MLT 30-50 keV electron flux models

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GOES MAGED Energy Models

Output data

1. 30-50 keV
2. 50-100 keV
3. 100-200 keV
4. 200-350 keV
5. 350-600 keV

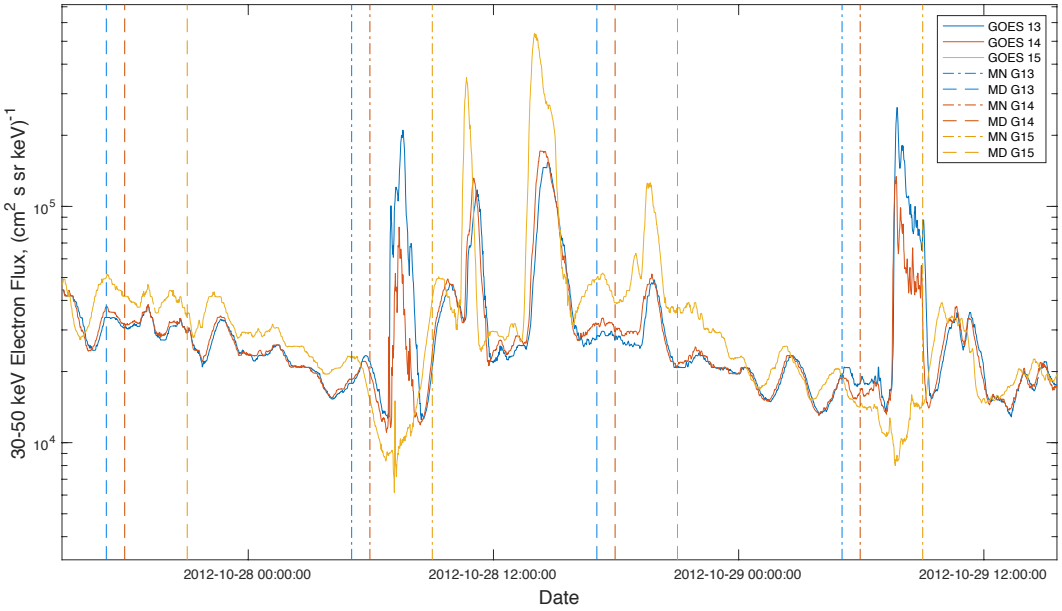
Inputs Data

Velocity, Density, pressure, the Dst Index, and $B_T \sin^6(\theta/2)$

$$
\begin{aligned}
J(t) = F[&J(t-24h), J(t-48h),\\
&v(t-2h), v(t-3h), \ldots, v(t-48h),\\
&n(t-2h), n(t-3h), \ldots, n(t-48h),\\
&p(t-2h), p(t-3h), \ldots, p(t-48h),\\
&\ldots,\\
&e(t-24h), e(t-48h)] + e(t)
\end{aligned}
$$

MLT Electron Flux Models

Low energy electrons in the radiation belt vary in space at different MLT



What spatiotemporal sampling to choose for modelling the 30-50 keV electron fluxes at GEO?

