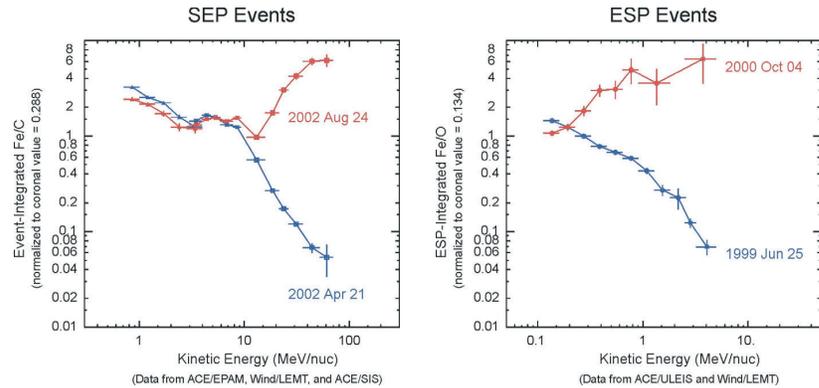


Tuesday AM

Session #1: Theory and Observations: What causes the energy-dependent Fe/O in large SEP events?

(working group 3)

In this session we hope to address the following question related to the campaign events. What causes the increase in Fe/O with energy in some large SEP events? We aim to combine theories and observations to better understand these events. These enhancements are associated with "exponential-like" turnover in the energy spectra and are therefore species-dependent. From the viewpoint of shock acceleration theory, exponential-like spectra are associated with spatial and temporal limitations. The exact point at which the spectrum deviates from a power law could depend on a number of things such as shock-normal angle, scattering mean-free path, shock strength, Q , M , etc. We hope to spark interest among scientists to de-convolve these into a nice picture of these events.



Key issues for this session are:

1. What are the occurrence rates of SEP and ESP events with extreme Fe/O energy dependence?
2. What is the seed population for these events?
3. Can existing shock acceleration mechanisms produce rising Fe/O with energy?
4. Does shock geometry play a role in producing rising Fe/O ratio with energy?
5. What are the main differences between perpendicular and parallel shocks in terms of spectral rollovers, acceleration times, injection thresholds?
6. What would be expected for the case in which the nominal (average) shock normal angle evolves as a shock propagates from the Sun to 1 AU?

Invited Speakers:

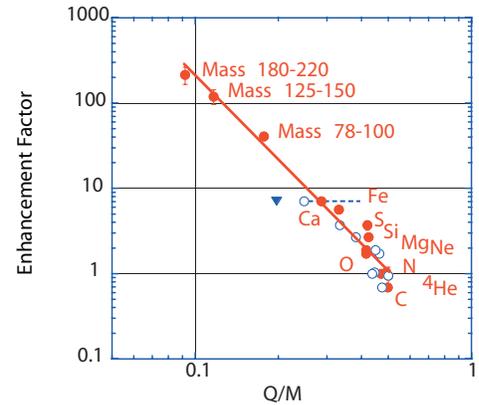
Allan Tylka, NRL
Mihir Desai, University of Maryland
Jozsef Kota, University of Arizona
Gang Li, University of California, Riverside
Joe Giacalone, University of Arizona

Tuesday PM

Session #2: Characteristics of impulsive SEP events and their solar origin.

(Joint with working group 1)

Recent measurements from ACE and Wind have shown the presence of ultra-heavy nuclei (mass > 100 AMU) in 3He-rich SEP events with enhancement factors that increase with mass and range between ~40-200 times the solar-system abundances. These exciting new measurements provide us with a great opportunity to test and constrain various particle acceleration models that are believed to operate during the so-called impulsive-flare-related SEP events. This session aims to bring together theorists and experimentalists to address the following key questions:



1. What are the basic characteristics (spectra and abundances) of heavy and ultra-heavy nuclei in 3He-rich SEP events?
2. Can RHESSI/TRACE observations be used to infer the solar origin of 3He-rich SEP events?
3. From these observations, what are the specific constraints on existing theories and models of particle acceleration and transport?

