



# Air Force Research Laboratory



**Integrity ★ Service ★ Excellence**



Atmospheric and  
Environmental Research



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## AE9/AP9 V1.50.001 Model Comparison Summary Report: Spatial Comparisons

28 September 2017

AE9/AP9/SPM Development Team



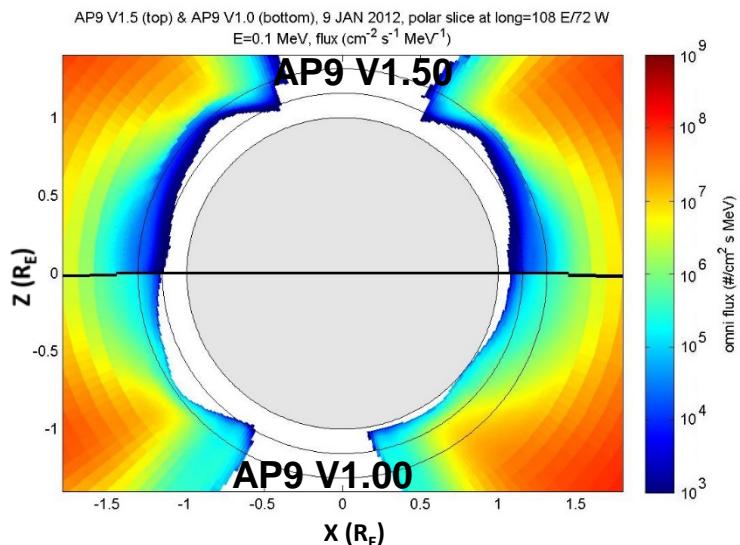
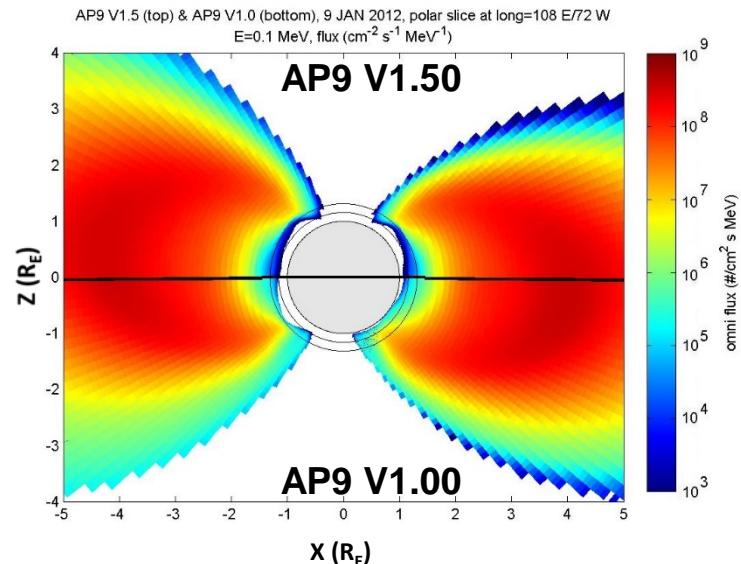
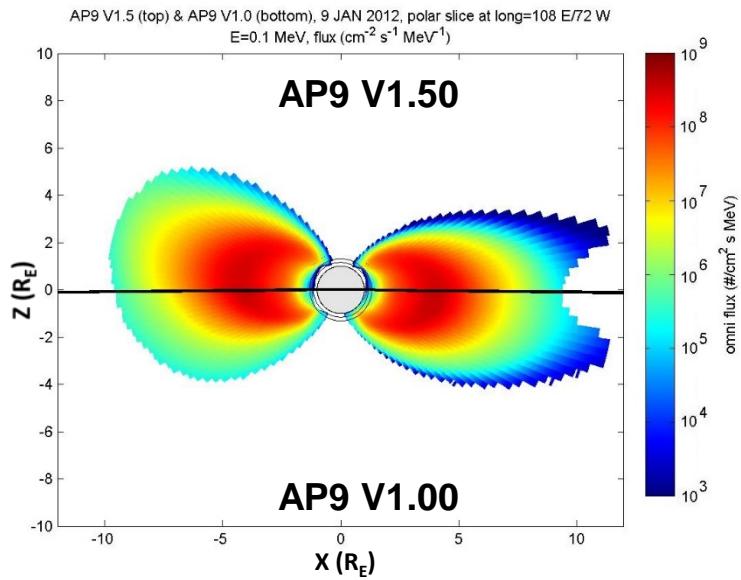
# **AE9/AP9 V1.50: Spatial comparisons to AE9/AP9 V1.0**

## *Content:*

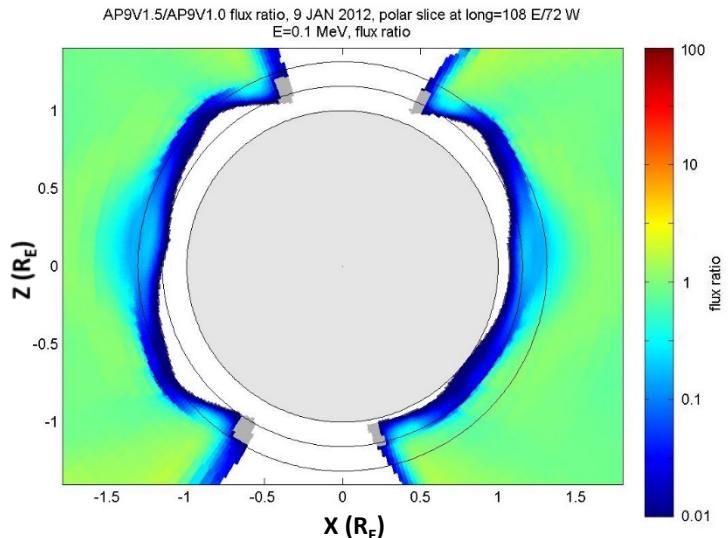
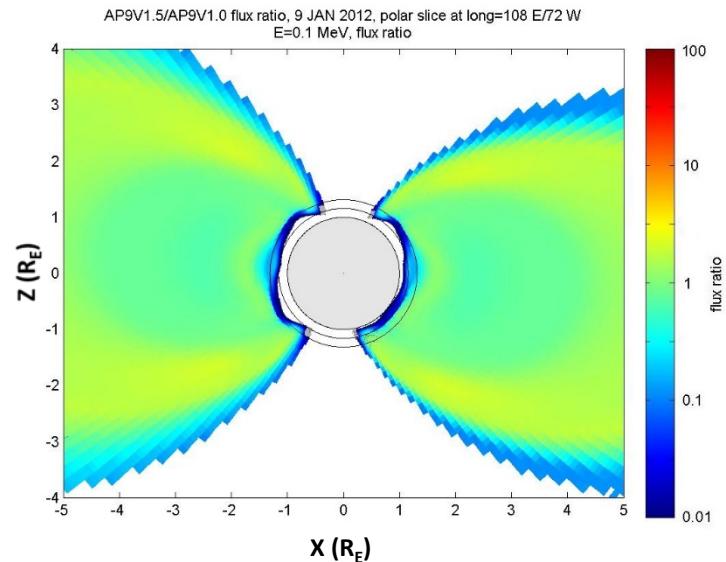
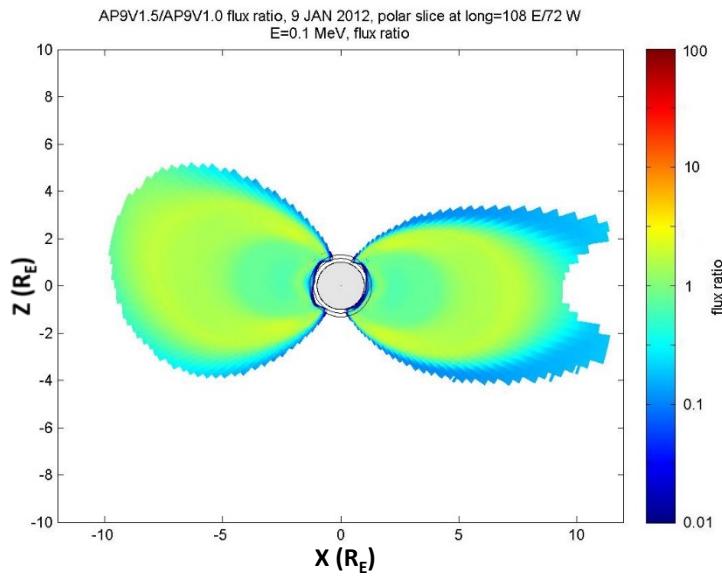
- All plots are meridional cuts through radiation belts, representing a plane through longitudes 108° E and 72° W (north-south axis is vertical).
- Split screen comparisons show AE9/AP9 V1.50 in top half of each figure and AE9/AP9 V1.0 in bottom half.
- Ratio comparisons show ratio of AE9/AP9 V1.50 to former models.
  - grey = nonzero flux in V1.50 but zero flux in former model.
  - brown = nonzero flux in former model but zero flux in V1.50.

# **AP9 V1.50 vs. AP9 V1.0**

# 0.1 MeV protons

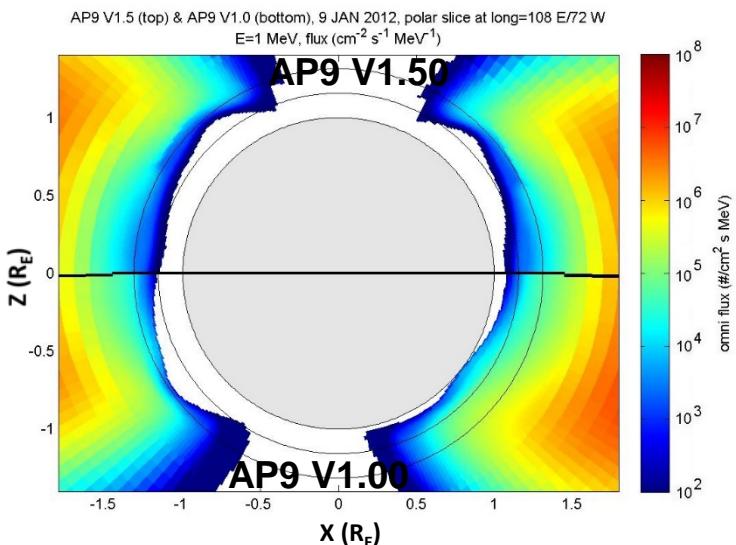
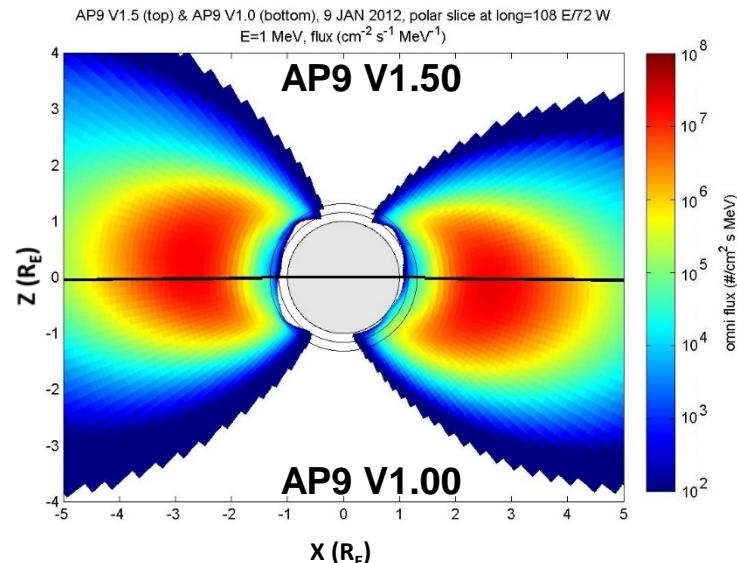
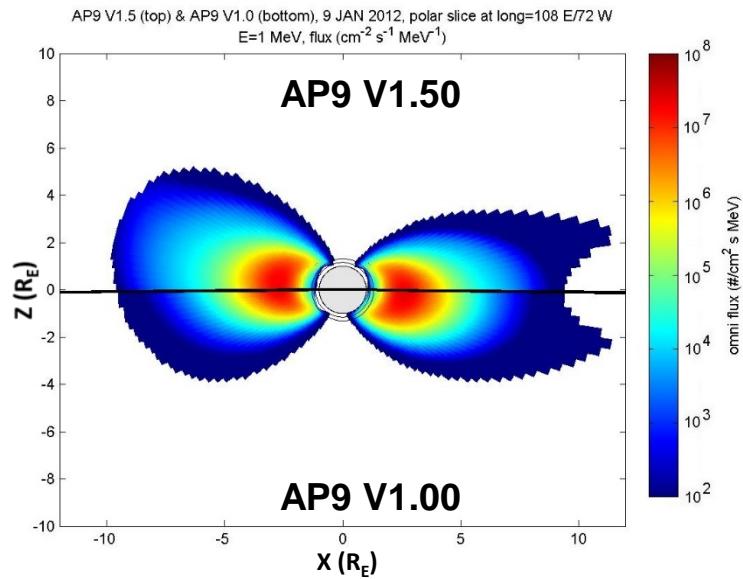


# 0.1 MeV protons, AP9V1.50-to-AP9V1.0 ratio

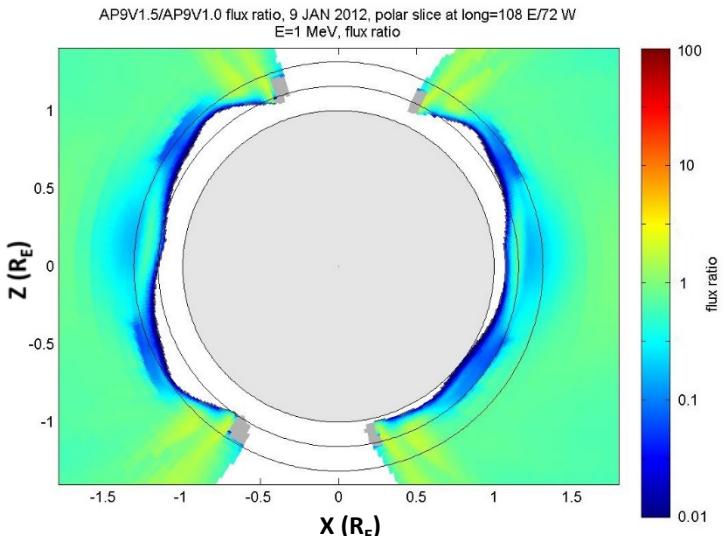
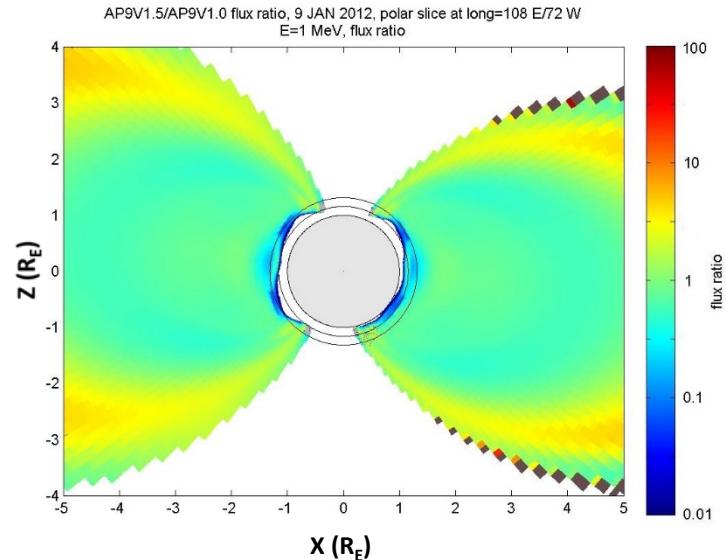
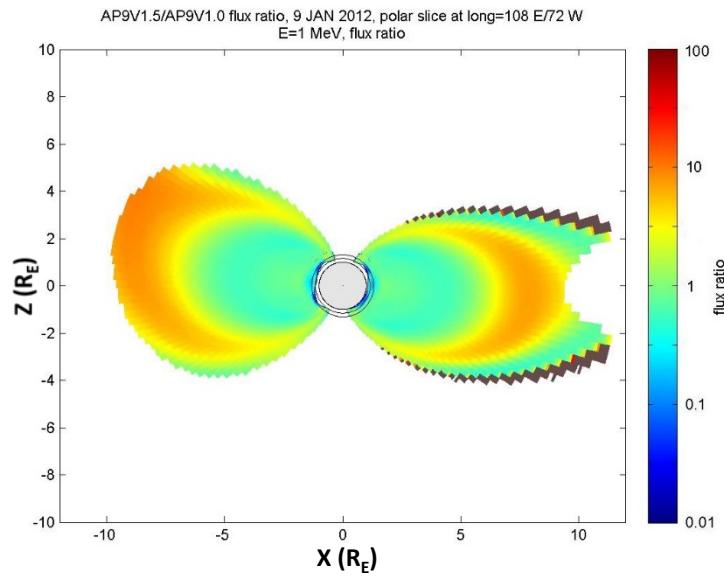