Spatial resolution: 1 Hour MLT

Temporal resolution: 1 Hour

MLT Electron Flux Models

Inputs Data

Velocity, Density, square root of pressure, and southward IMF

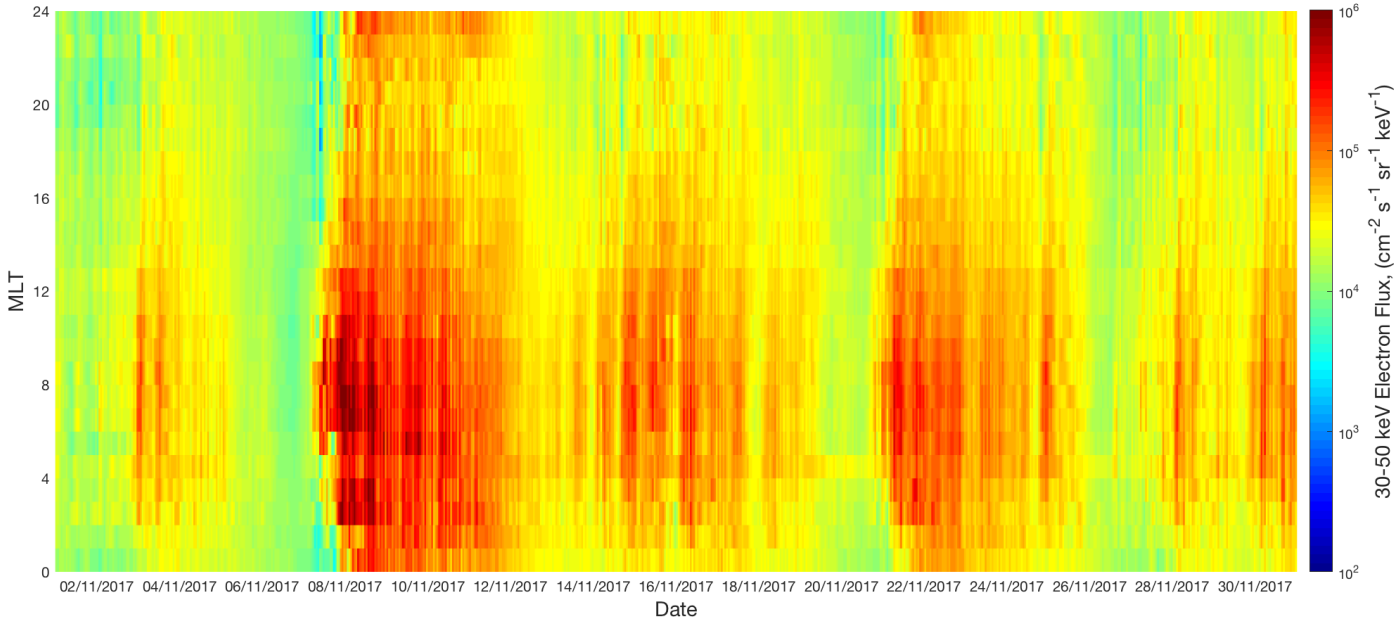
Output data

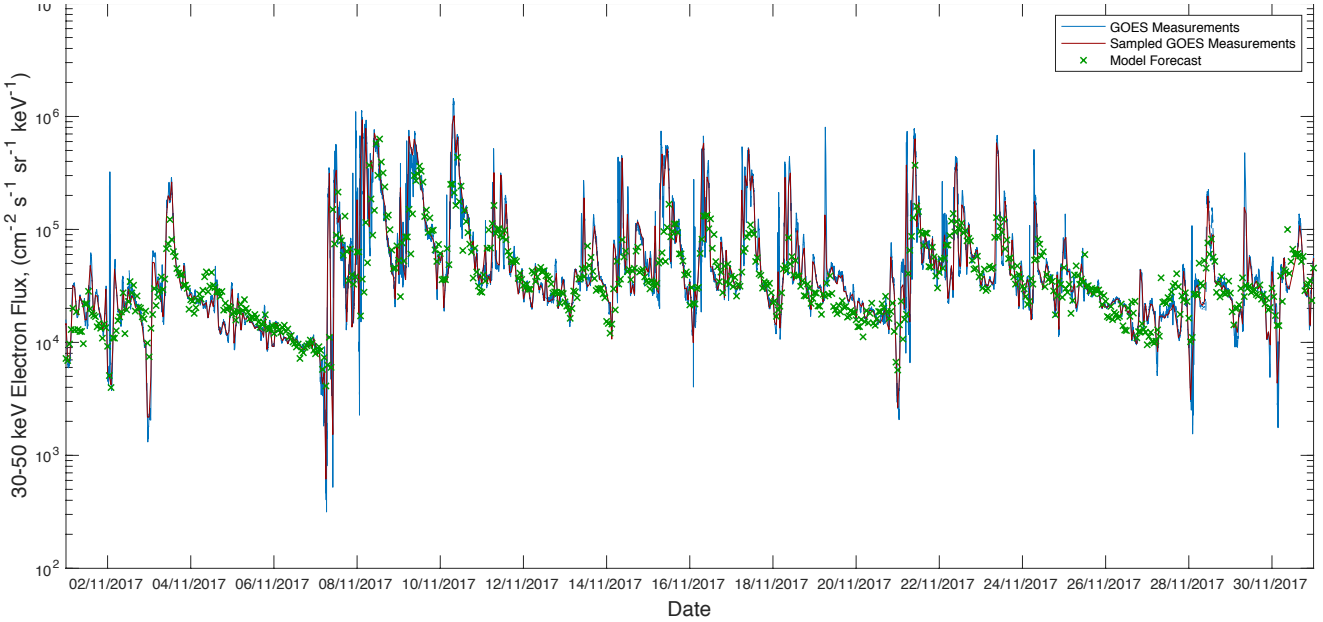
30-50 keV Electron Flux at 00 MLT, 01 MLT, …, 22 MLT, 23 MLT

$$\begin{aligned}\hat{J}(MLT,t) \;=\; & F[J(MLT,t-24),\\ & v(t-1),v(t-3),...,v(t-23),\\ & n(t-1),n(t-3),...,n(t-23),\\ & \sqrt{p}(t-1),\sqrt{p}(t-3),...,\sqrt{p}(t-23),\\ & B_f(t-1),B_f(t-3),...,B_f(t-23)]\end{aligned}$$

