Usage of Historical Documents with Scientific Understandings in the field of Solar Physics

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The sun is the most studied star by mankind, yet our knowledge on our parent star is based on the observation of limited time scale. Solar activities have been scientifically recorded for ~400 years with sunspot and ~160 years with flares (sudden increment of light emission with energy release). Meanwhile, people have witnessed and recorded the traces of solar activities for thousands of years, which we nowadays call as aurora. By combining scientific sunspot observations and historical records of aurora, first goal of our study is to decode solar flare activities for last ~400 years.

The physical variable of interest is the flare magnitude, and we have developed an estimation method with the statistics based on modern-day solar observations. The key of this method is an observation of low latitude aurora, which is a strong indication of coronal mass ejection at the flare. By knowing the size of sunspot and the existence of coronal mass ejection, our statistical method could estimate the magnitude of the flare.

At our poster, we will discuss the potentiality and difficulty of solar physics with historical documents. We hope this poster could be a demonstration of successful collaboration of science and history.

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