Introduction

- Energetic electron precipitation couples magnetosphere and ionosphere
- DMSP provides low-energy measurements (30 keV)
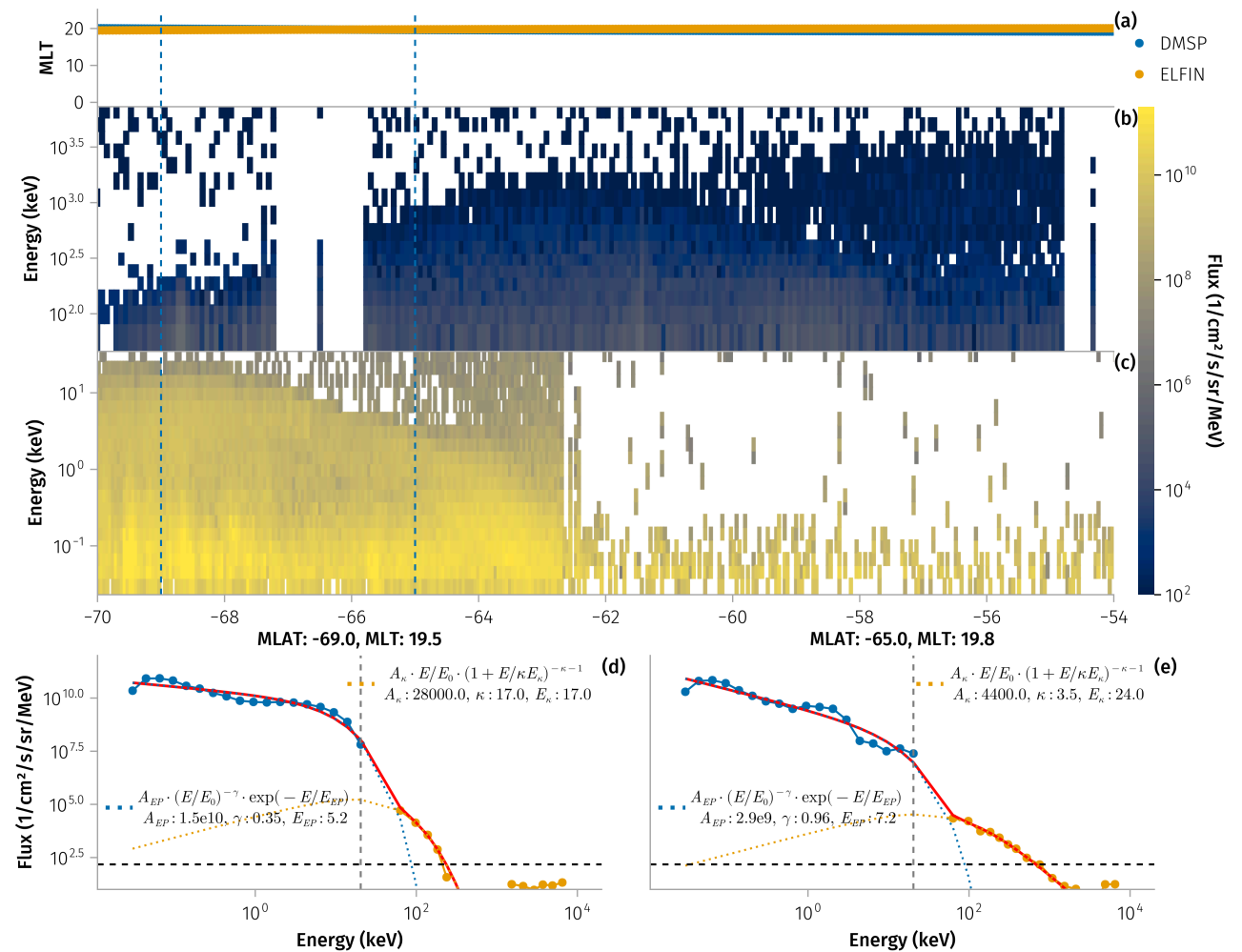- ELFIN extends to higher energies (50 keV to 6 MeV)

Figure 1: Example of a satellite conjunction event between 2021-12-01T22:19 and 2021-12-01T22:28. (a) ELFIN precipitating electron flux, (b) DMSP electron flux, (c) MLT, (d-e) averaged precipitating flux spectra.

