



# Air Force Research Laboratory



***Integrity ★ Service ★ Excellence***

## **AE9/AP9 V1.20.002 Model Comparison Summary Report: Spatial Comparisons**

**10 December 2014**

**AE9/AP9/SPM Development Team**

These comparison plots were generated by the model *prior* to the Jan 2015 update of the IGRF magnetic field model coefficients and the associated regeneration of the neural network database files.



Distribution A: Approved for public release; distribution unlimited.  
377ABW-2014-0883



# **AE9/AP9 V1.2:**

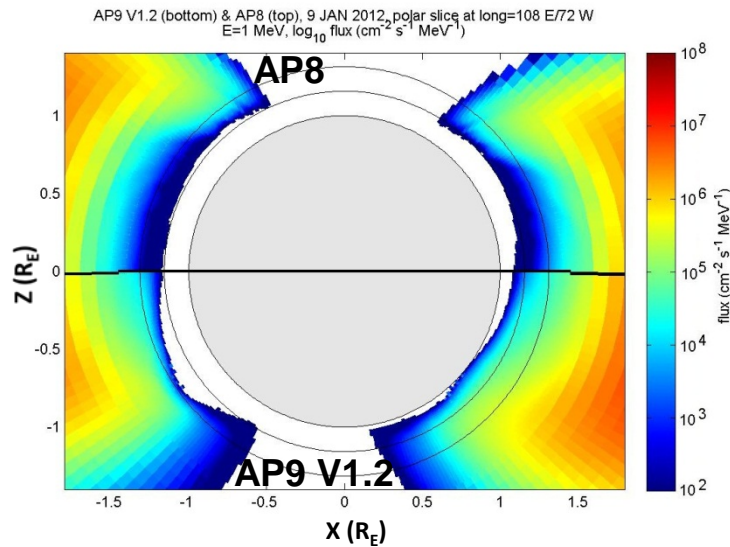
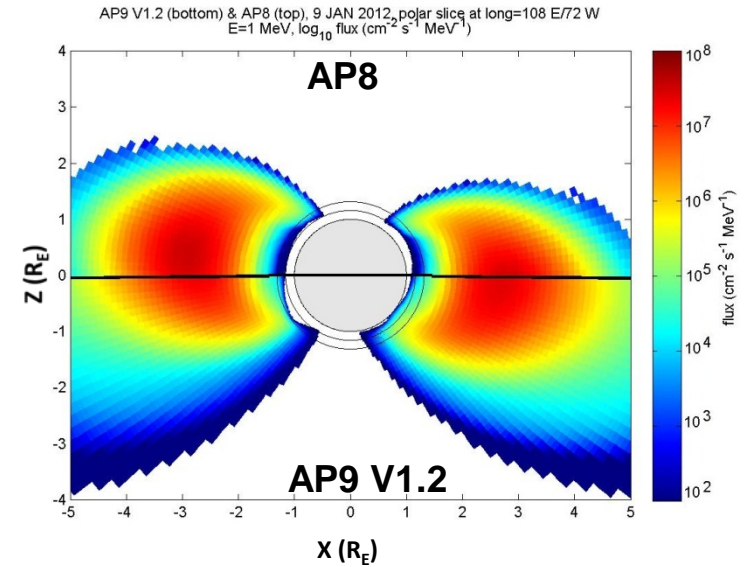
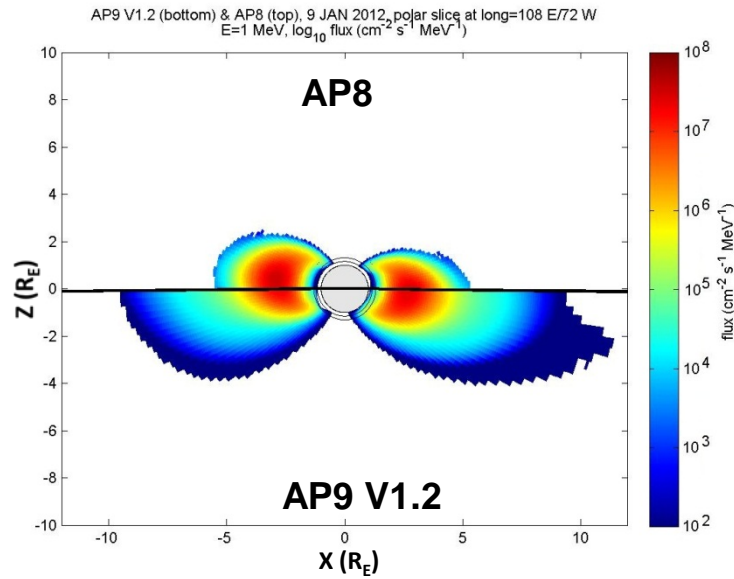
## **Spatial comparisons to AE8/AP8 and AE9/AP9 V1.0**

### *Content:*

- All plots are meridional cuts through radiation belts, representing a plane through longitudes 108° E and 72° W (north-south axis is vertical).
- Split screen comparisons show AE9/AP9 V1.2 in lower half of each figure and former models (AE8/AP8 or AE9/AP9 V1.0) in top half.
- Ratio comparisons show ratio of AE9/AP9 V1.2 to former models.
  - grey = nonzero flux in V1.2 but zero flux in former model.
  - brown = nonzero flux in former model but zero flux in V1.2.
- Radial profile plots show V1.2 and V1.0 fluxes vs. McIlwain  $L$  value near the equator.

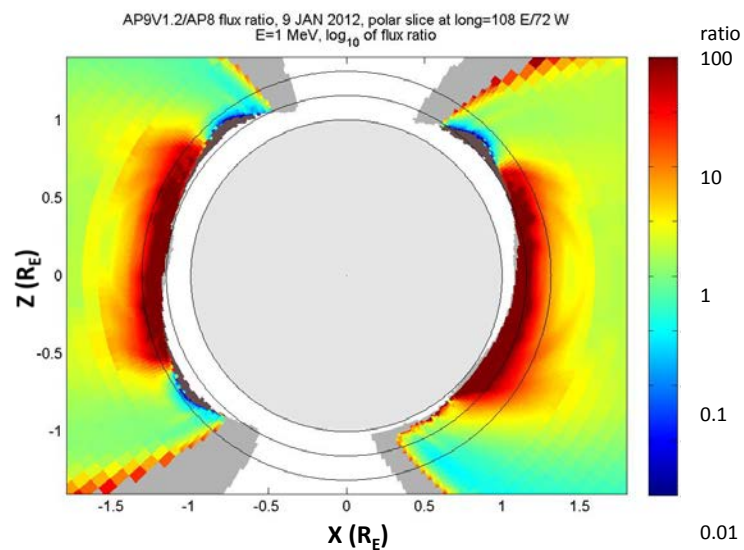
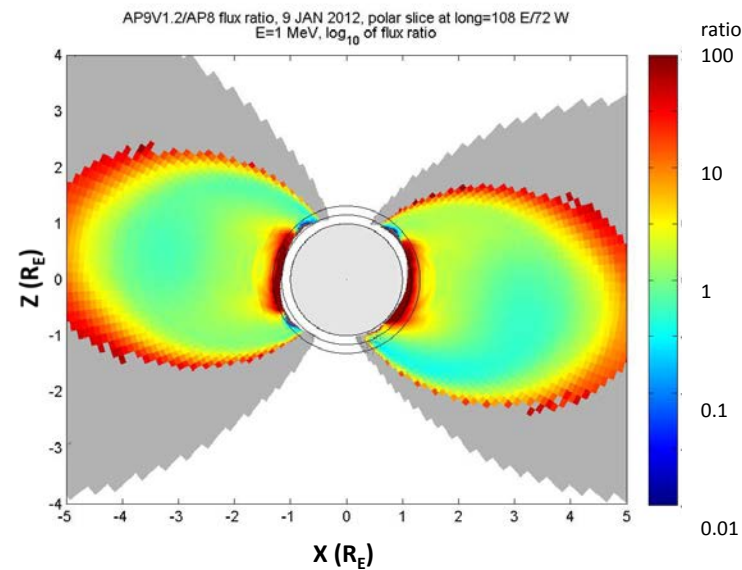
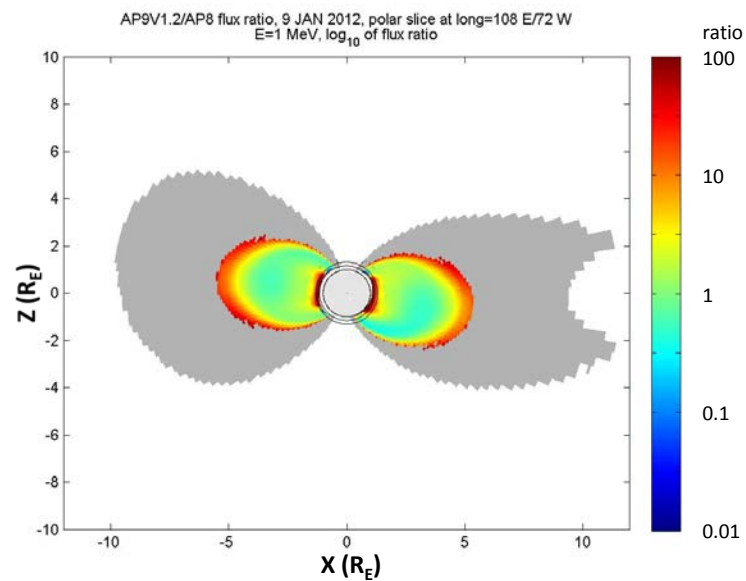
# **AP9 V1.2 vs. AP8**

# 1 MeV protons

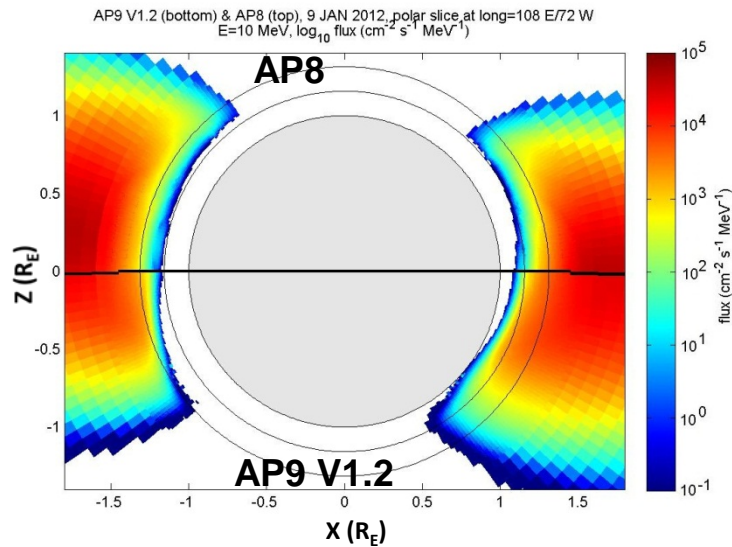
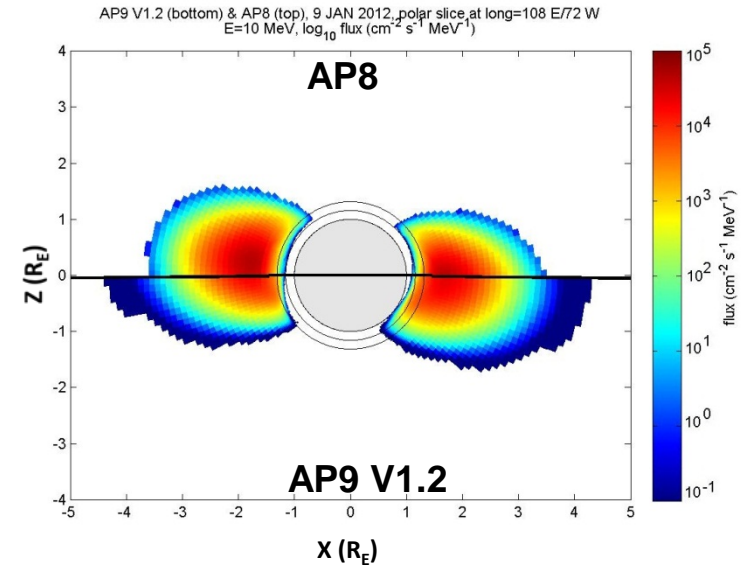
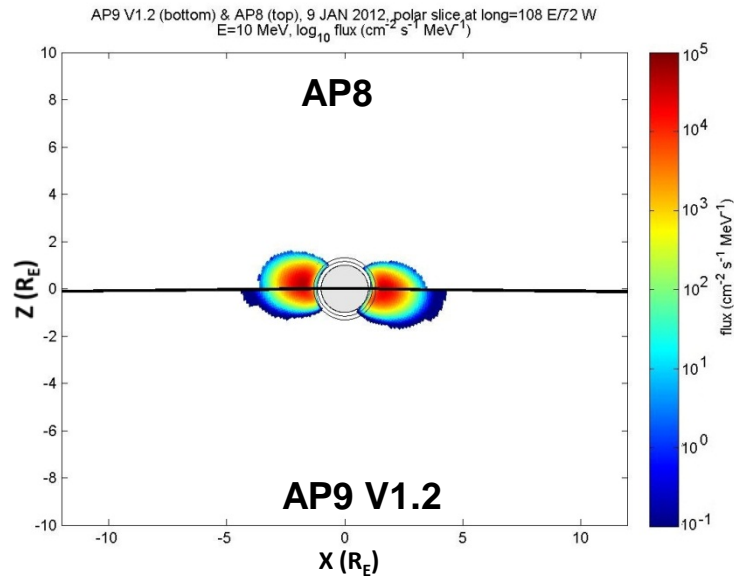




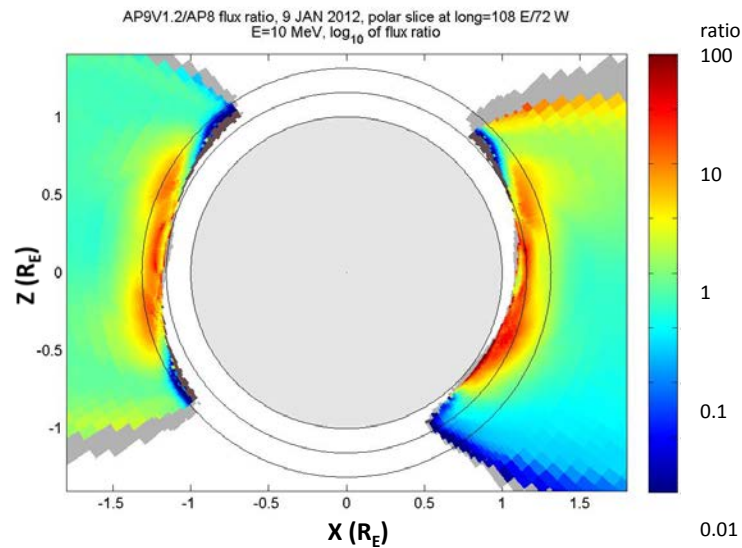
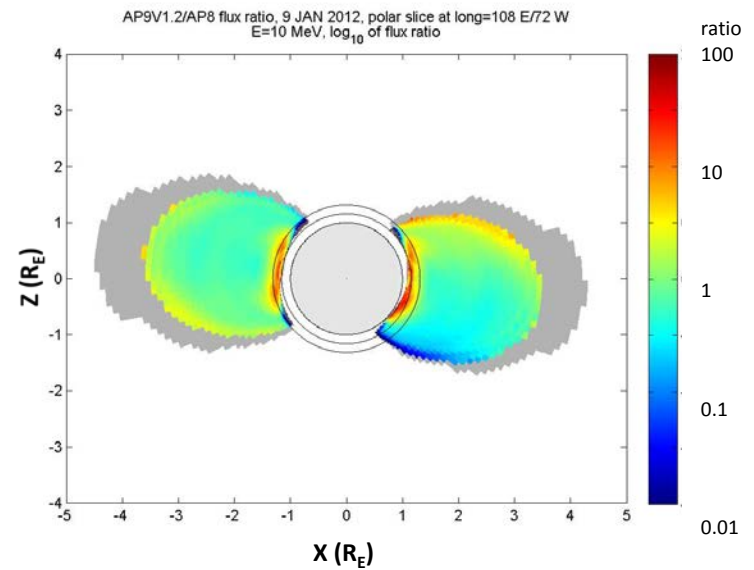
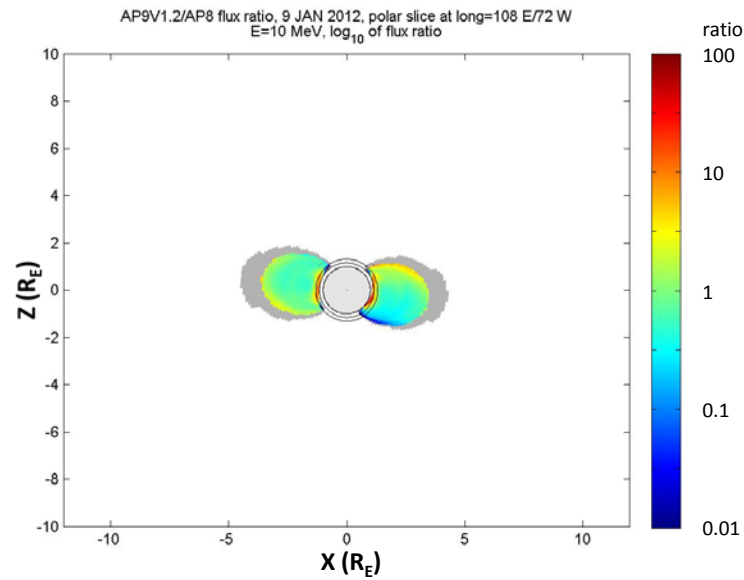
# 1 MeV protons, AP9-to-AP8 ratio



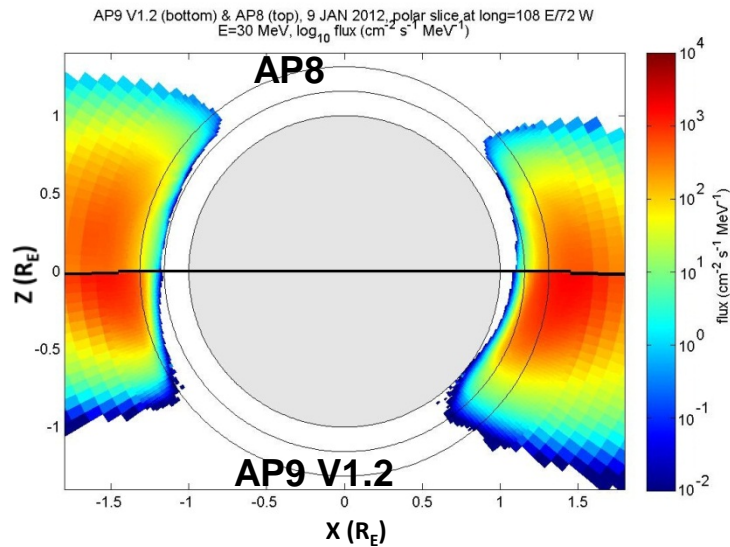
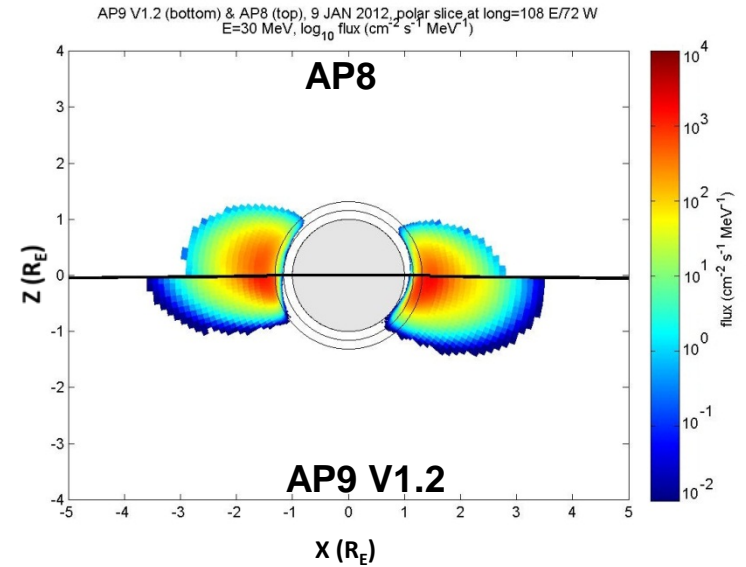
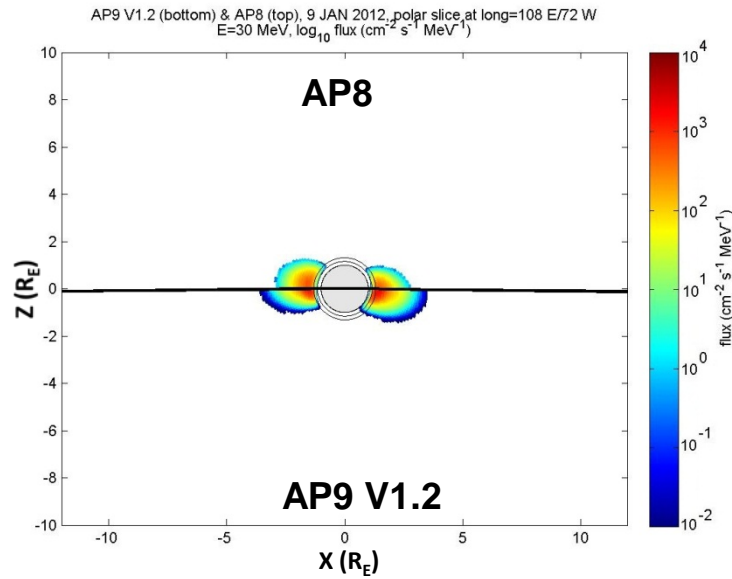
# 10 MeV protons



