EnKF-Salammbô data assimilation tool: Progress in the framework of the MAARBLE EU-project

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The MAARBLE project has received research funding
from the Seventh Framework Programme of the European Union
(Grant Agreement No 284520, FP7-SPACE-2011-1)

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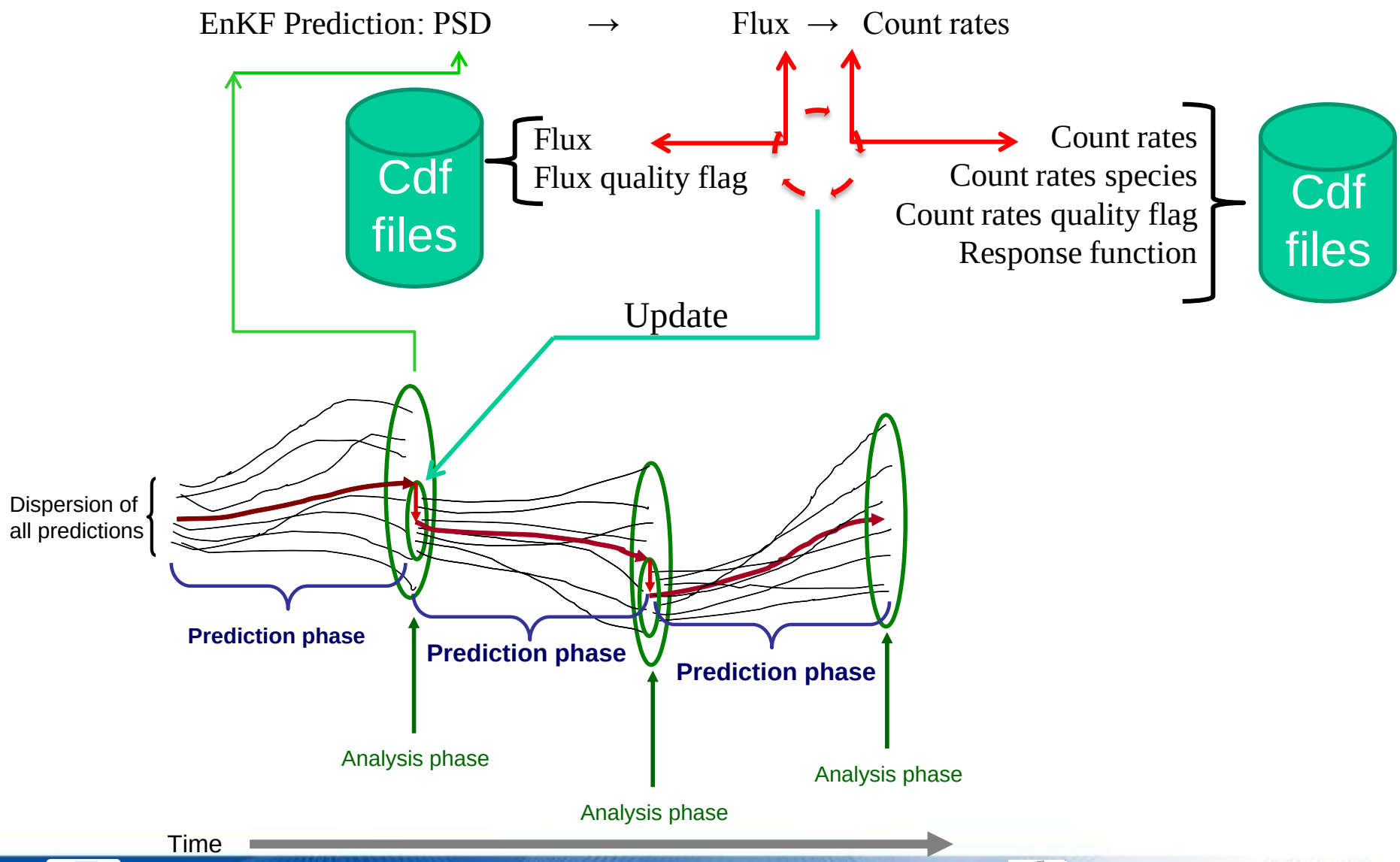
Outline

- Introduction
- Uncertainties in physical processes
- Validation against test data set
- Conclusions

