



Data assimilation tool to reconstruct particle flux measurements

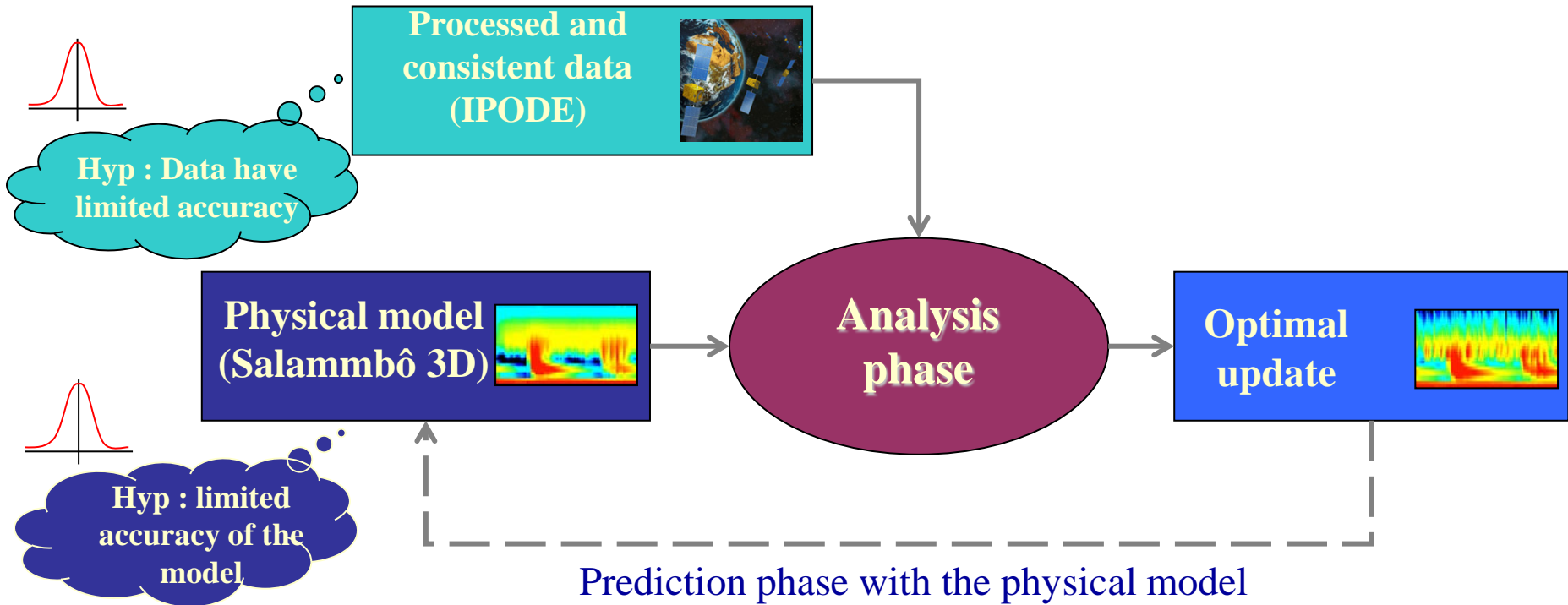
S. Bourdarie, V. Maget, D. Lazaro, I. Sandberg, D. Turner