Distribution A

# 1 MeV protons

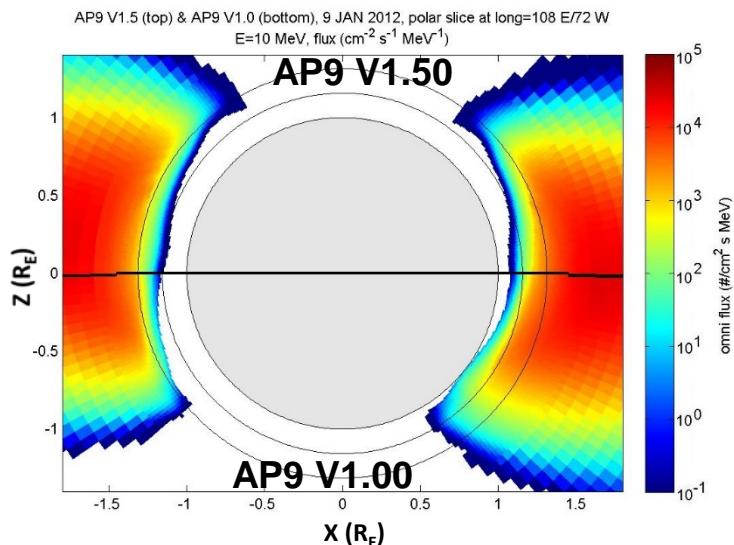
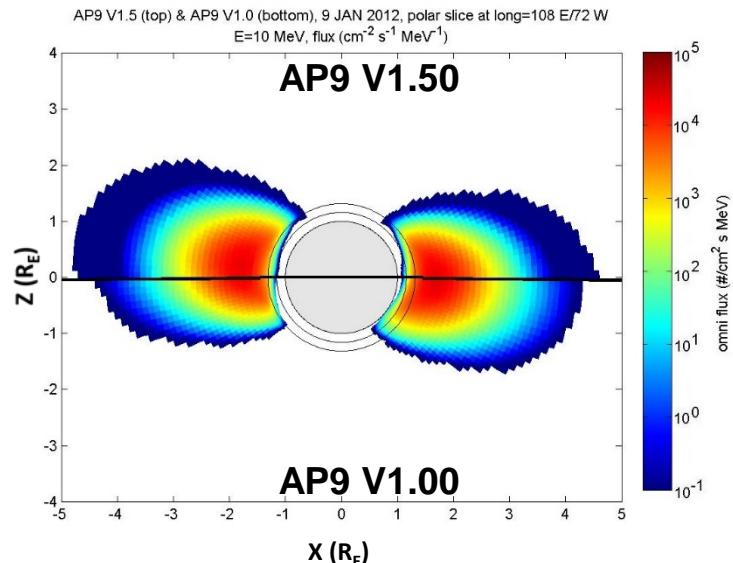
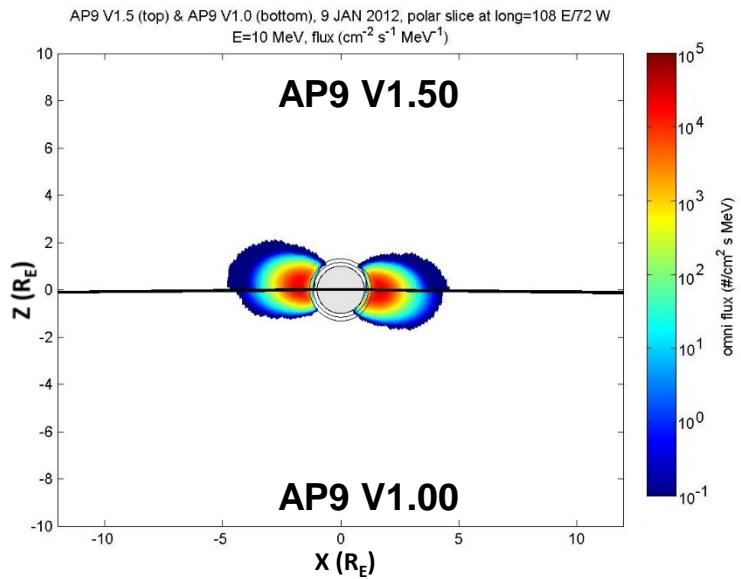


# 1 MeV protons, AP9V1.50-to-AP9V1.0 ratio

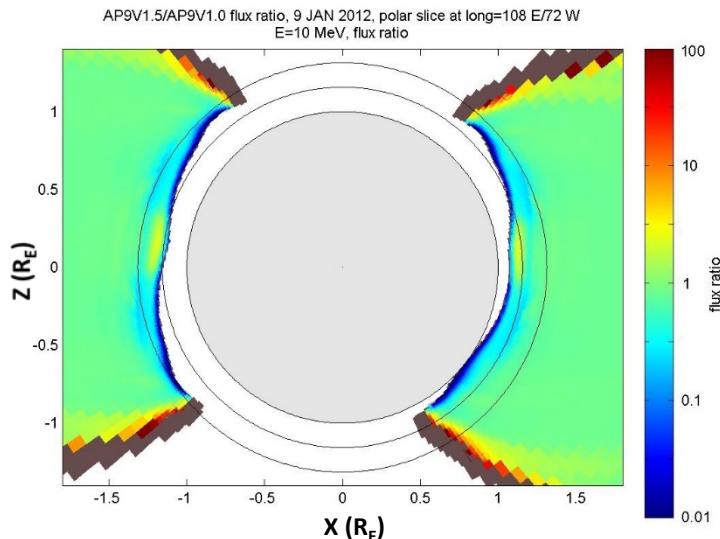
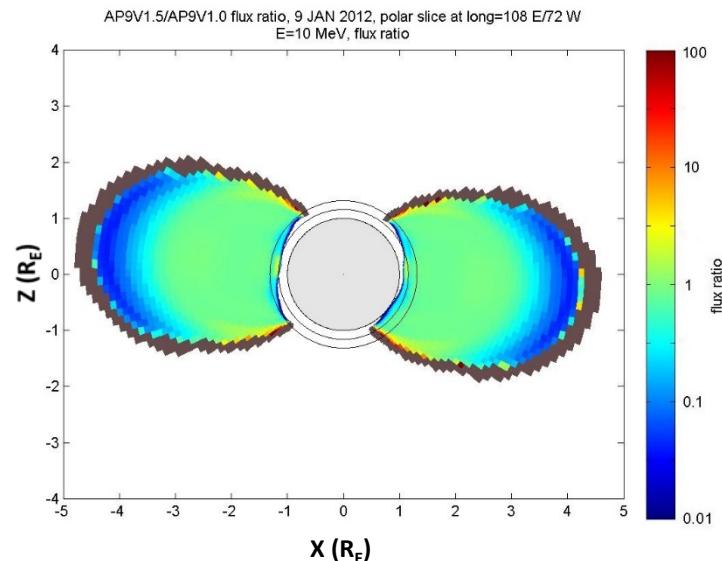
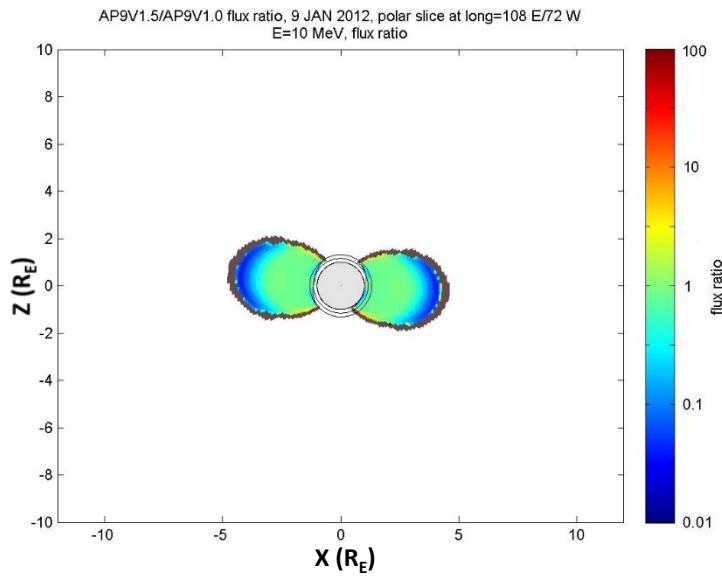


Distribution A

# 10 MeV protons

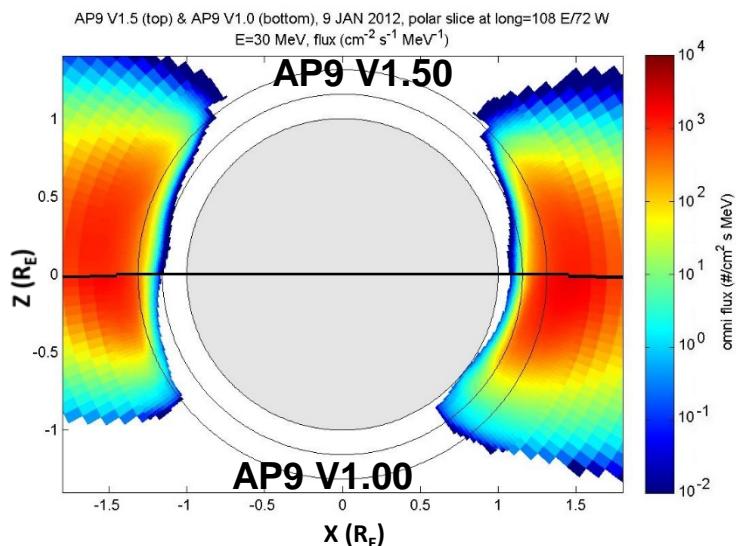
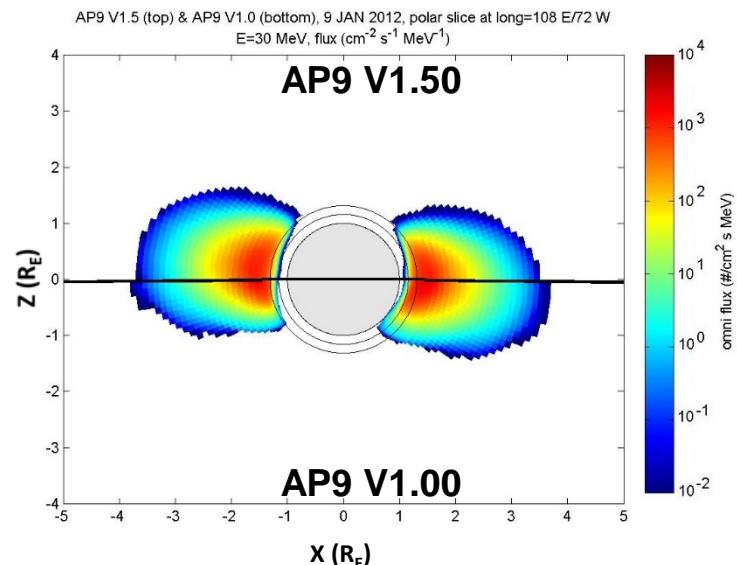
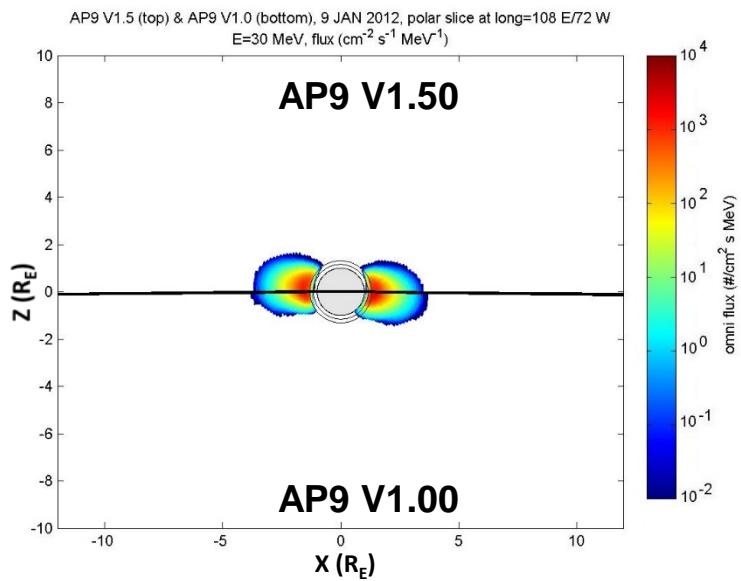


# 10 MeV protons, AP9V1.50-to-AP9V1.0 ratio



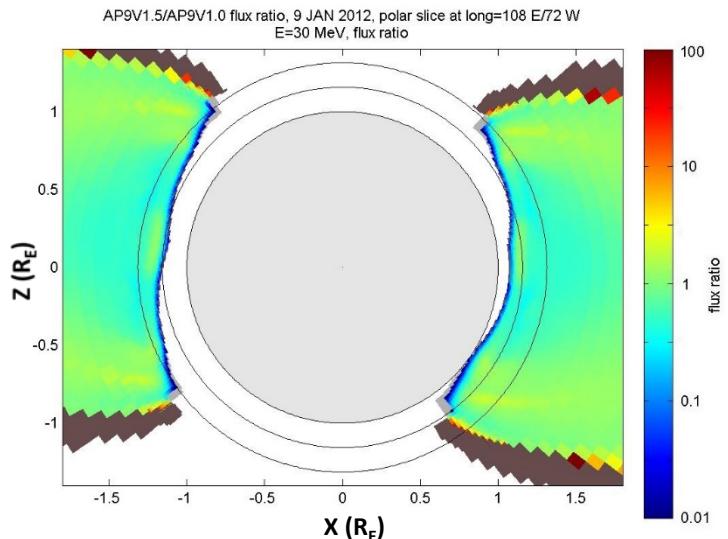
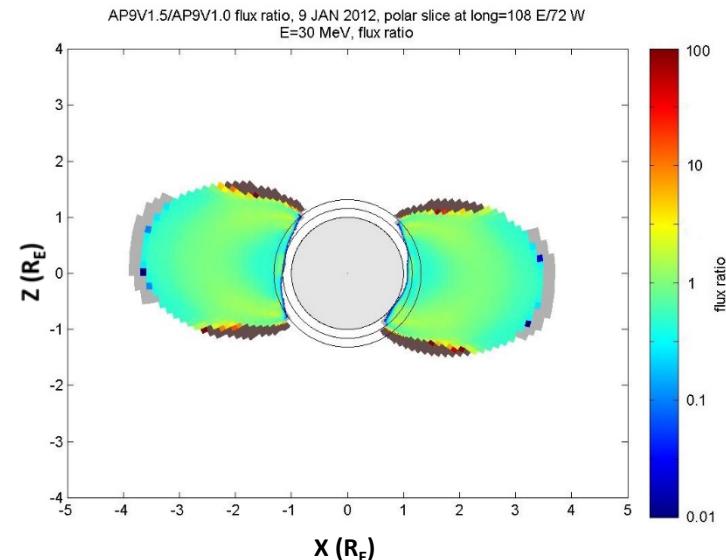
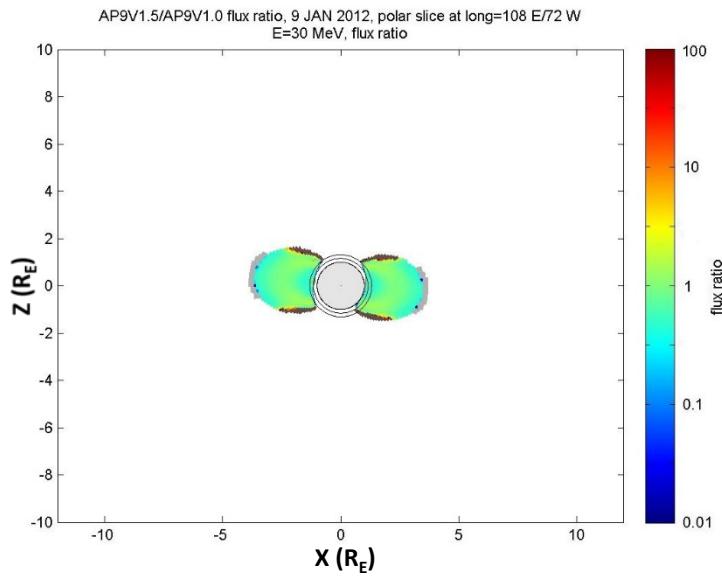
Distribution A