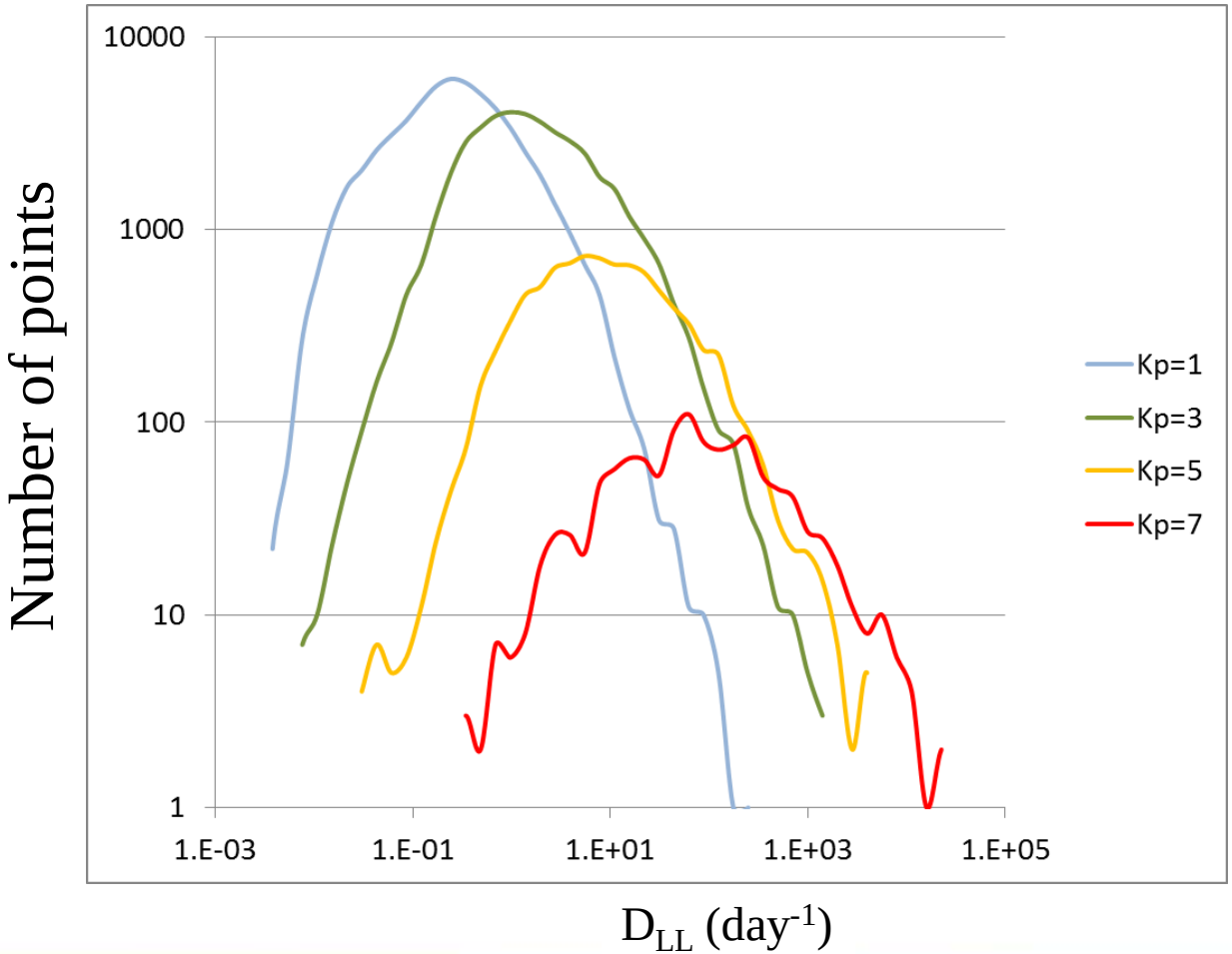
Data assimilation concept



Uncertainties in physical processes

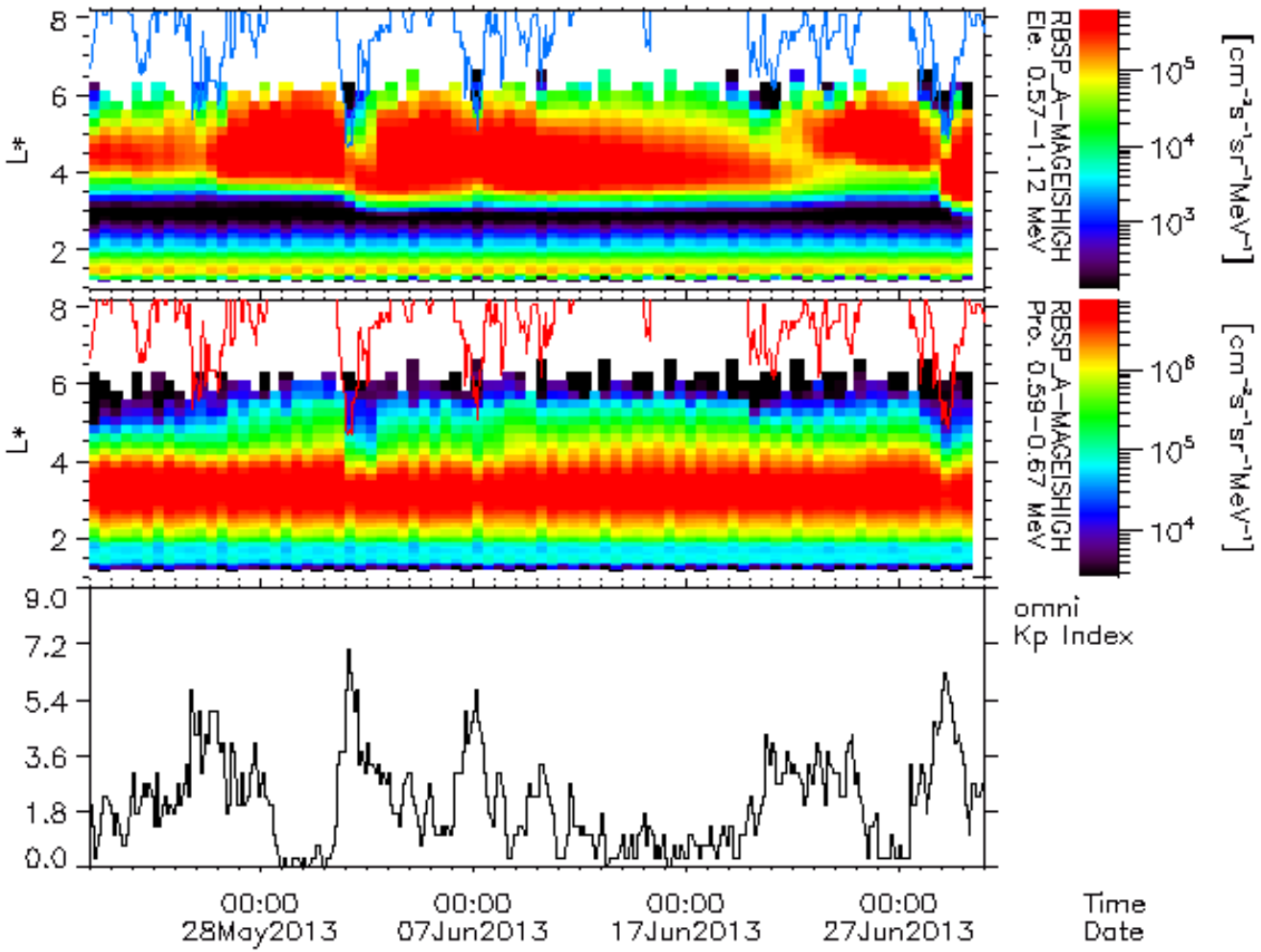
Radial diffusion

Radial diffusion distributions @ GEO



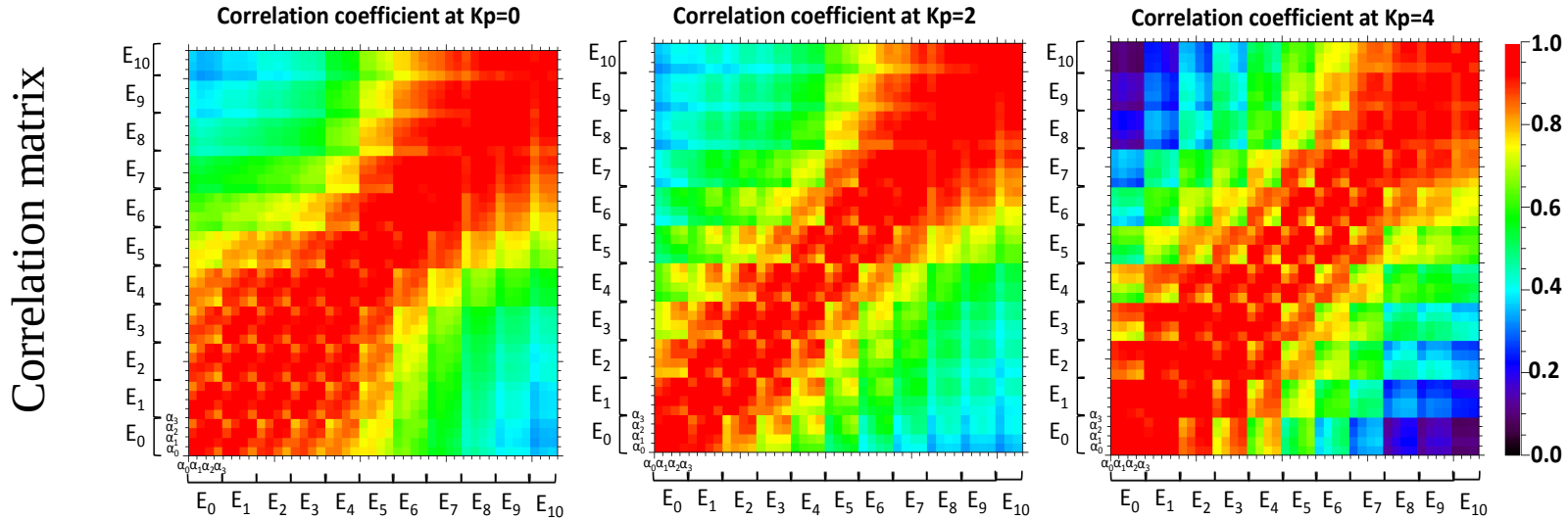
Uncertainties in physical processes

Drop outs (magnetopause shadowing)