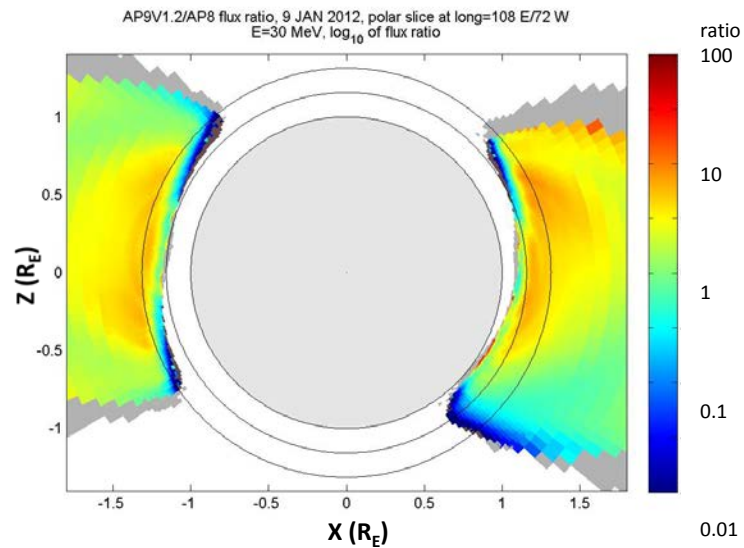
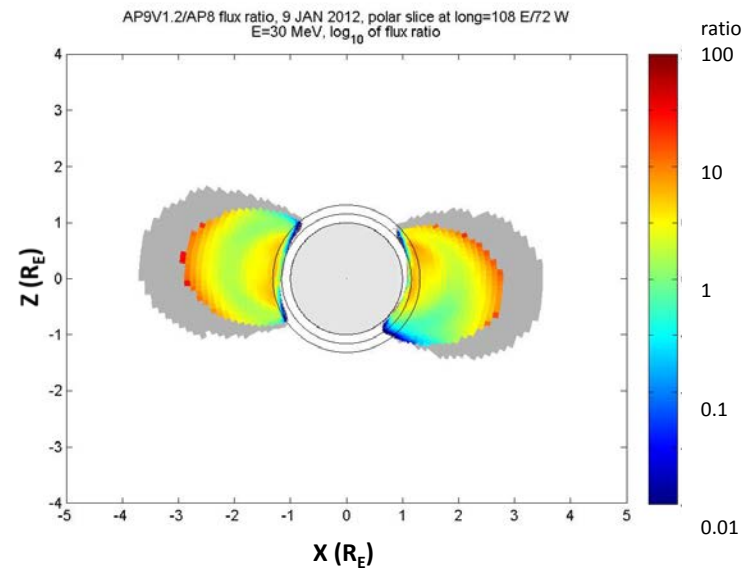
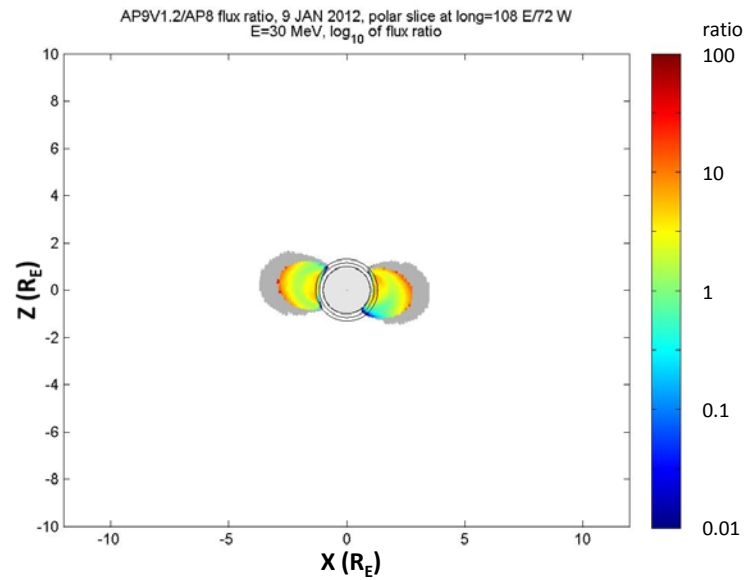
# 10 MeV protons, AP9-to-AP8 ratio



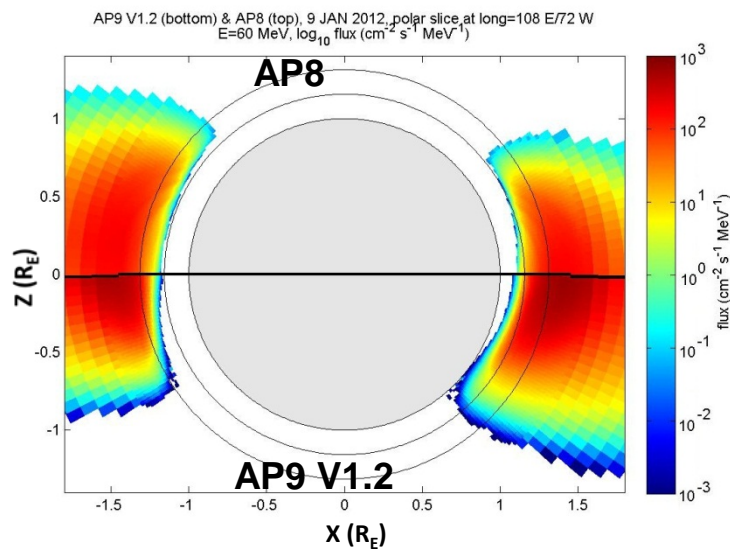
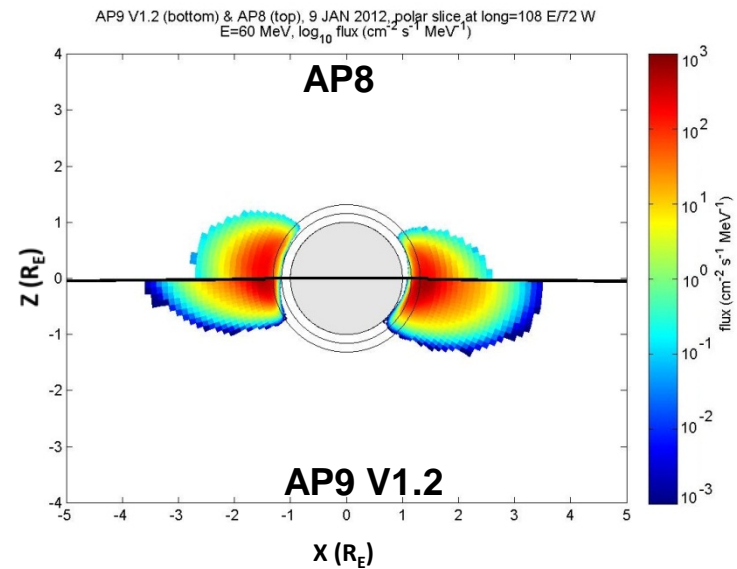
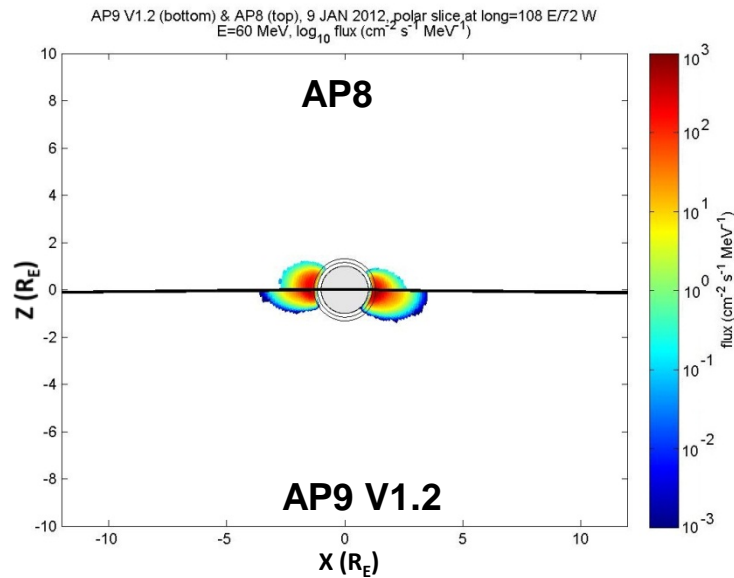
# 30 MeV protons



# 30 MeV protons, AP9-to-AP8 ratio

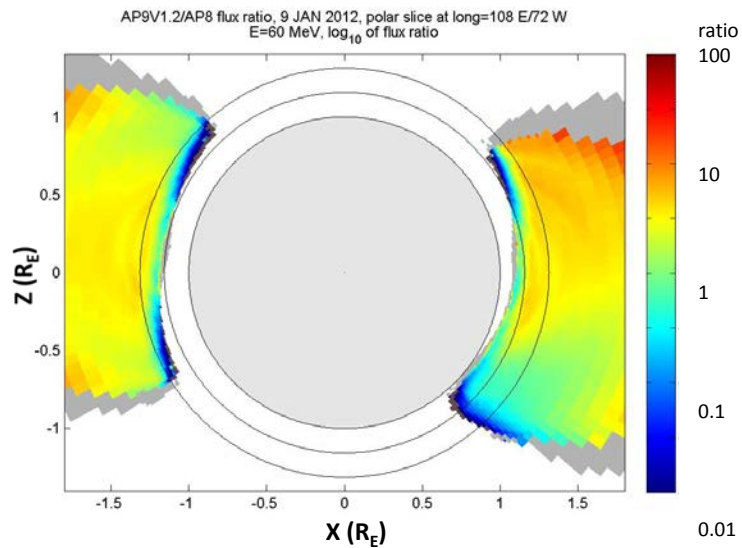
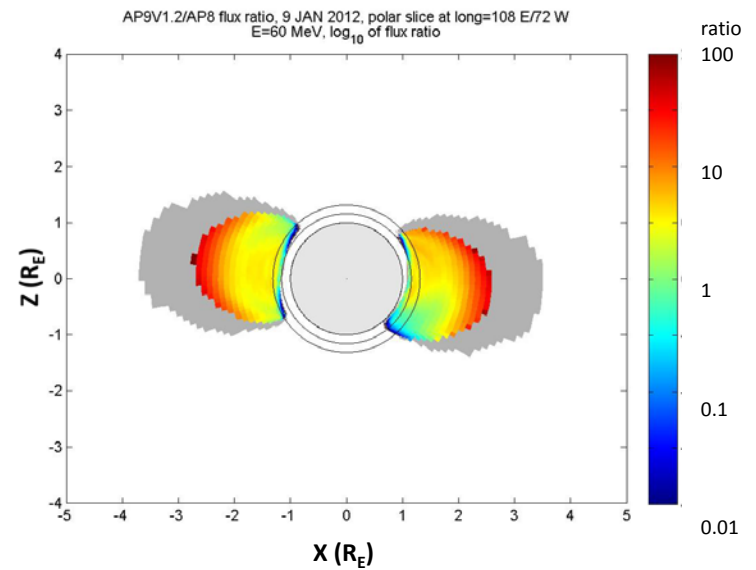
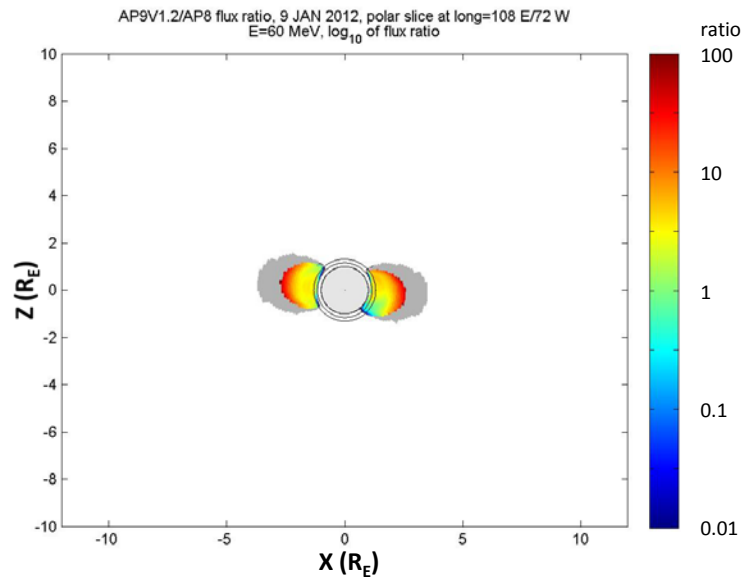


# 60 MeV protons

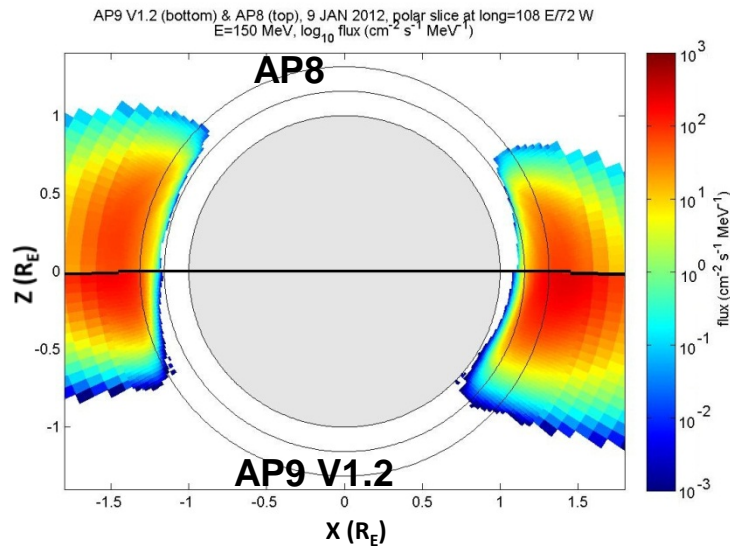
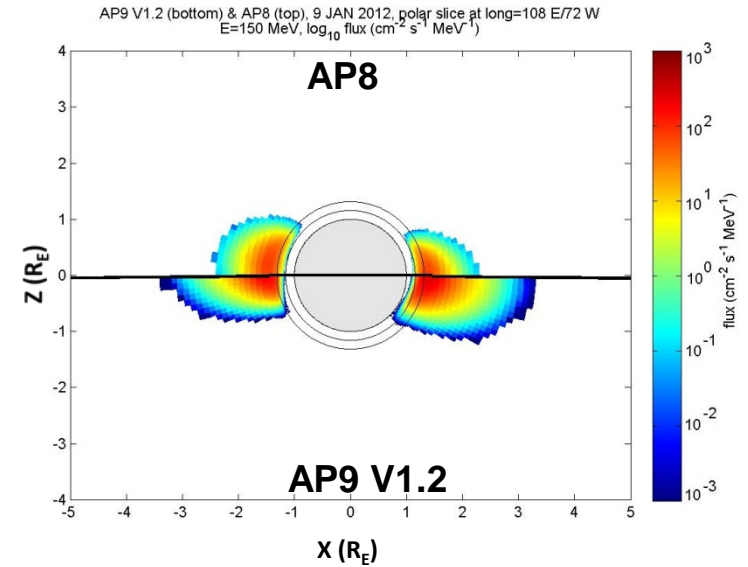
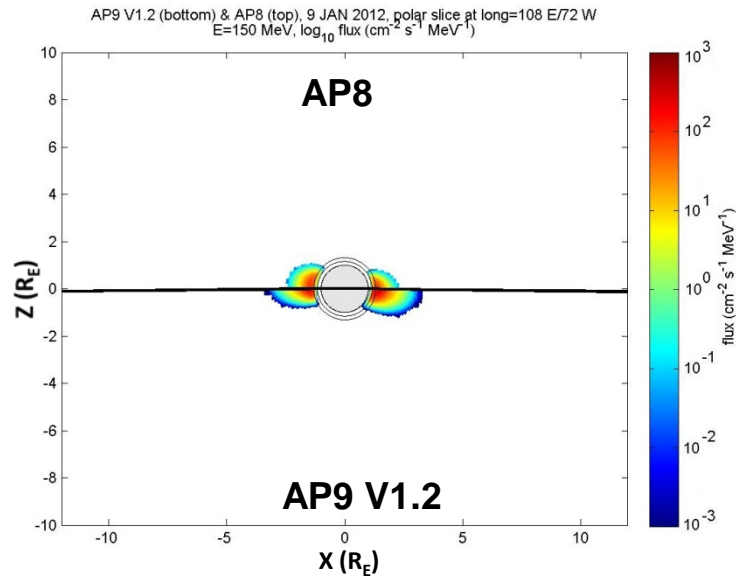




# 60 MeV protons, AP9-to-AP8 ratio

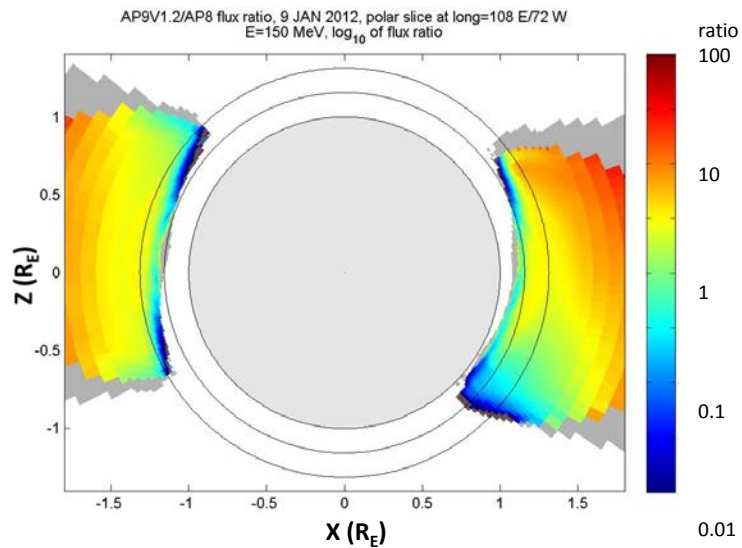
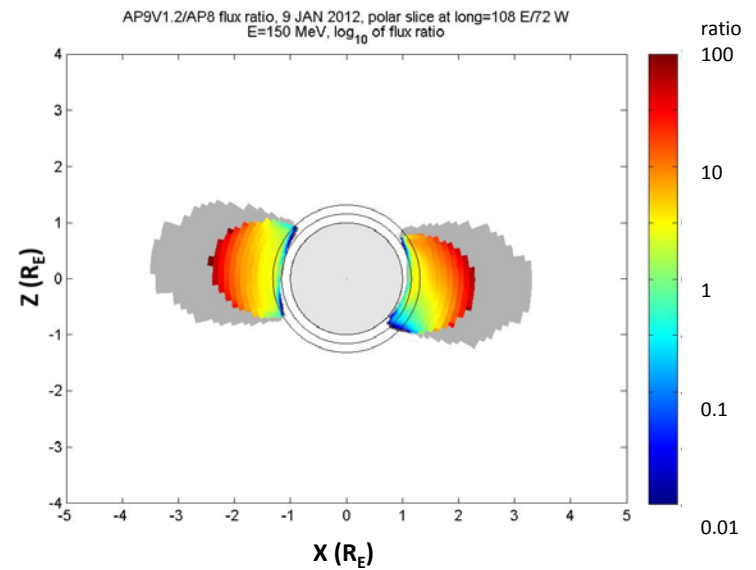
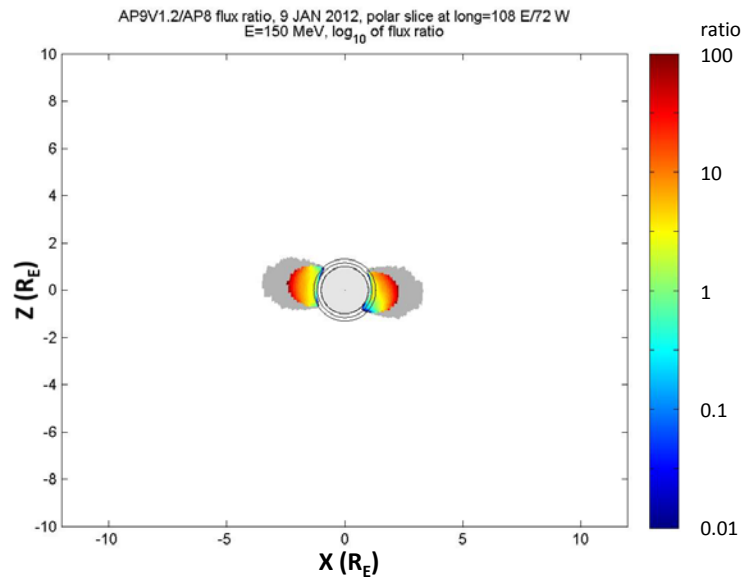