Outline

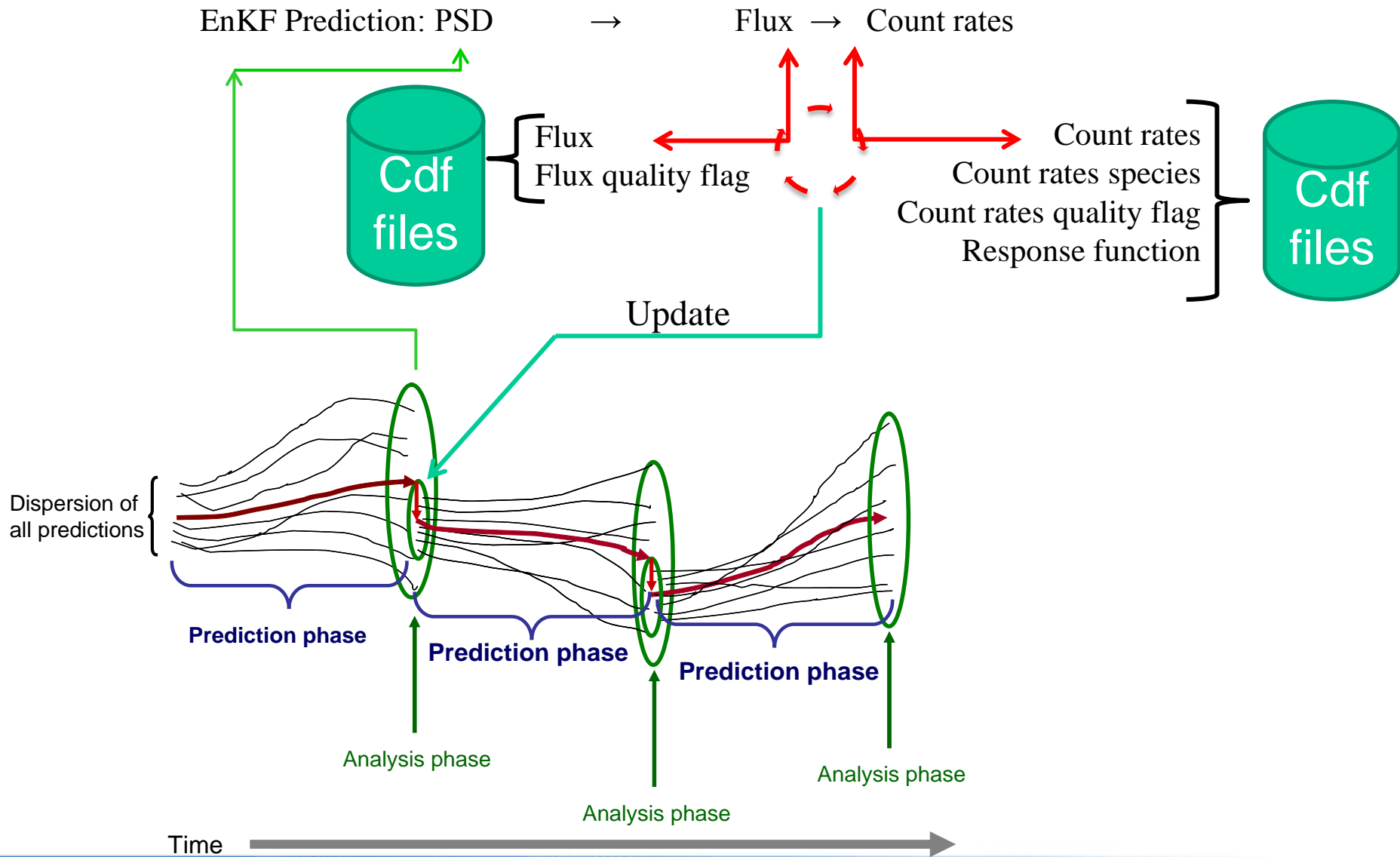
- Data assimilation concept
- Data assimilation challenges
- EnKF results during the September 2011 storm
- 3D reconstruction of the radiation belt dynamics

Data assimilation concept



- The update is weighted, global to the system, and optimal
- An estimate of the uncertainties of the nowcast is available at each time steps