Results

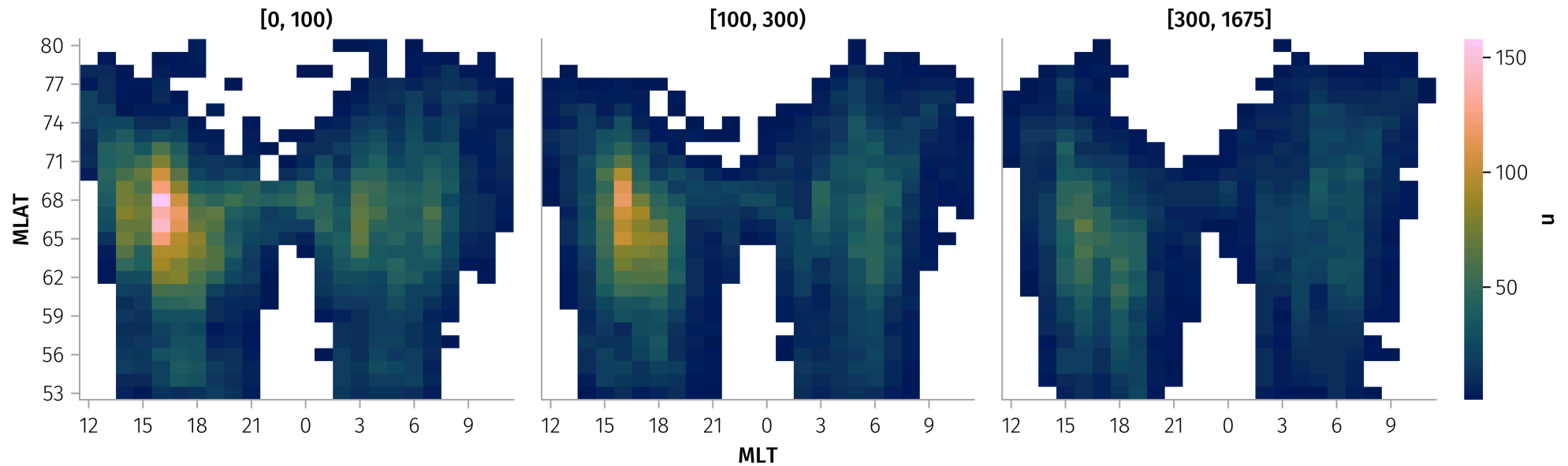Figure 2: The total number of MLAT-averaged spectral data points across different MLT and MLAT regions, separated by varying levels of the AE index.
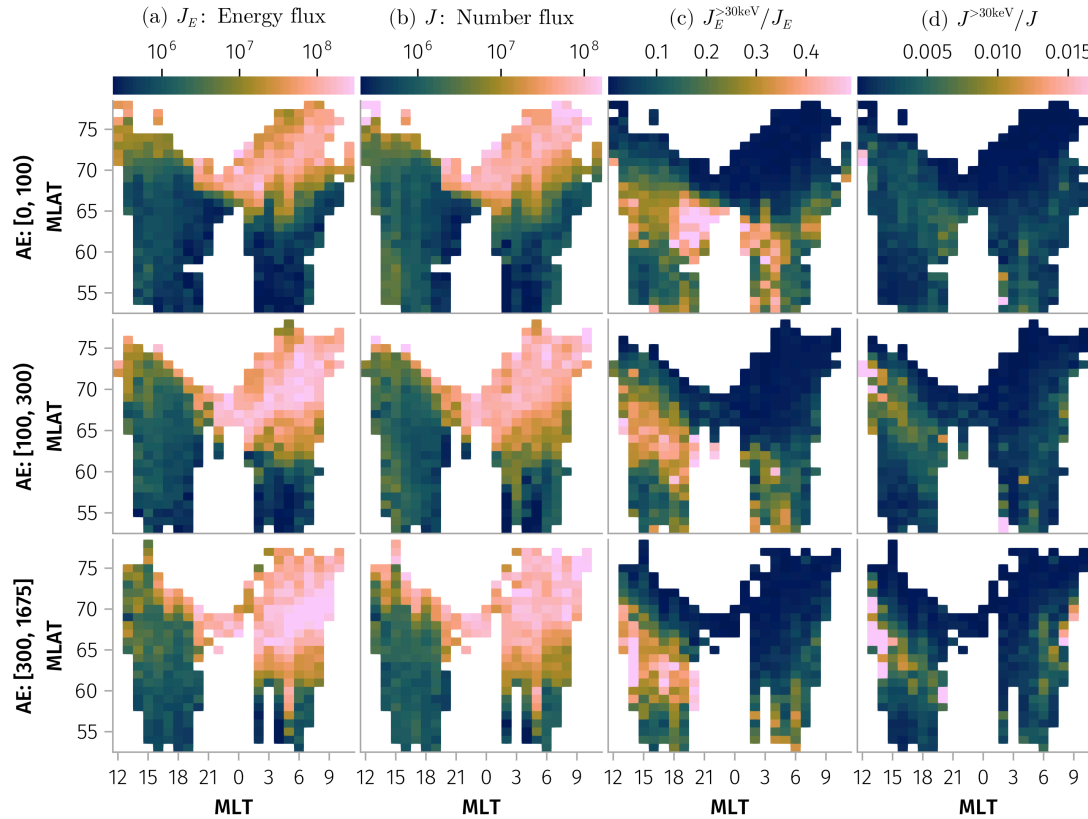
Results

