



Study of extreme events, from Carrington to now

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The goal here is to make an inventory of extreme events since 1859 until today and try to answer the question: is Carrington event a worse event than others? First, a state of the art on the 1859 Carrington event will be conducted, including recalling the sequence of events and the various data available. Then the second part will be devoted to the study of magnetic activity during the Carrington event in comparison with other more recent events such as in October 2003 and July 2004, for example. Thus a $K_{\text{Equivalent}}$ index will be calculated from magnetic data measured by the ground stations during the 1859 events and during other remarkable events in the space age. The result of this study seems to show that Carrington is really an extreme event but some more recent events are roughly comparable. Then, a third section summarizes a study on research of extreme events from 1859 to 2013 through the magnetic index AA. It appears to show that the number of extremes events follow the solar cycle. A final section is devoted to auroras observed during extreme events and in particular the magnetic latitude observations based on the intensity of the event.