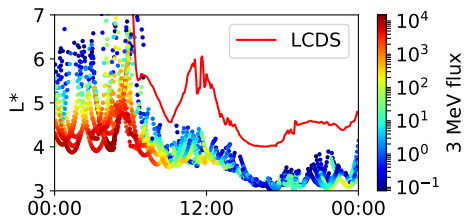


On the Similarity and Repeatability of Fast Magnetopause Shadowing Loss

Leonid Olifer, I. Mann, L. Ozeke, S. Claudepierre, D. Baker, and H. Spence

EGU General Assembly 2022

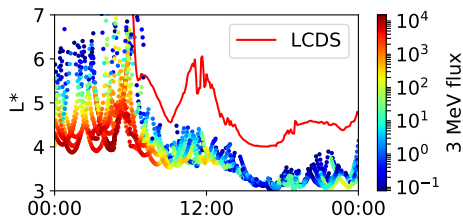
Dynamics of the last closed drift shell (LCDS) can be used to identify times of magnetopause shadowing losses



Fast RB loss is often accompanied by the LCDS compression.

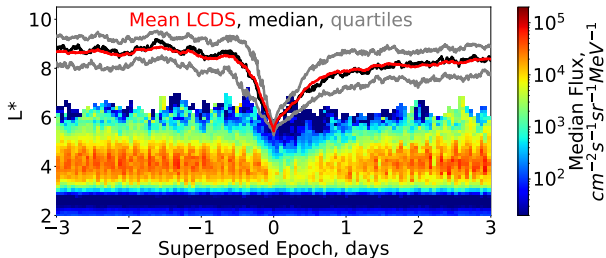
Olifer et al. (JGR, 2018)

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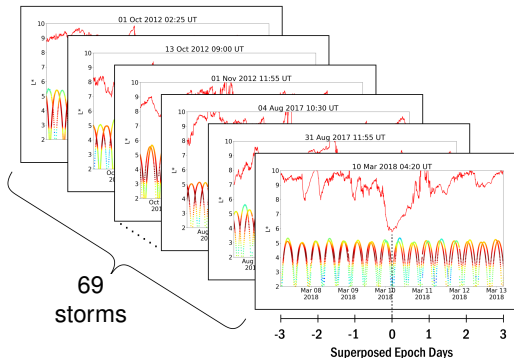


Superposed epoch analysis of 69 low L^* LCDS storms reveals **similarities in the radiation belt loss** and the identifies **processes responsible** for the loss

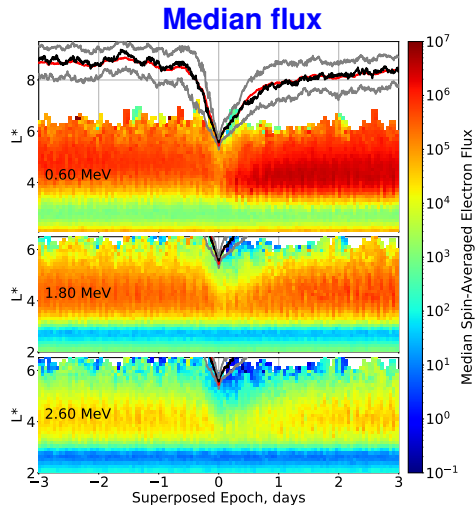
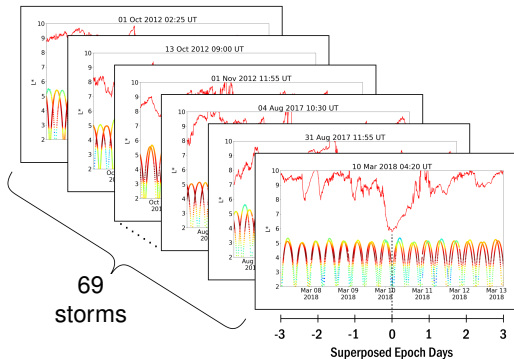
Olifer et al. (JGR, 2021)



Superposed epoch analysis of 69 storms with LCDS $L^* \leq 5.8$ reveals typical electron radiation belt loss progression