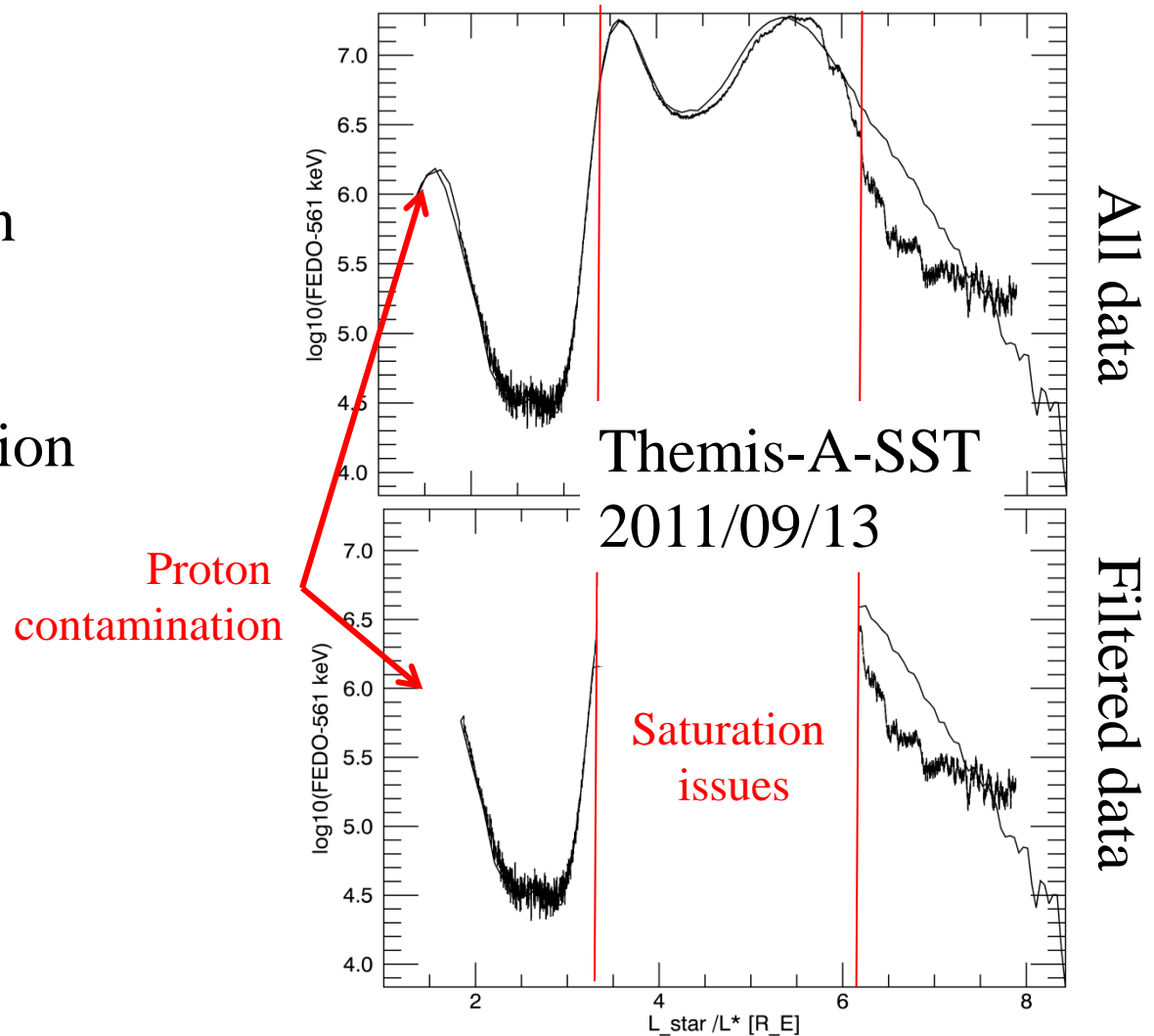
Data assimilation concept



Data assimilation challenges

Data quality:

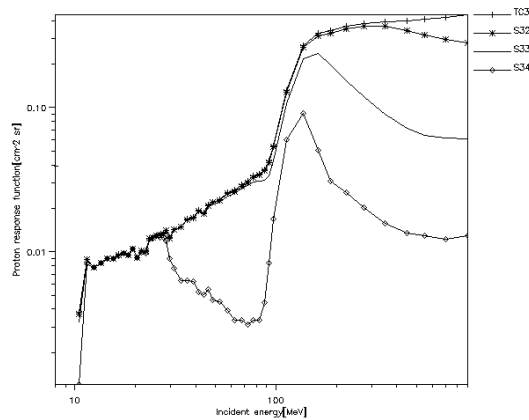
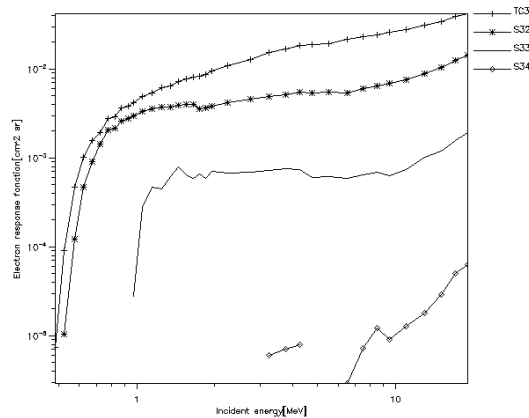