Figure 3: Median distributions of (a) total energy flux [$\mathrm{keV\,cm^{-2}\,s^{-1}\,sr^{-1}}$], (b) total number flux [$\mathrm{cm^{-2}\,s^{-1}\,sr^{-1}}$], and (c-d) fractional contribution of energetic particles (>30 keV) to total energy and number flux.

Results

Figure 3: Median distributions of (a) total energy flux [$\mathrm{keV\,cm^{-2}\,s^{-1}\,sr^{-1}}$], (b) total number flux [$\mathrm{cm^{-2}\,s^{-1}\,sr^{-1}}$], and (c-d) fractional contribution of energetic particles (>30 keV) to total energy and number flux.
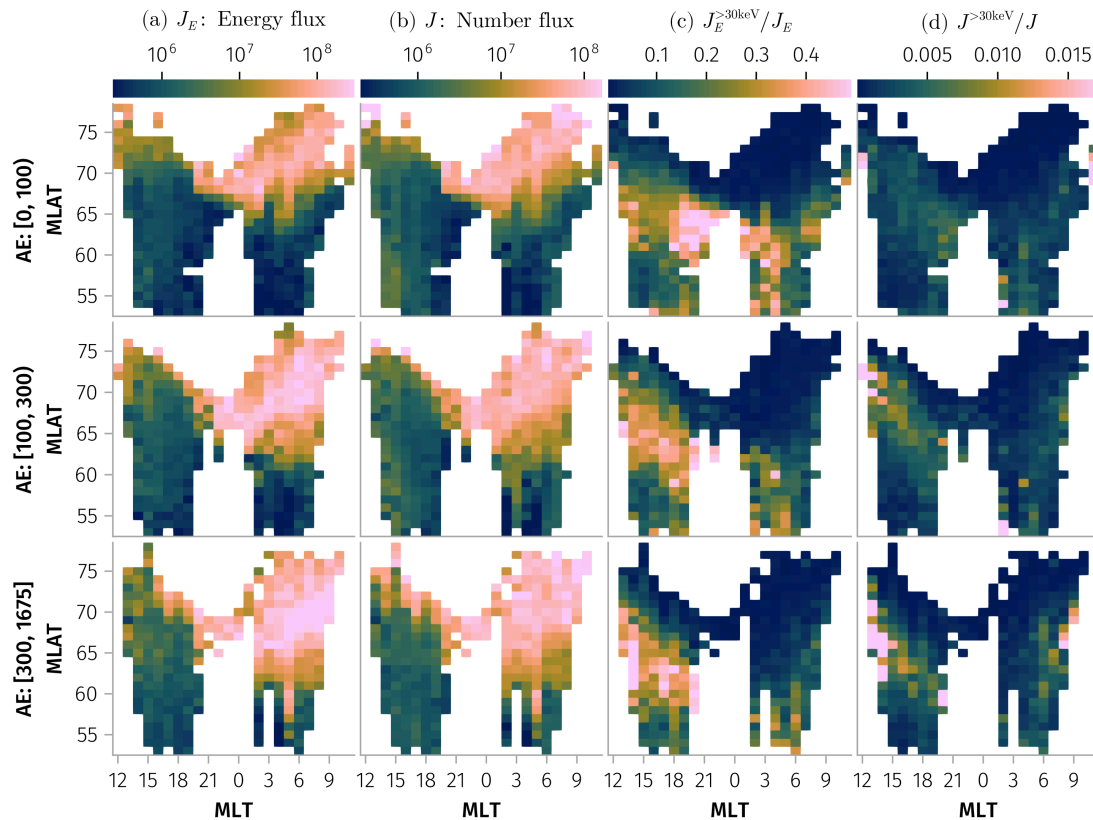

