Geophysical Research Abstracts
Vol. 15, EGU2013-13834, 2013
EGU General Assembly 2013

Solar Energetic Particle spectral and compositional invariance in the 3-D Heliosphere: Ulysses and ACE/WIND comparisons in late 2001

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We carry out the first detailed examination and comparison of elemental spectra and composition in the late decay phase of two Solar Energetic Particle (SEP) events in the so-called 'reservoir' regions, between spacecraft widely separated in latitude, as well as in longitude and radial distance in the Heliosphere. Energetic particle data from instruments onboard the Ulysses spacecraft located at a high heliospheric latitude of about 70 deg N and at a heliocentric distance of about 2.5 AU and from spacecraft at L1 are used in this work. Particle intensities over time are observed to be in close agreement following the shock passage over the widely separated spacecraft. Electron measurements were used to identify the extent of the particle reservoir. In this update on reservoir composition studies, we extend our previous work to sub-MeV/nucleon energies, using measurements from HI-SCALE on Ulysses and EPAM on ACE. Implications of the observations for models of SEP transport are also discussed.
Acknowledgments: The presented work has received funding from the European Union FP7 project COMESEP (263252) and has also been supported by NASA under grants NNH09AK79I and NNX09AU98G (AJT).