy particles from space, which may change the distribution of ions.

In this session, we will discuss what we should do as a next step to reach the determination of the mechanism, especially under the collaboration among broad range of scientists.