# 150 MeV protons



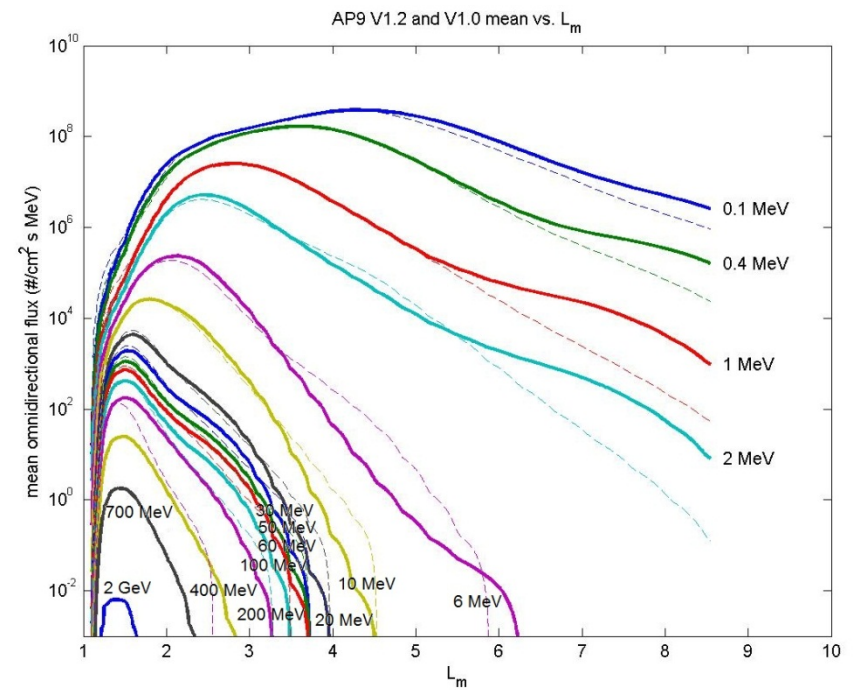
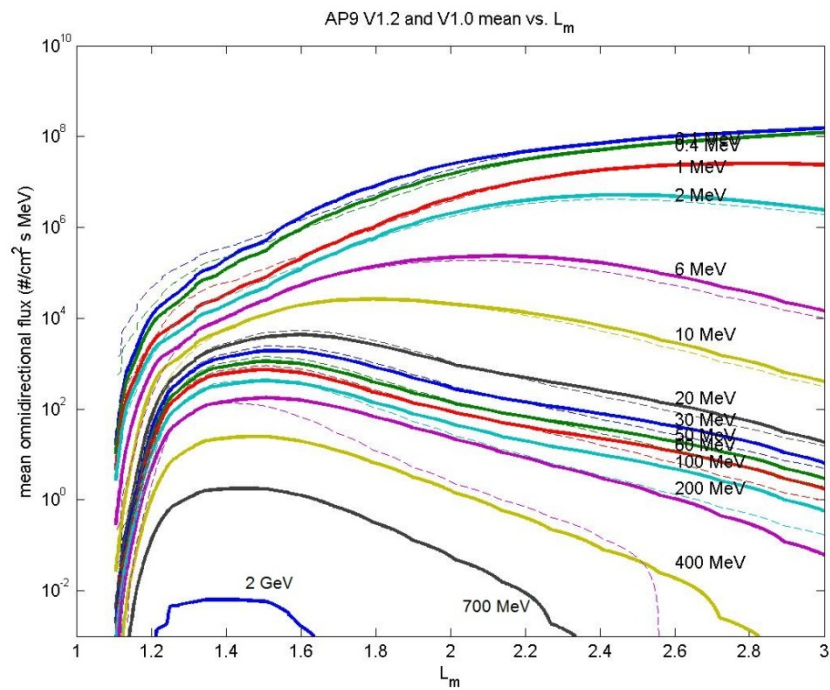


# 150 MeV protons, AP9-to-AP8 ratio

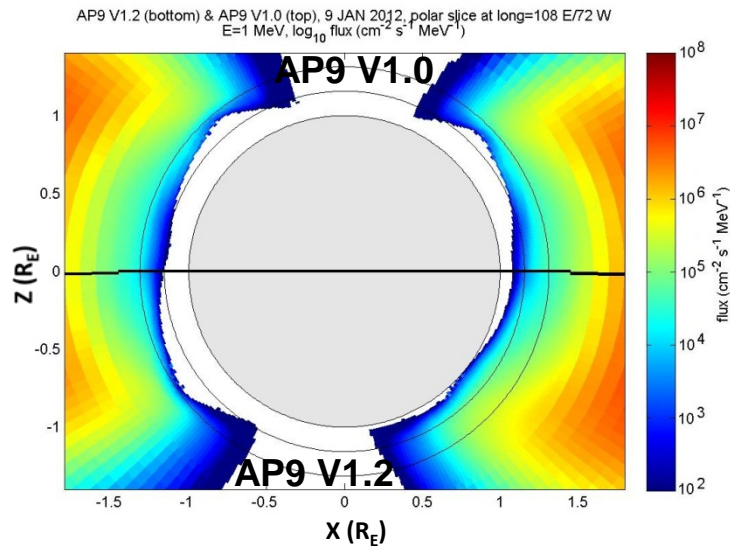
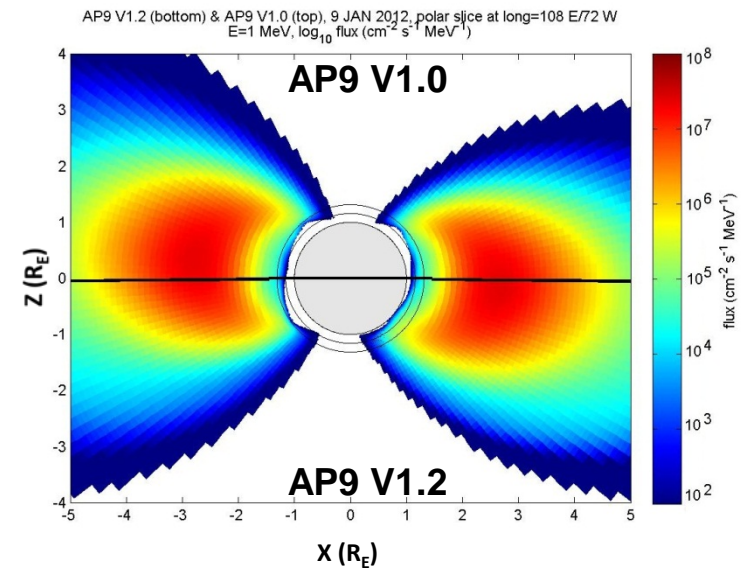
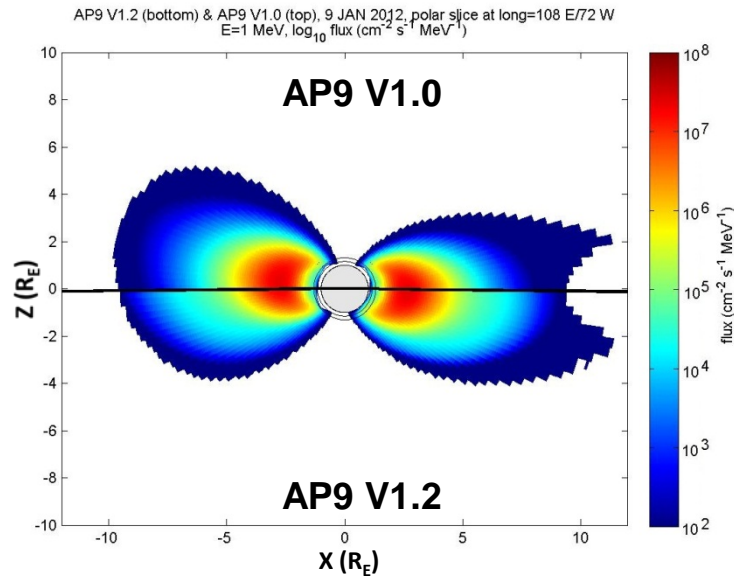


# **AP9 V1.2 vs. AP9 V1.0**

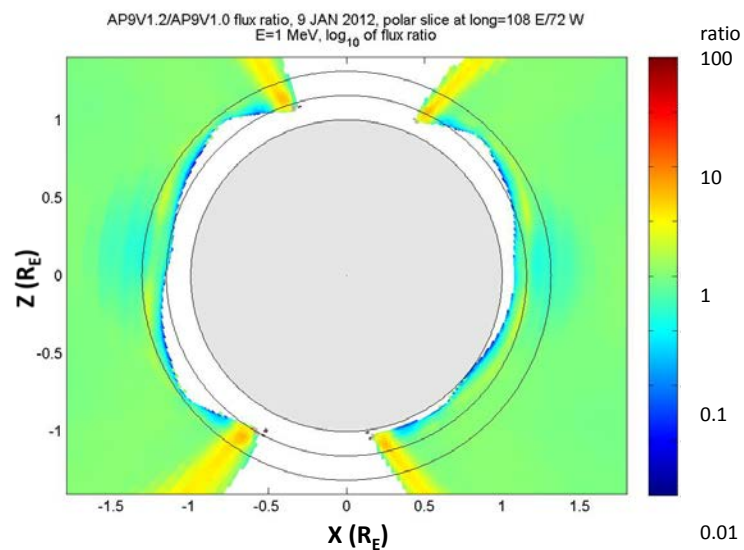
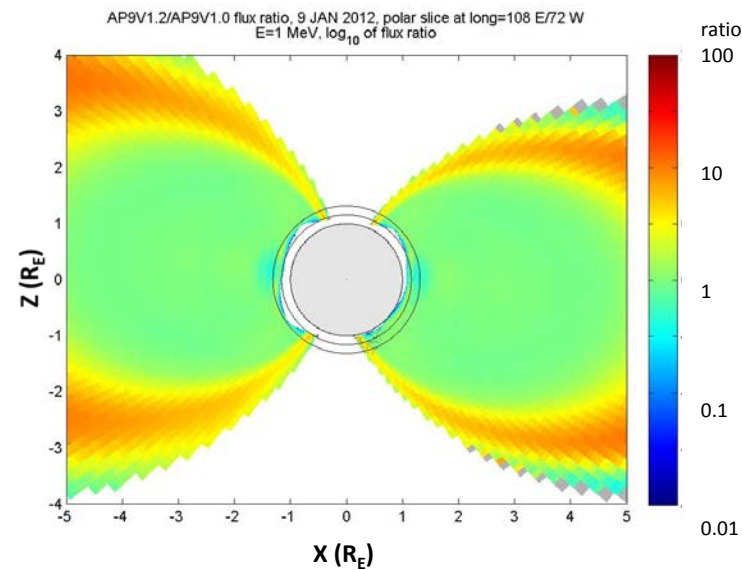
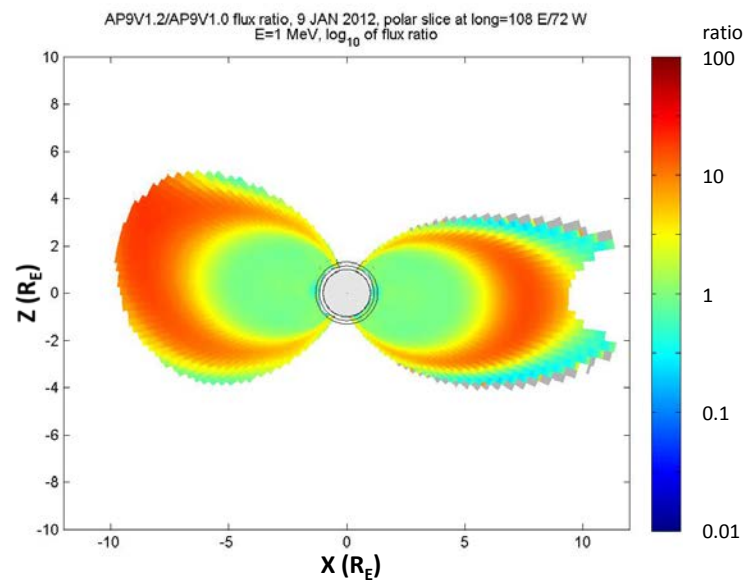
## Flux vs. McIlwain L value, near equator



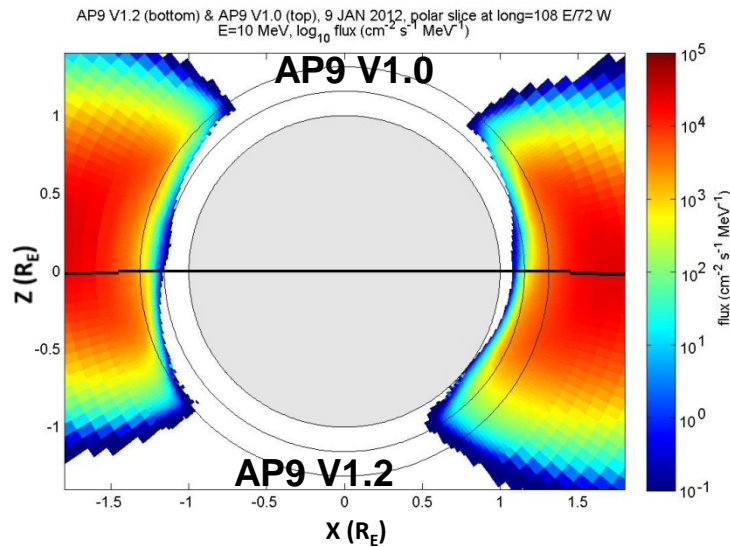
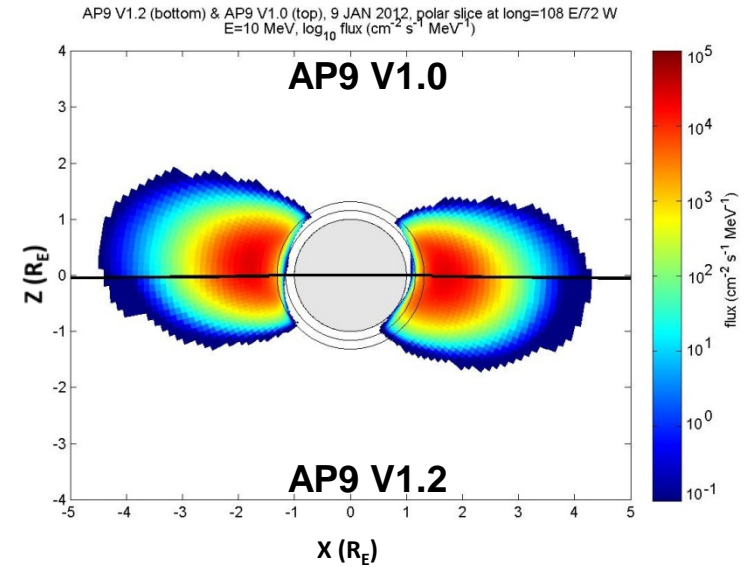
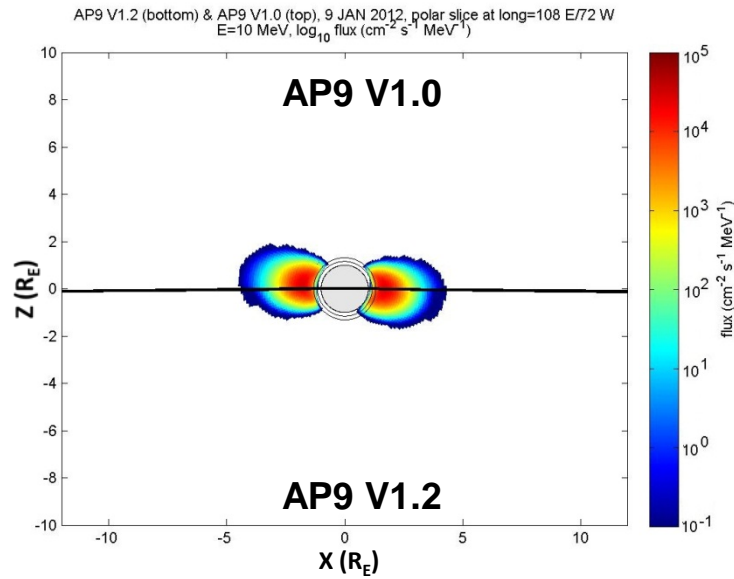
# 1 MeV protons



# 1 MeV protons, AP9V1.2-to-AP9V1.0 ratio

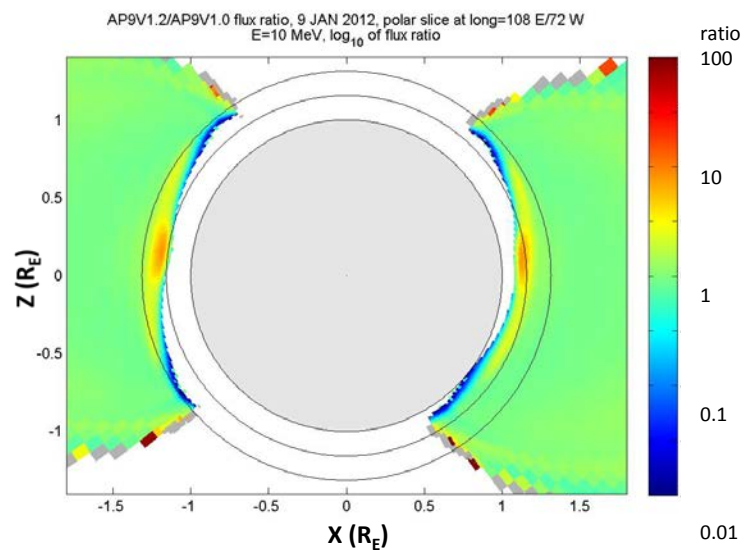
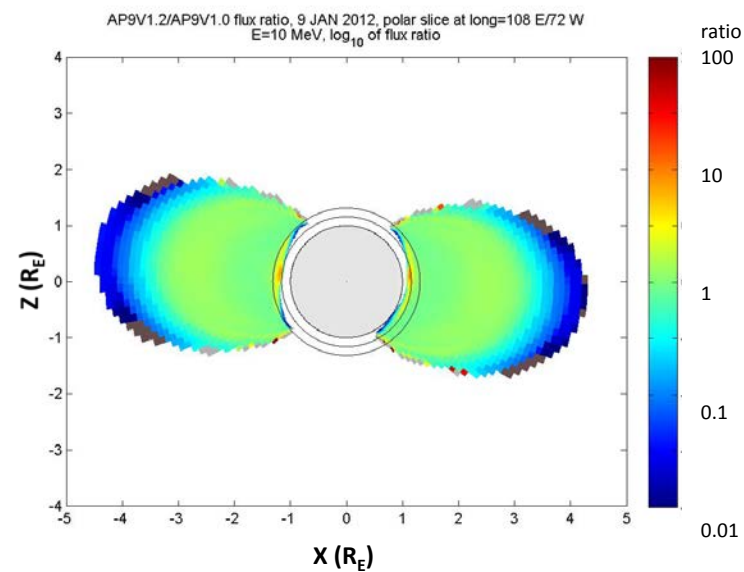
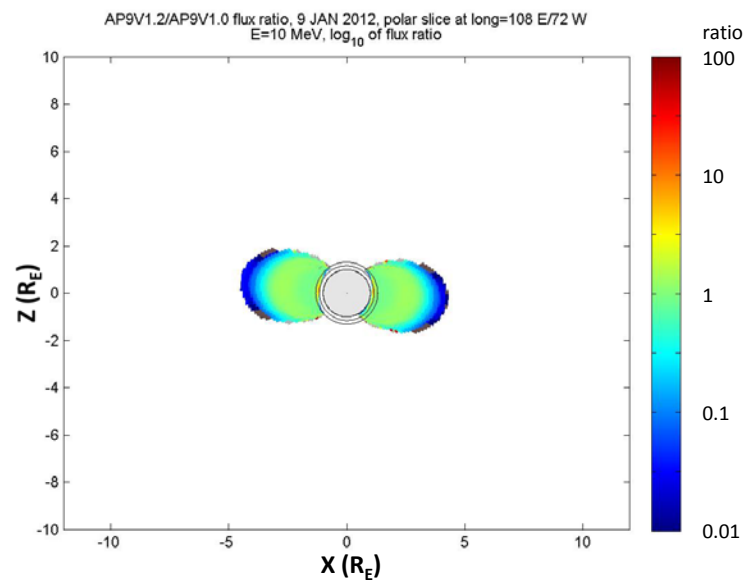