# 30 MeV protons



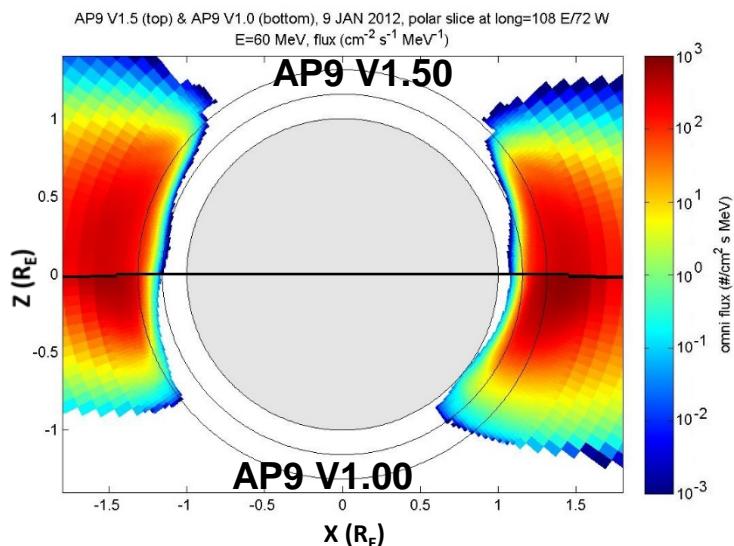
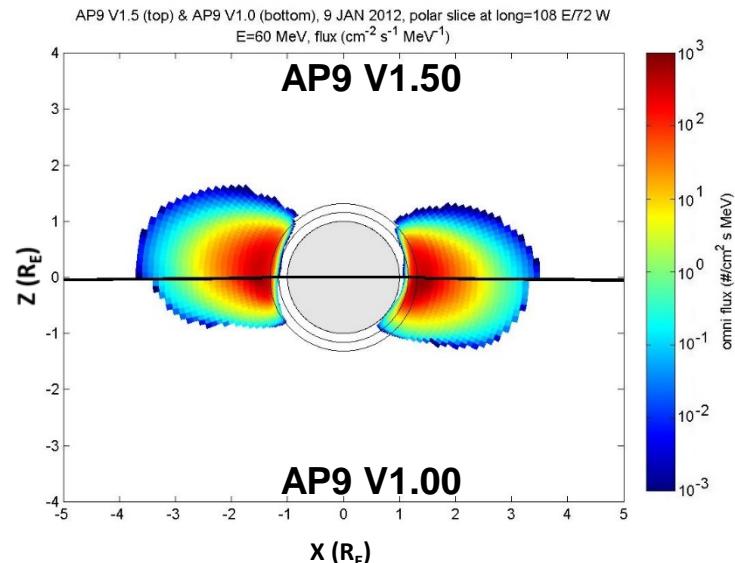
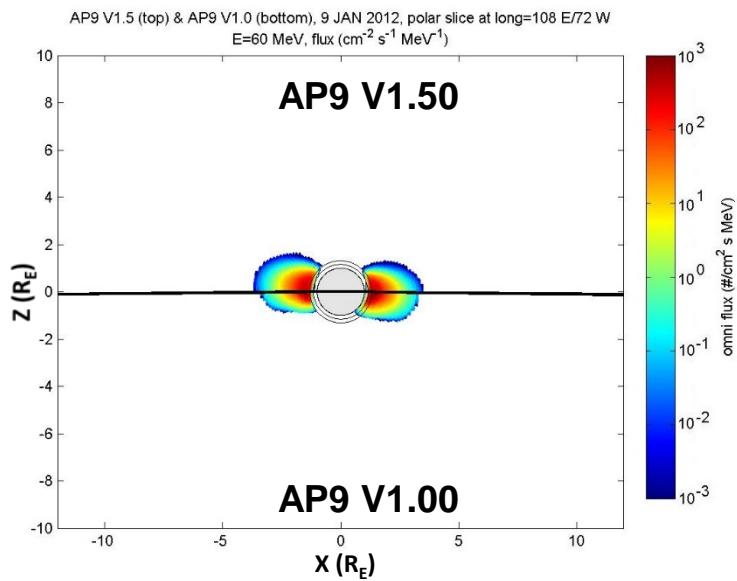
Distribution A

# 30 MeV protons, AP9V1.50-to-AP9V1.0 ratio

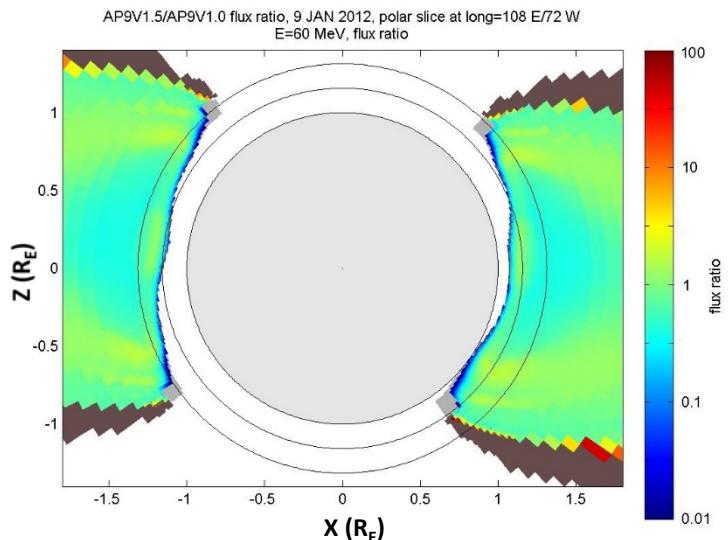
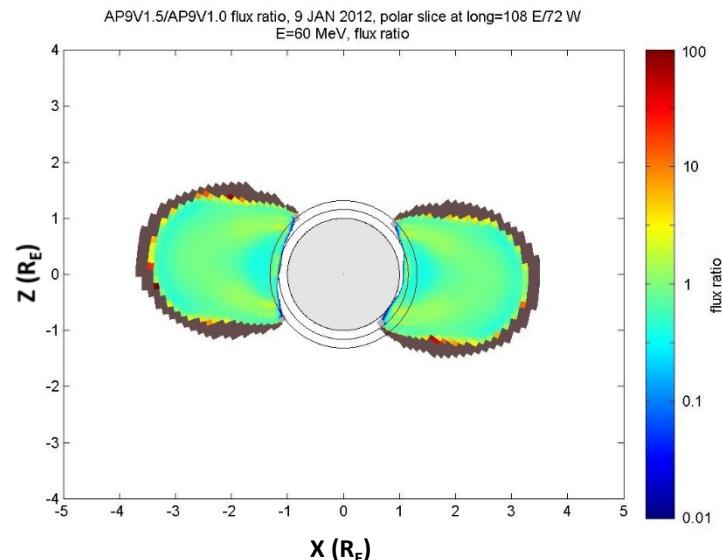
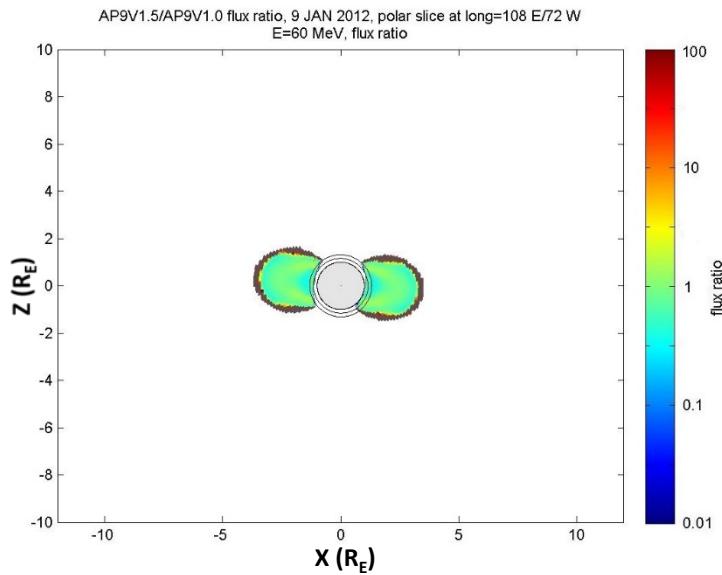


Distribution A

# 60 MeV protons

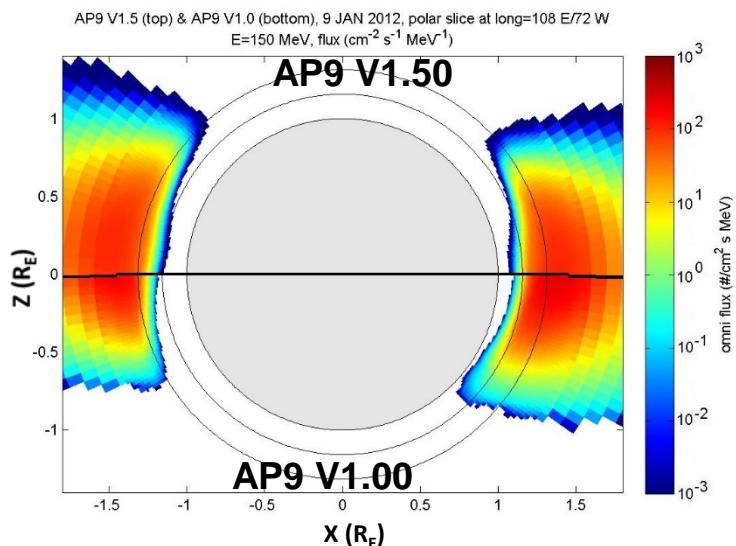
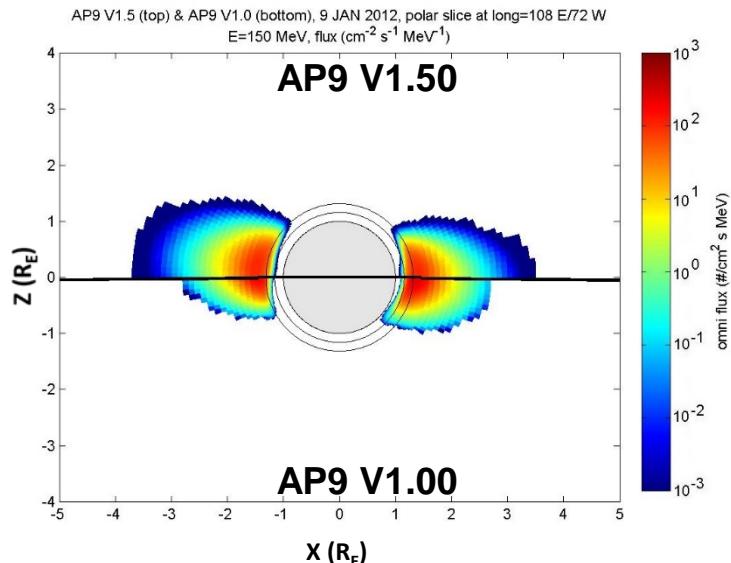
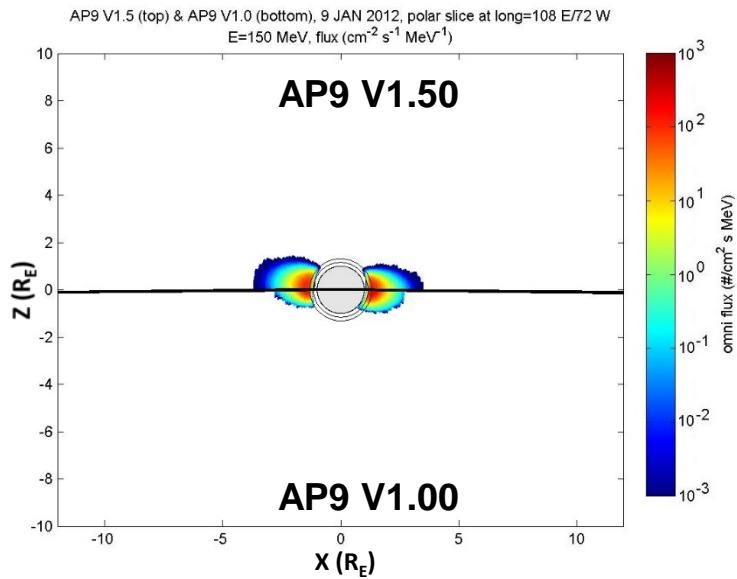


# 60 MeV protons, AP9V1.50-to-AP9V1.0 ratio

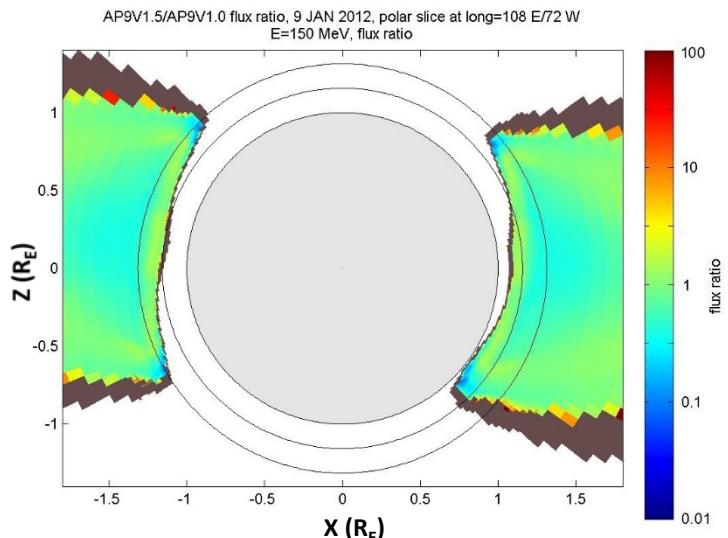
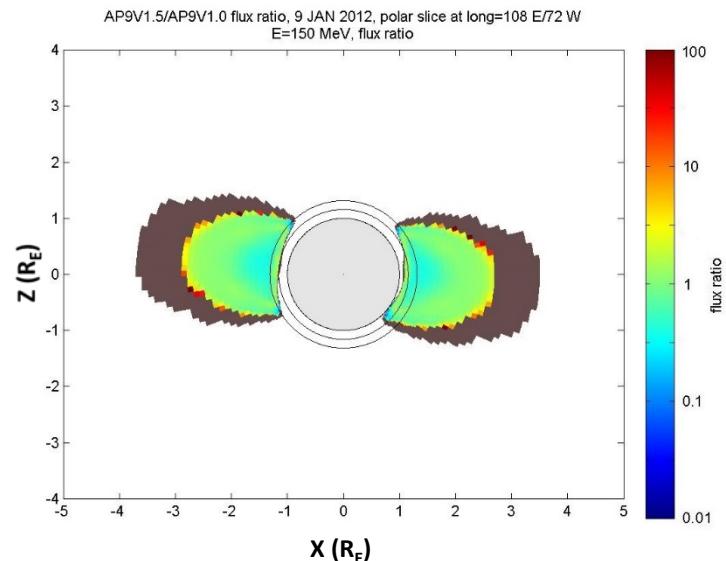
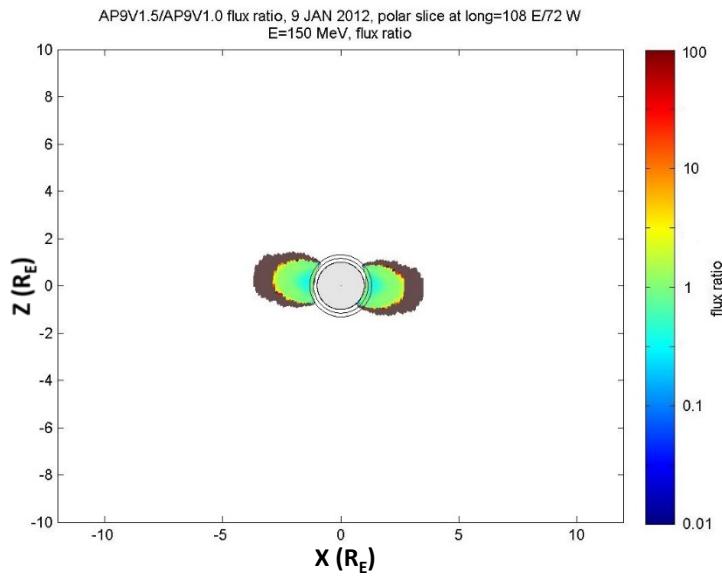


