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Interactive comment on "Multisatellite observations of the magnetosphere response to changes in the solar wind and interplanetary magnetic field" *by* Galina Korotova et al.

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This study addresses the characteristics of the important magnetospheric response tosolar wind shocks. Using multi-point in-situ observations within the magnetosphere the authors present case and statistical studies of the electromagnetic fields and plasma response during shock events. A detailed analysis of the strong February 27, 2014 shock event is presented. For the statistical investigation, 30 shock events of varied strength are investigated. The positions of the spacecraft making the in -situ observations differ event to event, enabling a discussion of the characteristic magnetospheric responses in the noon, midnight, dusk, and dawn sectors. The statistical

analyses concentrate on pulse propagation speed, direction, and strength (Ey) and the associated plasma drift velocity. Lastly, a brief comparison of the observed results with model calculations is presented.

The paper presents a good overview of previous studies relating to IP shock response within the magnetosphere and the descriptions of the data included in the study and the steps taken in reaching their results are presented clearly. Taken as a whole, the paper appears well written, accurate and believable. While the results of the studies presented are well documented, they do not seem particularly new. It is recommended that the authors add a bit more detail (see suggestions below e.g.) to show more clearly the significance of their results. It will be important for the authors to include a clear statement of what they feel are the most significant features of the study.

Suggestions:

For the fast mode propagation velocities, it would be good to describe the theoretical parametric dependence of the fast mode velocity (e.g. its dependence on radial distance). How well do the observed pulse velocities agree with theory for the Feb 2014 event (e.g. lines 310-312) and others?

lines 255-258: Two techniques for calculating the normal vector of the shock (n) are described. How well do these two techniques agree with each other?

In the Introduction (lines 89-100), the resonant acceleration of trapped particles is discussed briefly. This paper presents observations and calculations of the propagation speed of the shock-induced pulse, the strength and variation of Ey, and the associated plasma drift velocities Vx and Vy. A useful addition to the paper would be to present some detail on how those parameters have important effects on plasma acceleration in interactions involving the initial fast-mode pulse or with subsequent ULF oscillations.

For example, the studies of Wygant et al [1994] using CRRES data, Foster et al. [2015] using Van Allen Probes data, and others have shown that within the magnetosphere, the tailward propagation of the strong shock-induced electric field impulse can result in the extremely fast acceleration of high energy, ultra-relativistic electrons deep within Earth's Van Allen radiation belts. The strong electric field associated with the shock-induced fast mode pulse is of about 1-min duration and accelerates radiation belt electrons for the length of time they are exposed to it.

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