# 10 MeV protons

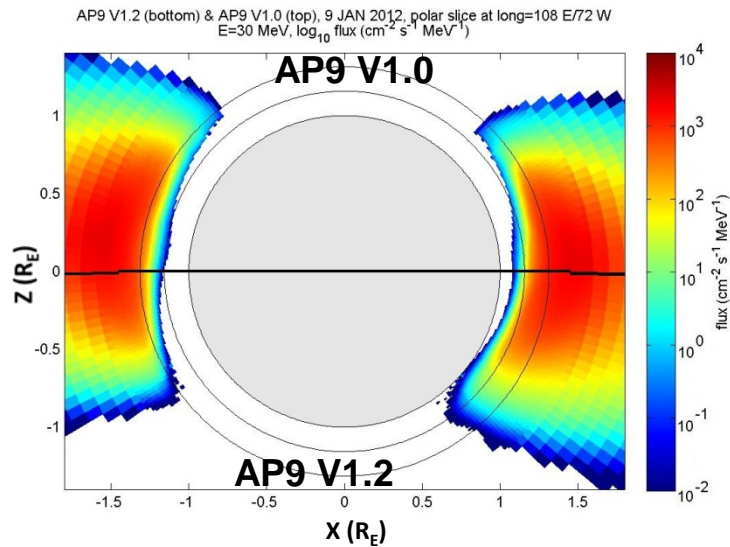
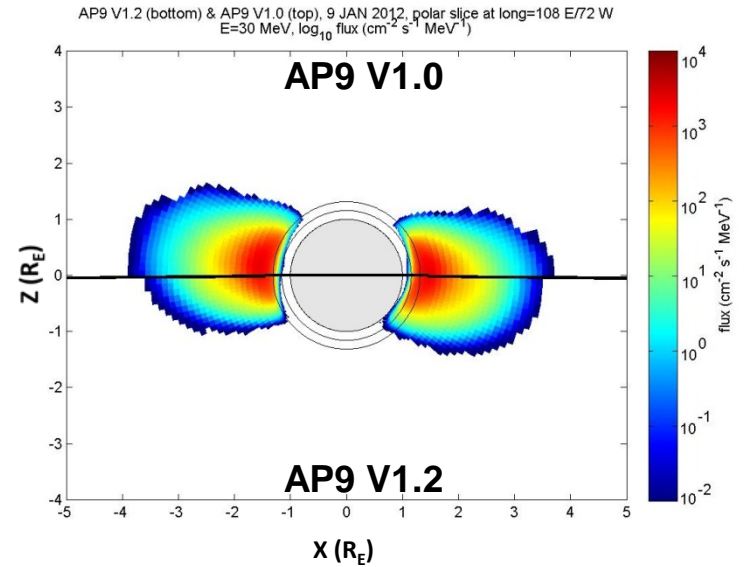
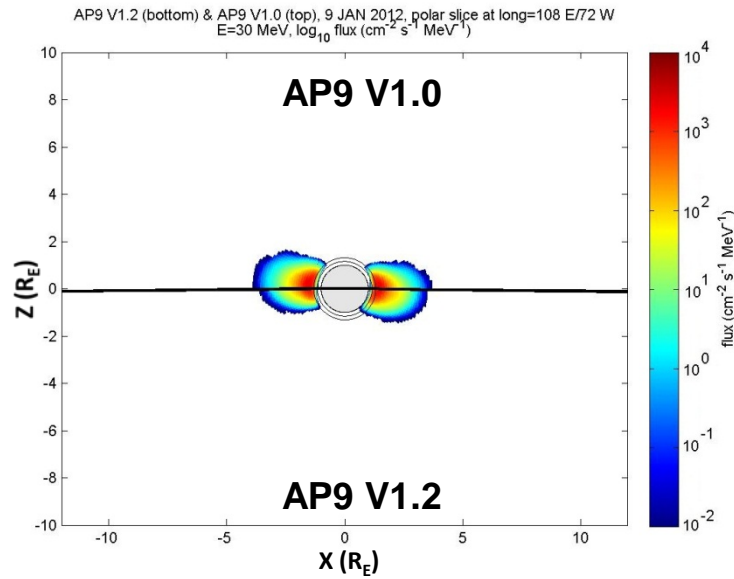




# 10 MeV protons, AP9V1.2-to-AP9V1.0 ratio

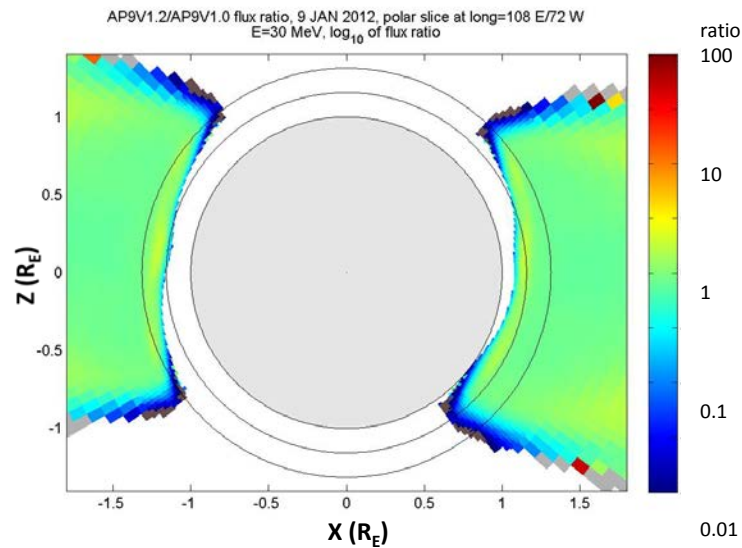
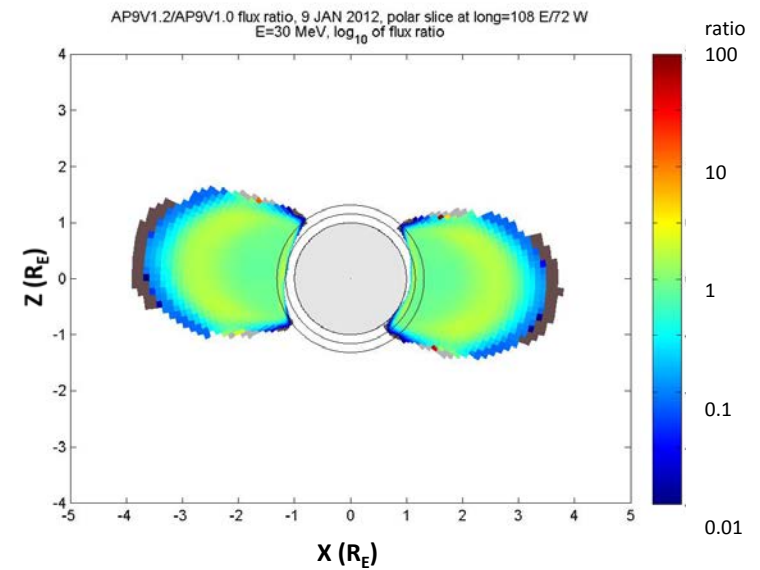
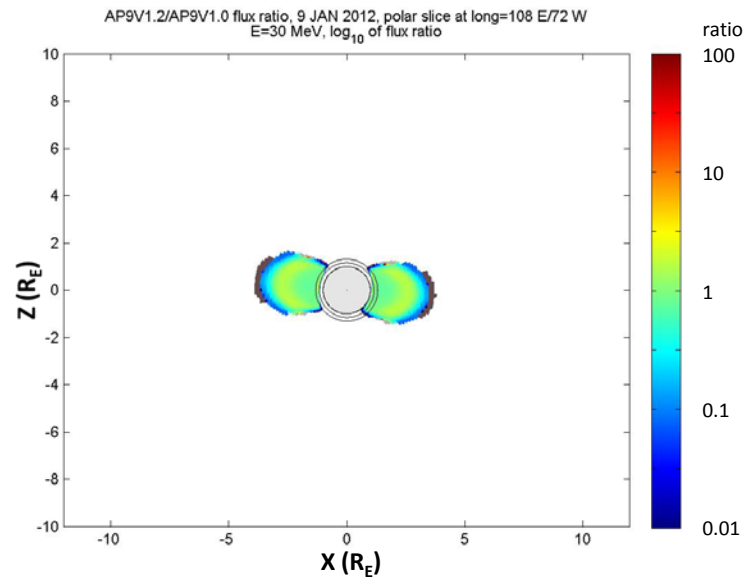


# 30 MeV protons

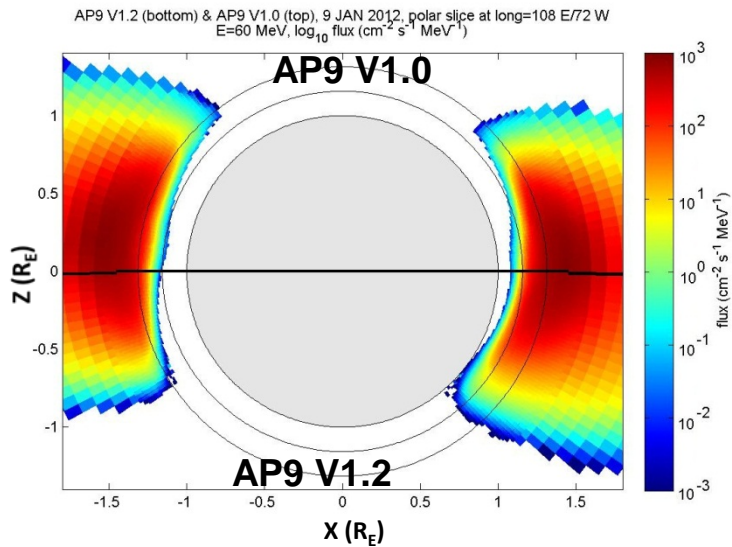
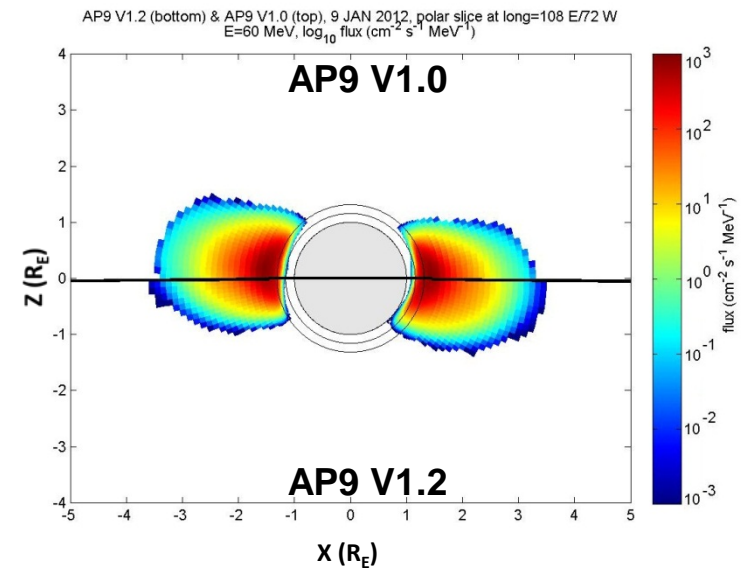
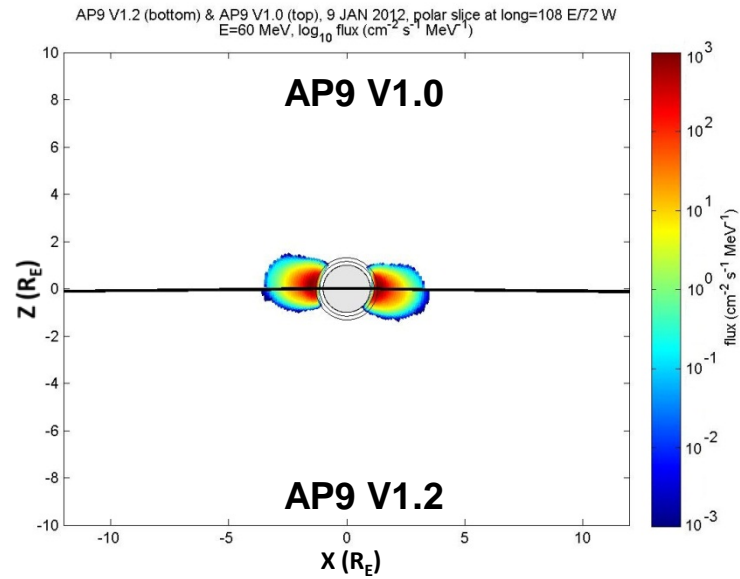




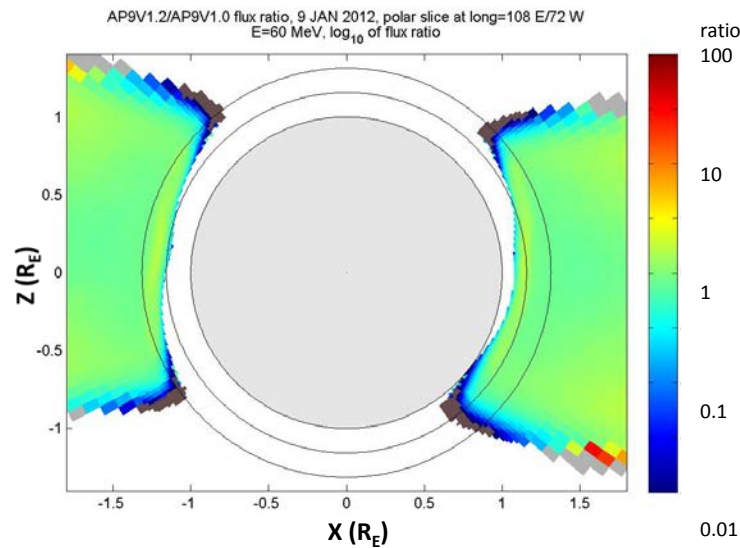
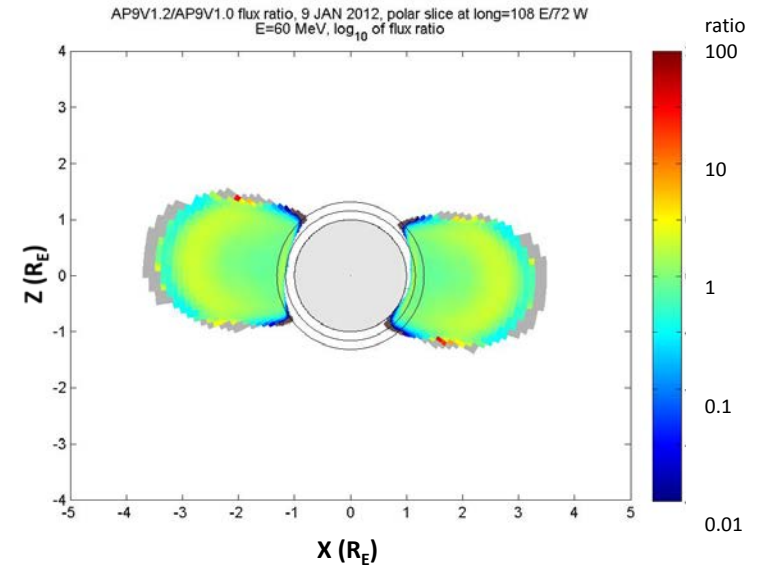
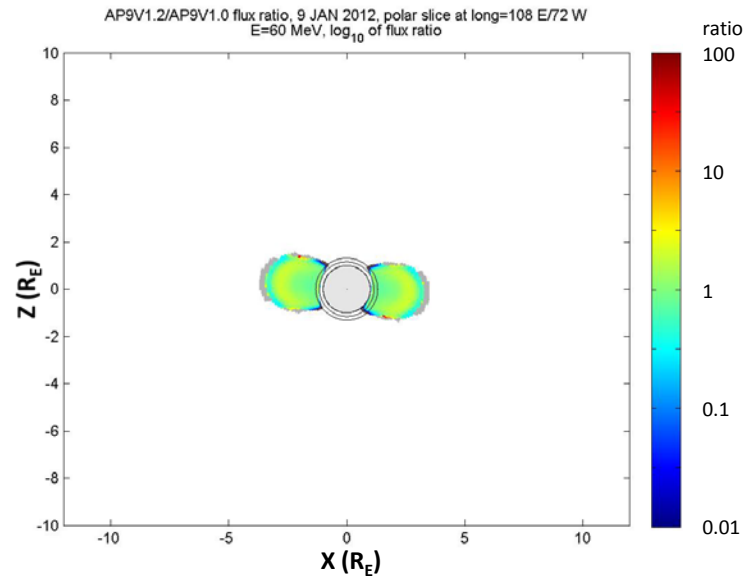
# 30 MeV protons, AP9V1.2-to-AP9V1.0 ratio



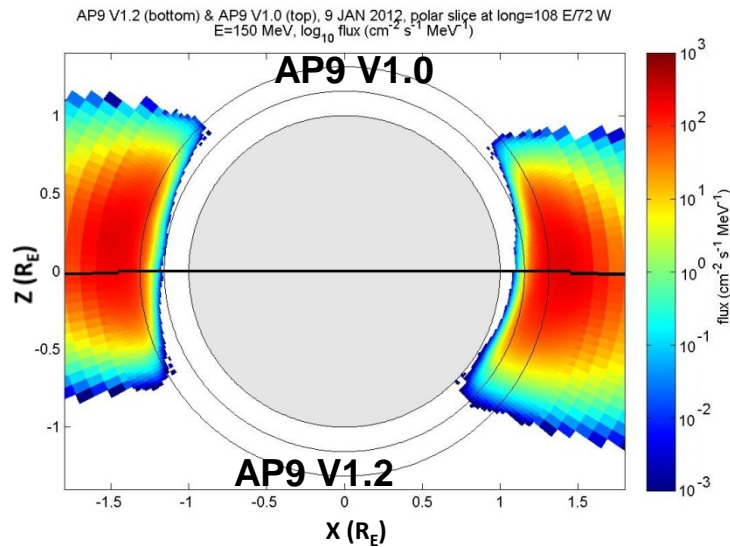
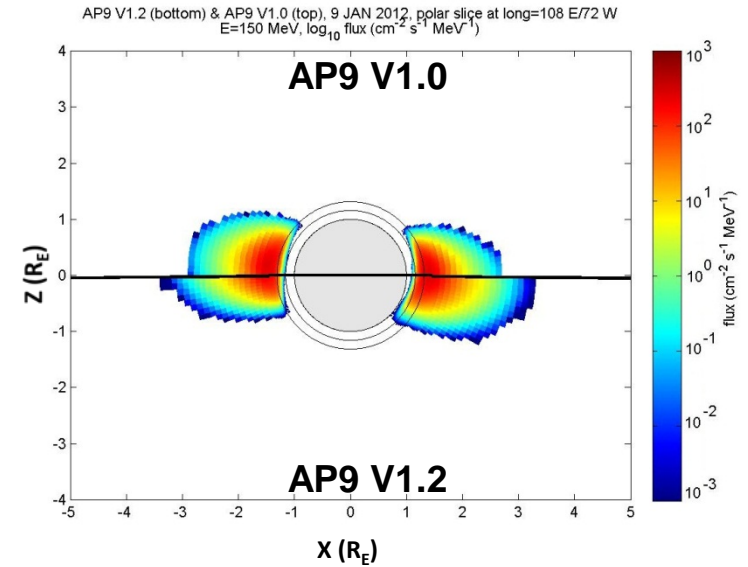
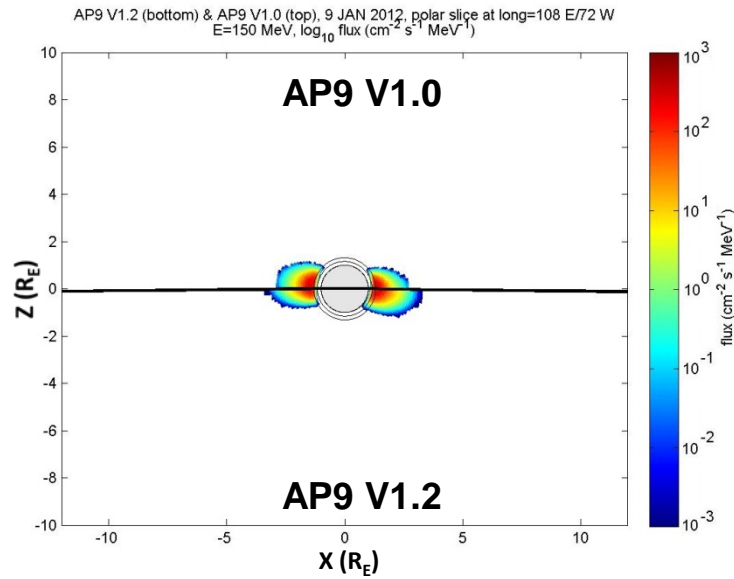
# 60 MeV protons