- Saturation
- Contamination
- Background
- Glitches
- Cross-calibration



Data assimilation challenges

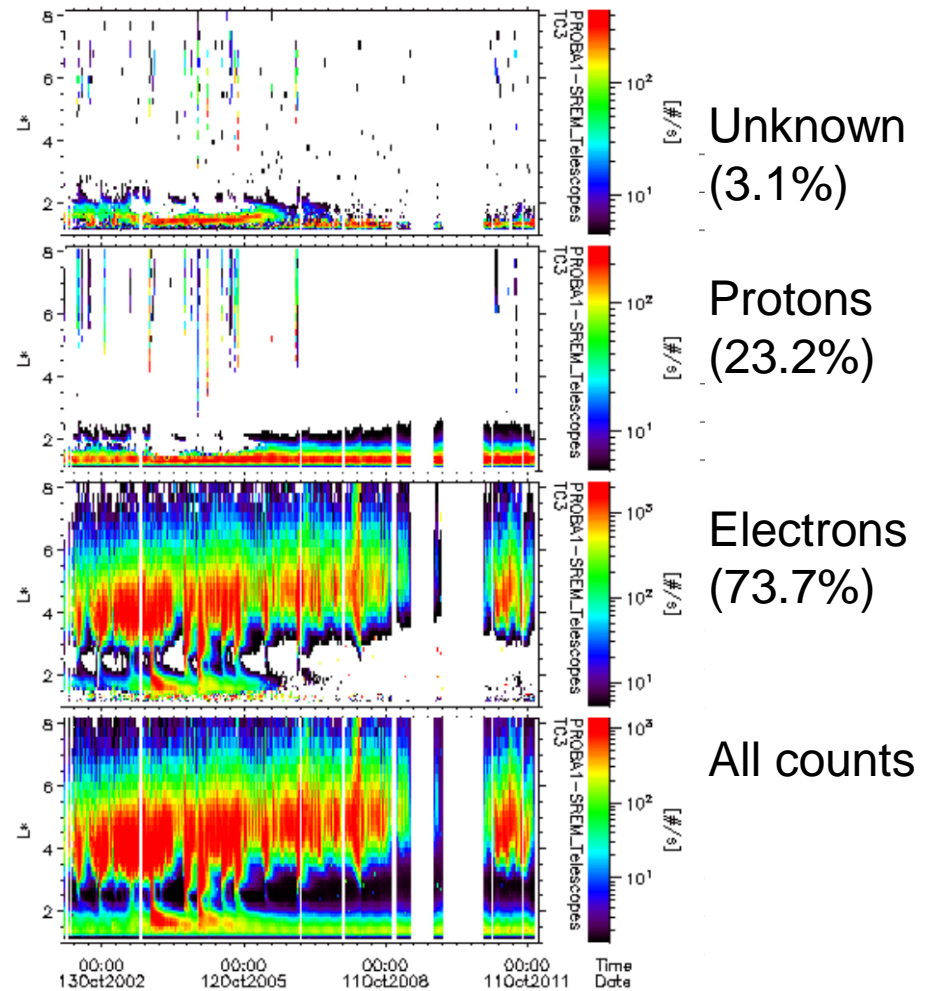
Data quality:

- Specie discrimination



PROBA-1 / SREM

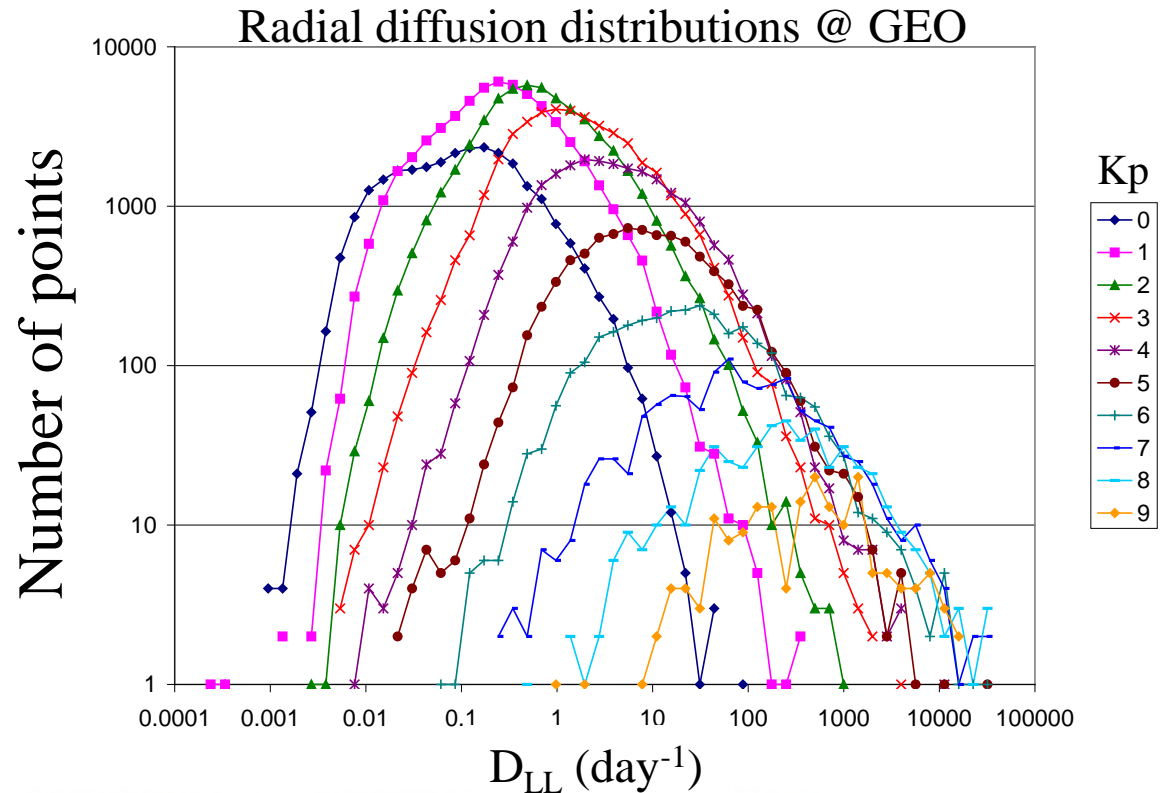
IPSAT-V5.4b-SVN:508



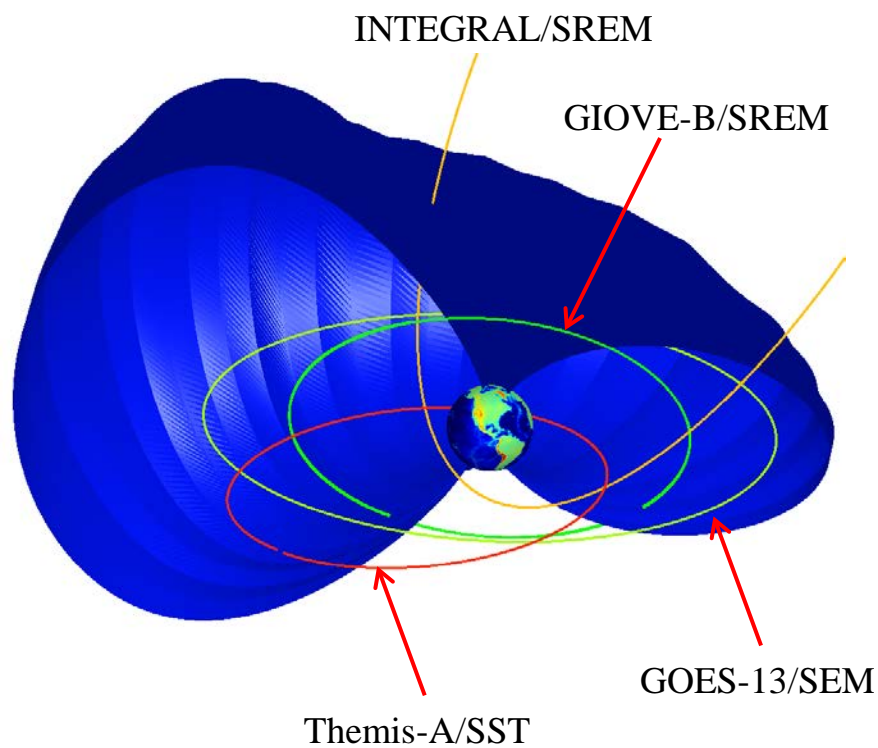