Distribution A

# 150 MeV protons

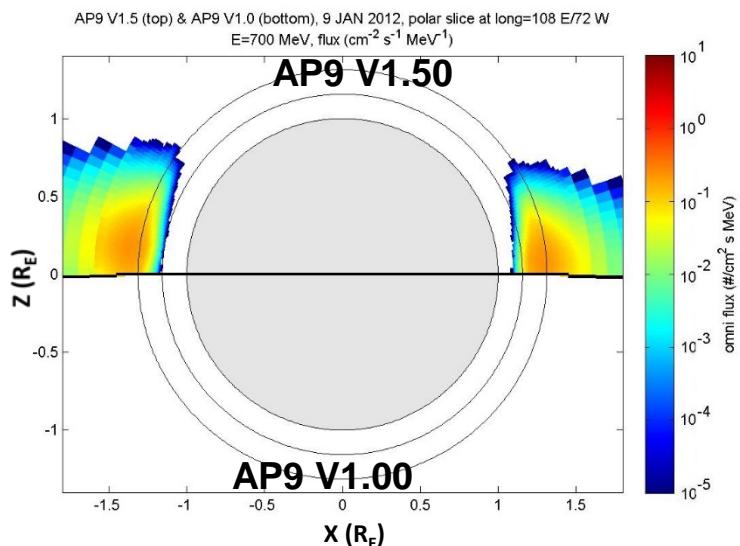
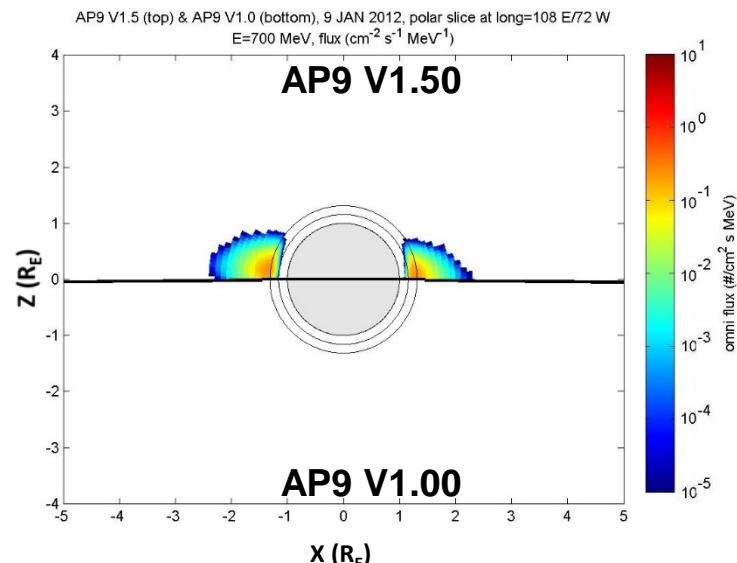
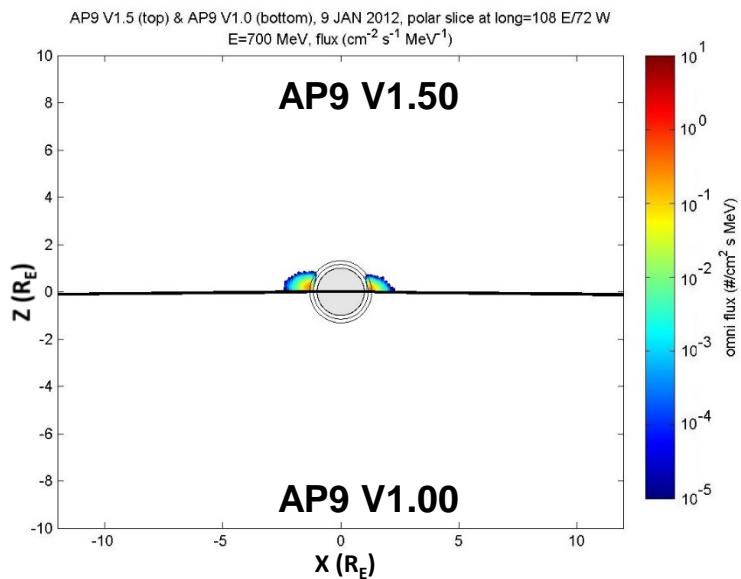


# 150 MeV protons, AP9V1.50-to-AP9V1.0 ratio

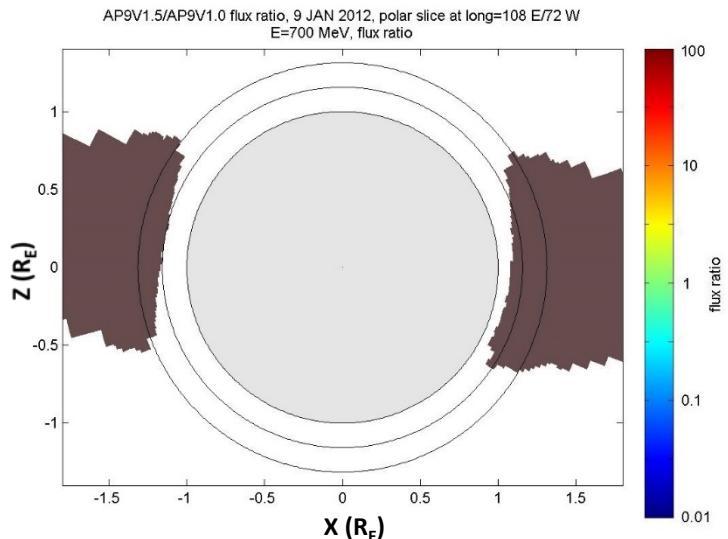
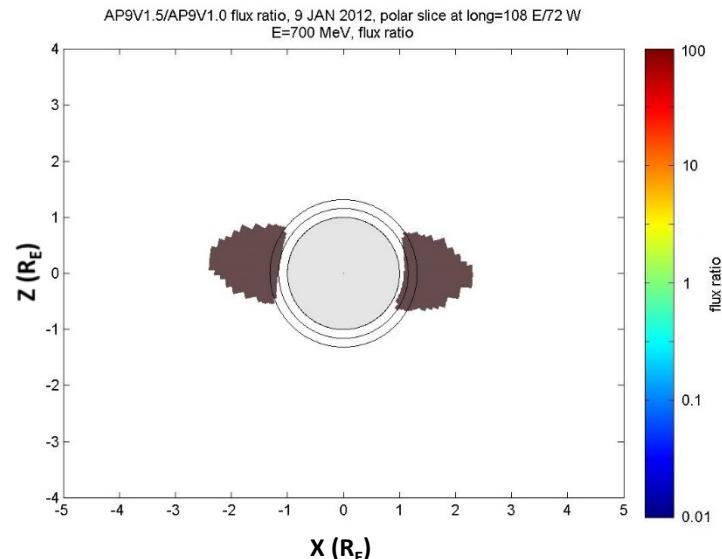
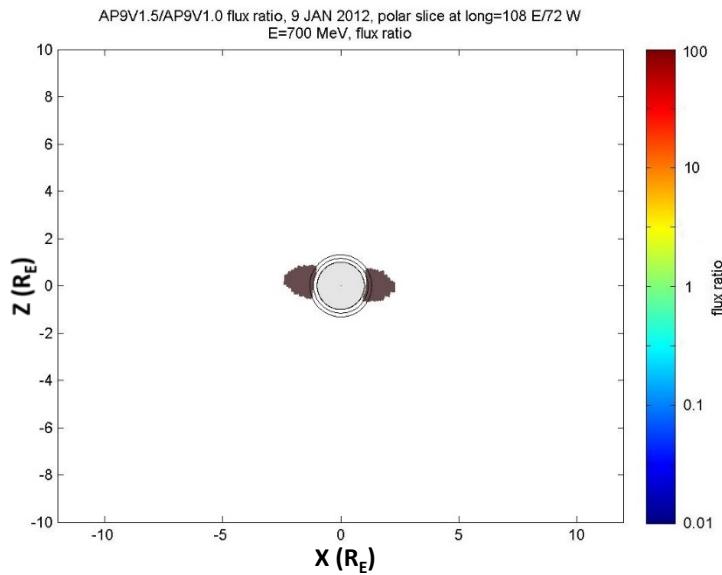


Distribution A

# 700 MeV protons



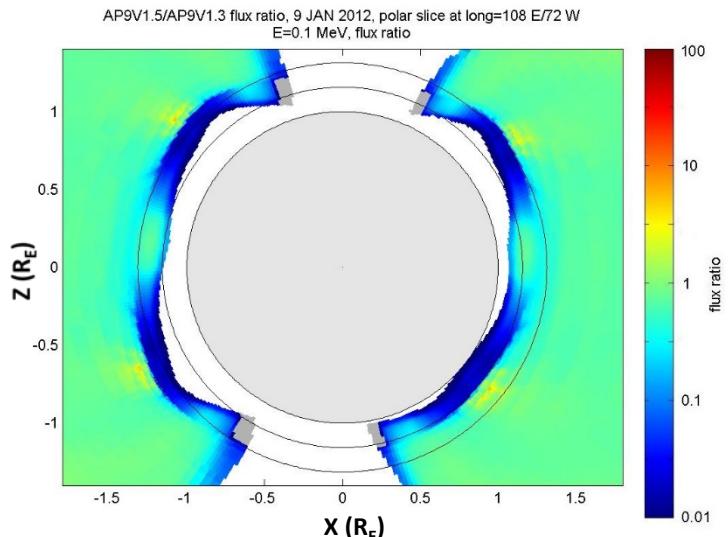
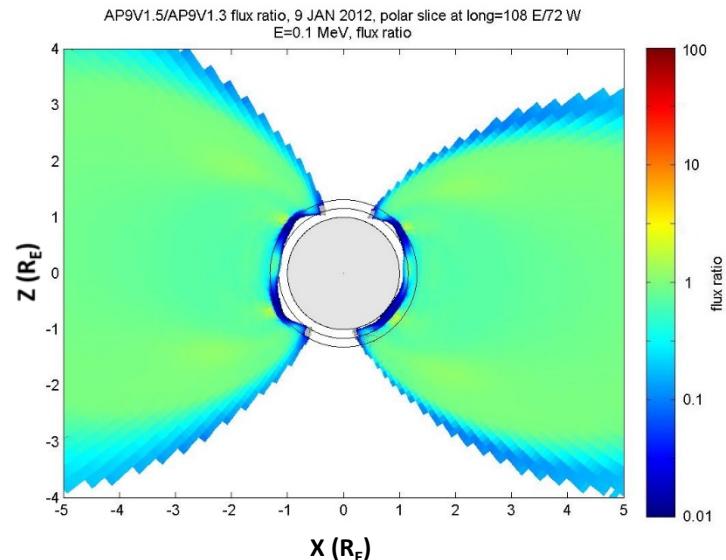
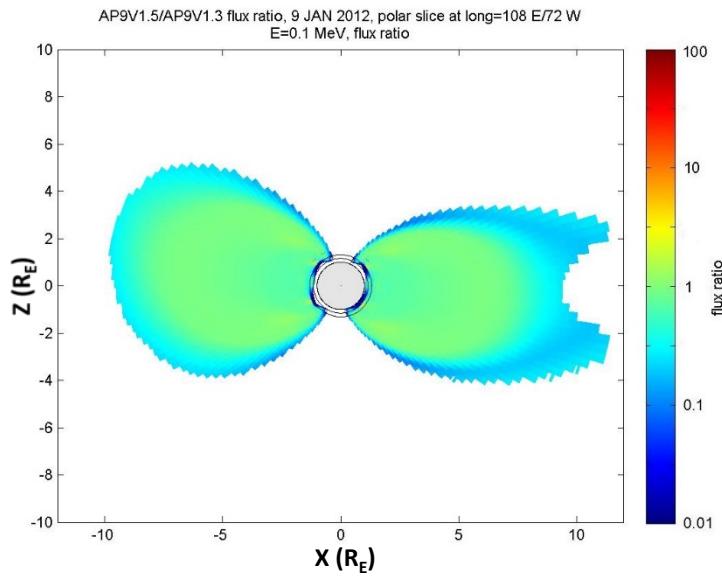
# 700 MeV protons, AP9V1.50-to-AP9V1.0 ratio



Distribution A

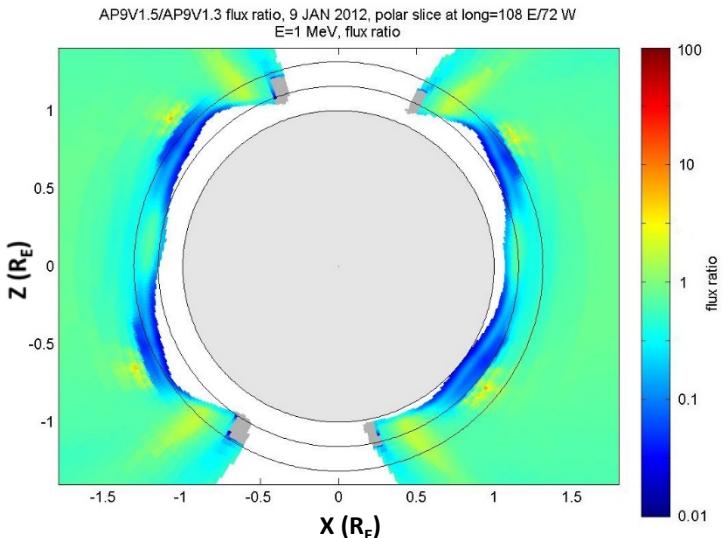
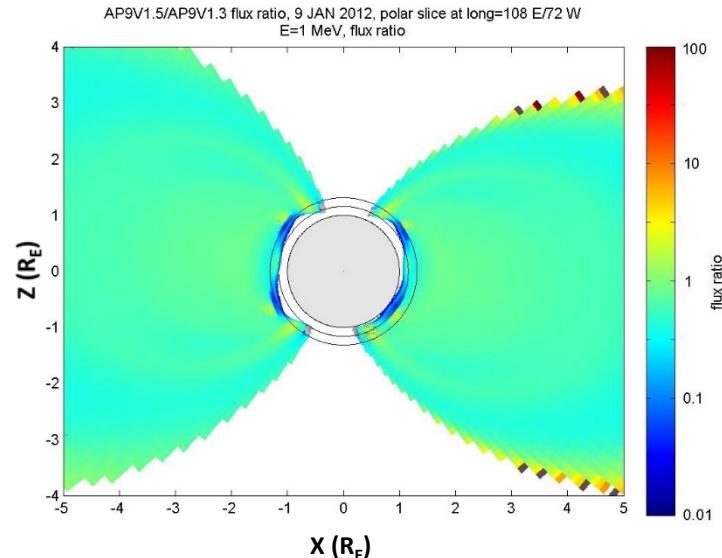
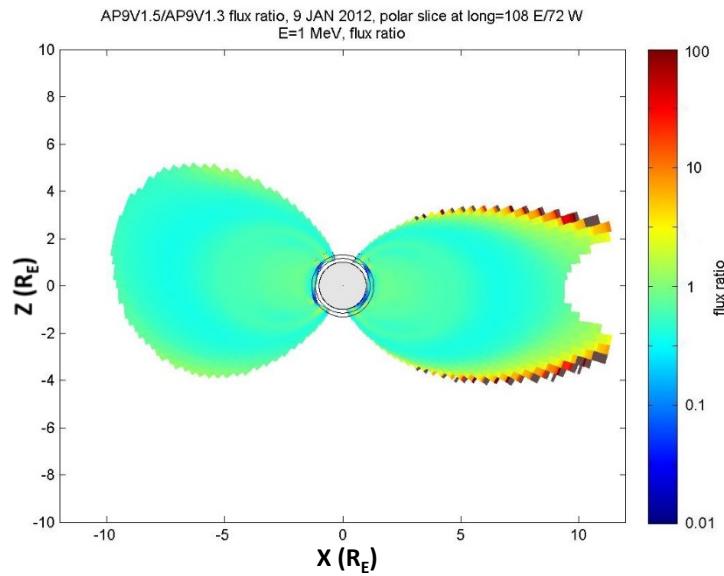
# **AP9 V1.50 vs. AP9 V1.3**

