

# Gradual Solar Energetic Particle Events with 'Impulsive' Composition

T.T. von Roseninge<sup>a</sup>, C.M.S. Cohen<sup>b</sup>, A.C. Cummings<sup>b</sup>, R.A. Leske<sup>b</sup>, R.A. Mewaldt<sup>b</sup>, E.C. Stone<sup>b</sup> and M.E. Wiedenbeck<sup>c</sup>

(a) *NASA/Goddard Space Flight Center, Greenbelt, MD 20771, USA*

(b) *California Institute of Technology, Pasadena, CA 91125, USA*

(c) *Jet Propulsion Laboratory, Pasadena, CA 91109, USA*

Presenter: T. von Roseninge (tycho@milkyway.gsfc.nasa.gov), usa-von-roseninge-T-abs1-sh12-oral

We report on elemental abundances observed in solar energetic particle events during the recent solar maximum. These observations were made using the Solar Isotope Spectrometer on the Advanced Composition Explorer. They include most elements from He to Ni in a common kinetic energy interval, 12 - 60 MeV/n. We have earlier reported on some gradual events which had composition matching the composition expected on average for impulsive events [1]. Tylka et al. [2] have suggested an explanation in which a perpendicular shock created by a gradual event preferentially accelerates remnant ions from preceding impulsive events (see also [3]). Five events which were originally presented in [1] as examples of gradual events with impulsive composition included three ground level events (GLEs) out of four which had occurred during the observing period. The explanation of Tylka, et al. [2] therefore suggests that a perpendicular shock should be able to create a GLE. How (or whether) this is related to the presence of suprathermal remnants is unclear. We have searched for all gradual events with impulsive composition since the earlier report and examine their association with GLEs.

## References

- [1] von Roseninge, et al., AIP Conf. Proc. 598, 343 (2001).
- [2] Tylka, A.J., et al., Ap. J., 625, 474 (2005).
- [3] Mason, G.M., Mazur, J.E., & Dwyer, J.R., Ap. J. 525, L133 (1999).

