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Statistical analyses of solar activity and climate change

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Introduction

There are a lot of studies about the relationship between the solar activity and the climate change, and various theories have been proposed. However, there is no definite theory. Then, the purpose of this study is to find how the solar activity influences Earth's climate.

Analysis

We compared the annual mean global temperature, precipitation, sea surface temperature and amount of low cloud with the sunspot number. The data of the sunspot number that we used are provided by Solar Influences Data Analysis Center (SIDC).

Result

The correlations were not significant when we compared the annual mean global temperature, precipitation, sea surface temperature and amount of low cloud with the sunspot number. About the amount of the low cloud, our result is the same as Svensmark's (Svensmark, 2000) between 1983 to 1991 and 1998 to 2009, i.e. these inversely correlated. However, from 1991 to 1998, our result is not the same as Svensmark's.

Conclusion

The correlation of the sunspot number and the annual mean global temperature, precipitation, sea surface temperature and amount of low cloud was not significant. As for the Svensmark's theory, our result partly consisted of his theory, but partly contradicted his.

Keywords: solar activity, climate change, cosmic ray, cloud amount, statistical analyses, correlation