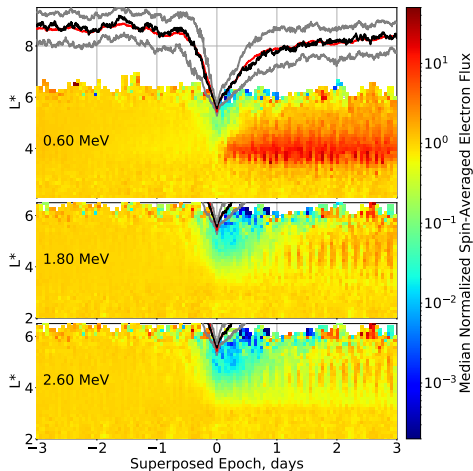


Superposed epoch analysis of 69 storms with LCDS $L^* \leq 5.8$ reveals typical electron radiation belt loss progression

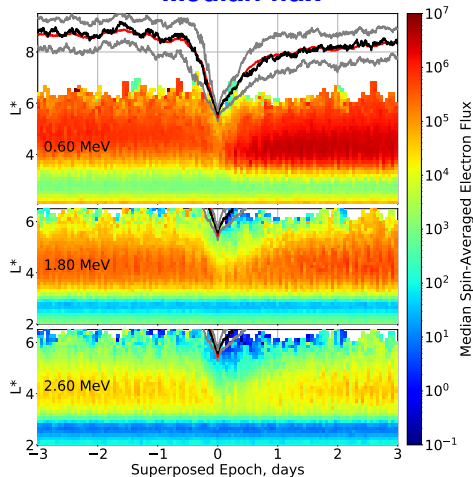


Analyzing relative flux change w.r.t. pre-storm levels enables detailed comparison of losses at different energies

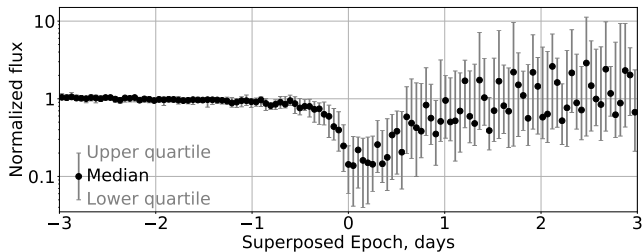
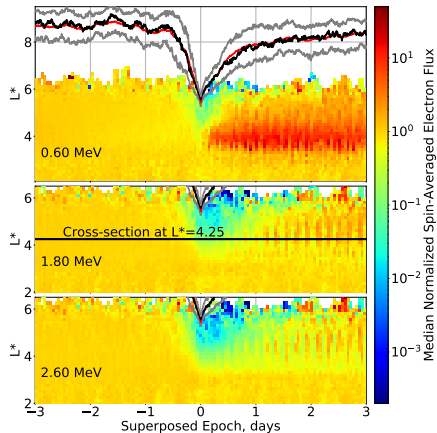
Median normalized flux



Median flux



Superposed epoch analysis reveals low variability of the fractional loss from one storm to the next

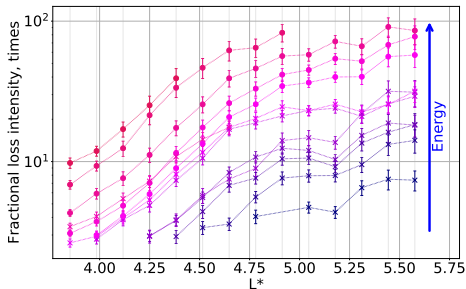
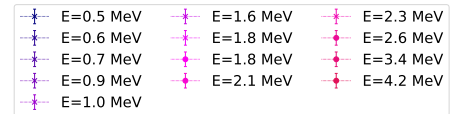


Error bar size represents variability between different storms

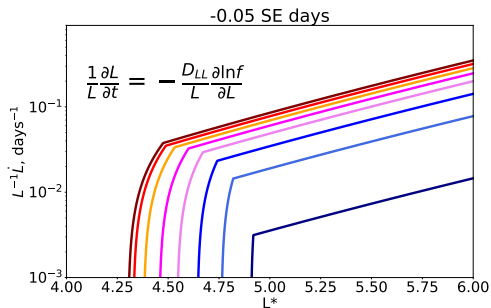


Fractional loss intensities are organized by energy and L^* also consistent with the radial diffusion

Observed fractional loss intensity



Outward D_{LL} transport rate



Superposed epoch analysis reveals repeatability and similarity of magnetopause shadowing losses

1. The losses inside the LCDS seem to demonstrate repeatability from storm to storm.
2. Fractional loss of flux is independent of the initial pre-storm levels and is identical from storm to storm.
3. Magnetopause shadowing and outward radial diffusion are likely the dominant cause on the loss:

Olifer et al. 2021, JGR: Space Physics.

Thank you!

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