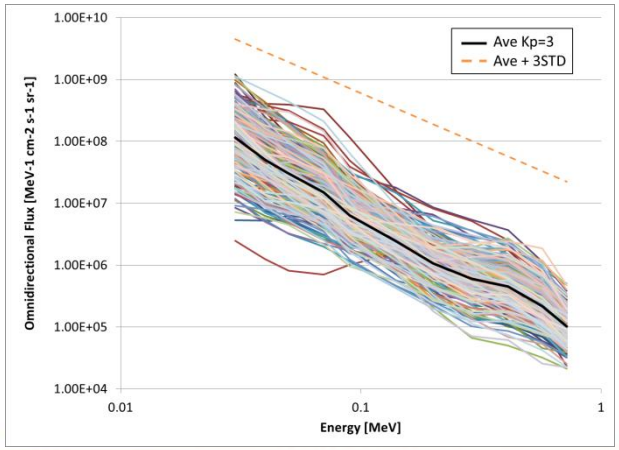


Uncertainties in physical processes

Boundary condition @ L*=8 (poster from Maget et al.)



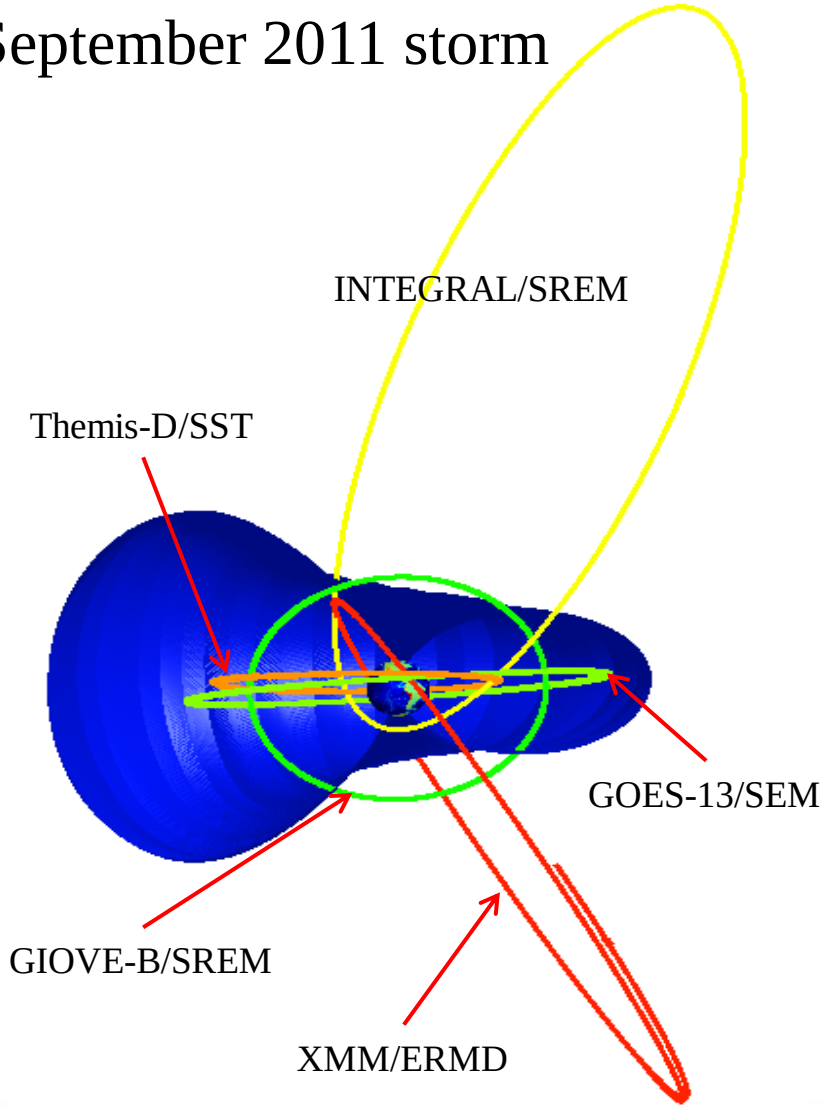
THEMIS/SST: 31 keV, 41 keV, 52 keV, 65.5 keV, 92 keV, 139 keV, 203.5 keV, 293 keV, 408 keV, 565.5 keV and 719.5 keV

