

## Quantitative Assessment of Radiation Belt Modeling Challenge Event Candidates

Due to current availability of Qin-Denton files for empirical field models, no candidate events after March 2014 are listed.

### Storms, enhancements dominant:

1. **Oct 8-9, 2012:** CME-shock driven storm, double-dip in Dst; MeV electron responses: fast dropout followed by very strong enhancement. Observations: Reeves et al. (Science, 2013). Modeling: Thorne et al. (Nature, 2013); Hudson et al. (GRL, 2014); Kress et al. (GRL, 2014), Tu et al. (GRL, 2014).
2. **Mar 17-18, 2013:** CME-shock driven storm; MeV electron responses: fast dropout followed by very strong enhancement. Modeling: Boyd et al. (GRL, 2014); Xiao et al. (JGR, 2014), Foster et al. (GRL, 2014); Li, W. et al., (JGR, 2014).
3. **May 1, 2013:** Strong enhancement of multi-MeV electrons from a relatively weak (SymH  $\sim$  -60 nT), very isolated storm (nothing around it for more than +/-10 days); solar wind speed doesn't get very fast here... only up to  $\sim$ 500 km/s.
4. **July 10, 2013:** Modest-storm (Dst  $\sim$  -79 nT) acceleration up to  $\sim$  5.2 MeV. Initial PSD depleted from previous storm. Middle storm in series of three, all with different responses. No reports in literature.

### Non-storm, enhancements dominant:

1. **Jan 13-14, 2013:** minimum Dst of -30nT, not a classic storm profile in Dst; MeV electron responses: minimal prior depletion, strong enhancement. Observations: Schiller et al. (GRL, 2014)
2. **Feb 21-24, 2013:** minimum Dst of -35nT, Dst profile storm-like; MeV electron responses: minimal prior depletion, strong enhancement. Observations: Su et al. (GRL, 2014)
3. **Sep 19-20, 2013:** minimum Dst of -19nT, no storm-like profile, but some substorm activity. THEMIS apogee is in the pre-midnight plasma sheet and RBSP apogee is in the dusk sector. No reports in literature.

### Storms, dropout dominant:

1. **Sep 30, 2012:** Minimum Dst of -41nT (reached -119nT on Oct 1st). Two CMEs impacted the magnetosphere, resulting in two-phase dropout of outer belt electrons. Observations: Turner et al. [JGR 2014].
2. **Jun 1, 2013:** Minimum Dst of -119nT. Strong MeV electrons before and after storm with clear, non-adiabatic main phase dropout. No reports in literature.

3. **Feb 27, 2014:** Minimum Dst of -99 nT. MeV electron response: dropout event. No reports in literature.

Non-storm, dropout dominant:

1. **May 14, 2013:** Sym H min  $\sim$ -20 nT; dropout over a broad range of electron energies (100s of keV to multi-MeV); storm onset later on the 16th, but the dropout already occurred clearly and suddenly on the 14th. No reports in literature.
2. **Sep 24, 2013:** Minimum Dst of -24nT, not a classic storm profile in Dst. MeV electron responses: rapid depletion. No reports in literature.
3. **Feb 16, 2014:** Minimum Dst of -22 nT, not a classic storm profile in Dst. MeV electron responses: rapid depletion. No reports in literature.