Data assimilation challenges

Uncertainties in physical models:

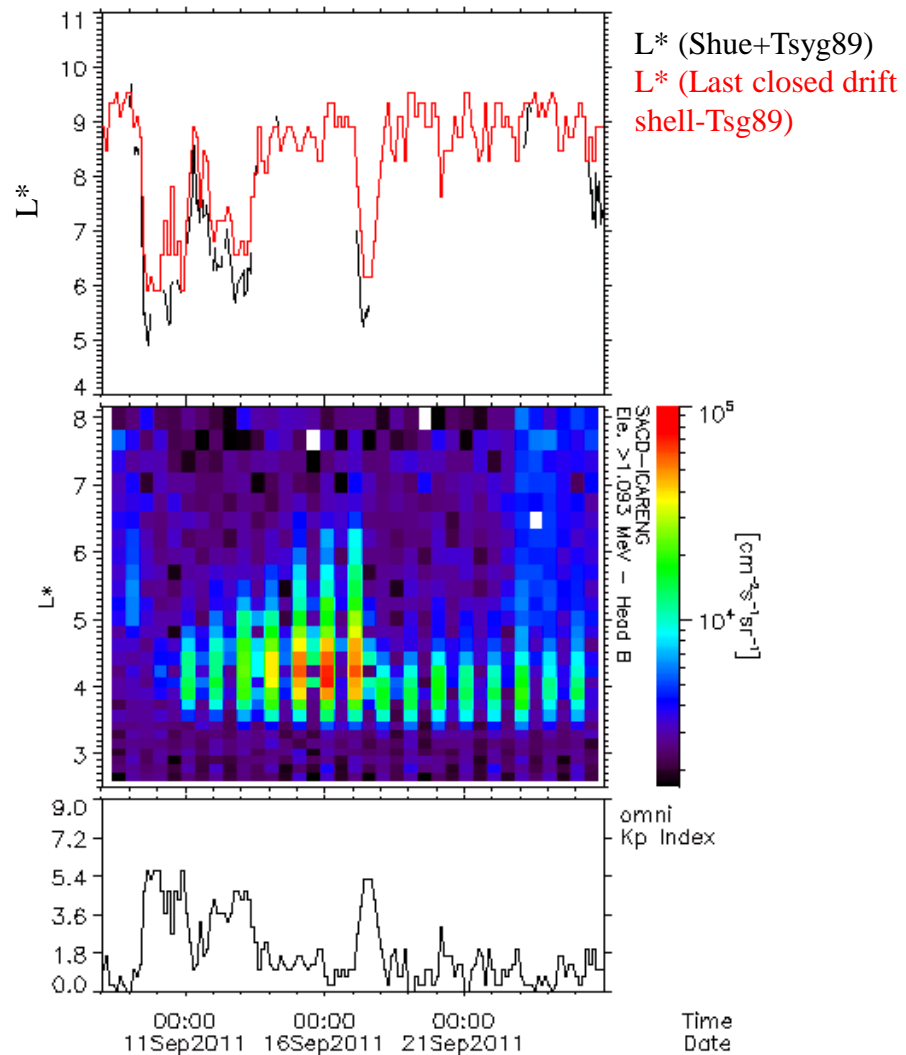
- Boundary condition
- Radial diffusion
- Wave-particle interactions