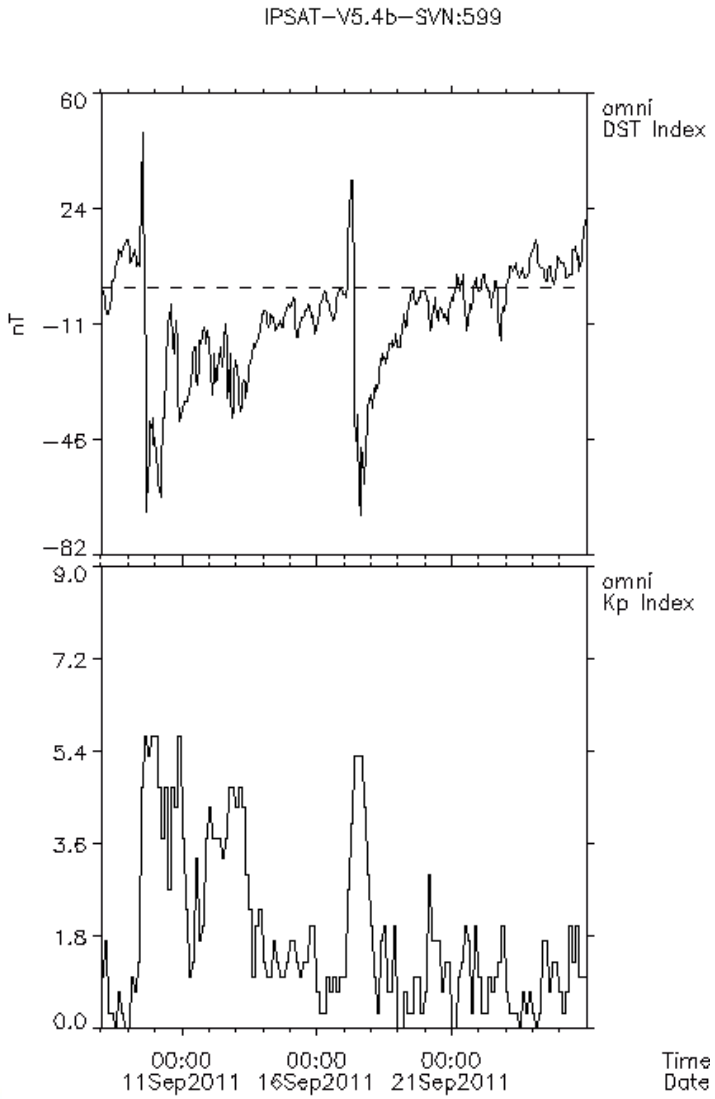


200 spectra drawn using the muli-variate Monte Carlo sampling

Validation against test data set

September 2011 storm





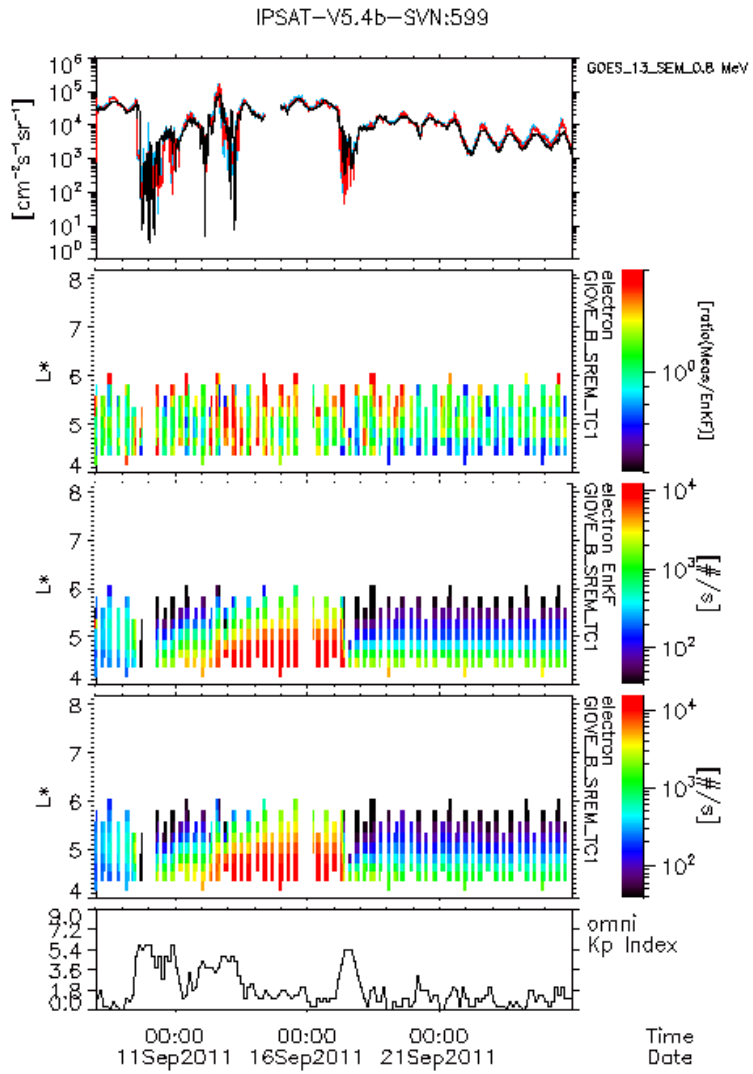
Validation against test data set

Scenario 1:

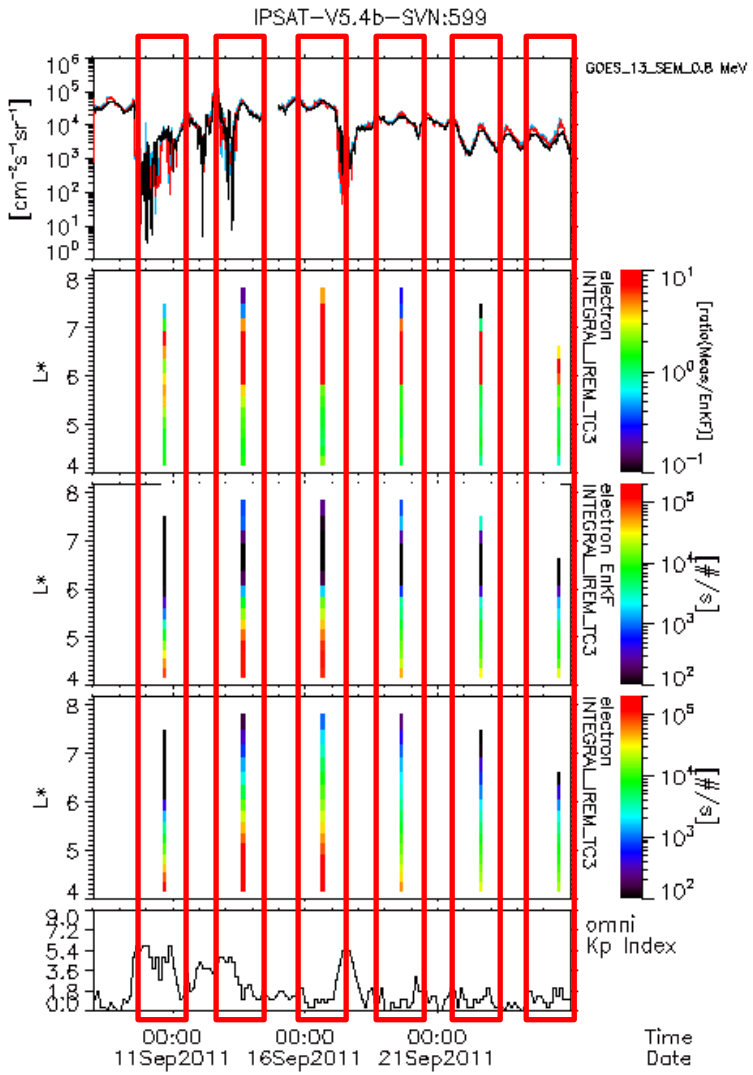
- Data ingested: GIOVE-B/SREM and GOES13
- Test data set = INTEGRAL/IREM
  THEMIS-D/SST
  XMM/ERMD

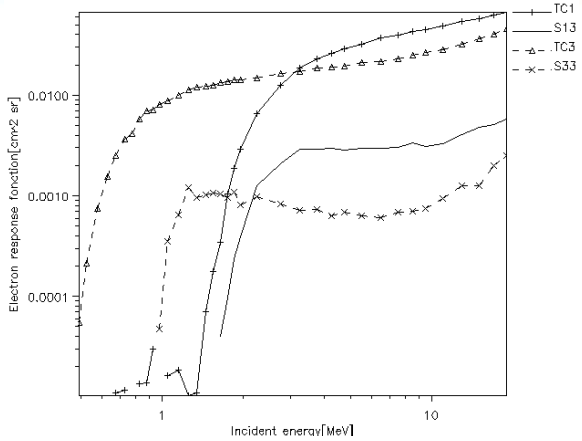
Scenario 2:

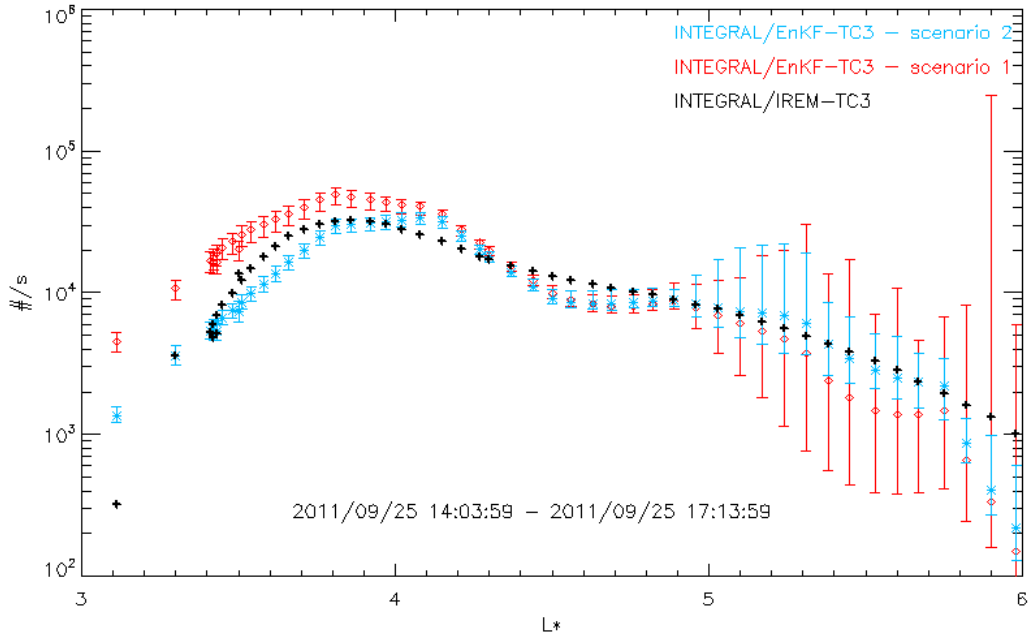
- Data ingested: GIOVE-B/SREM
  GOES13
  INTEGRAL/IREM
- Test data set = THEMIS-D/SST
  XMM/ERMD



