Secular Changes in Extreme Space Weather Activity Observed Near 1 AU : Solar Origin and Possible Terrestrial Effects

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Solar dynamo is known to control the solar activity and related space weather changes observed near 1 AU. It will be shown that the occurrences of super geomagnetic storms (Dst > 500 nT) and large fluence solar proton events exhibit a secular decreasing trend during the sunspot cycles 9-23. The temporal change in solar dynamo characteristics inferred from (a) calculations of solar magnetic flux amplification factor [1] (b) observations of solar equatorial rotation rate and (c) calculations of the shift in
barycentre of the solar system from the solar centre seem to explain the secular trend in space weather activity observed near earth. The geomagnetic and cosmic ray modulation of atmospheric phenomena [2] due to extreme space weather activity changes will be discussed in the above context.

References

[1] T.E.Girish and G.Gopkumar , Secular Changes in Solar Magnetic Flux Amplification Factor and Prediction of Space Weather,Paper presented in the *IAU Symposium 257: Universal Heliophysical Processes*, Ionnina,Greece (2008).
[2] I.G.Usoskin and G.A Kovalstov, *Comp Ren. Geosci.* **340,** 441 (2008).