# 0.1 MeV protons, AP9V1.50-to-AP9V1.3 ratio



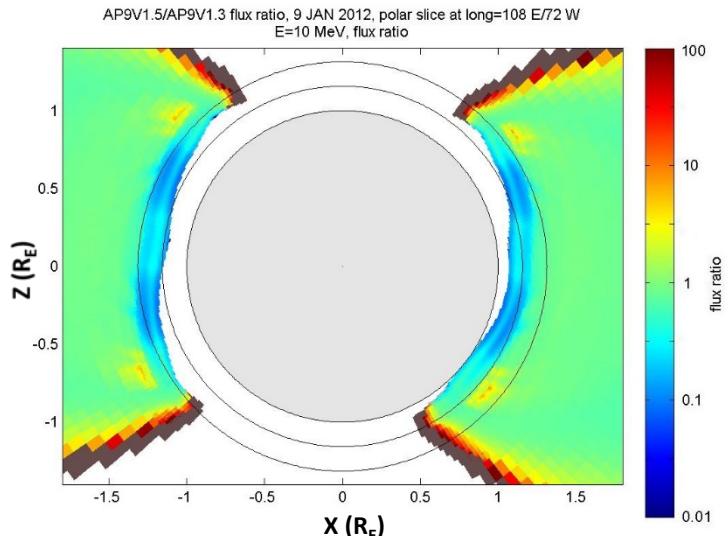
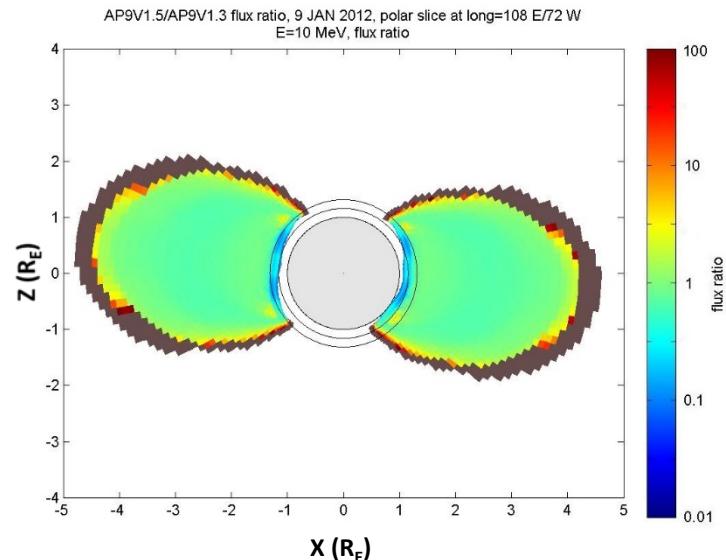
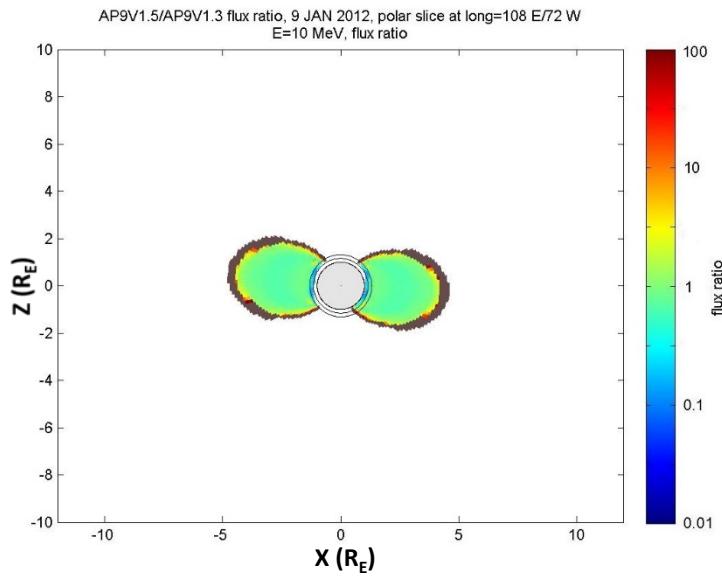
Distribution A

# 1 MeV protons, AP9V1.50-to-AP9V1.3 ratio



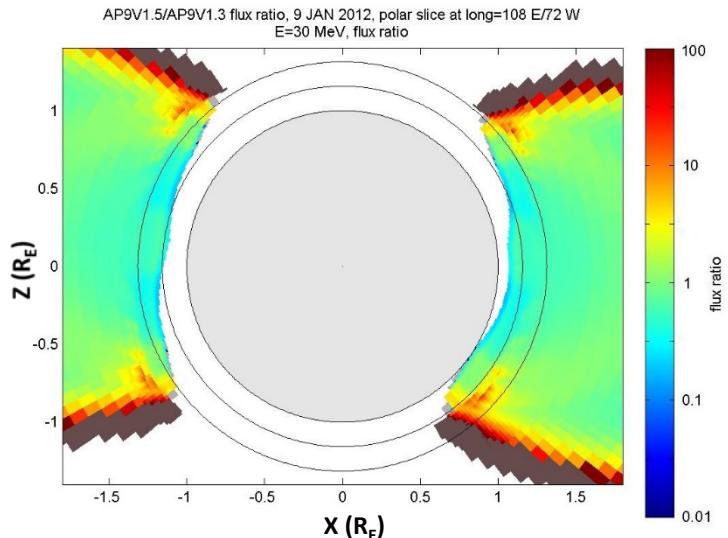
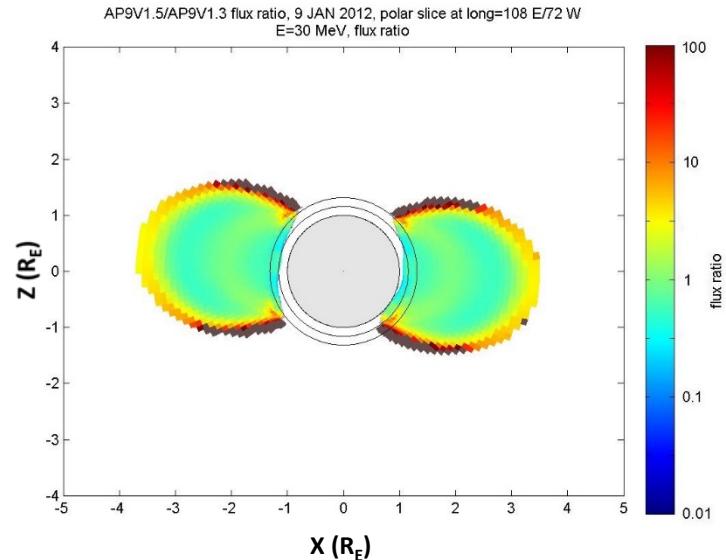
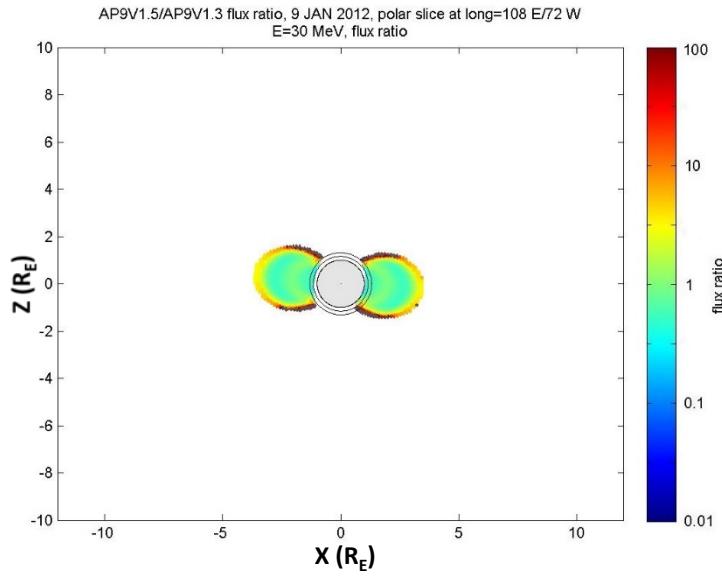
Distribution A

# 10 MeV protons, AP9V1.50-to-AP9V1.3 ratio



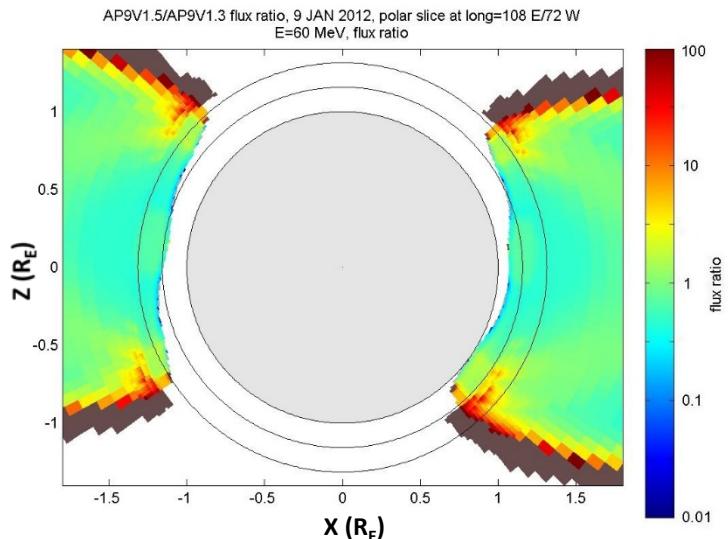
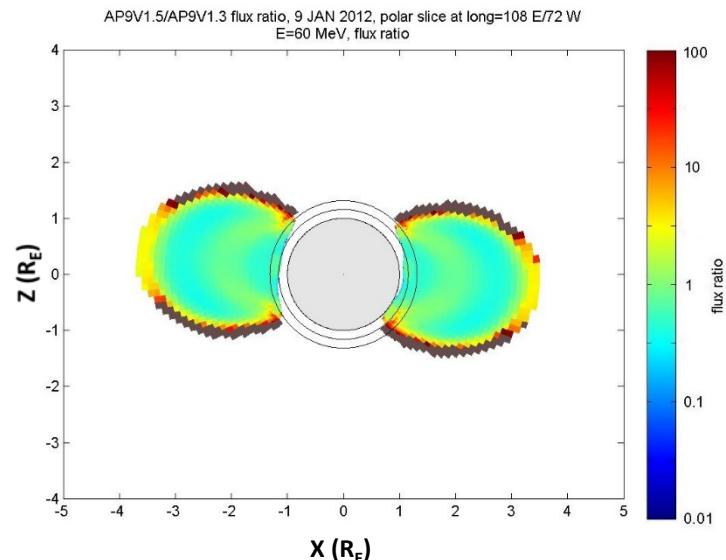
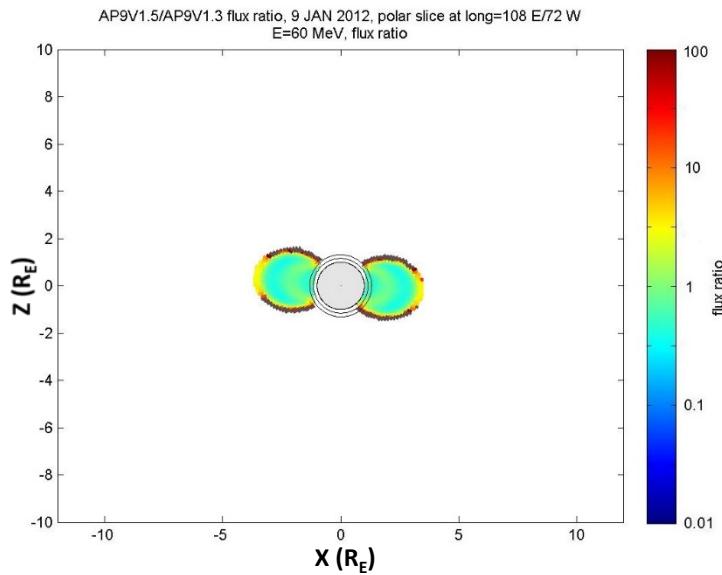
Distribution A

# 30 MeV protons, AP9V1.50-to-AP9V1.3 ratio



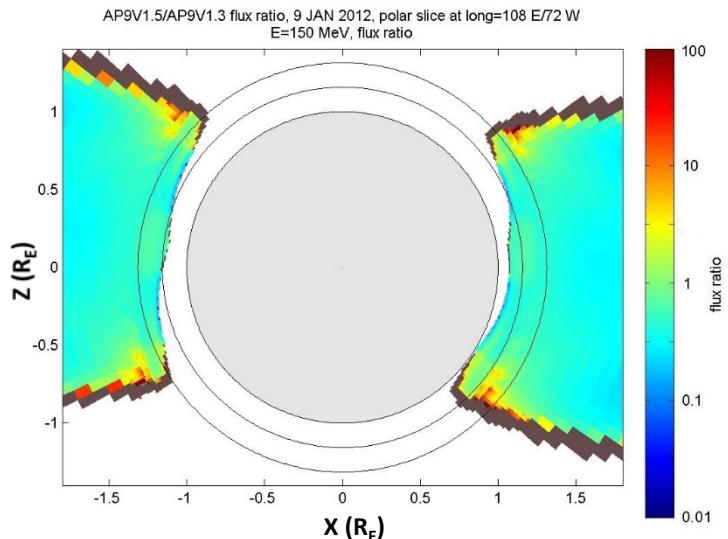
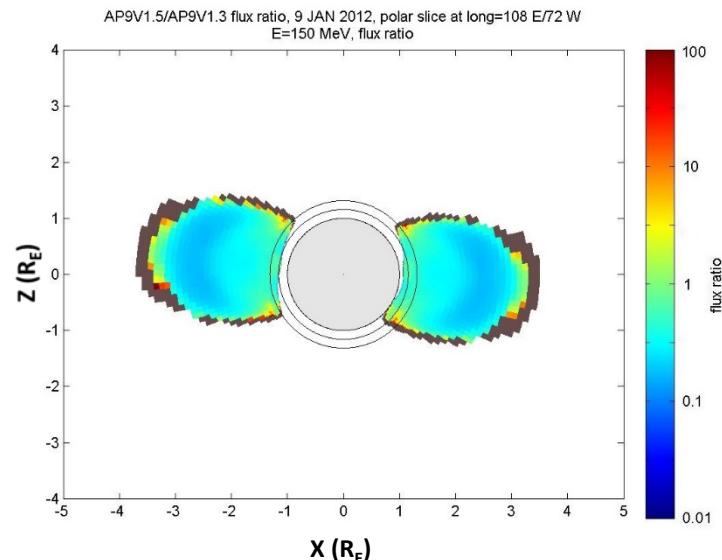
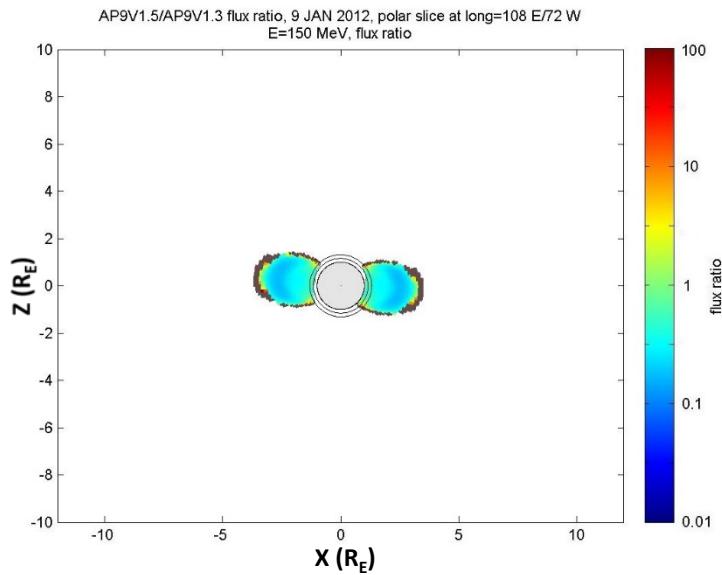
Distribution A