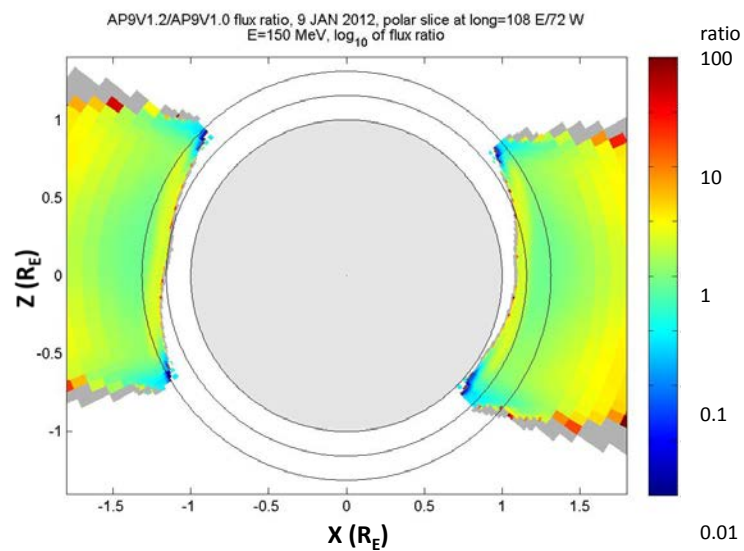
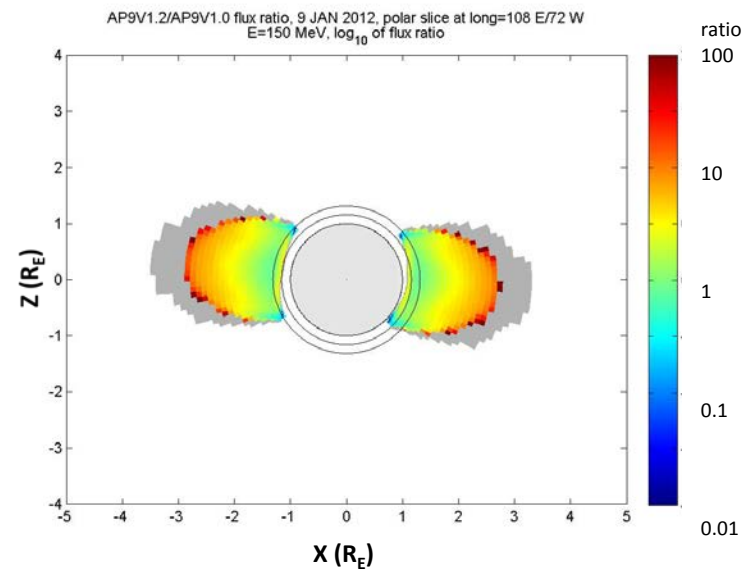
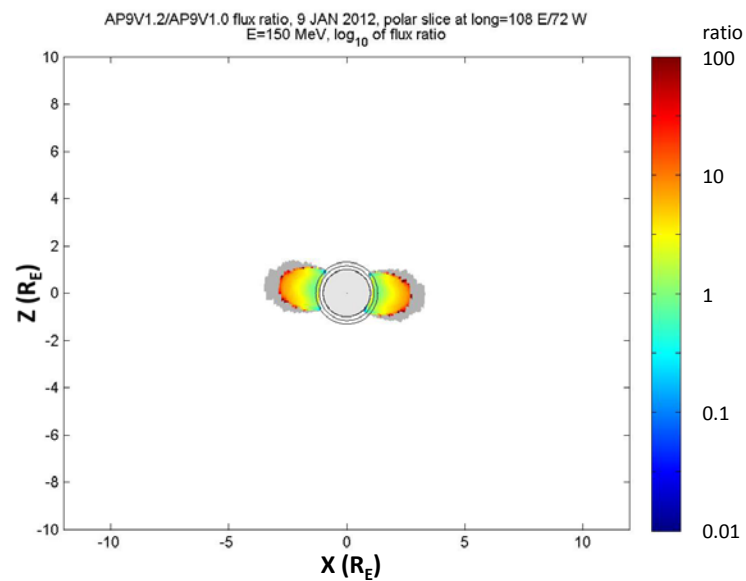
# 60 MeV protons, AP9V1.2-to-AP9V1.0 ratio



# 150 MeV protons

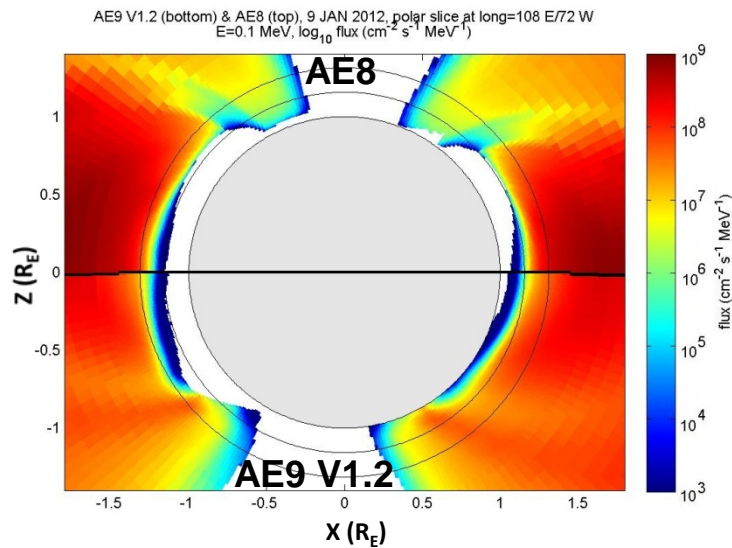
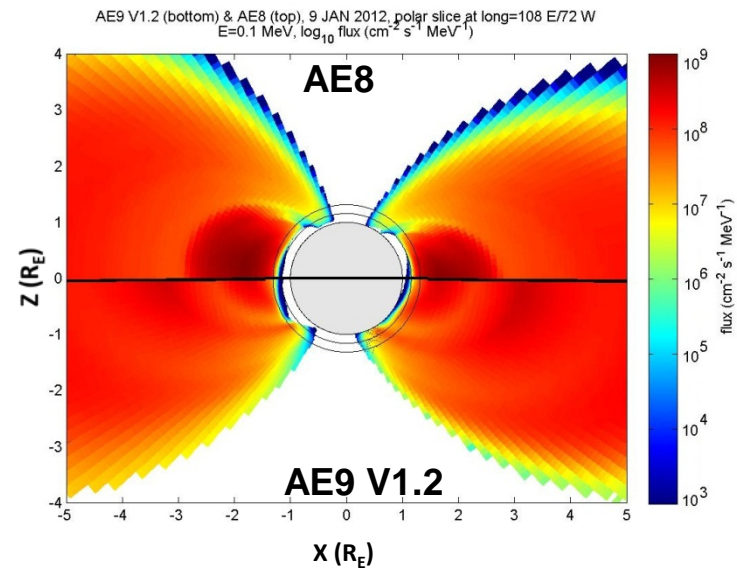
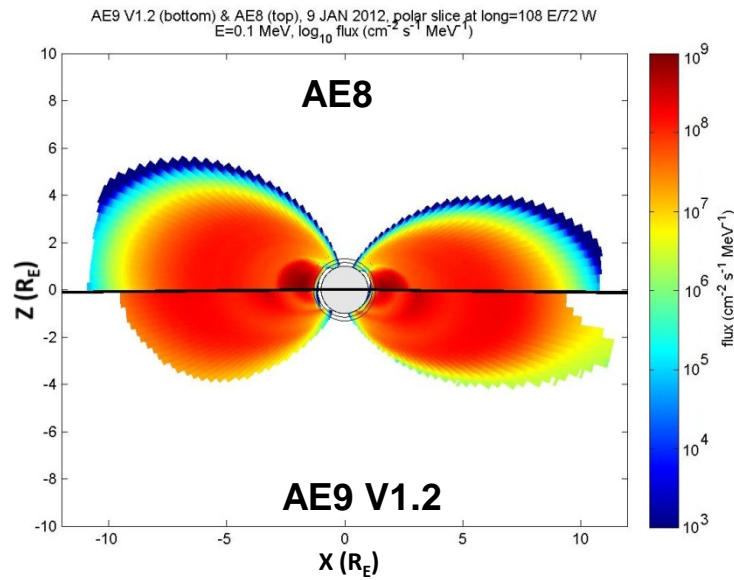


# 150 MeV protons, AP9V1.2-to-AP9V1.0 ratio



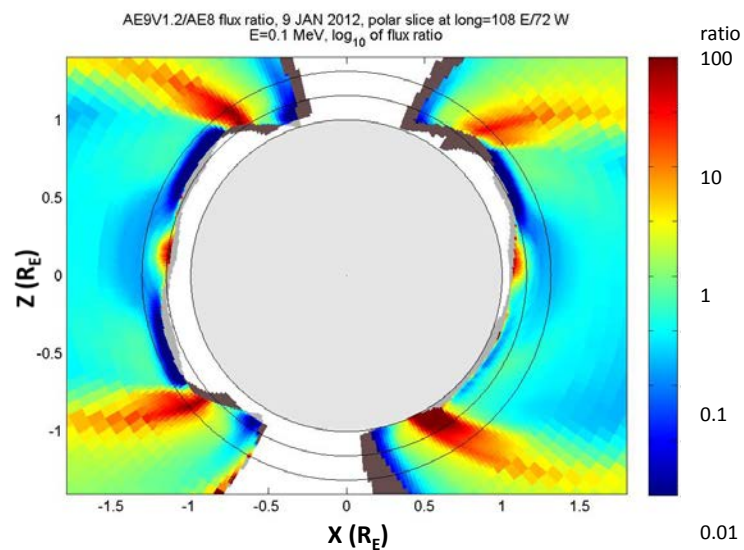
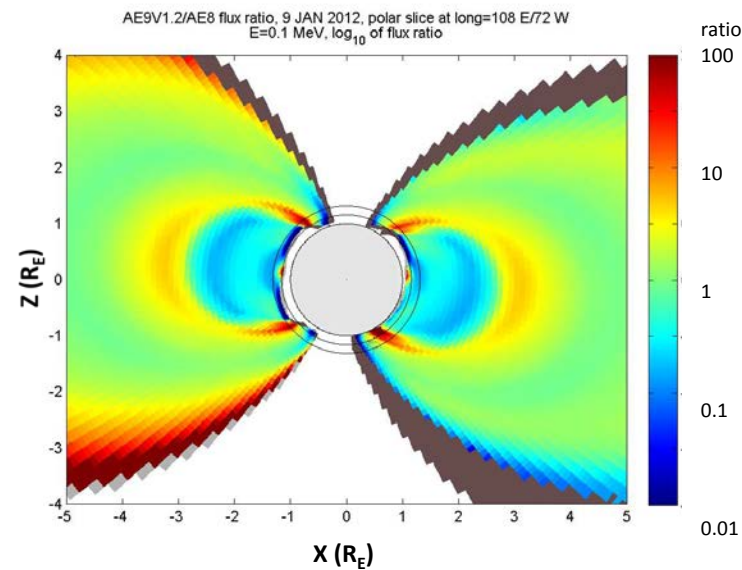
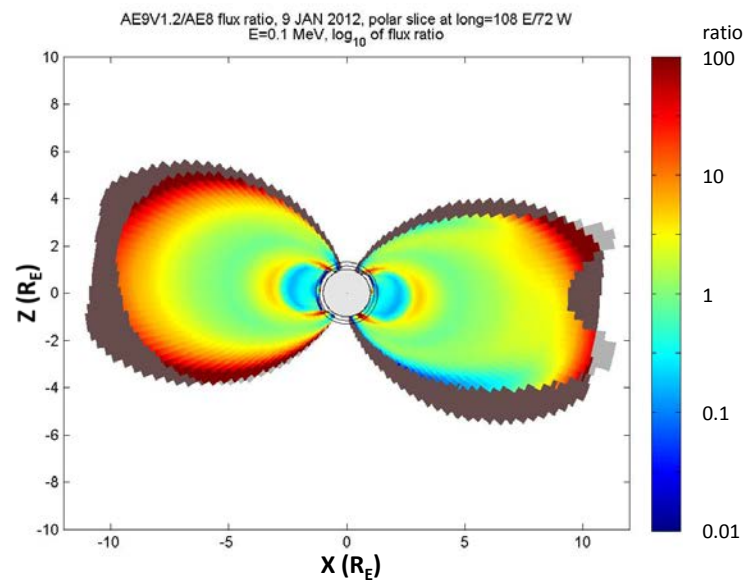
# **AE9 V1.2 vs. AE8**

# 0.1 MeV electrons



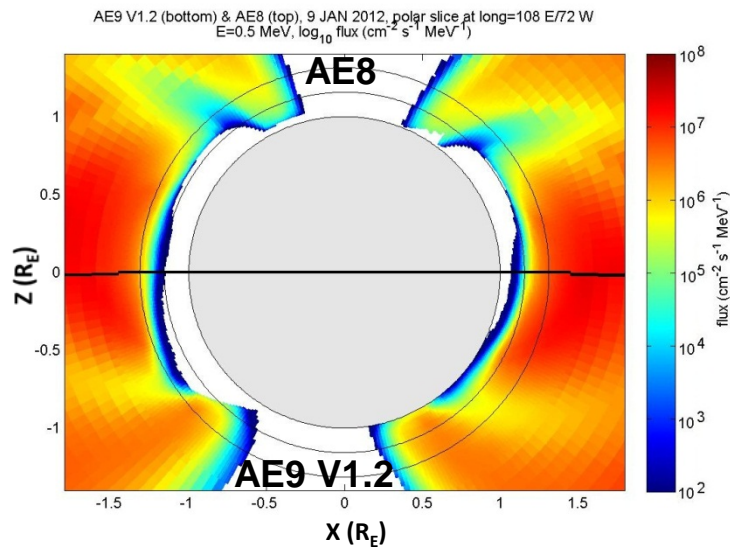
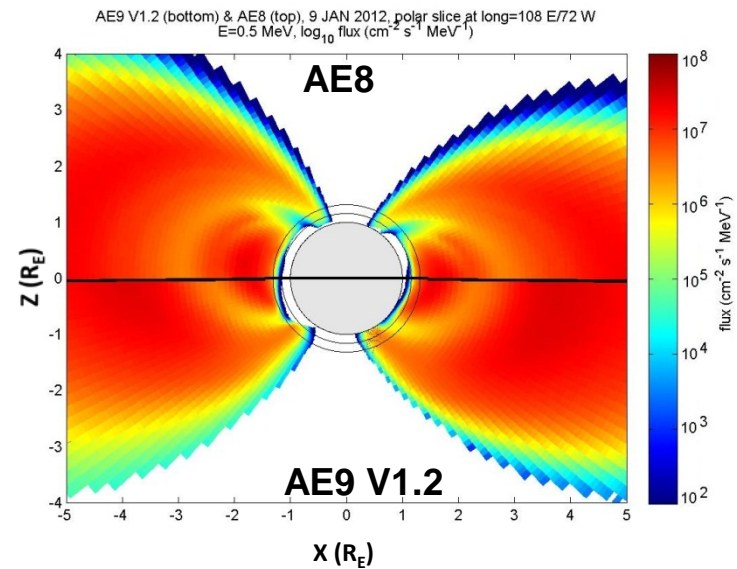
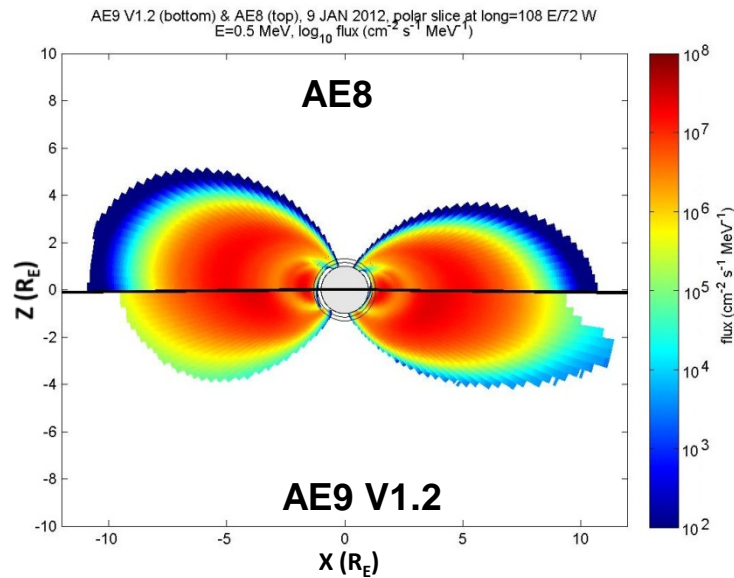


# 0.1 MeV electrons, AE9-to-AE8 ratio

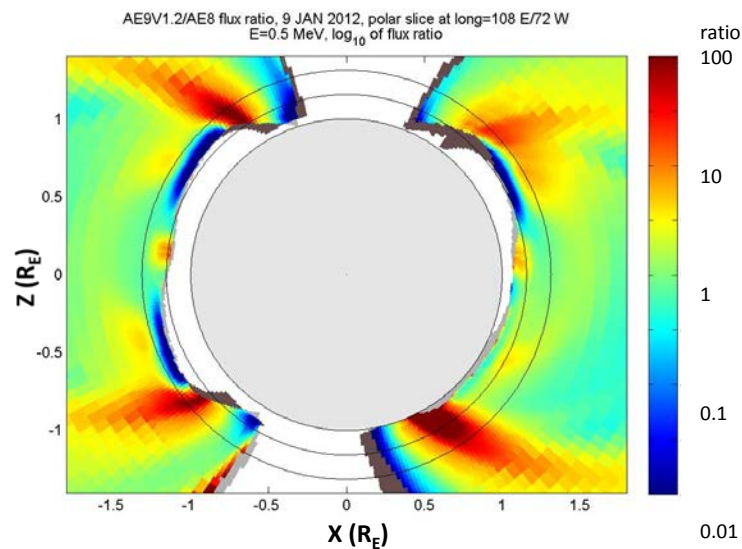
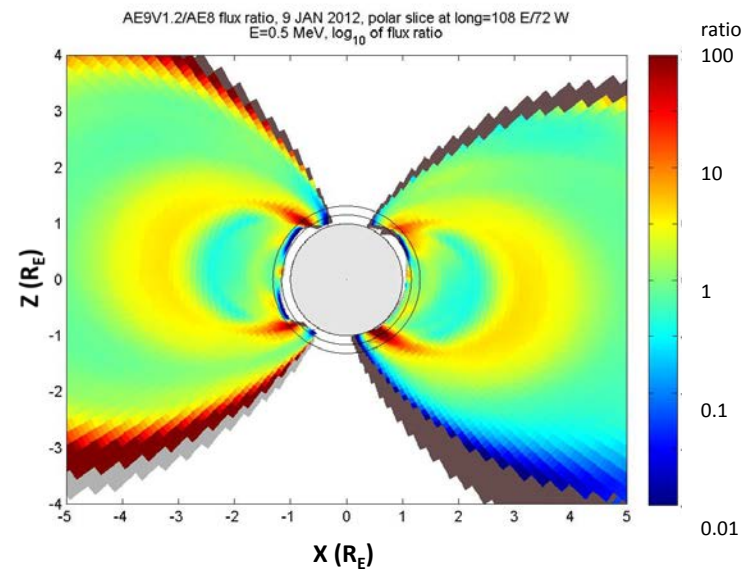
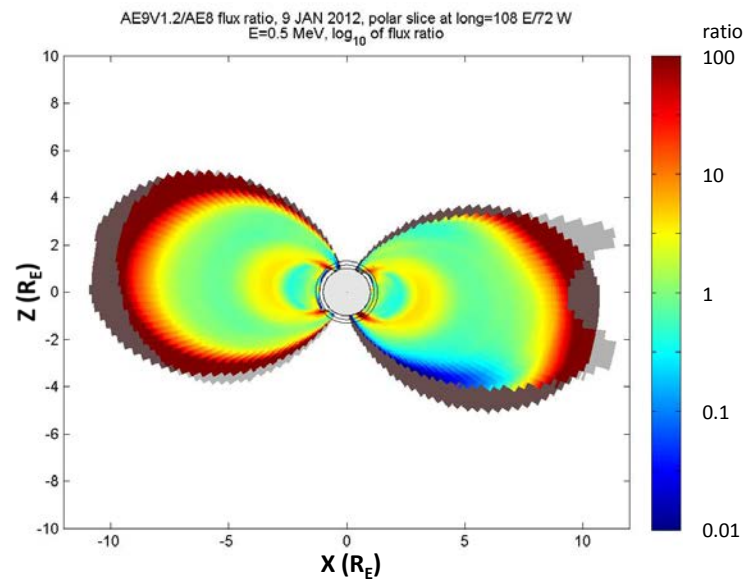




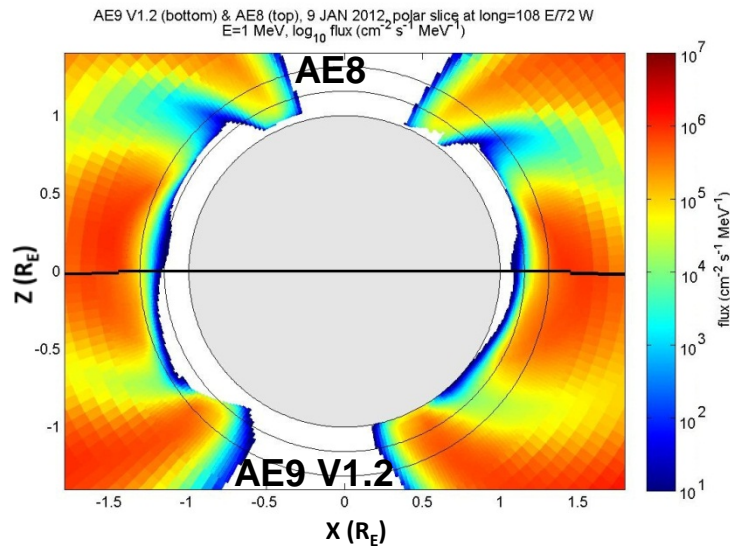
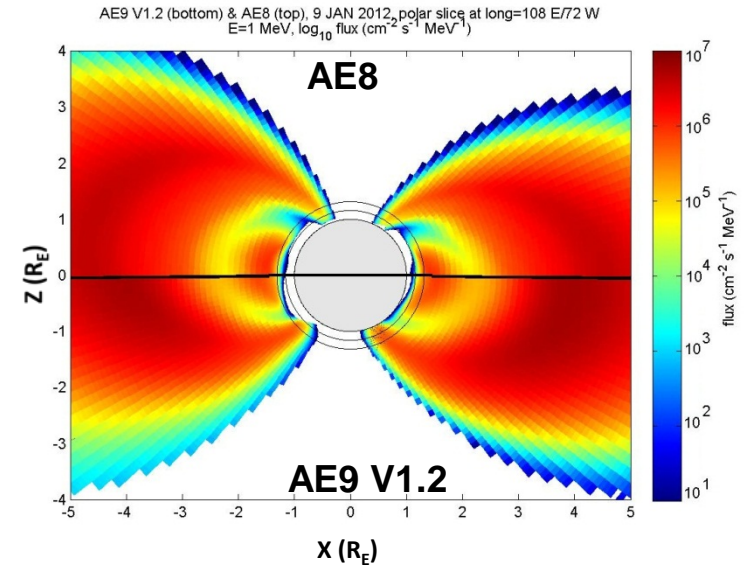
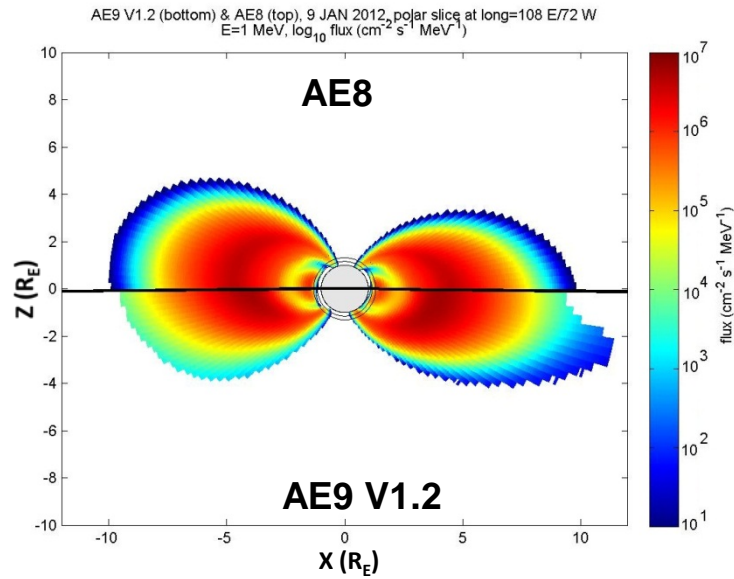
# 0.5 MeV electrons



