THE INFLUENCE OF SOLAR PROTON FLARES
ON THE CIRCULATION OF THE EARTH'S TROPOSPHERE

R. H. Olson
University of Colorado, Boulder, Colorado 80302, USA

W. O. Roberts
ASPEN Institute for Humanistic Studies, Boulder, Colorado 80302, USA

M. A. Shea and D. F. Smart
Air Force Geophysics Laboratory, Bedford, Massachusetts 01731, USA

The vorticity area index (VAI) is a measure of the size, intensity, and
number of cyclonic disturbances, existing at any one moment, in the Earth's
troposphere. Solar flares which cause PCA or GLE events seem to cause a
double effect on the VAI: (1) An increase in VAI at about the time of the
solar event, (2) A decrease in VAI some 3-5 days after the solar event,
apparently in connection with the geomagnetic storm which typically follows
the solar event.

The effects seem to be stronger for particle producing flares than for other
flares of equal magnitude. However, when PCA events not having a well defined
flare association are examined, the effects are much decreased. This is
interpreted to suggest that the particle radiation is not solely responsible
for the weather effects observed.

The observed effects are found at all seasons of the year, but are strongest
in the equinoctial months. The position of the flare on the sun is
relatively unimportant. If anything, there is a tendency for flares near
the western limb to be less effective in producing the sun-weather effect.
This is in contrast to the non-proton flares, which display a much stronger
influence on the weather if the flare is near central meridian.

Coordinates: SP 4.6 (Other) Possibility, Solar Effects on the Weather
This paper would be of general interest to all participants in the SP and
MG sections

Mailing address: M. A. Shea
Air Force Geophysics Laboratory (PHG)
Hanscom AFB
Bedford, Massachusetts 01731, USA

© Bulgarian Academy of Sciences • Provided by the NASA Astrophysics Data System