Validation against test data set







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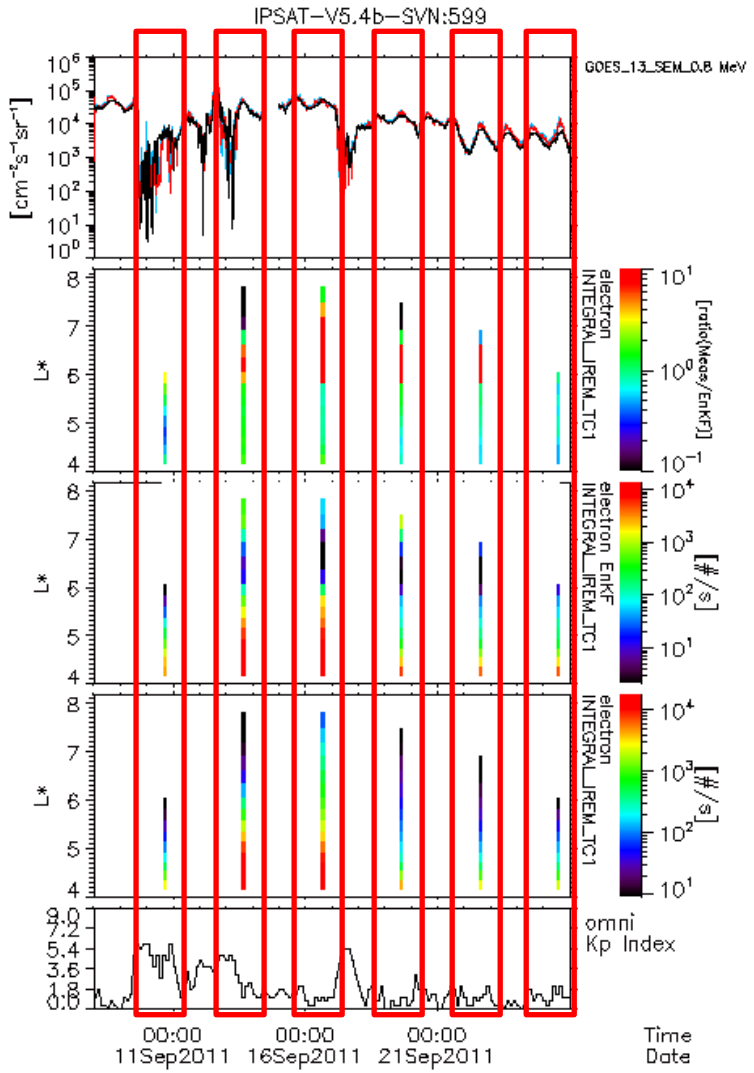