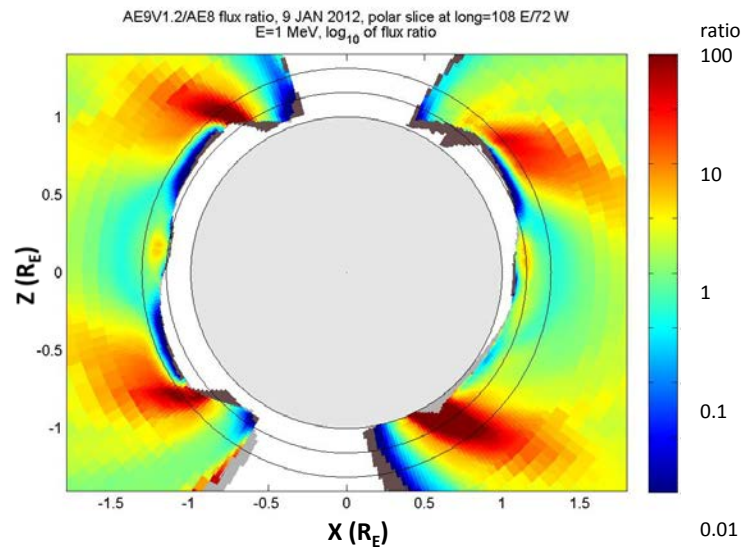
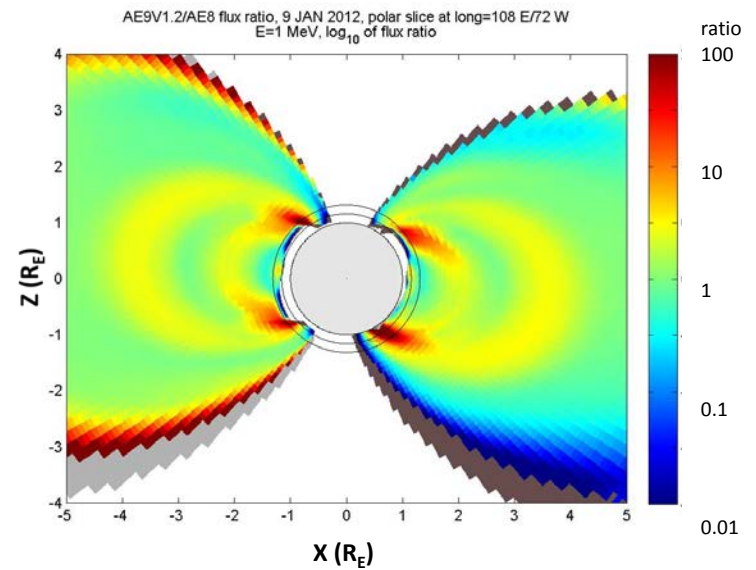
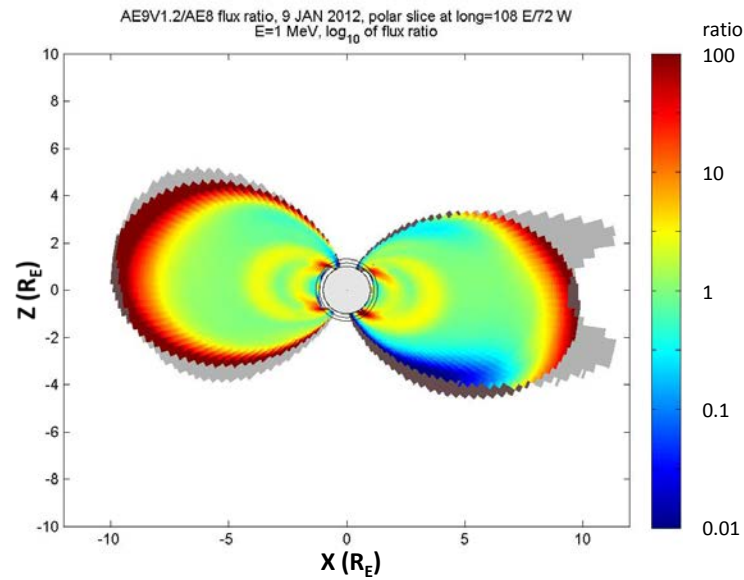
# 0.5 MeV electrons, AE9-to-AE8 ratio



# 1 MeV electrons

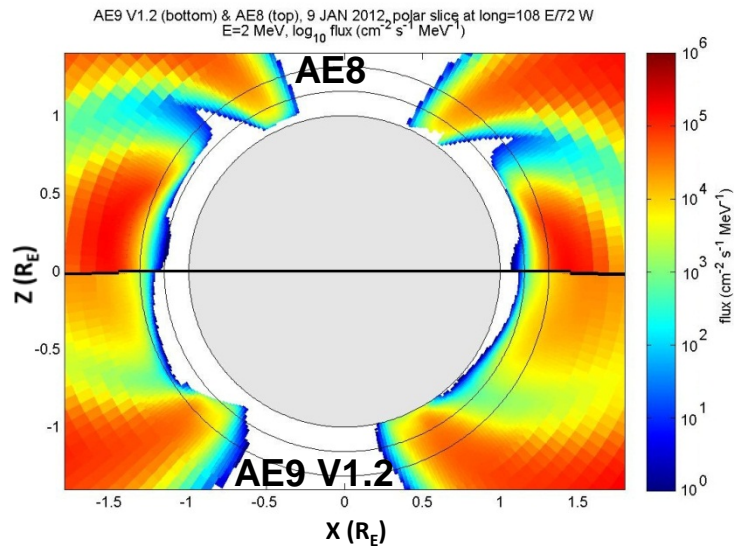
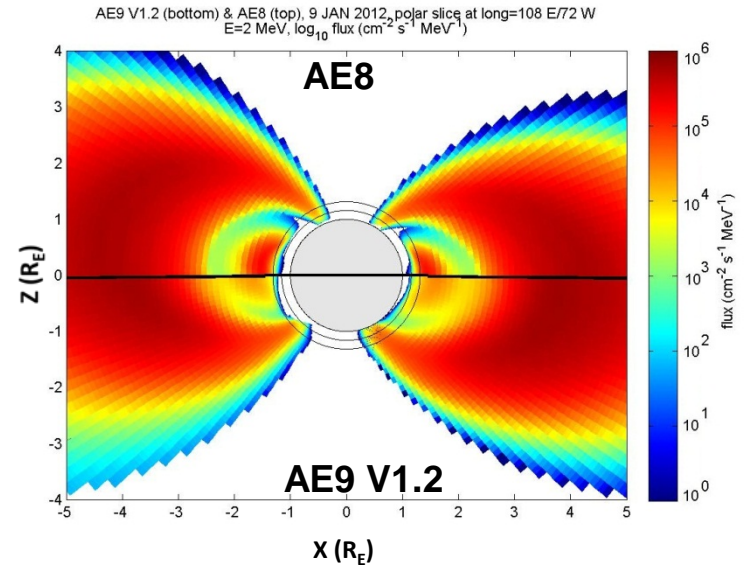
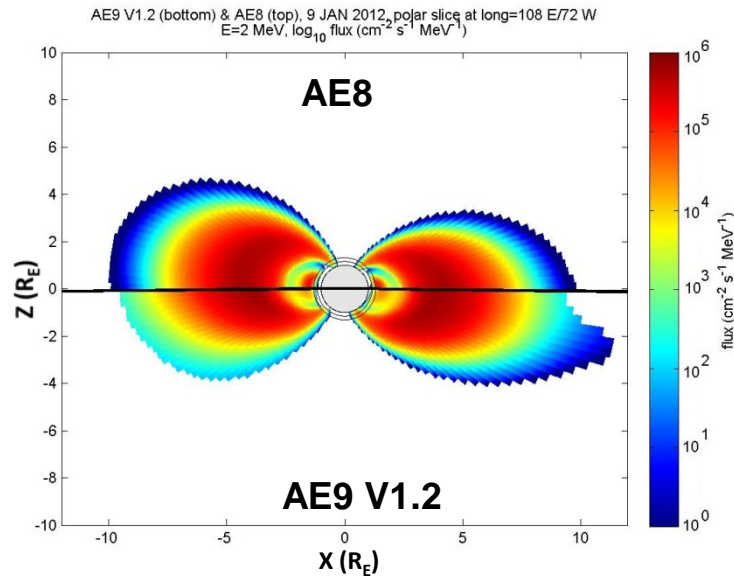


# 1 MeV electrons, AE9-to-AE8 ratio

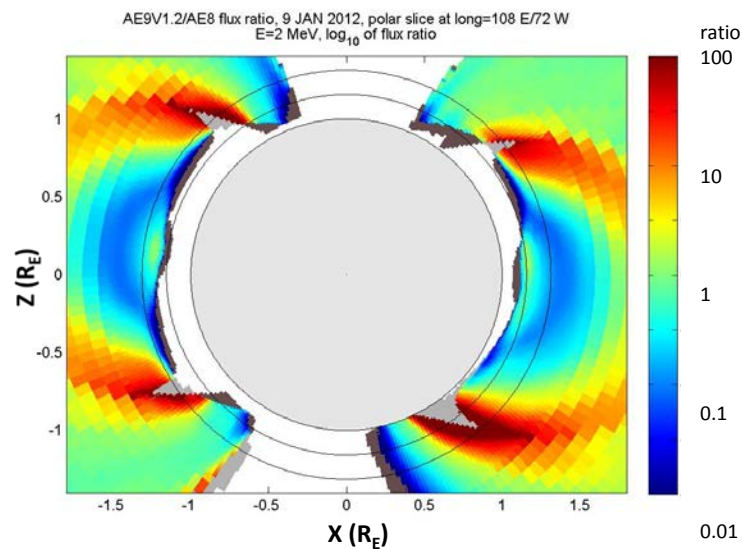
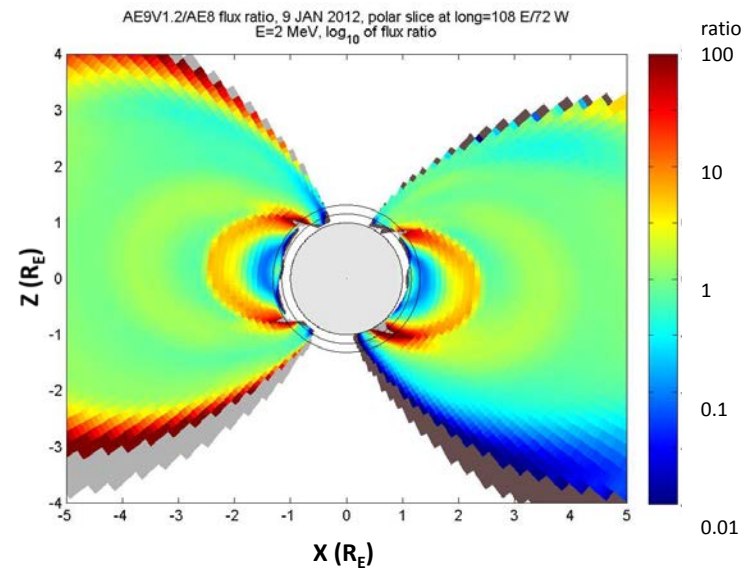
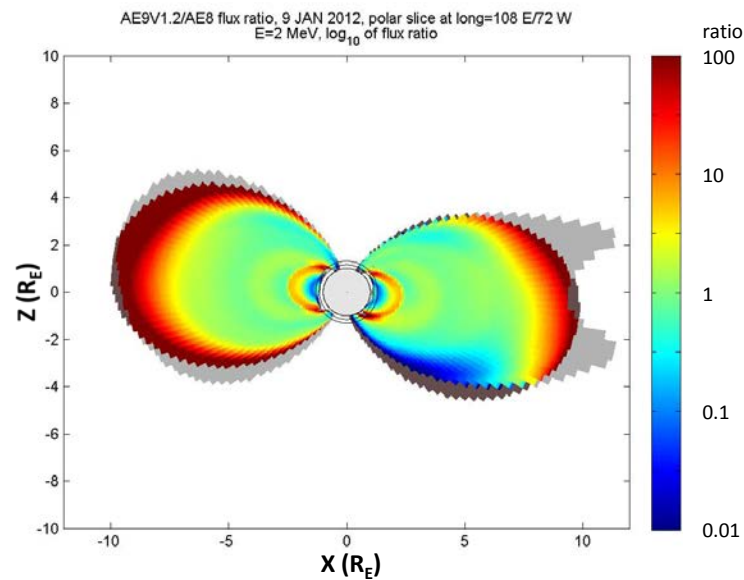




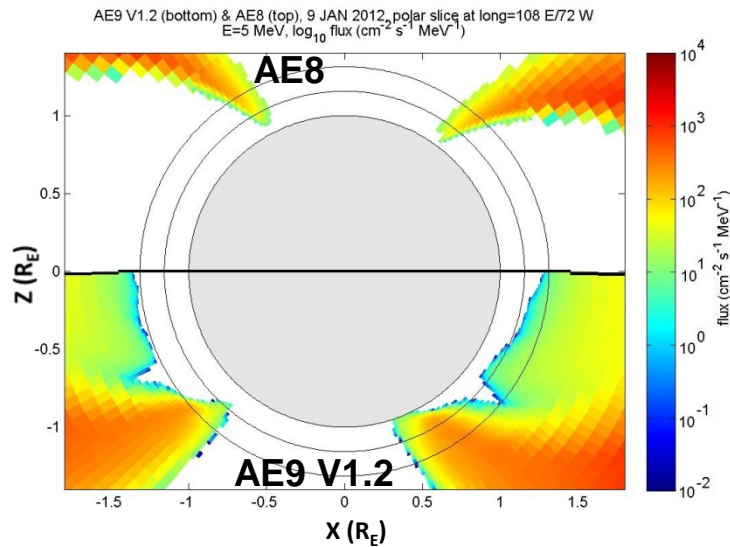
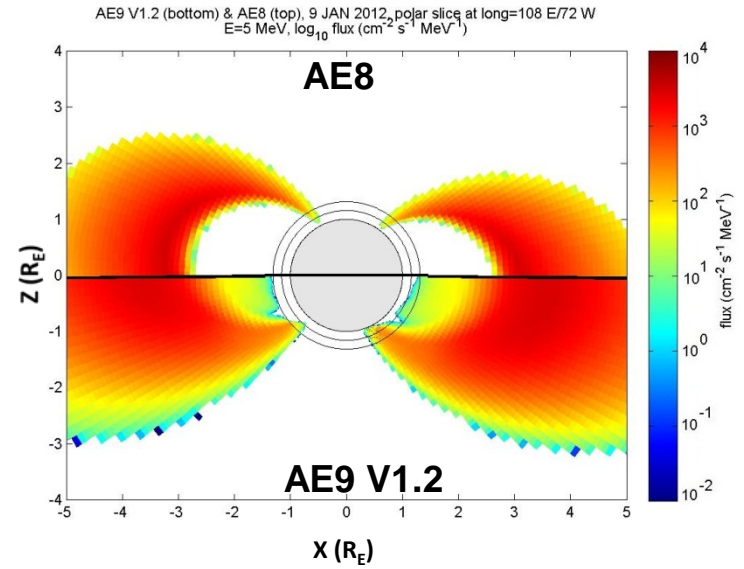
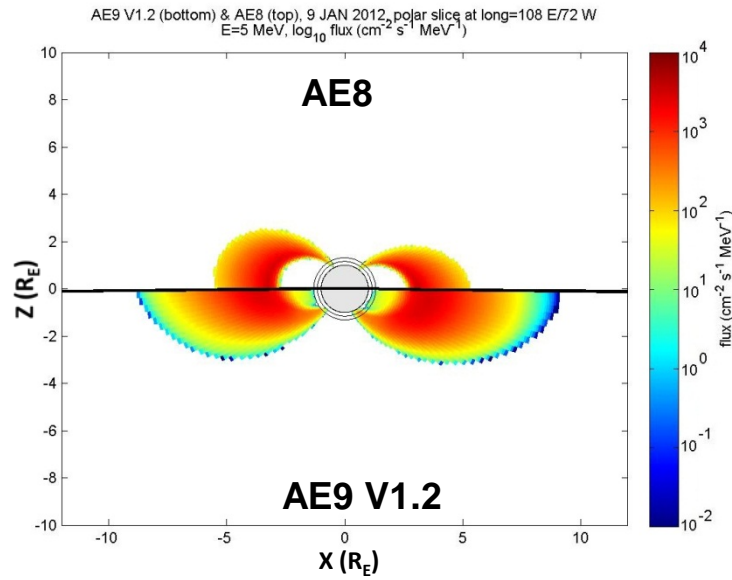
# 2 MeV electrons



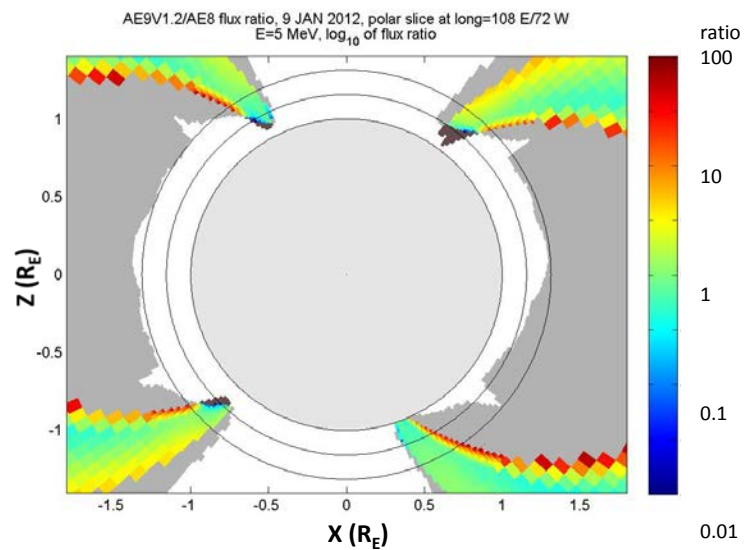
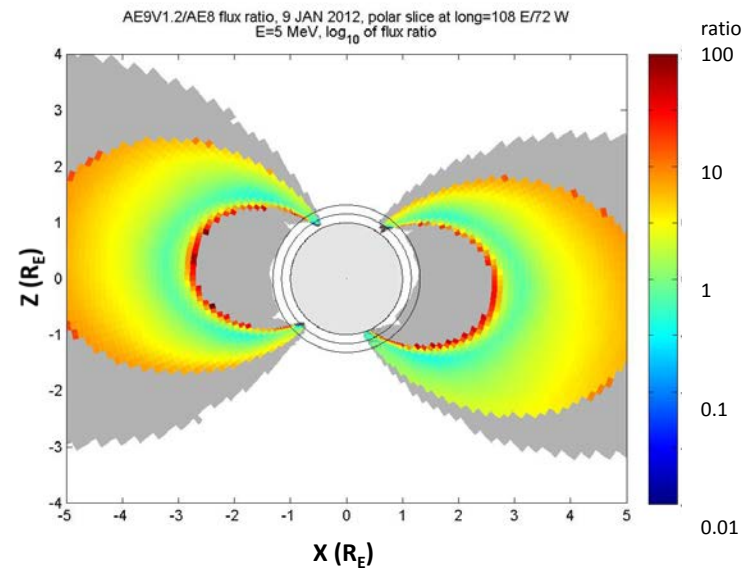
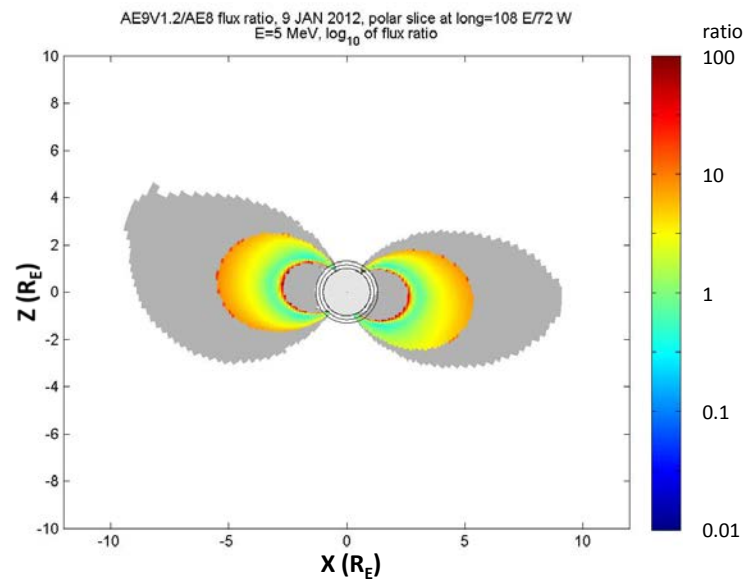
## 2 MeV electrons, AE9-to-AE8 ratio