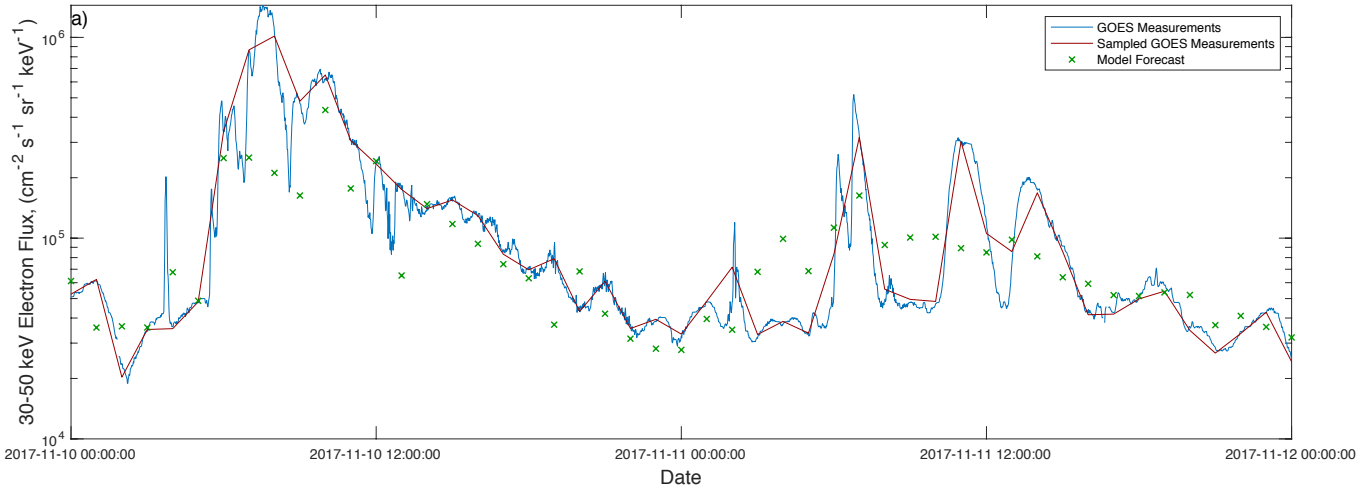
Where F is a third degree polynomial

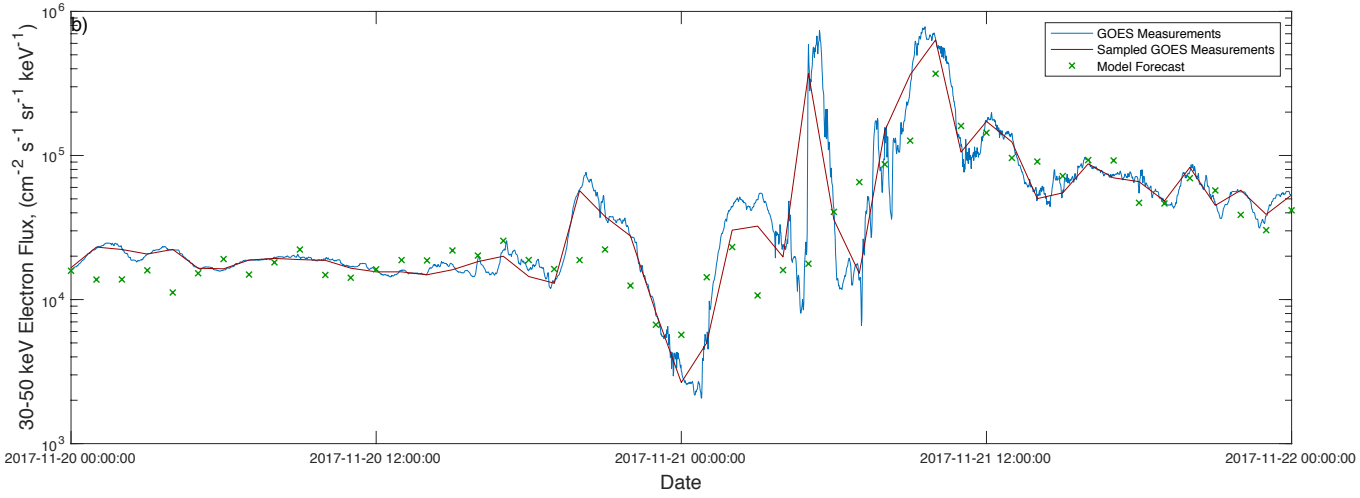
MLT Electron Flux Models



