Project Details

ROSES ID: NRA-00-OSS-01
Selection Year: 2001
Program Element: Independent Investigation: LWS

Project Title:
Historical Evidence for Major Solar-Terrestrial Outbursts for the past 150 Years from the Analysis of Nitrate Data in Polar Ice Cores

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Summary:
The objective is to ascertain from historical data the probability of major solar-terrestrial events that had a significant proton flux for the past 150 years. Our most recent analysis supports the supposition that major solar proton fluence events (those with >30 MeV omni-directional fluence exceeding 109 cm-2) generate sufficient NOy in the upper atmosphere so that when the polar vortex is operating the resultant NOy is deposited in the polar snows. Magnetic records exist indicating major solar-terrestrial activity for the past 150 years. We propose to analyze the nitrate records to compare the NOy deposition in the years when major magnetic storms have occurred against the nitrate record in polar snows deposited within a few months of each event. The results of this study are appropriate to three of the four LWS NASA Strategic Enterprises.

Publication References:

Summary: no summary

Reference: McCracken, K. G.; Dreschhoff, G. A. M.; Zeller, E. J.; Smart, D. F.; Shea, M. A.; (2001), Solar cosmic ray events for the period 1561-1994: 1. Identification in polar ice, 1561-1950, Journal of Geophysical Research, Volume 106, Issue A10, p. 21585-21598, doi: 10.1029/2000JA000237

Summary: no summary

Reference: Shea, M. A.; Smart, D. F.; (2004), The Use of Geophysical Data in Studies of the Historical Solar-Terrestrial Environment, Solar Physics, Volume 224, Issue 1-2, pp. 483-493, doi: 10.1007/s11207-005-4138-z