# 60 MeV protons, AP9V1.50-to-AP9V1.3 ratio



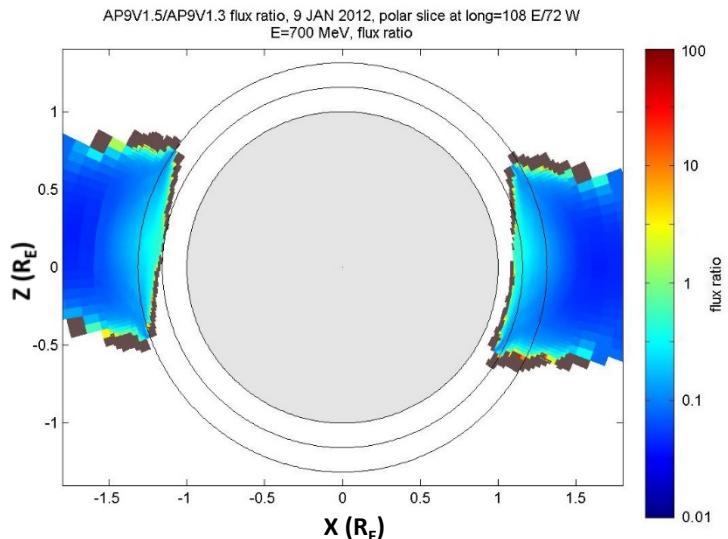
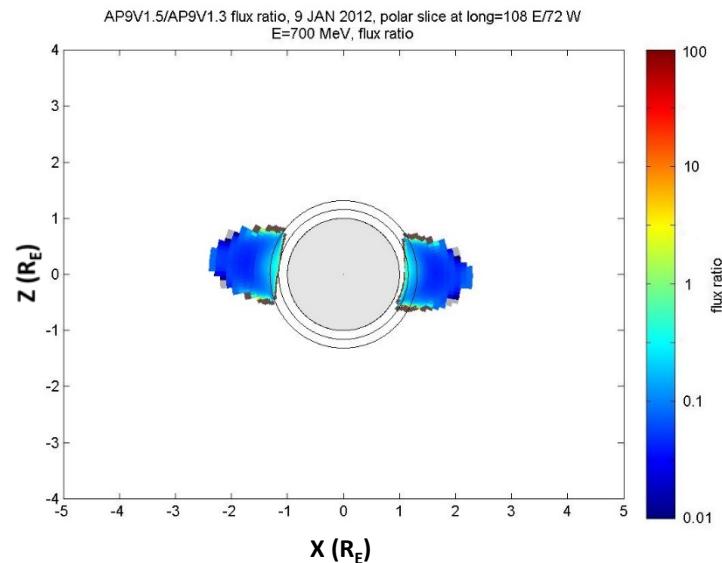
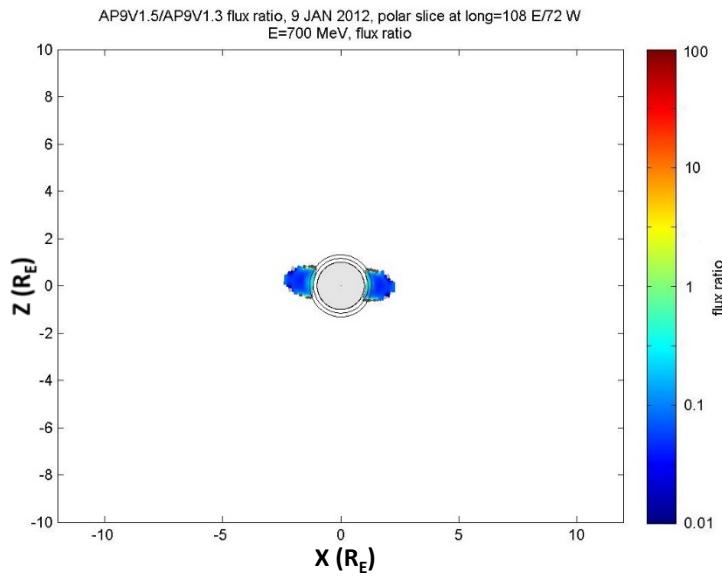
Distribution A

# 150 MeV protons, AP9V1.50-to-AP9V1.3 ratio



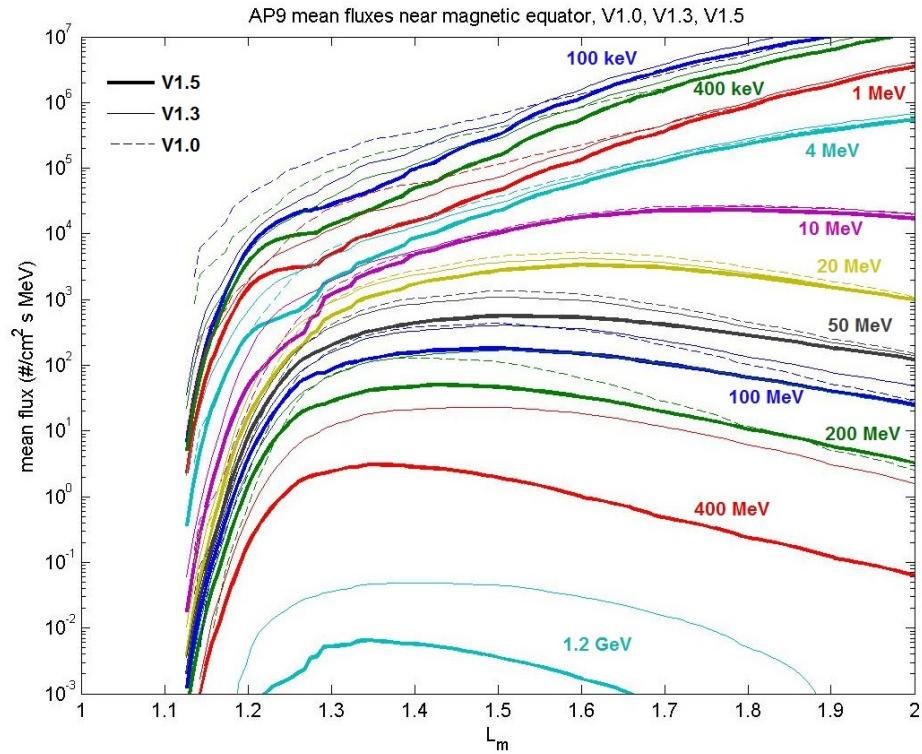
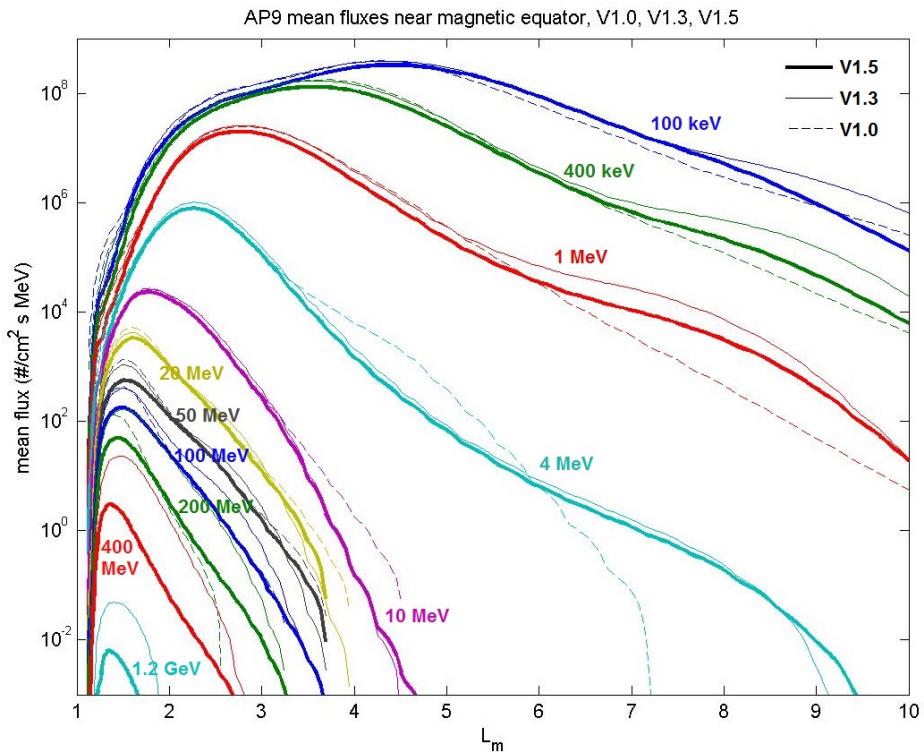
Distribution A

# 700 MeV protons, AP9V1.50-to-AP9V1.3 ratio



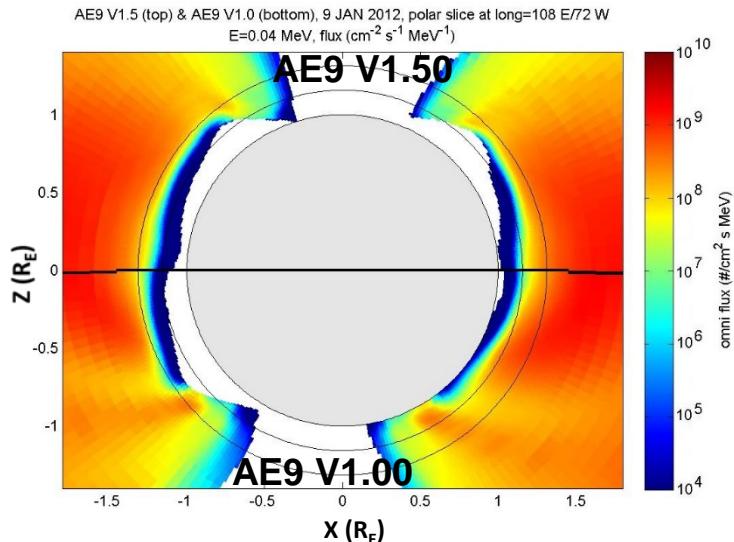
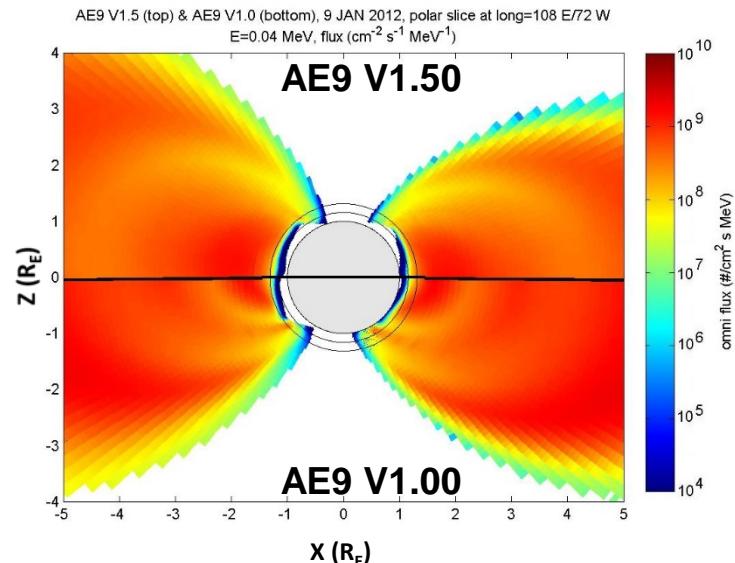
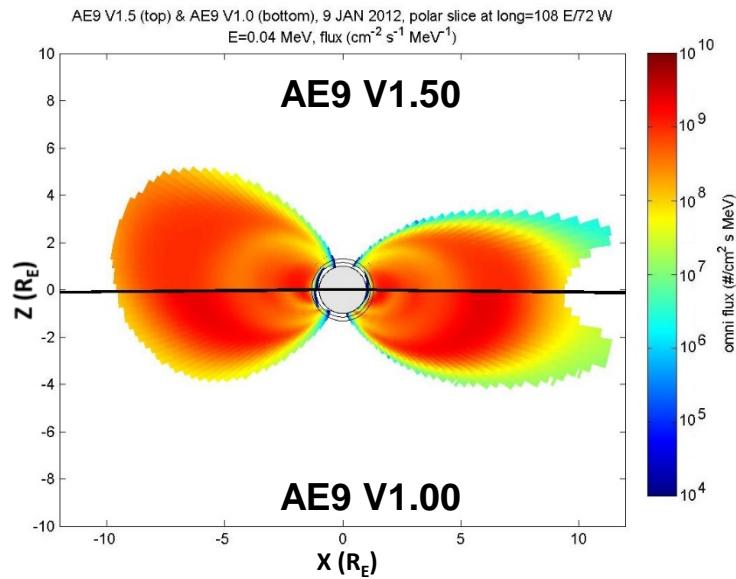
Distribution A

# AP9 profiles in $L_m$

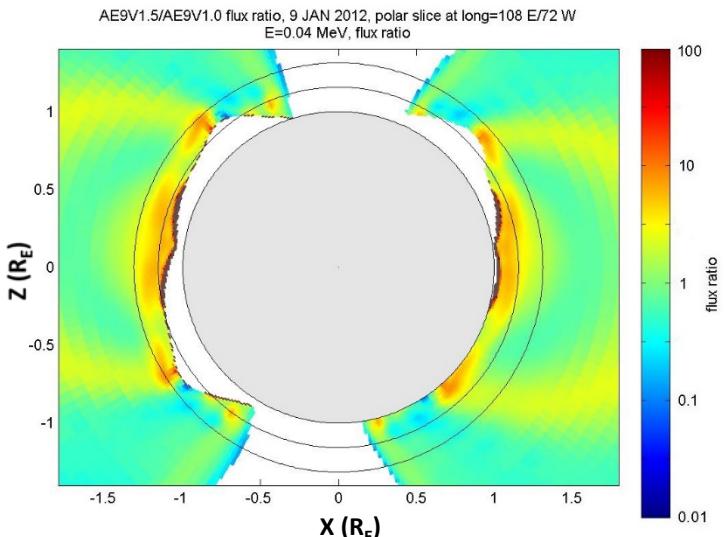
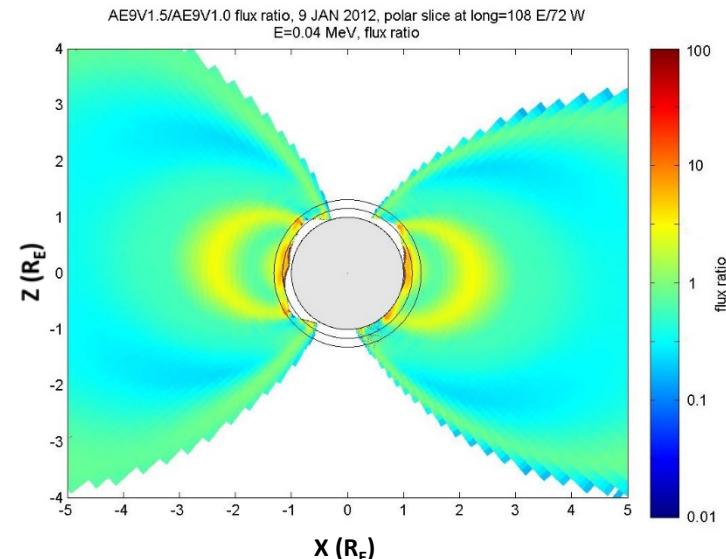
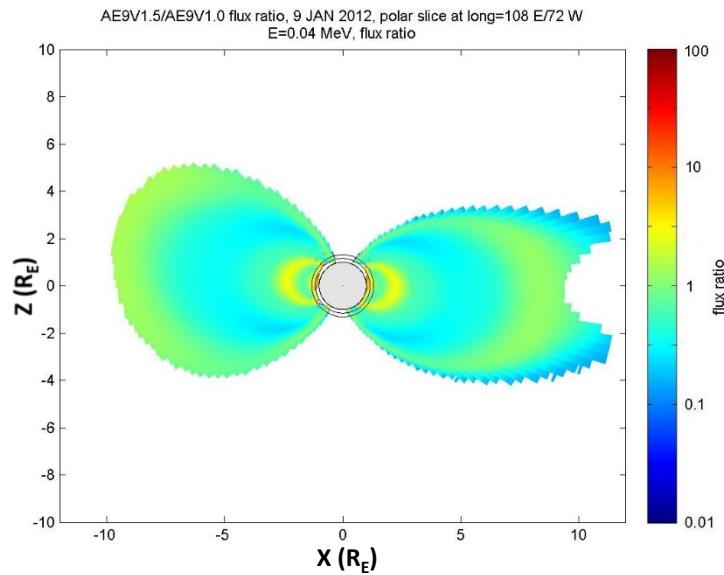


