

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 NO_y in the upper atmosphere so that when the polar vortex is operating the resultant NO_y 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 NO_y 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