

Title: Solar Influence on Terrestrial Weather and Global
Lightning Patterns via Cosmic Ray Modulations

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Significant Accomplishments to Date in FY-84:

1. We have obtained additional cosmic ray neutron monitor data needed for use in three of our analyses: (1) solar activity influence on ionization of the upper troposphere and tropopause; (2) solar activity influence on Canadian high stratus in winter; and (3) the S3-4 satellite study of IMF/GMF magnetic coupling effects. Because of the new data acquisitions, we have trained two new data processing analysts. These tasks are now in process.
2. A general theory paper has been completed (see below) on the magnetic coupling model of solar activity influence on atmospheric processes. The magnetic coupling model is used to explain a number of seemingly diverse studies with emphasis on those concerning lightning incidence.

Focus of Current Research Activities and Plans for FY-85:

1. Continue the analyses, now in progress, of solar activity influence on atmospheric processes, especially those affecting high clouds and global lightning patterns.
2. Finish other theory papers, several of which appear in condensed form in the general paper just completed (see below).

Recommendations for New Research

1. Continue and expand measurement of upper troposphere ionization by three means: (1) cosmic ray neutron monitors on the earth's surface; (2) long duration super pressure balloons, both circumpolar and equatorial; and (3) low altitude polar orbit satellite cosmic ray surveys (i.e. the S3-4 SFEX experiment).

List of Publications Prepared since June 1983

1. "Cosmic Rays, Solar Activity, Magnetic Coupling and Lightning Incidence", to appear in the Proceedings of the International Conference on Lightning and Static Electricity, June 26-28, 1984, Orlando, Florida.