# **AE9 V1.50 vs. AE9 V1.0**

# 0.04 MeV electrons

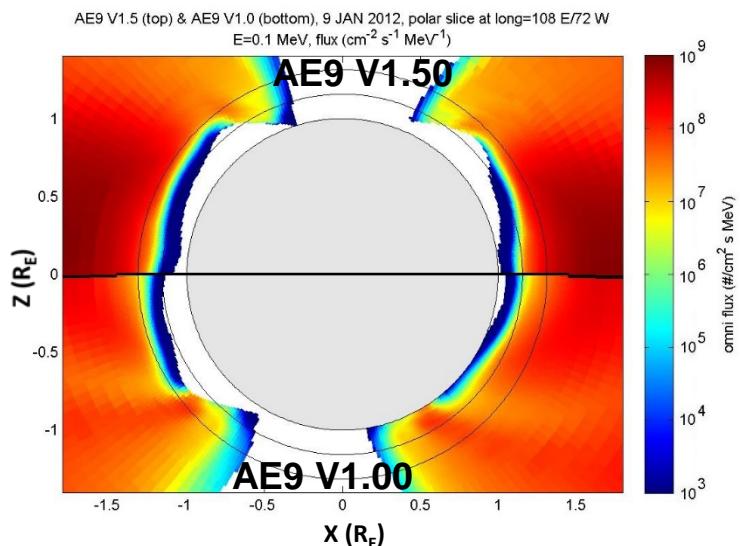
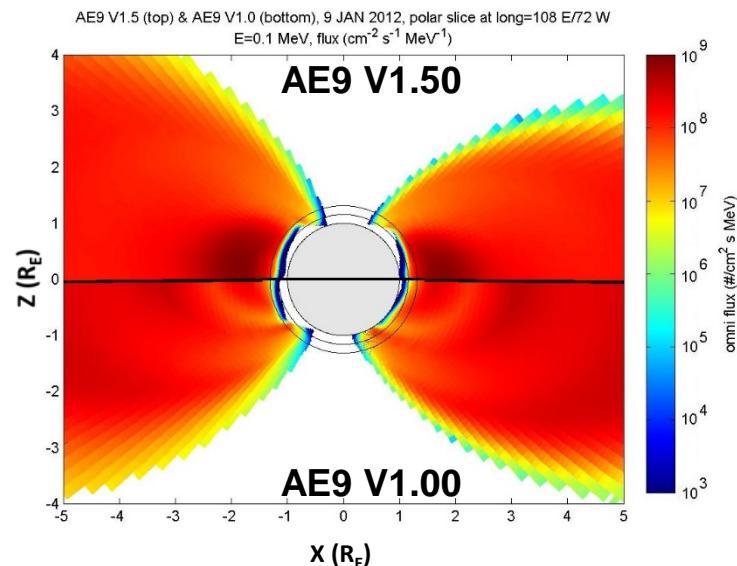
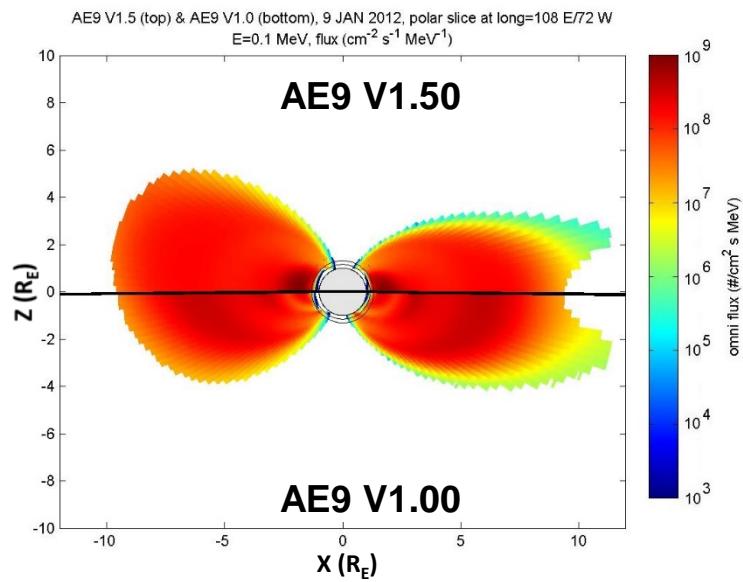


# 0.04 MeV electrons, AE9V1.50-to-AE9V1.0 ratio

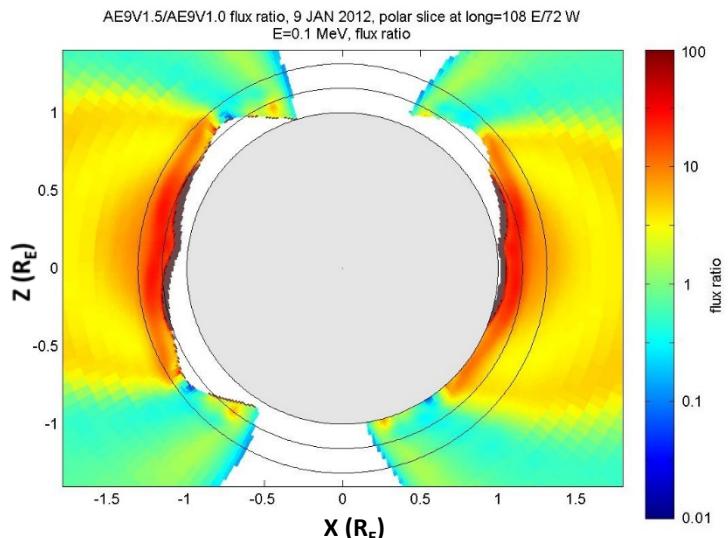
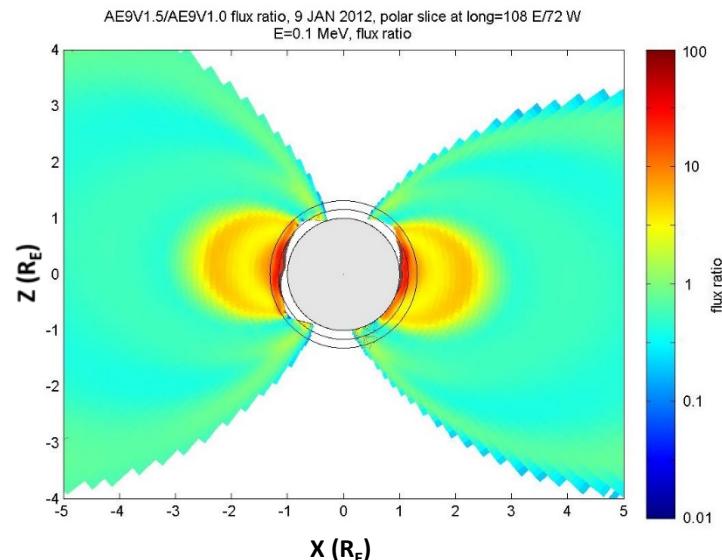
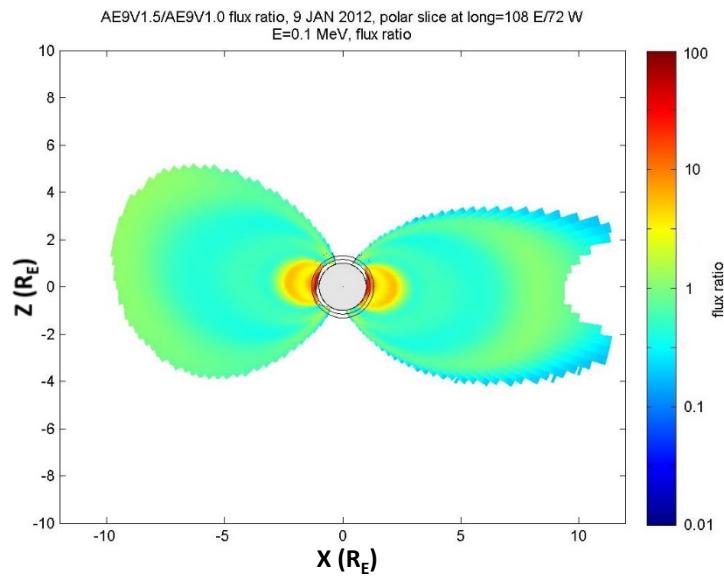


Distribution A

# 0.1 MeV electrons

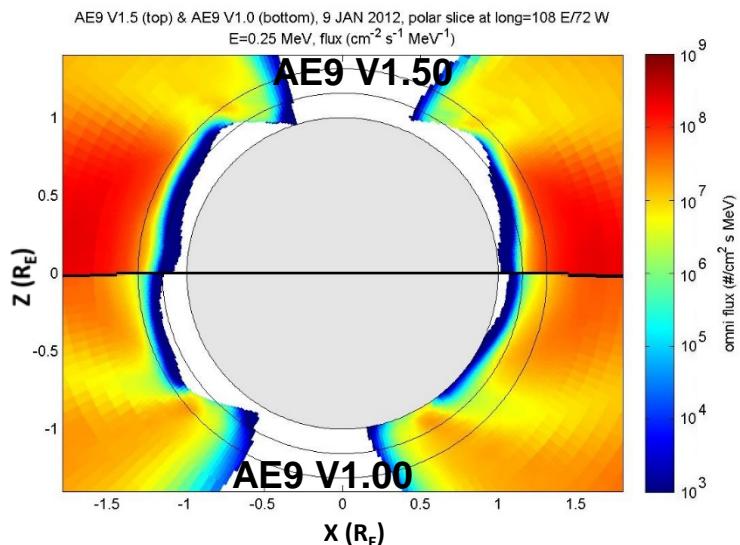
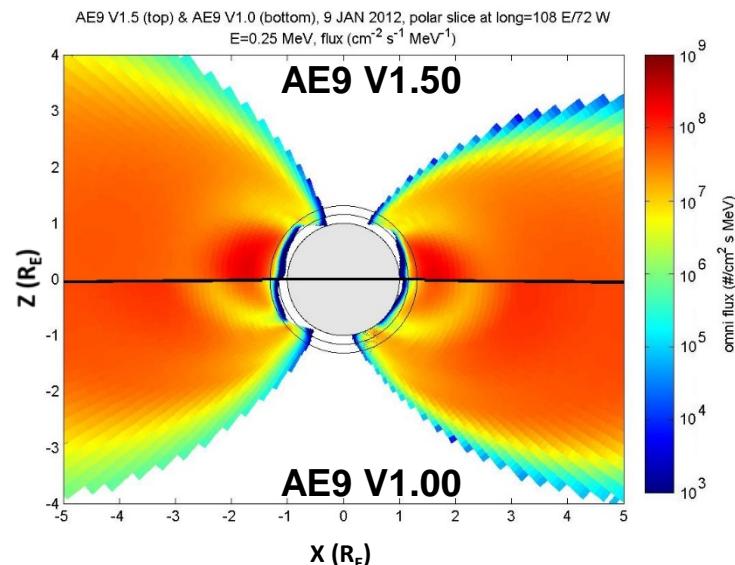
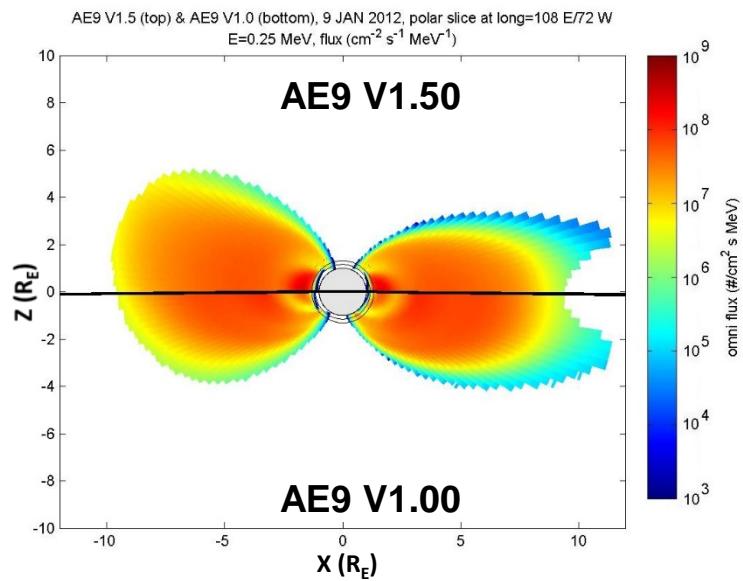


# 0.1 MeV electrons, AE9V1.50-to-AE9V1.0 ratio

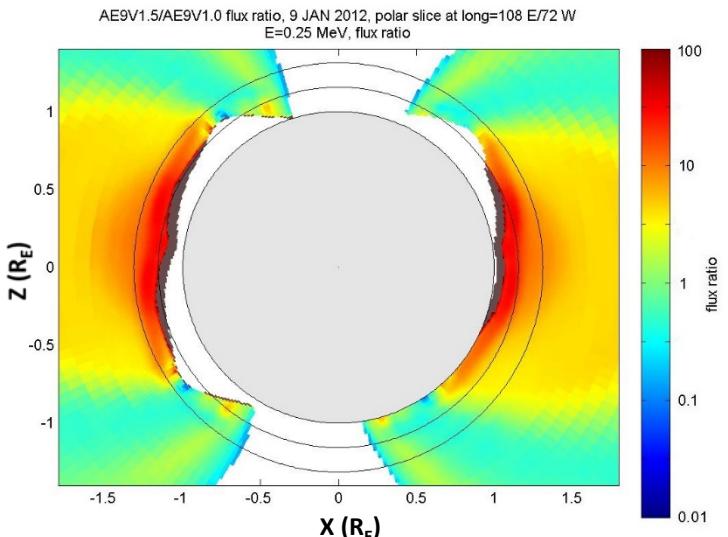
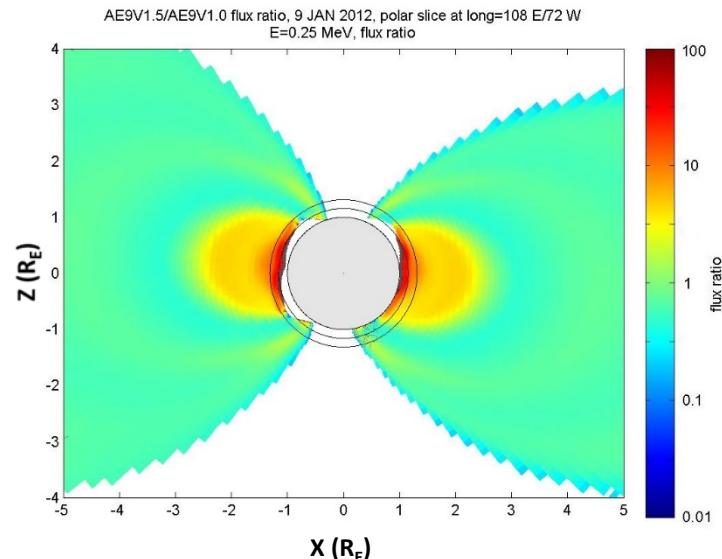
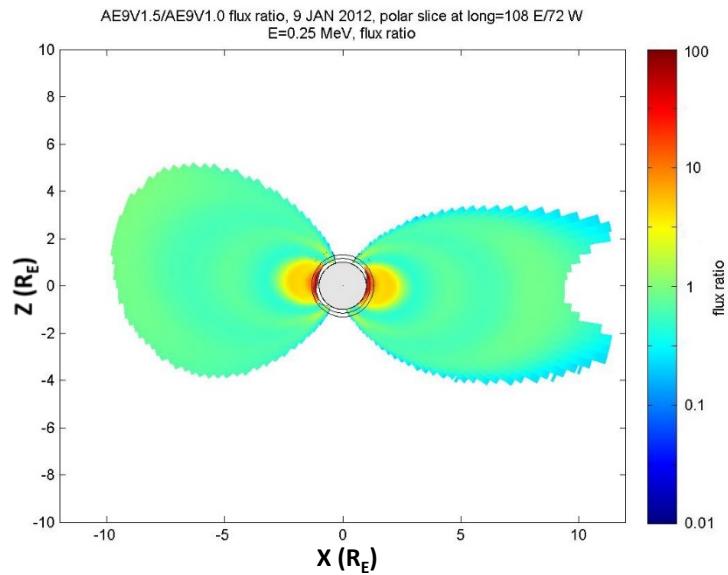