EnKF results during the September 2011 storm



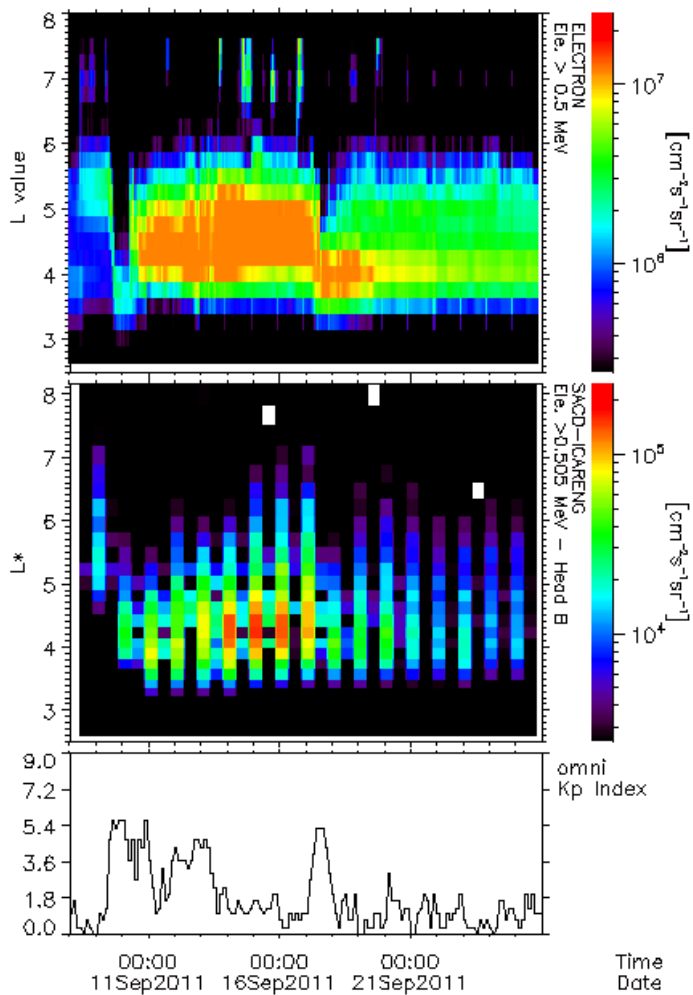
IPSAT-V5.4b-SVN:599



EnKF results during the September 2011 storm

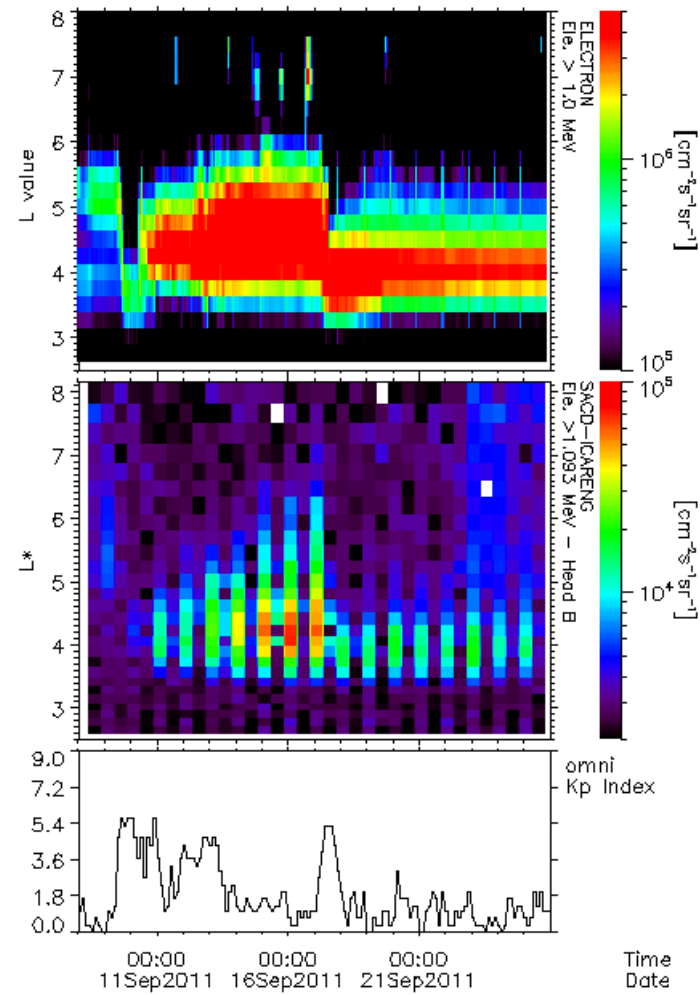
IPSAT-V5.4b-SVN:599

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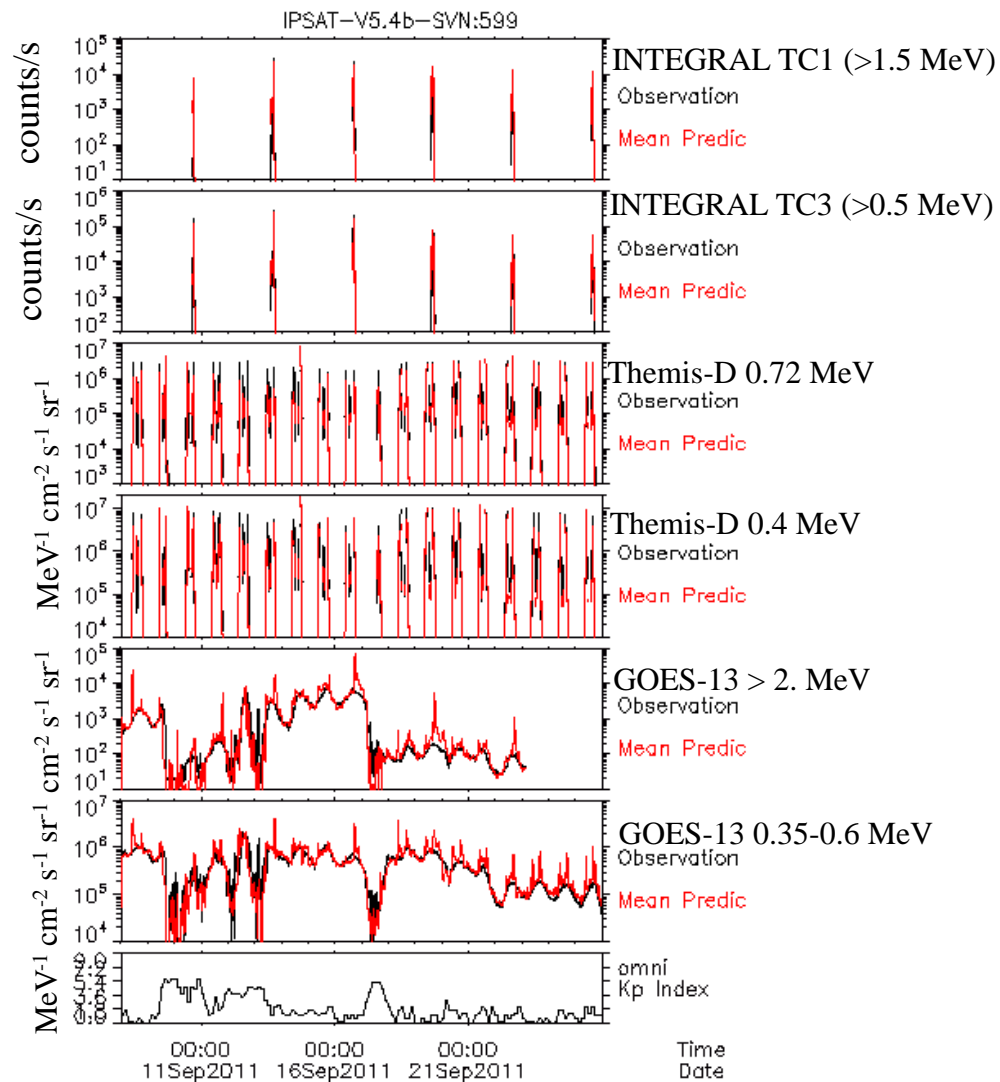