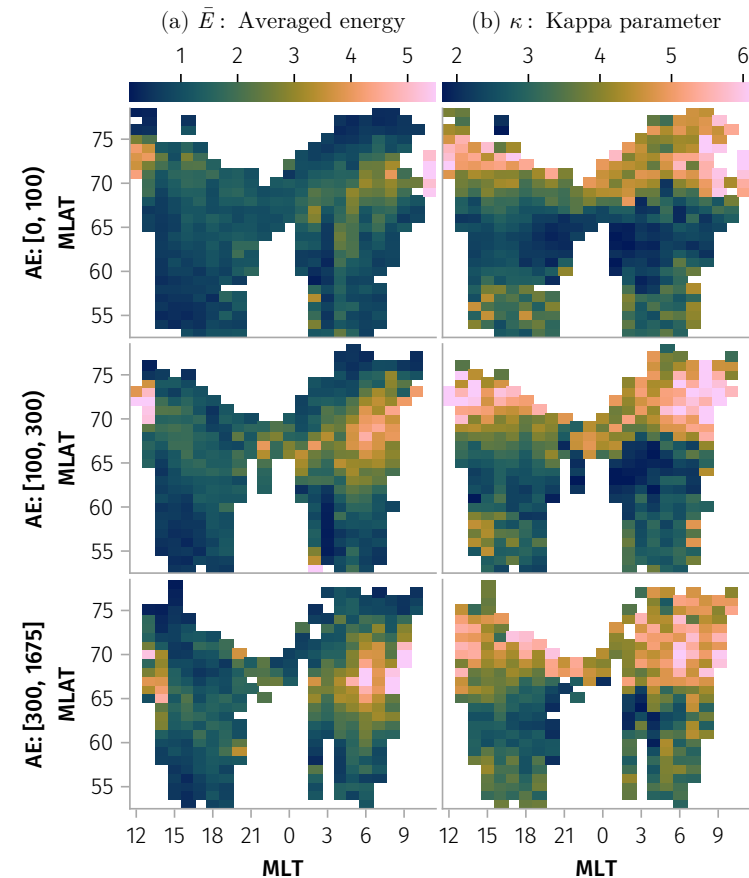Figure 4: Median distributions of (a) averaged energy ($\overline{E}$) [keV] and (b) kappa parameter (κ) as functions of MLT and MLAT, sorted by AE index levels.
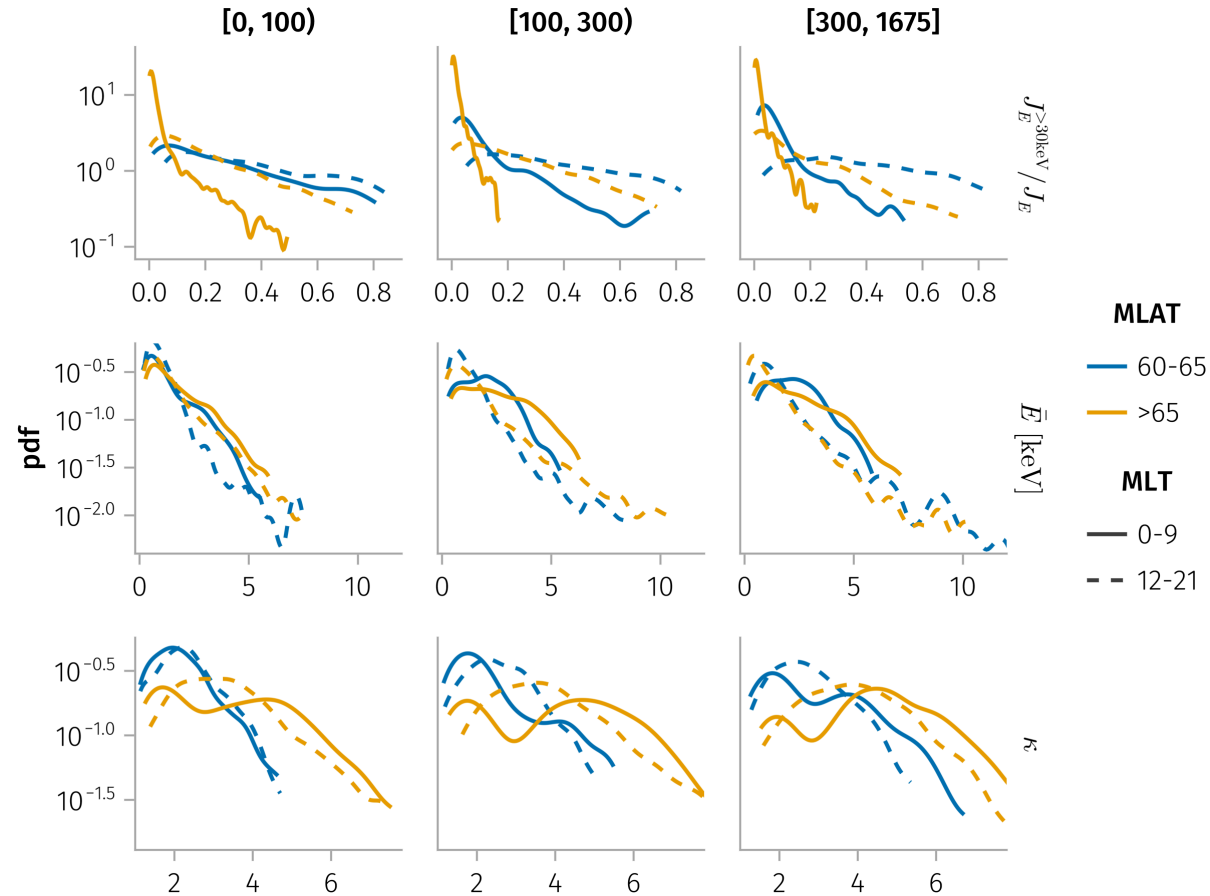
Results

Figure 5: Probability density functions for (a) energy flux ratio $\frac{J_E^{>30\ \text{keV}}}{J_E}$, (b) kappa parameter ($\kappa$), and (c) mean energy $\overline{E}$. Data organized by AE ranges, MLT sectors, and MLAT bands.