Invited Speakers:

Glenn Mason, University of Maryland
Don Reames, NASA/GSFC
Sam Krucker, SSRL, UC Berkeley
Vahe Petrosian, Stanford University
Randy Jokipii, University of Arizona
Jim Miller, University of Alabama, Huntsville

Wednesday AM

Session #3: Suprathermal-through-relativistic electrons during SEP events at 1 AU, their associated radio emissions and solar signatures

(Joint with working groups 1 and 2)

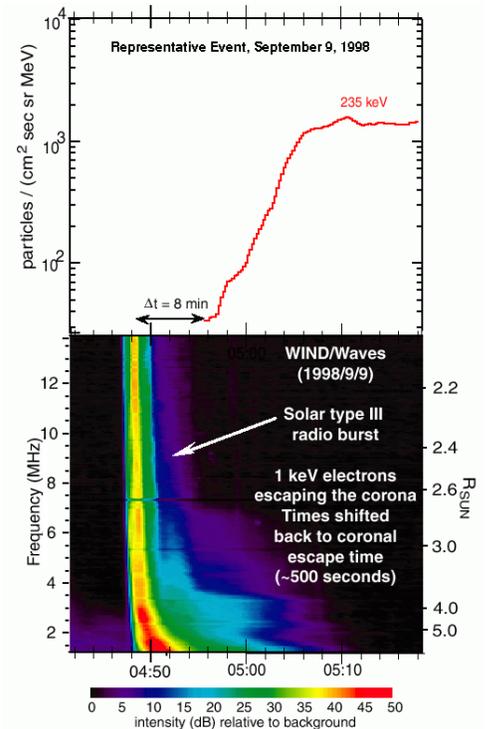
This session will investigate the relationship between electrons with energies ranging from hundreds of eV to tens of MeV and the associated radio emissions (e.g., Type II and III bursts) to identify their times of acceleration near the Sun and subsequent injection into the interplanetary medium. Such timing studies provide an essential first step toward establishing the connection between *in situ* particle observations made near the Earth, and the associated phenomena near the Sun i.e., CME-driven coronal shocks or flares. These identifications are critical for improving our understanding of the acceleration processes and the interplanetary transport of electrons observed at 1 AU.

This session will focus on the following questions:

1. What causes the delay between inferred electron injection times and the associated radio emissions?
2. What is the pathlength of the first arriving electrons?
3. Are lower-energy suprathermal electrons related to the higher-energy electrons? Do they have the same origin?
4. Are type II and type III radio emissions a key diagnostic for timing studies of SEP events?
5. Can observations from TRACE, Yohkoh, SoHO etc. be used to identify and characterize the source regions of the electrons and the radio emissions observed at 1 AU?

Invited Speakers:

Dennis Haggerty, Applied Physics Laboratory
Mike Reiner, NASA/GSFC
Jack Gosling, Los Alamos National Laboratory
Paul Evenson, Bartol Research Institute
Nariaki Nitta, Lockheed Martin, Palo Alto



Thursday AM

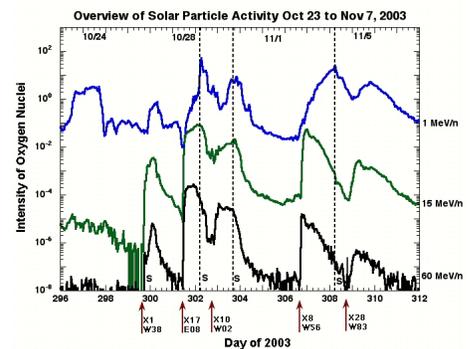
Session #4: Extreme SEP Events, their solar origin and impact on geospace

(Joint with working groups 1 and 2)

This session is motivated by the extreme solar-terrestrial events of October and November 2003 that were observed by many ground-based and space-borne instruments. Such disturbances are important both in the framework of scientific investigations of the near-Earth environment and because of their impacts on technological systems. This session aims to bring together various solar, heliospheric, and magnetospheric physicists to discuss similarities and differences between the well-documented extreme events of cycle 23 and those observed during previous solar cycles. The session will be focused on comprehensive discussions of the solar origin of such extreme events and their associated impacts on geospace.