# 5 MeV electrons



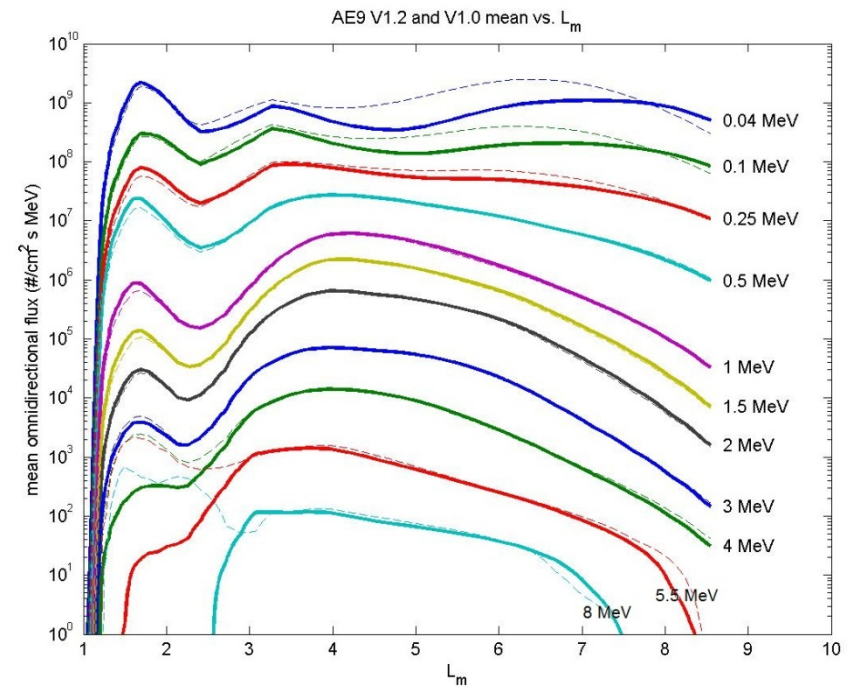
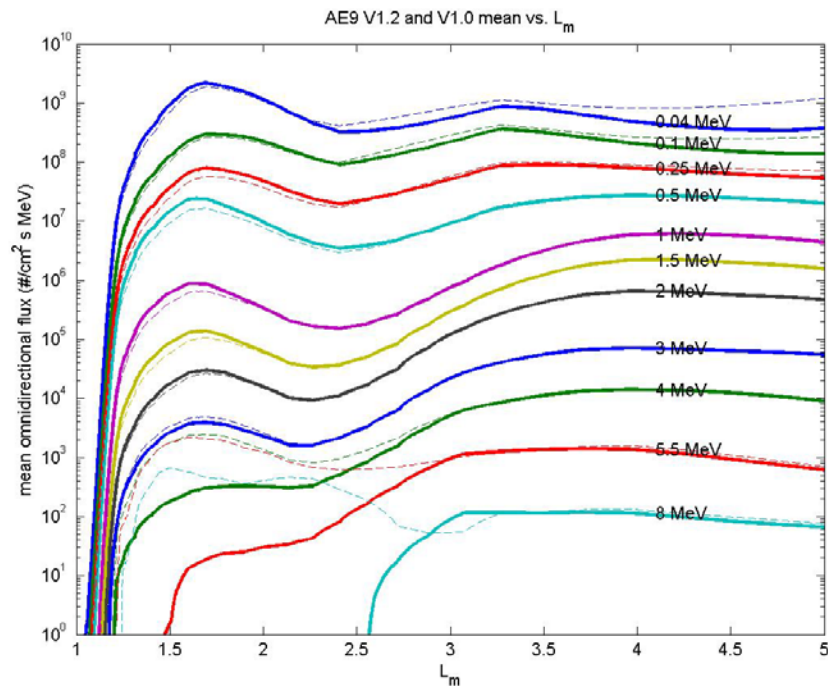
## 2 MeV electrons, AE9-to-AE8 ratio



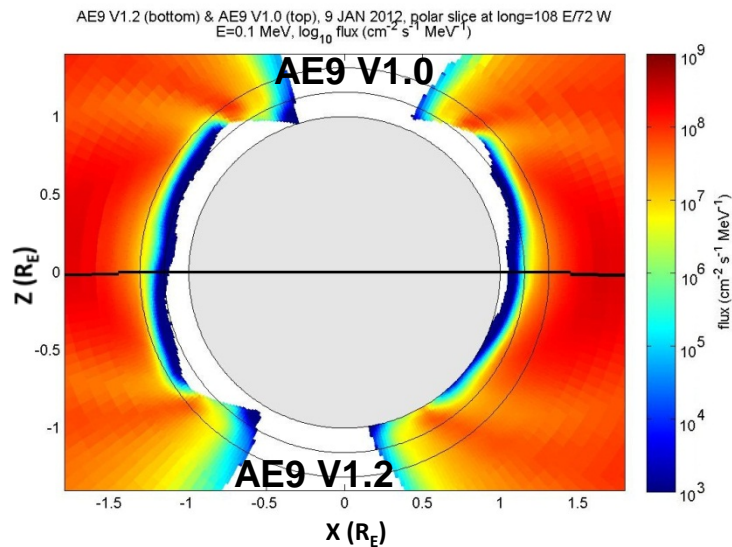
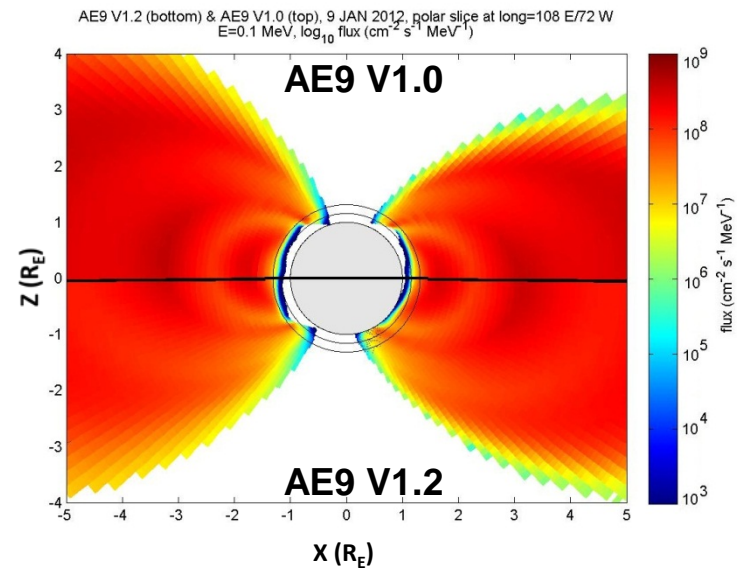
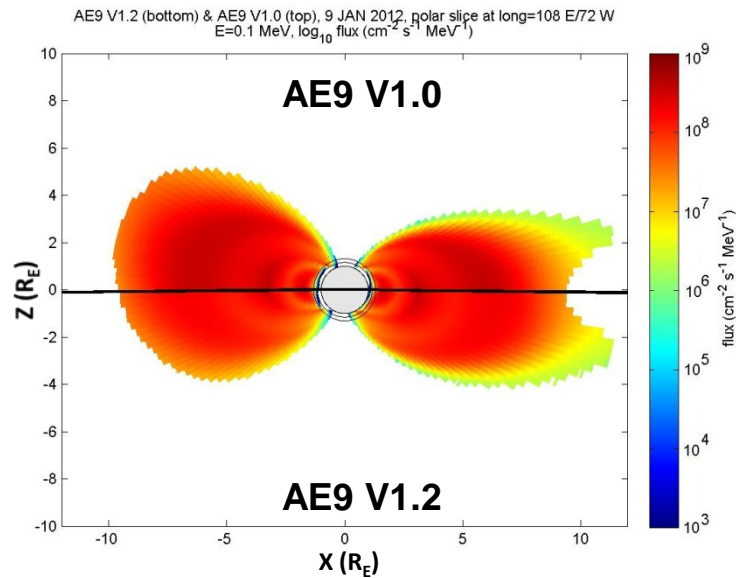


# **AE9 V1.2 vs. AE9 V1.0**

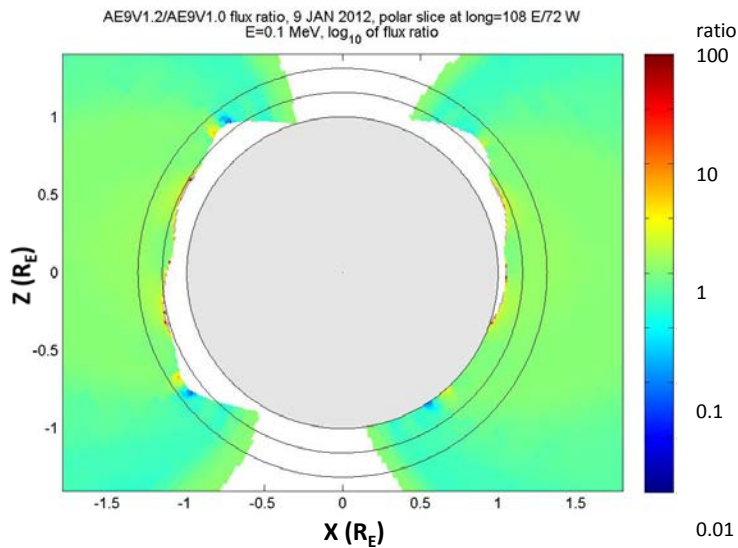
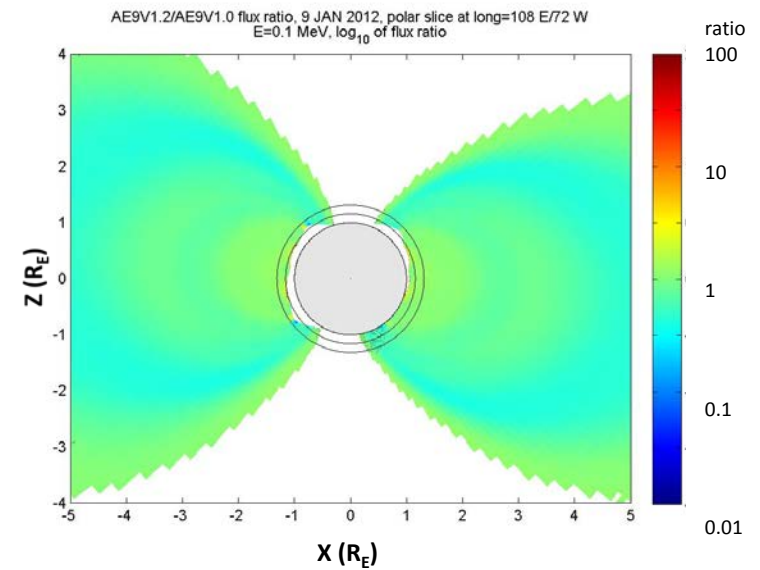
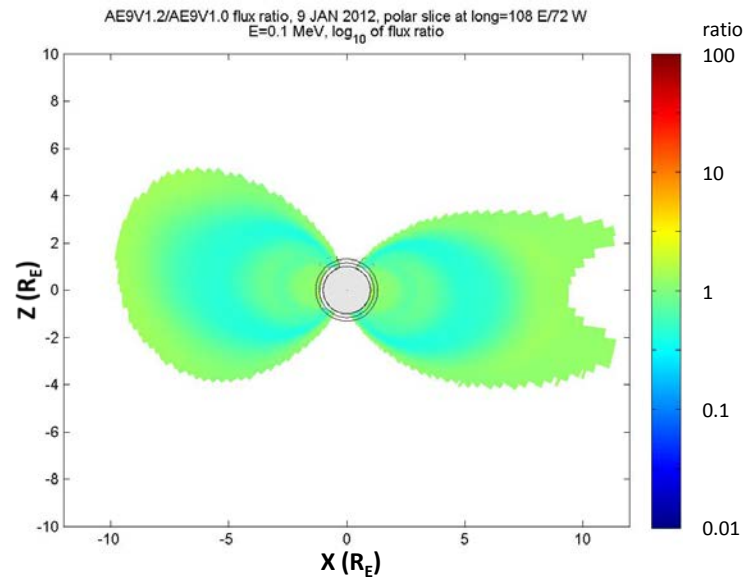
## Flux vs. McIlwain L value, near equator



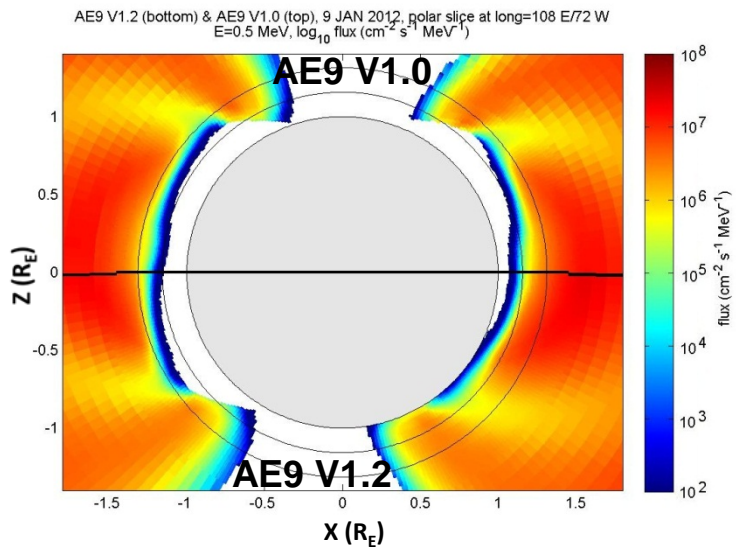
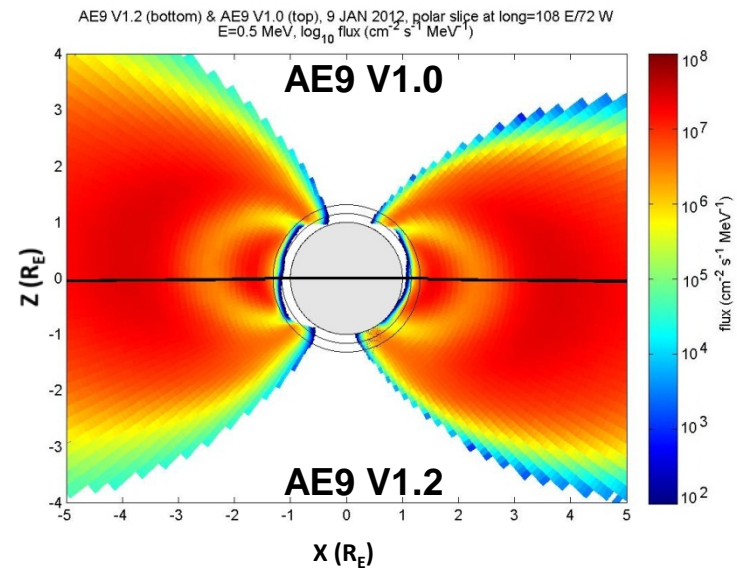
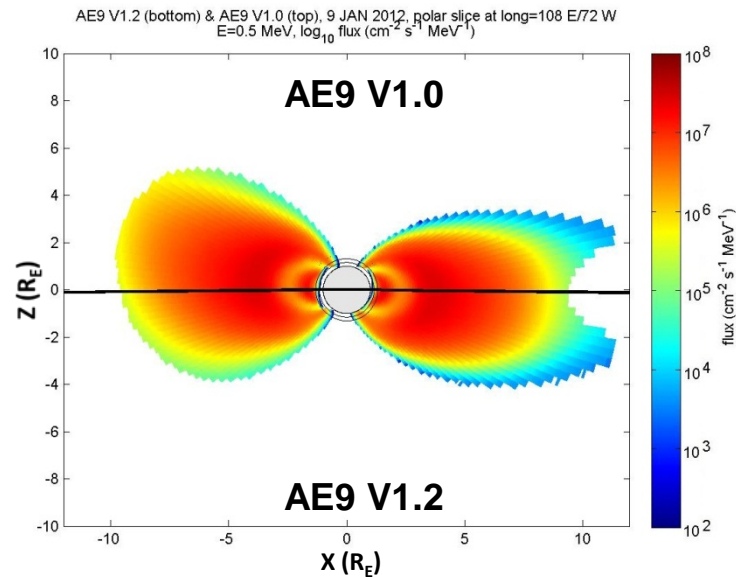
# 0.1 MeV electrons



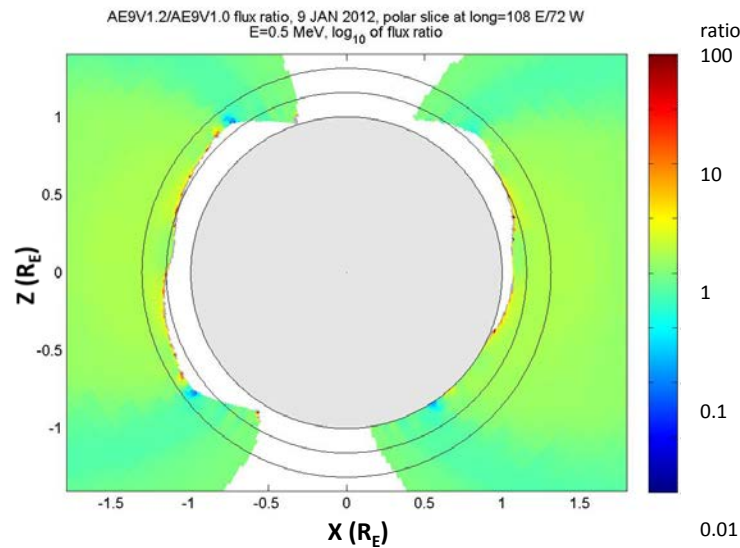
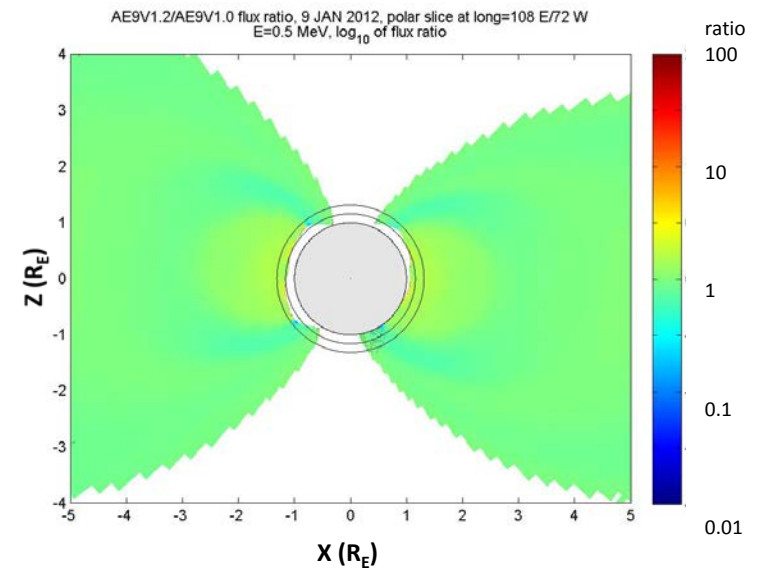
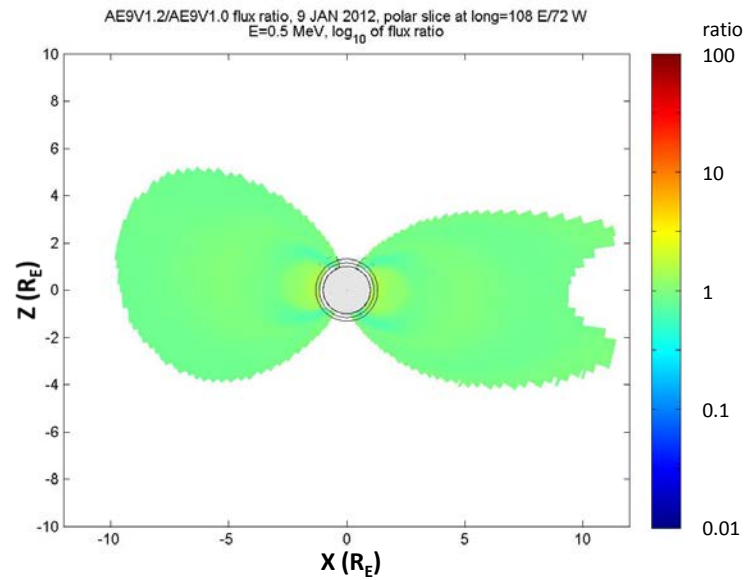
# 0.1 MeV electrons, AE9V1.2-to-AE9V1.0 ratio



