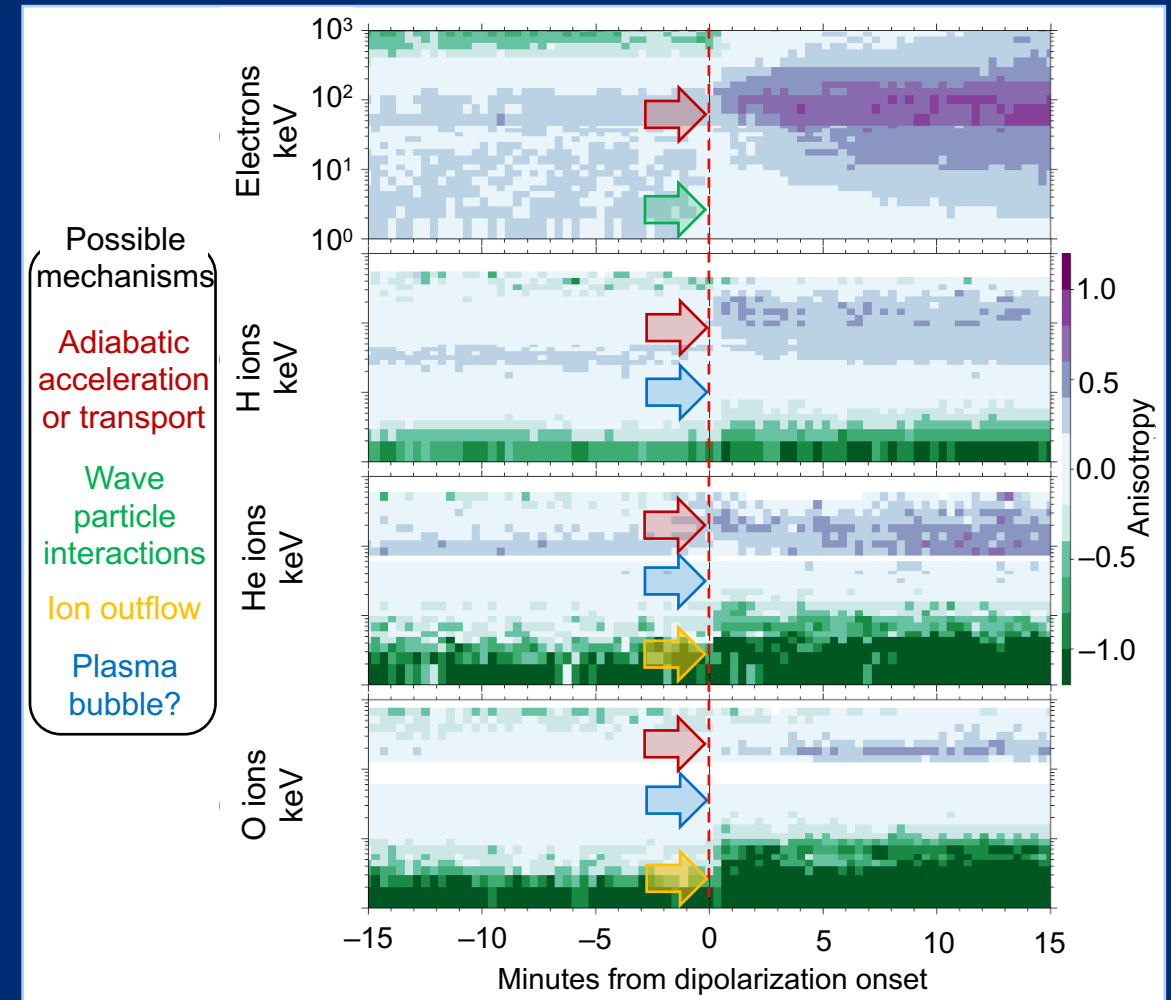


Impact of Deep Local Dipolarization on Electron and Ion Pitch Angle Distributions

- The pitch angle distribution (PAD) of energetic particles provides important information for understanding particle energization, transport and loss processes in Earth's magnetosphere.
- This study investigates pitch angle dependent electron and ion flux changes in response to local dipolarizations inside geosynchronous orbit (GEO), based on a superposed epoch analysis of 144 dipolarizations observed by the Van Allen Probes mission.
- Local dipolarizations lead to isotropic/anisotropic electron and ion PADs, depending on energy and species.
- The statistical PAD properties could be explained by a combination of acceleration/transport, wave-particle interactions, and ionospheric outflow.

Figure: Superposed $E-t$ diagrams of flux anisotropy (A) of electrons, and H, He and O ions. $A > 0.5$ ($A < -0.5$) means that the PAD is a strong perpendicular (field-aligned) anisotropy. For $A \sim 0$, the PAD is more isotropic.



First statistical picture of the response of electron and ion PADs to local dipolarizations inside GEO.