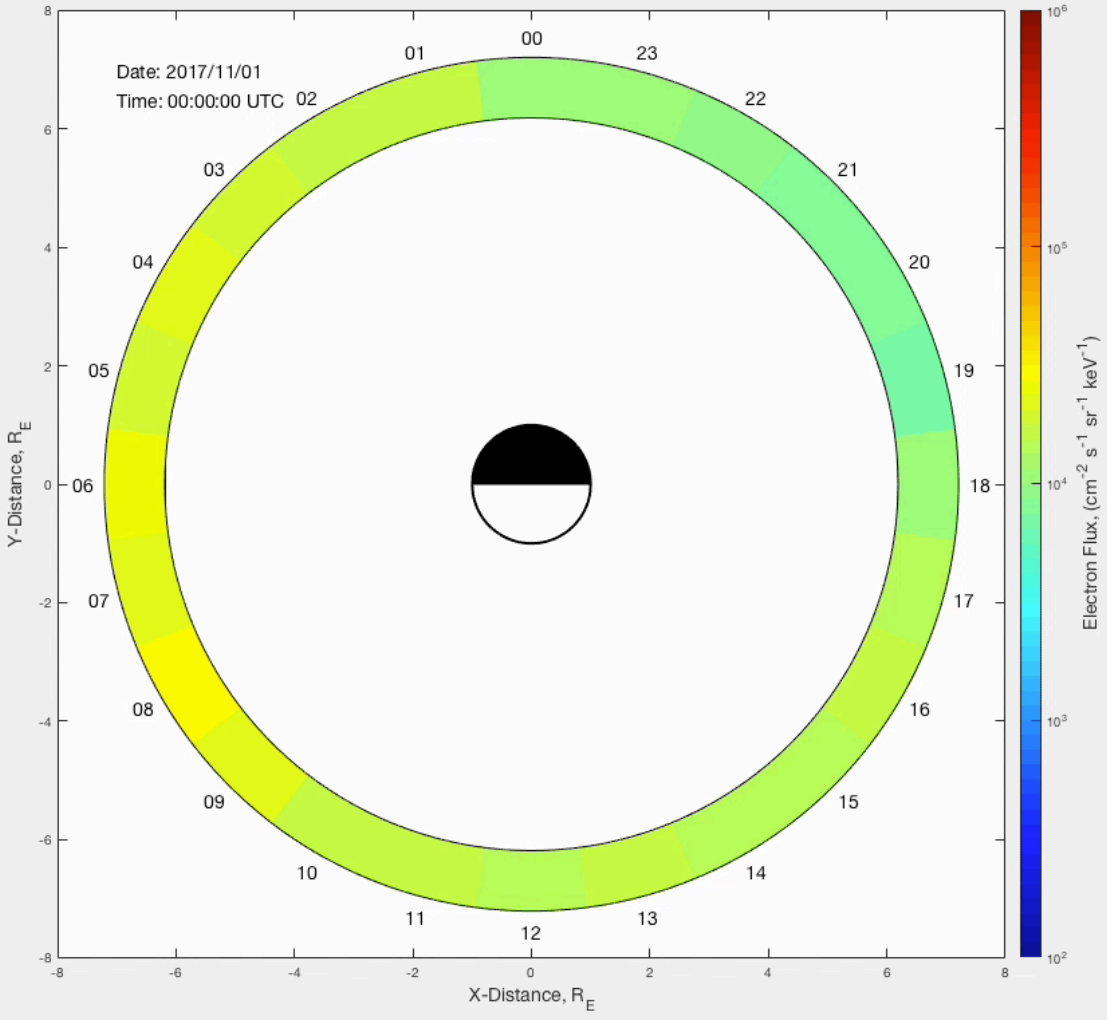


MLT Electron Flux Models





MLT Electron Flux Models



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 637302.