EnKF @mag equator

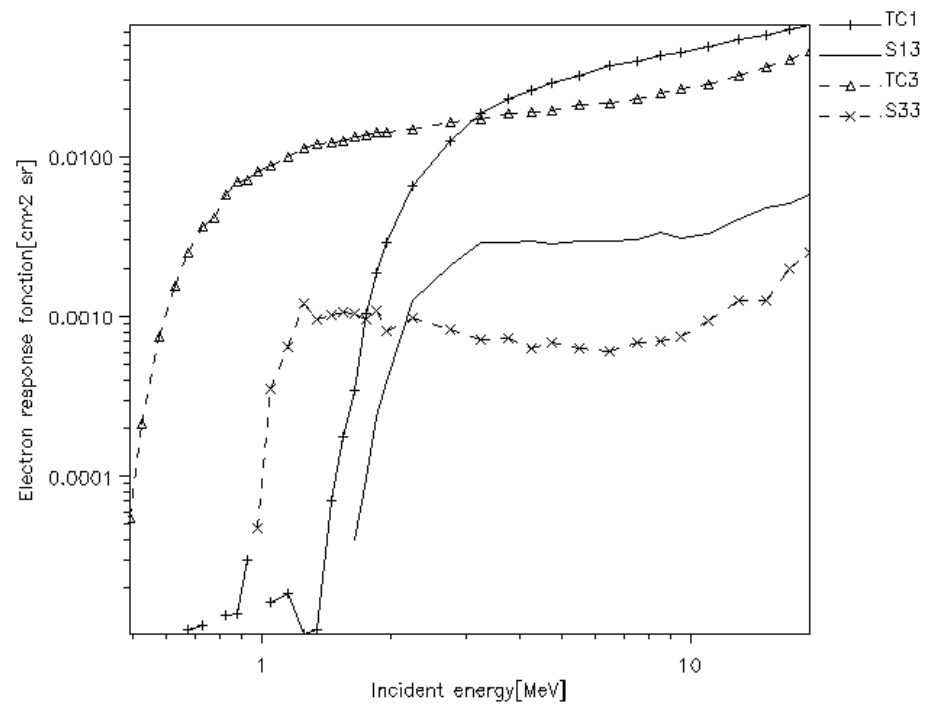
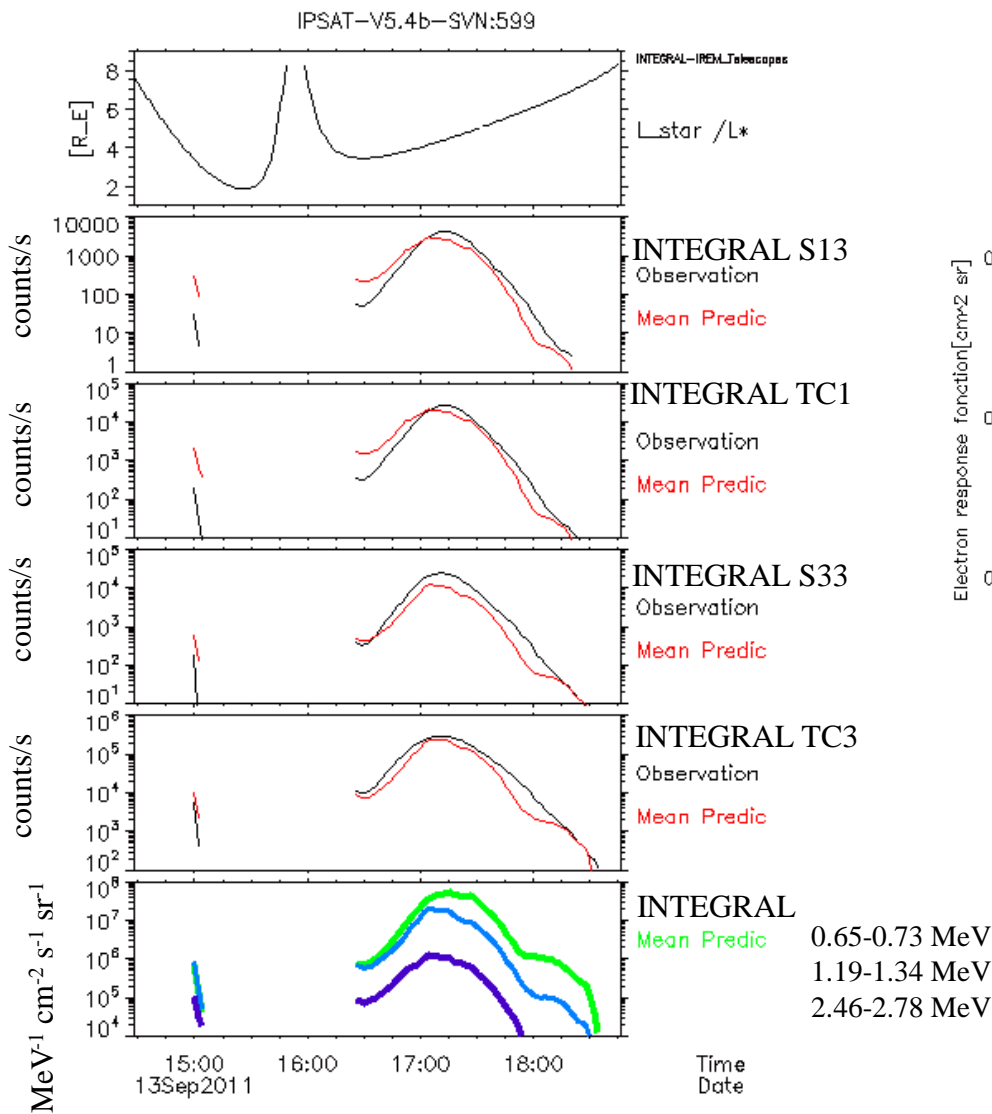
Measurements @LEO



EnKF results during the September 2011 storm



EnKF results during the September 2011 storm



3D reconstruction of the radiation belt dynamics

Video