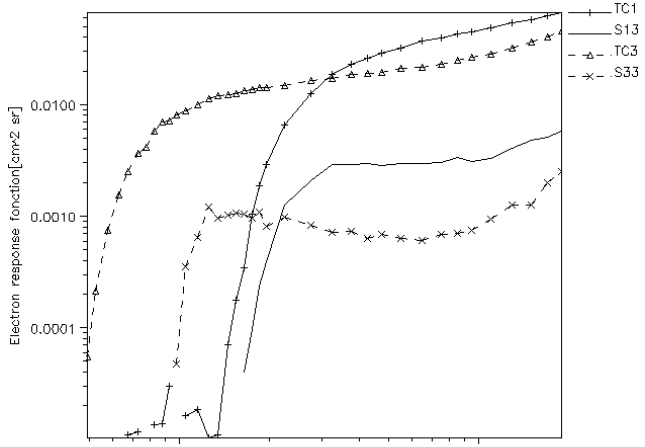

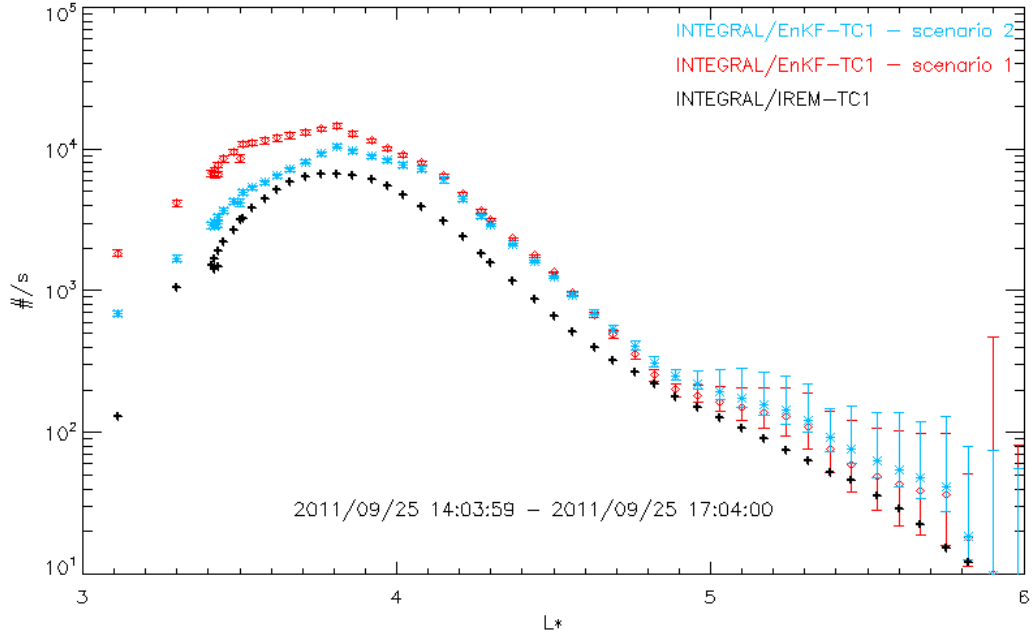

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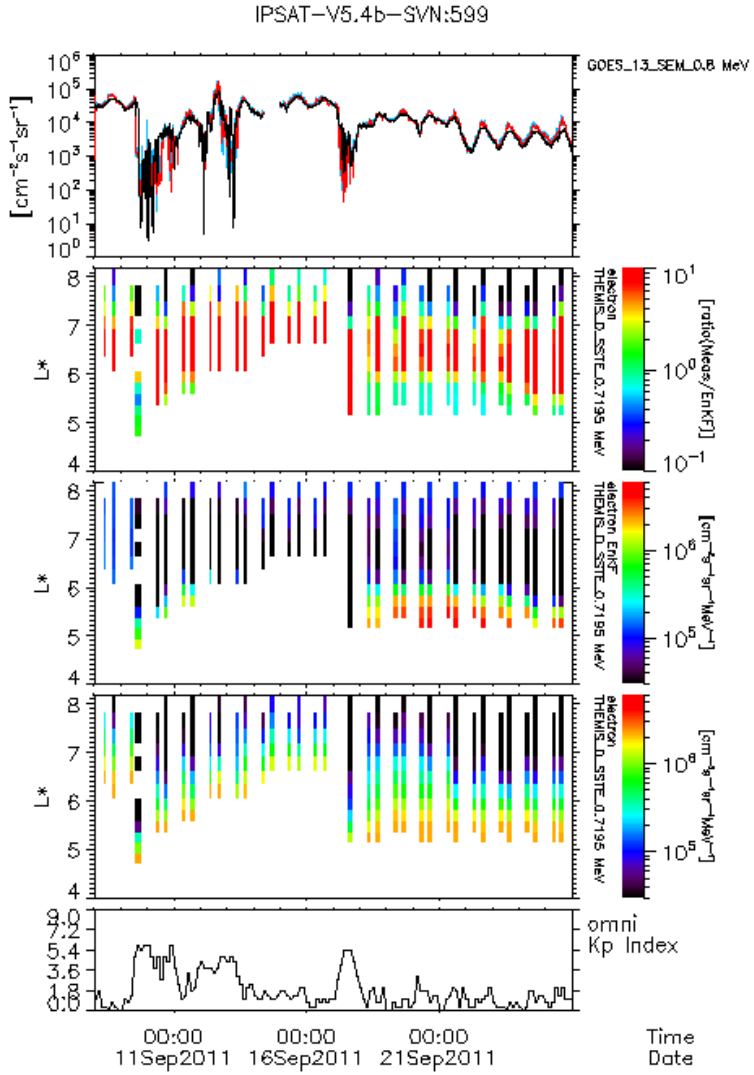

