New Understanding of Particle Injections Inside GEO

- NASA's Van Allen Probes mission provided almost 7-year (2012–2019), continuous observations of energetic electrons (e^-) and protons (H^+) at < 6.0 R_E.
- In this study we examined typical evolution of dispersionless injections inside GEO and related magnetic changes by performing superposed epoch analyses of 171 events.
- The 171 events were categorized into three groups: (*i*) 75 both-species injections, (*ii*) 68 e^--only injections, and (*iii*) 28 H^+-only injections.
- Most of the dispersionless injections occurred in the dusk-to-midnight sector and at > 5 R_E, regardless of species.
- For Group (*i*), the presence or absence of negative dip ahead of dipolarization likely determines a temporal offset between the e^- and H^+ injection onsets.

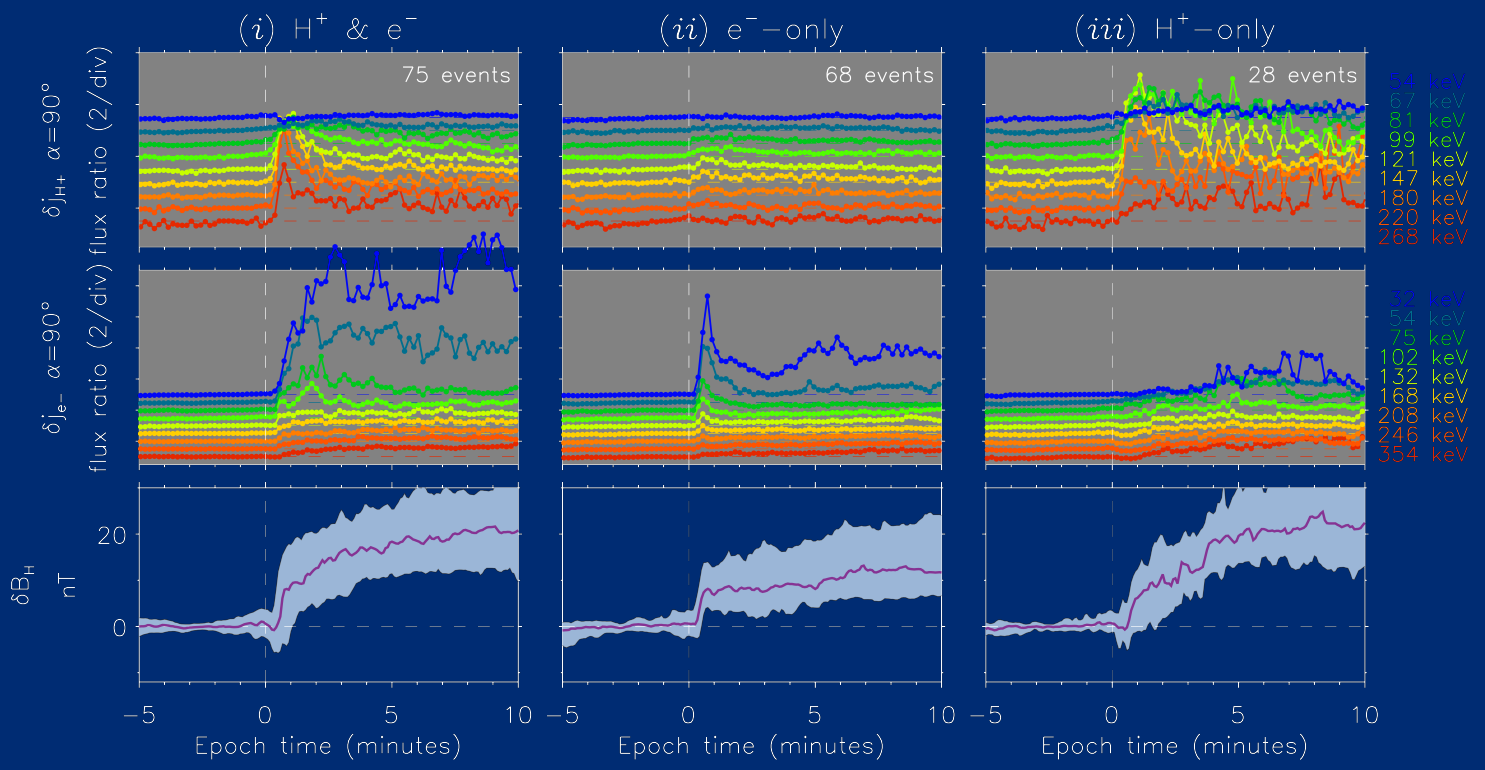

Fig. Superposed epoch results of both-species (*i*, 75 events), e^--only (*ii*, 68 events), and H^+-only (*iii*, 28 events) dispersionless injections and related B_H variations.

7+ year Van Allen Probes mission provided unprecedented insight into statistical properties of e^- and H^+ dispersionless injections inside GEO

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