1. What do differences in SEP data during the extreme Solar Particle Events of cycle 23 and those observed during previous solar cycles (e.g., October/November 2003 vs. September/October 1989) tell us about the acceleration mechanisms? Are there any similarities between these extreme events and the campaign events?
2. Can we use signatures in solar flare activity, CME observations etc., to shed light on the above differences?
3. How do such disturbances affect the near-Earth environment?
4. Can the differences in the solar and interplanetary data be used to understand their impacts on technological systems?
5. How can these scientific data be utilized to develop a comprehensive framework that could eventually enable more accurate prediction of the occurrence and potential impact of such events?

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Invited Speakers:

- Nat Gopalswamy, NASA/Goddard
- Christina Cohen, Caltech
- Joe Mazur, Aerospace Corporation
- Joel Mozer, Airforce Research Lab.
- Frank Toffoletto, Rice University

Thursday PM

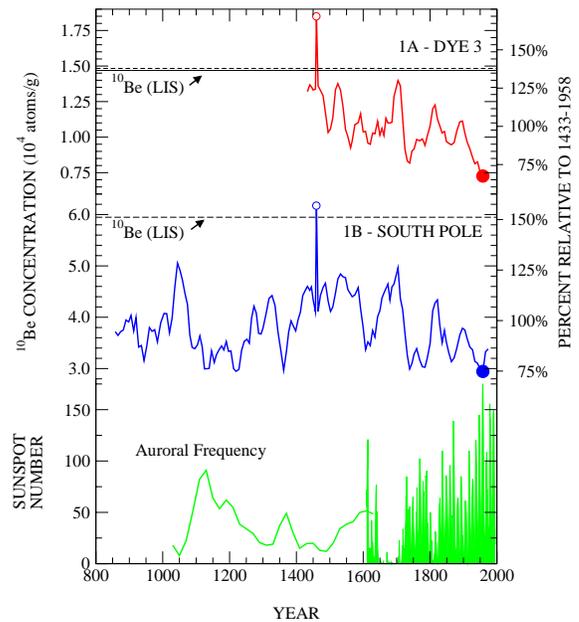
Session #5: Long-term effects of solar variability on the interplanetary magnetic field strength, the galactic cosmic radiation in the heliosphere, and Earth's climate

(Joint with working group 1 and 2)

Cosmogenic radioactive isotopes with long half-lives such as ^{10}Be and ^{14}C are formed as a consequence of the interaction of galactic cosmic rays (GCRs) with nitrogen and oxygen in the Earth's atmosphere. The energy spectrum of GCRs is modulated by the heliospheric magnetic field, which is governed by solar activity. Thus the cosmic-ray flux and therefore also the production rate of these isotopes depend on the level of solar activity i.e., the higher the activity the lower is the cosmic ray flux and the ^{10}Be and ^{14}C production rates. ^{10}Be is removed from the atmosphere after ~1-2 years by precipitation in polar ice sheets. Thus, changes in the concentrations of ^{10}Be preserved in annual layers in ice cores reflects changes in the helio- and geomagnetic modulation of the cosmic ray flux at Earth over many millennia. These records can therefore be used to infer solar activity levels over the distant past and understand the relationship between the dynamic Sun and changes in the Earth's climate.

This session aims to characterize solar activity, the activity over the past ~1000 years. Issues to be discussed

1. What do ^{10}Be concentrations in polar ice cores tell us about the cosmic ray flux, the heliospheric magnetic field, and solar activity?
2. How do these measurements compare with long-term records of geomagnetic activity and solar EUV irradiance?
3. How did changes in solar activity affect the Earth's climate over the past 1000 years?
4. Can these measurements be reconciled with models of galactic cosmic ray modulation, interplanetary field strength, solar irradiance, and geomagnetic activity?



Invited Speakers:

- Gerard Bond, Columbia University
- Ken McCracken, University of Maryland
- Leif Svalgaard, AFRL
- Vladimir Florinski, UC Riverside