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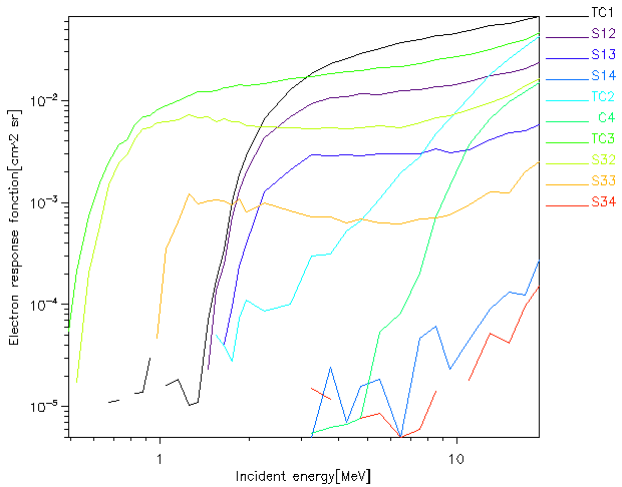
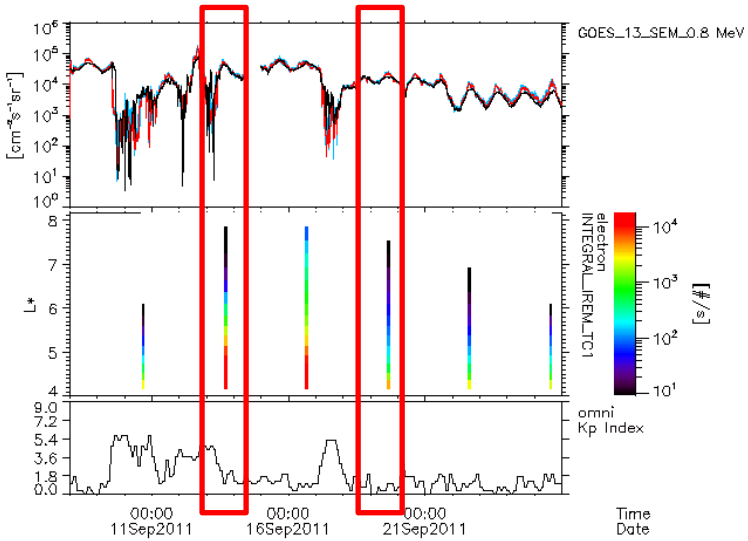
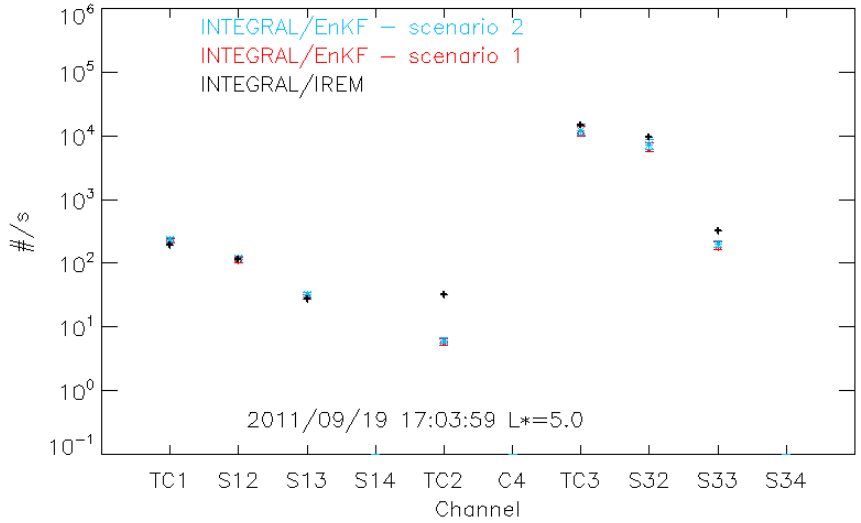
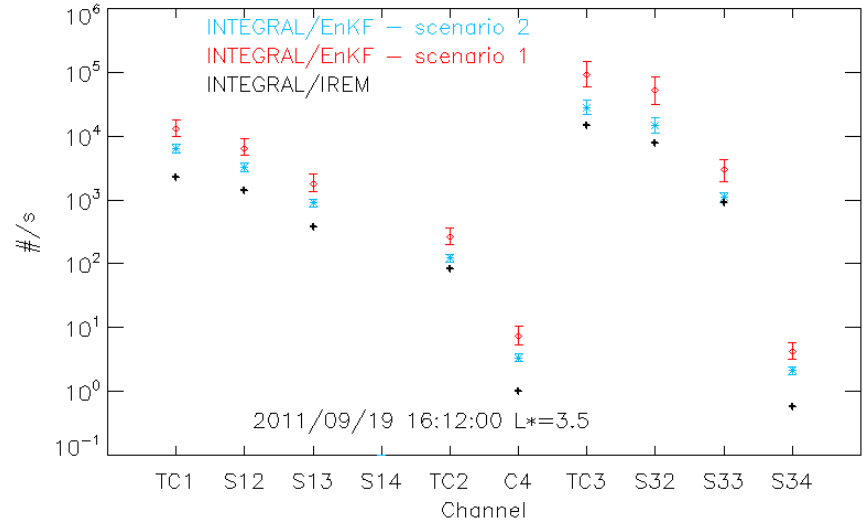




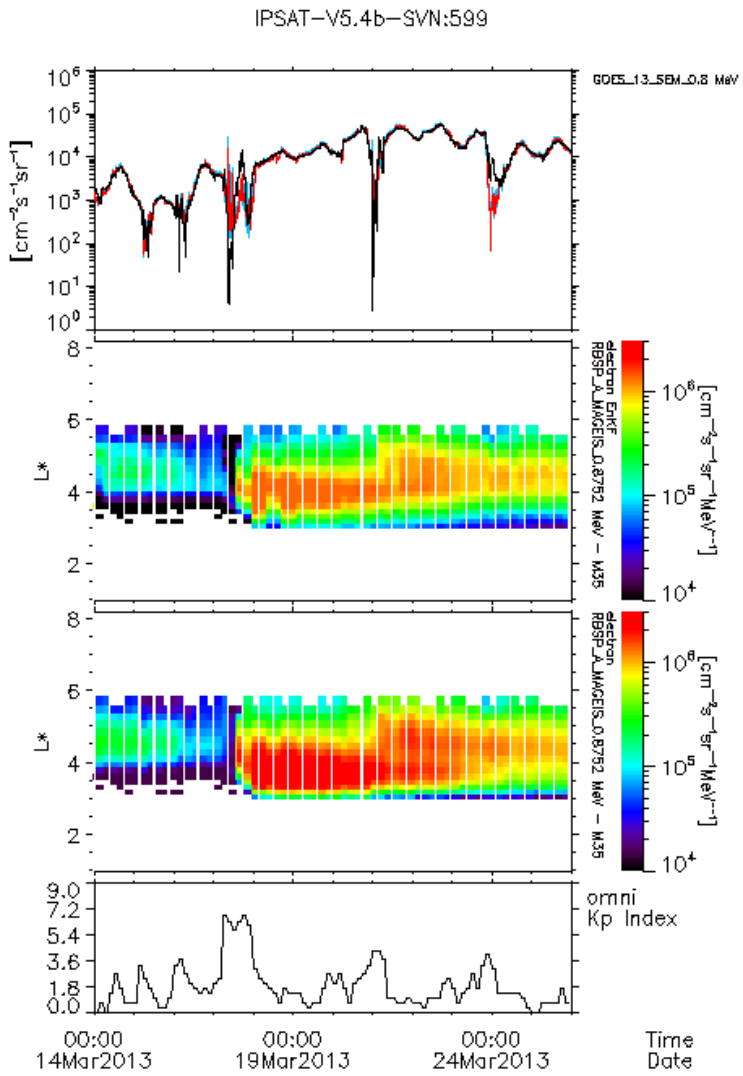




Validation against test data set

Scenario 1:

- Data ingested: RBSP_A/MAGEIS
  GOES13



Conclusions

- MAARBLE has allowed to improve the data assimilation tool
  - Assimilation of count rates
  - Uncertainties on radial diffusion coefficients
  - Uncertainties on drop out due to magnetopause shadowing
  - Uncertainties on boundary condition (Themis-SST)
- Validation has been performed during the September, 2011 storm
  - INTEGRAL/IREM count rates could be retrieved
  - The Kalman filter provides uncertainties on results
  - The challenging region of the slot where there are steep gradients is well defined by the data assimilation tool.