# 0.5 MeV electrons

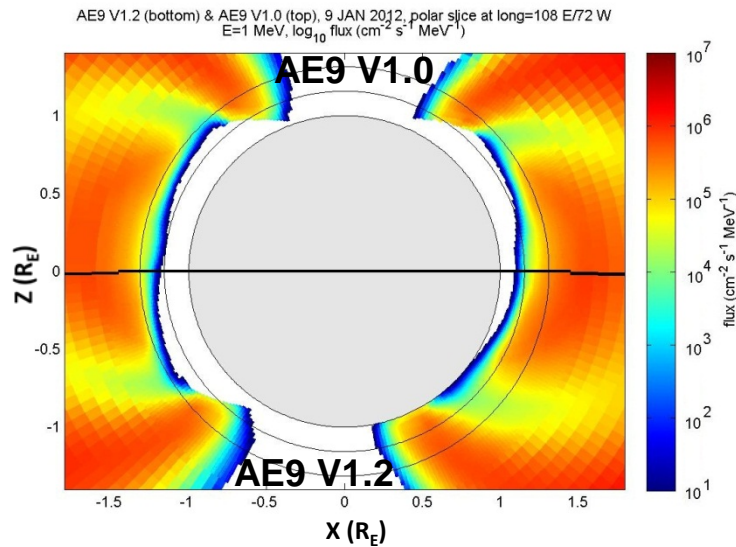
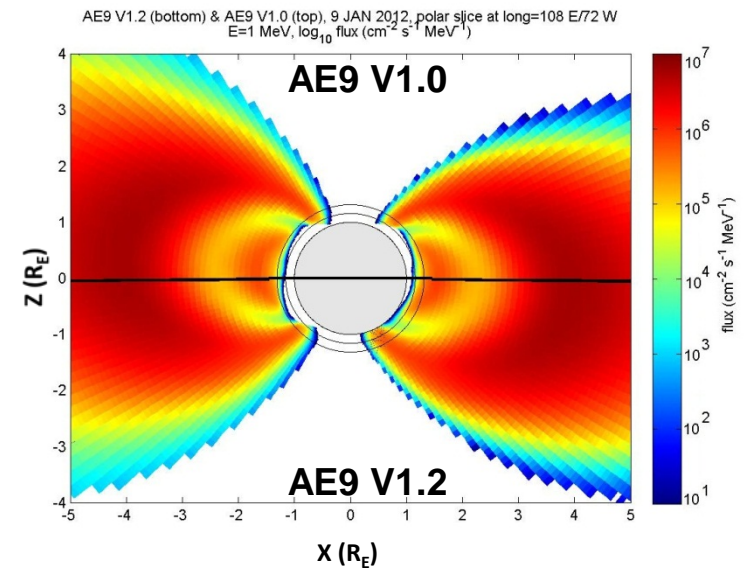
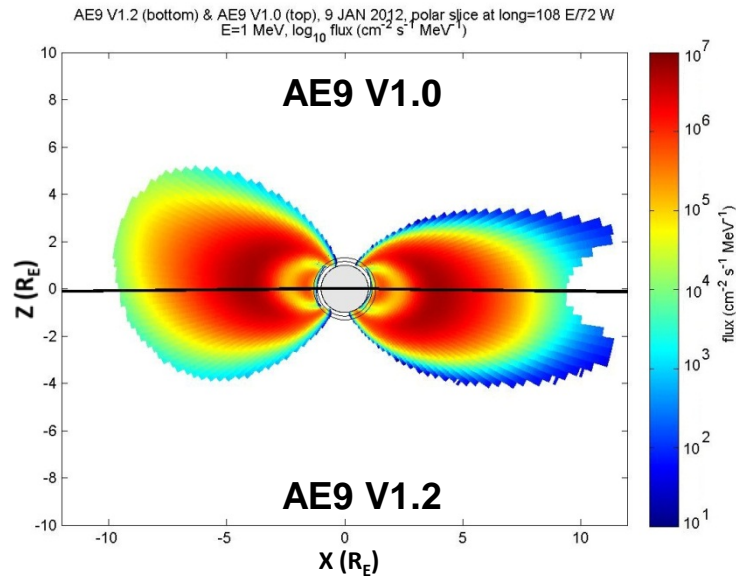


# 0.5 MeV electrons, AE9V1.2-to-AE9V1.0 ratio



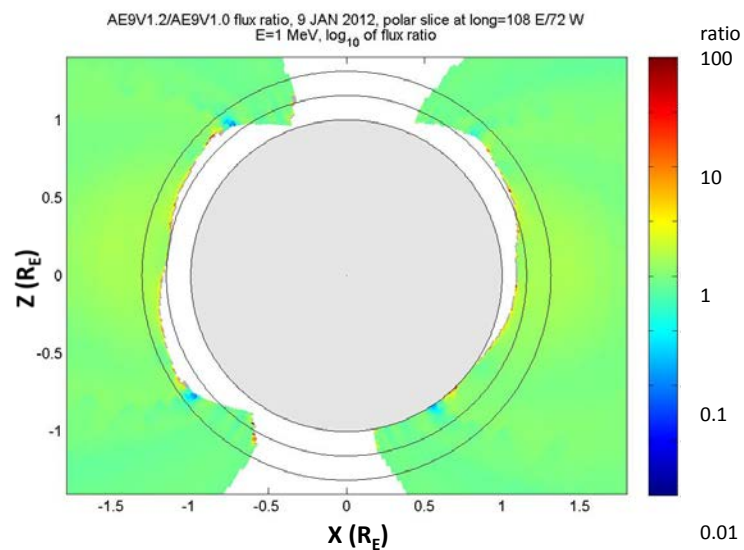
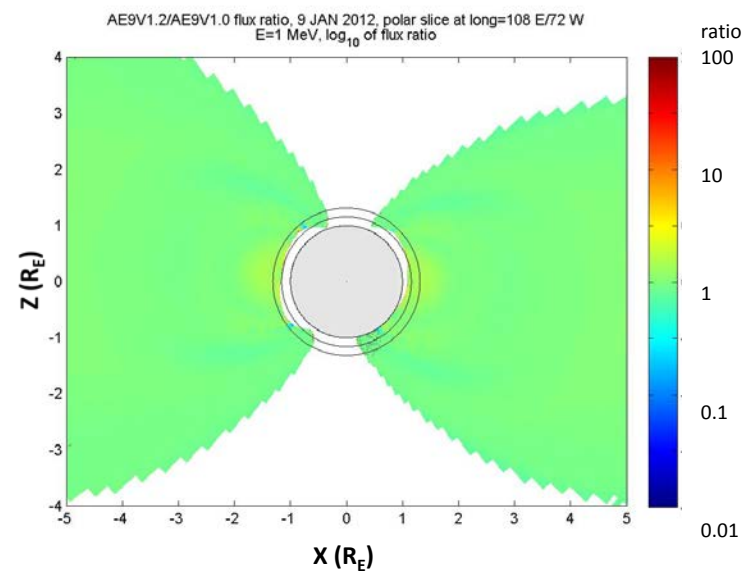
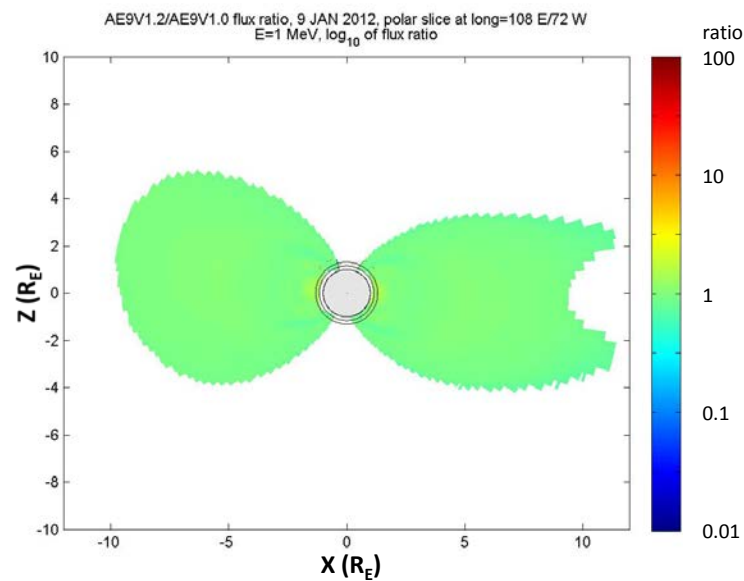


# 1 MeV electrons

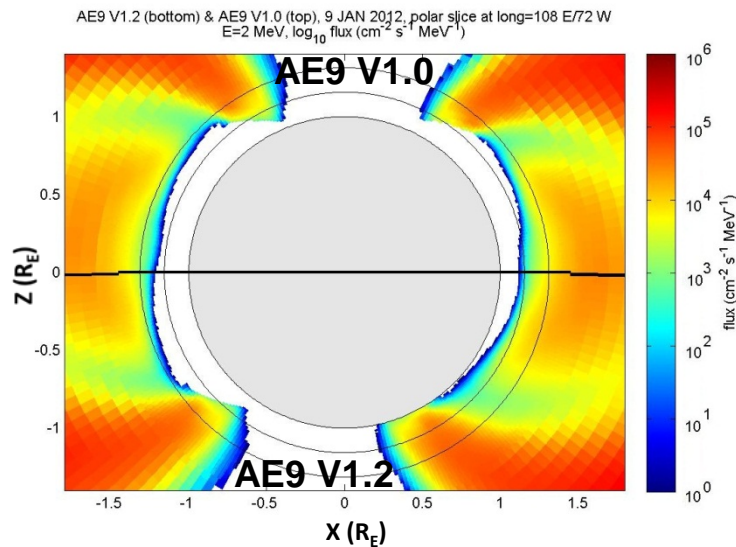
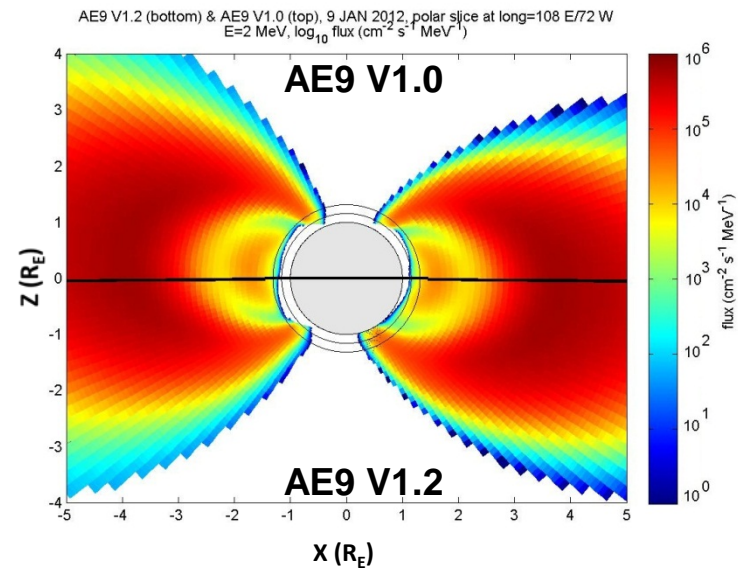
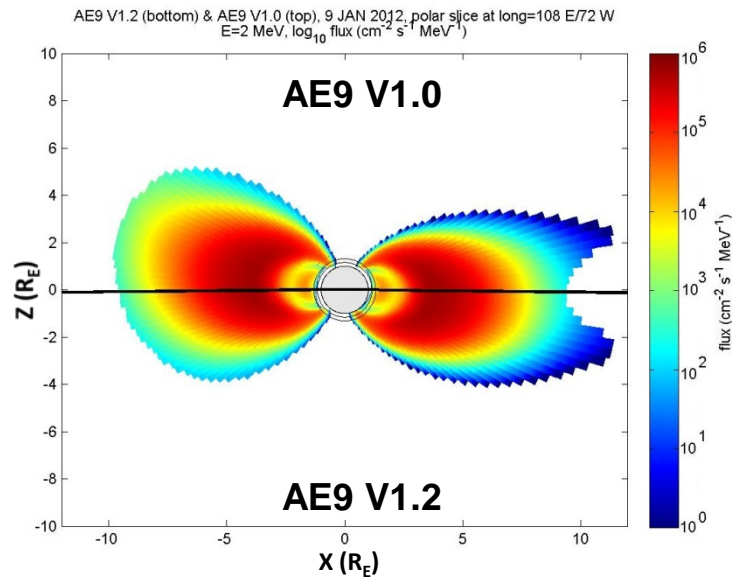




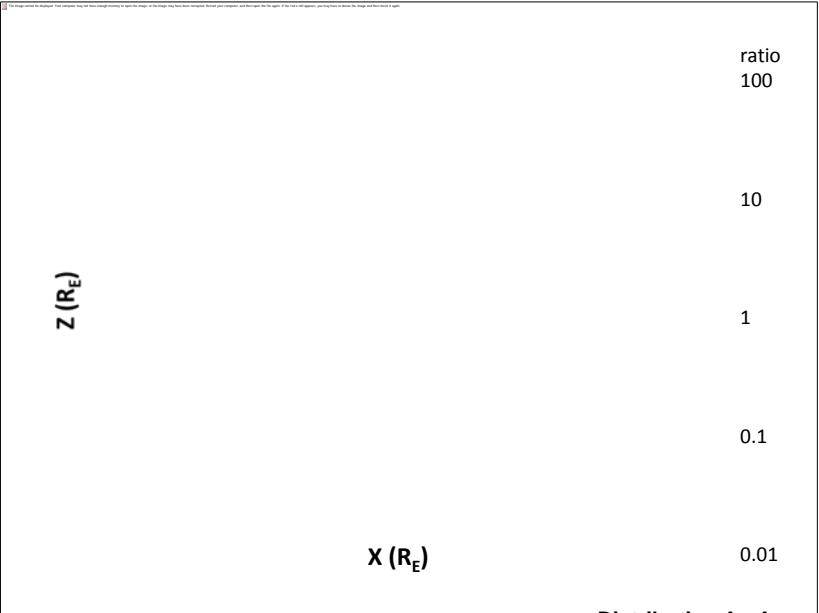
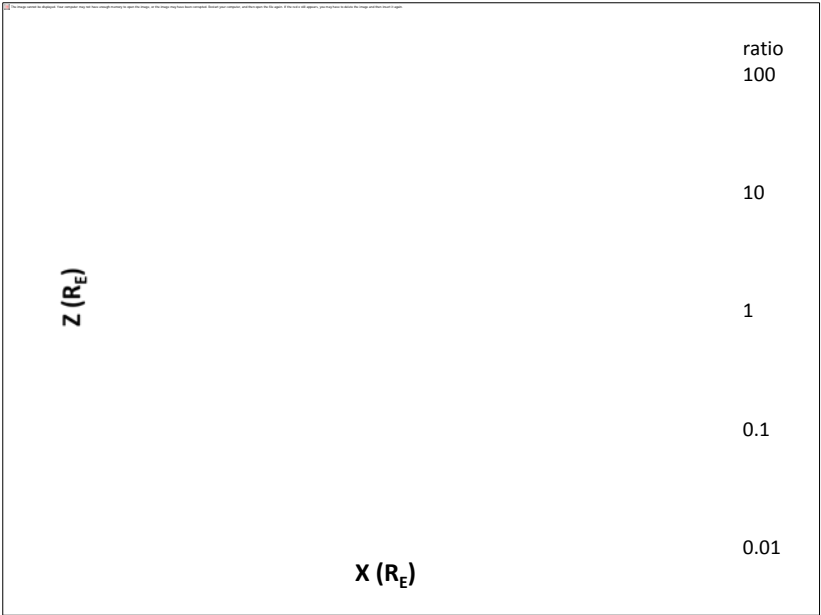
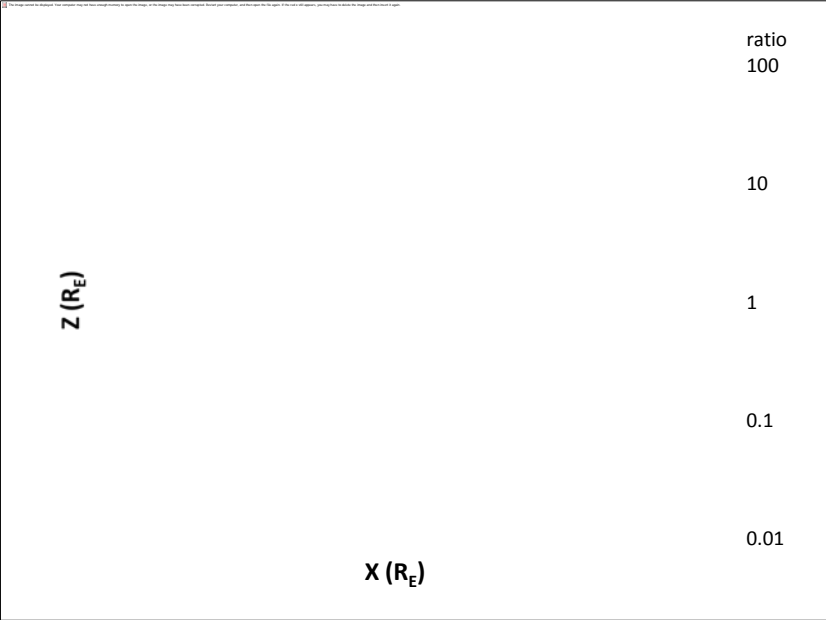
# 1 MeV electrons, AE9V1.2-to-AE9V1.0 ratio



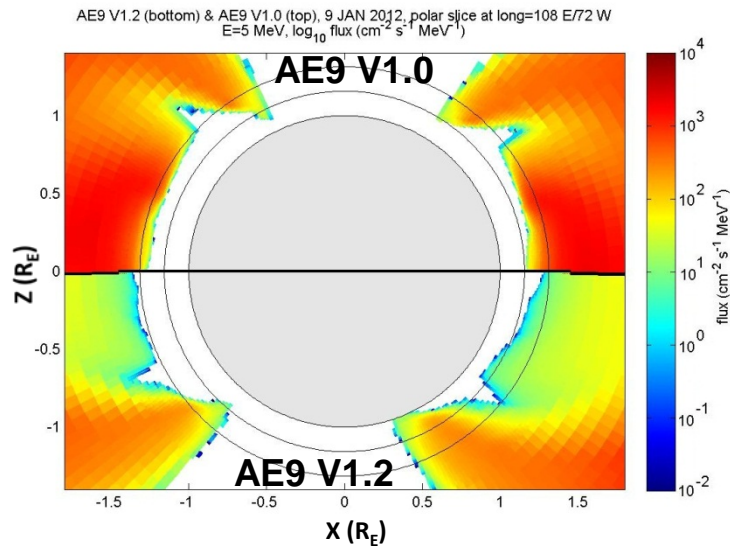
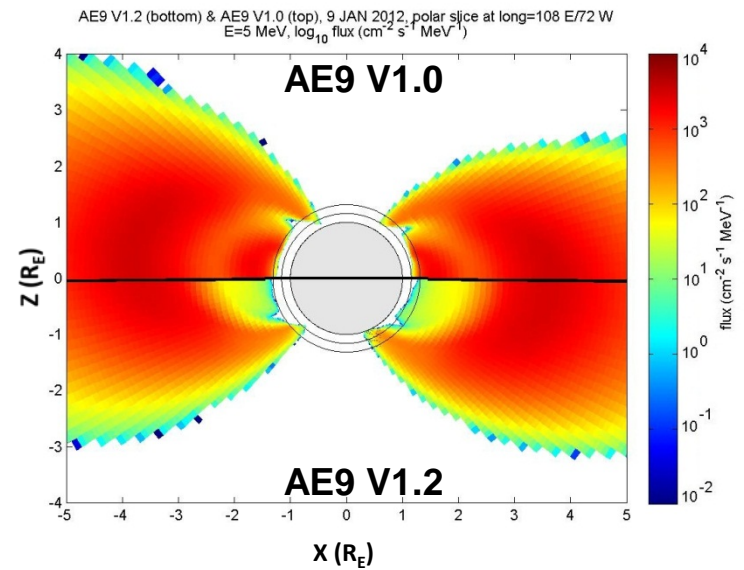
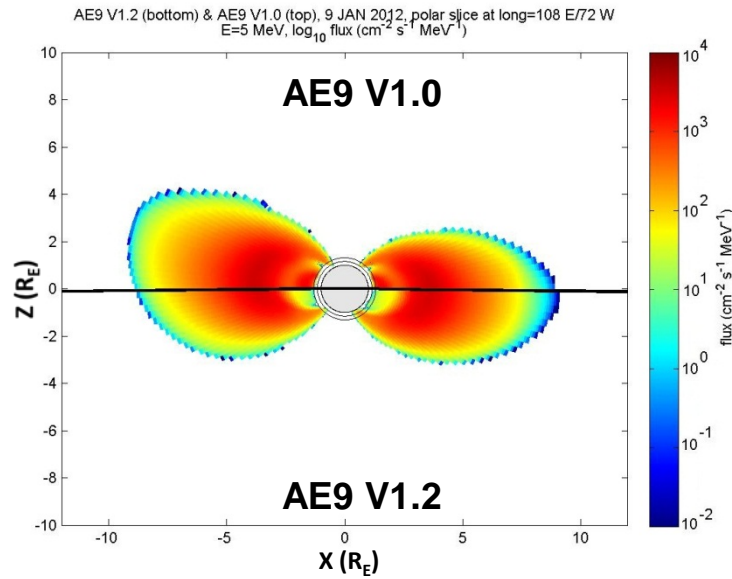
# 2 MeV electrons



# 2 MeV electrons, AE9V1.2-to-AE9V1.0 ratio



# 5 MeV electrons



# 5 MeV electrons, AE9V1.2-to-AE9V1.0 ratio