Distribution A

# 0.25 MeV electrons

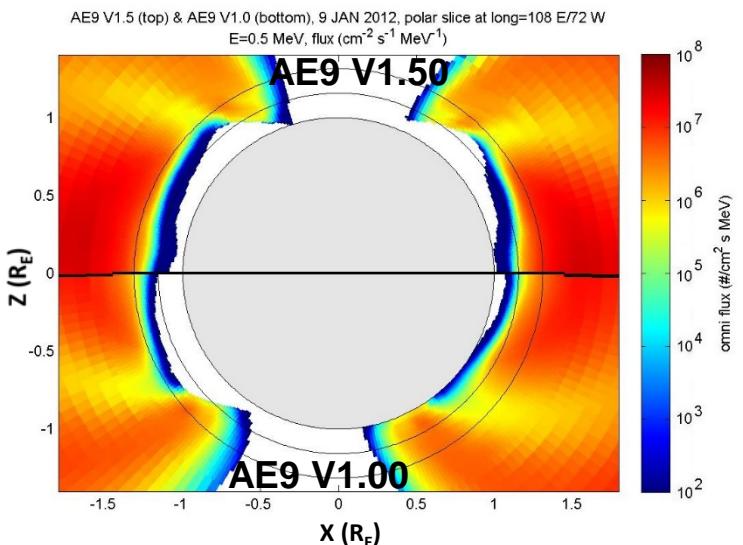
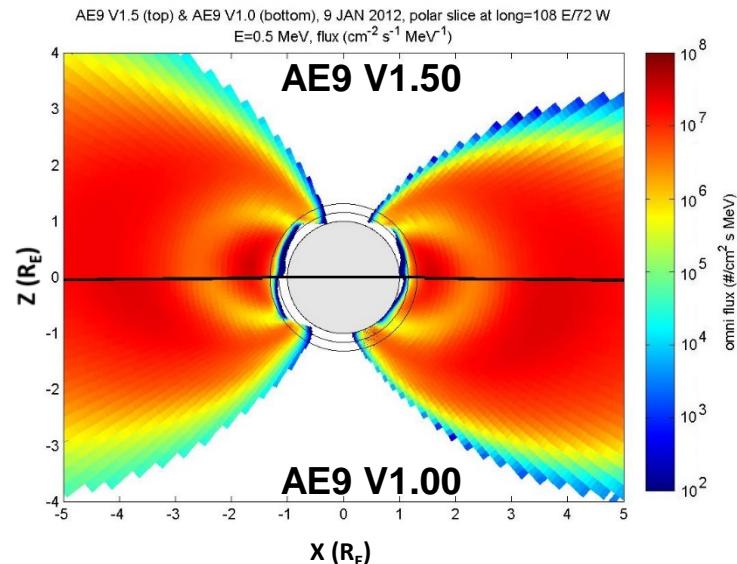
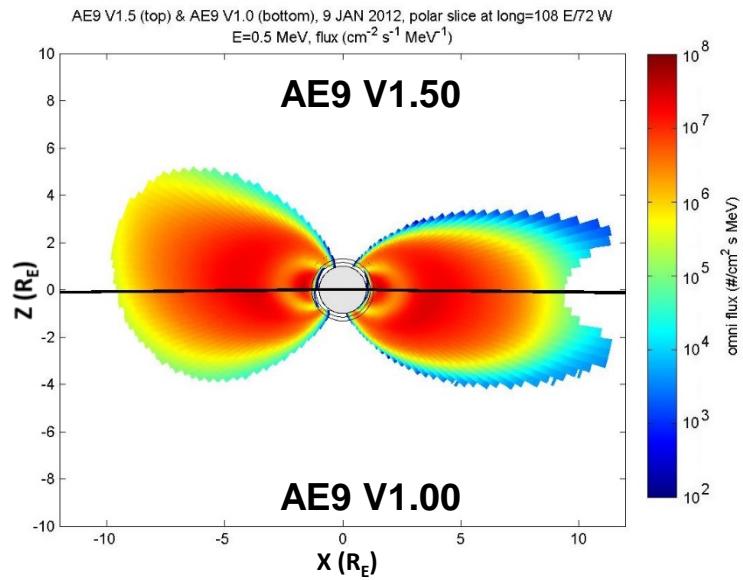


# 0.25 MeV electrons, AE9V1.50-to-AE9V1.0 ratio

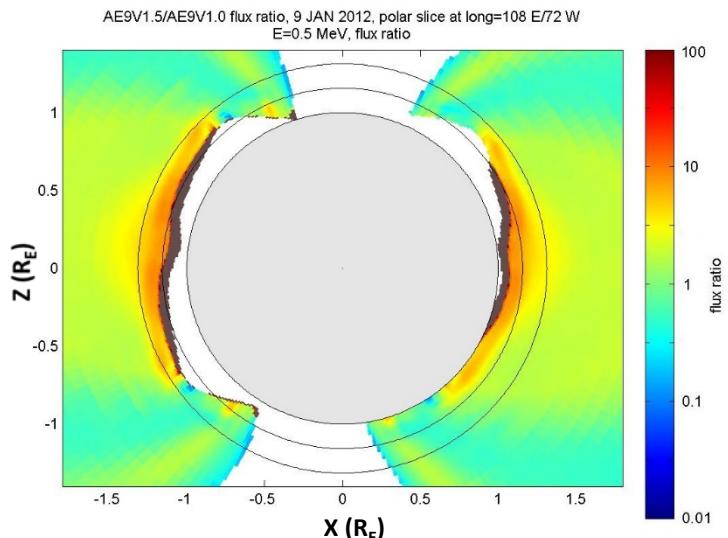
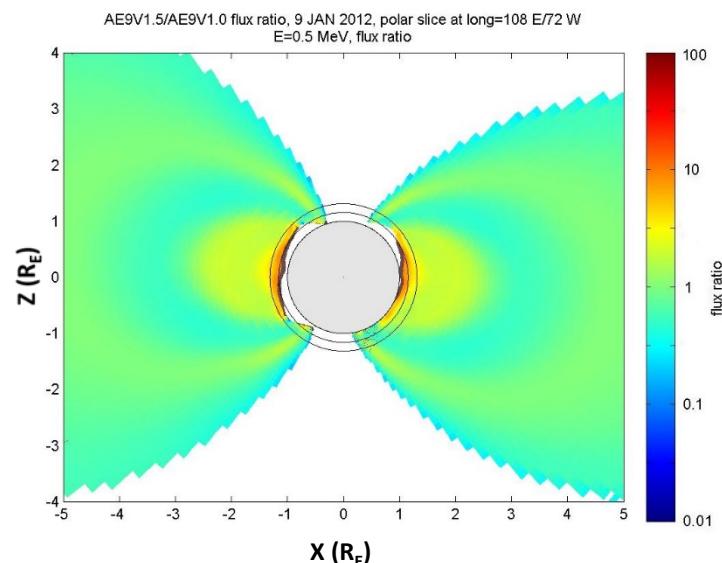
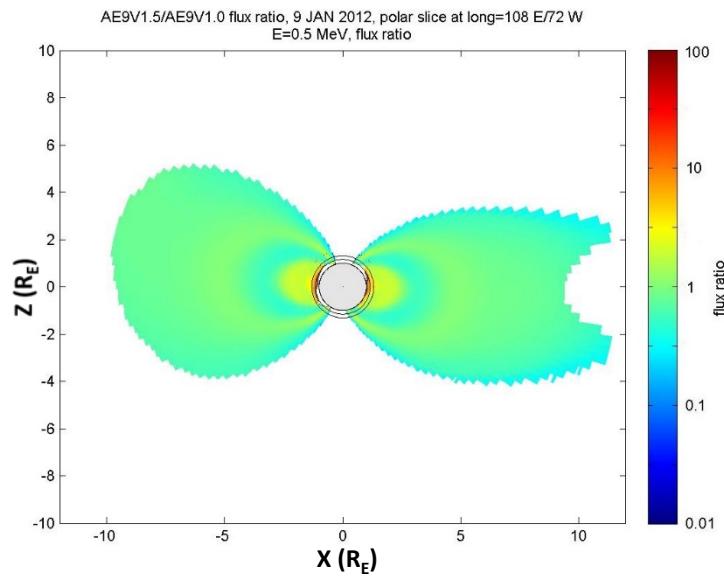


Distribution A

# 0.5 MeV electrons

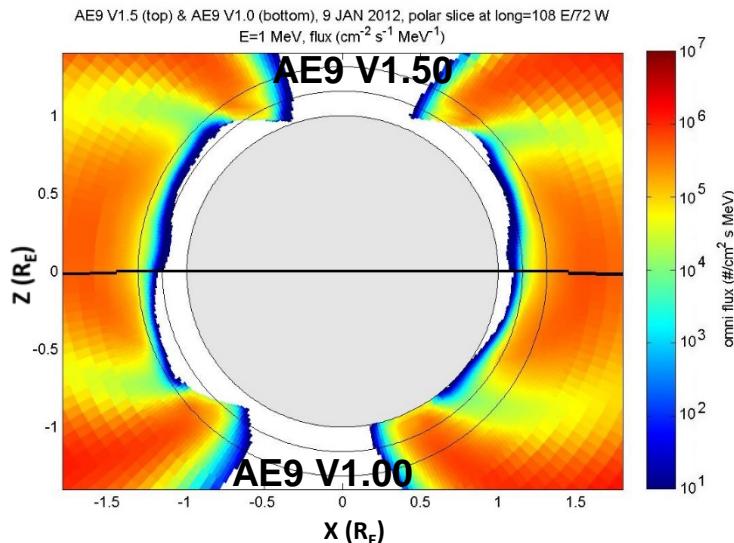
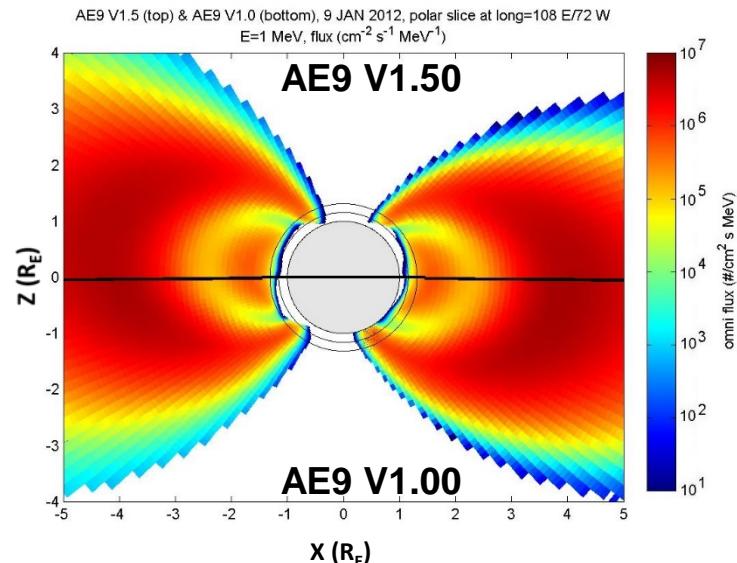
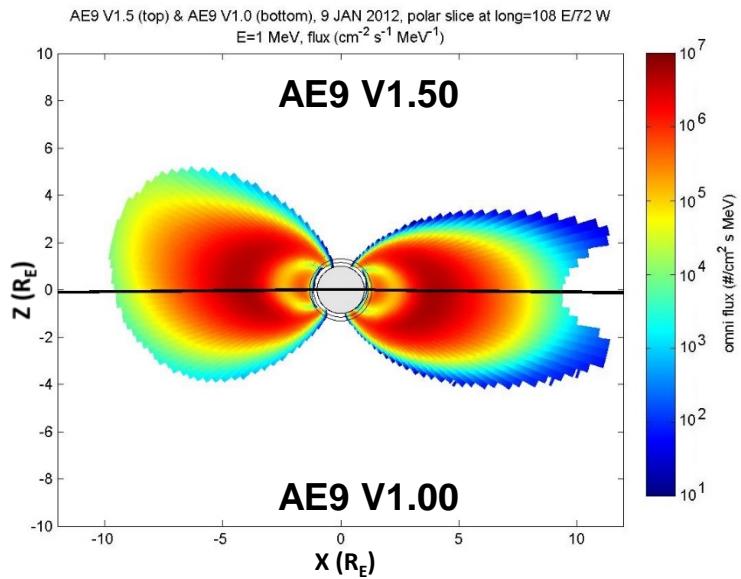


# 0.5 MeV electrons, AE9V1.50-to-AE9V1.0 ratio

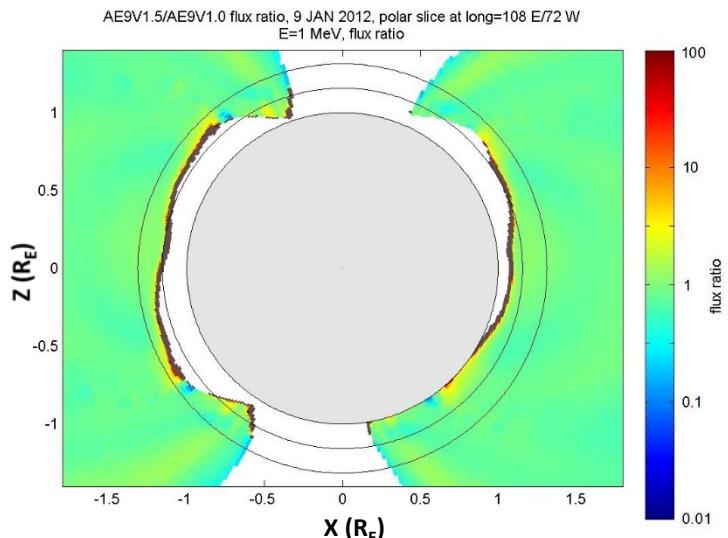
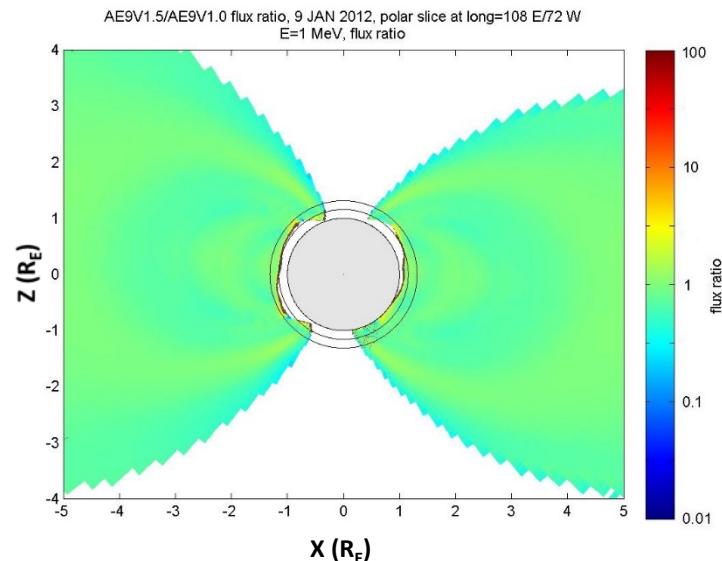
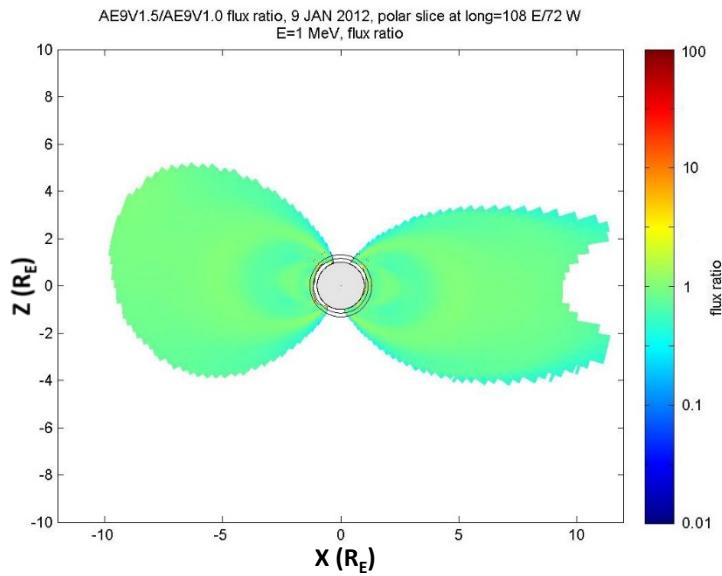


Distribution A

# 1 MeV electrons

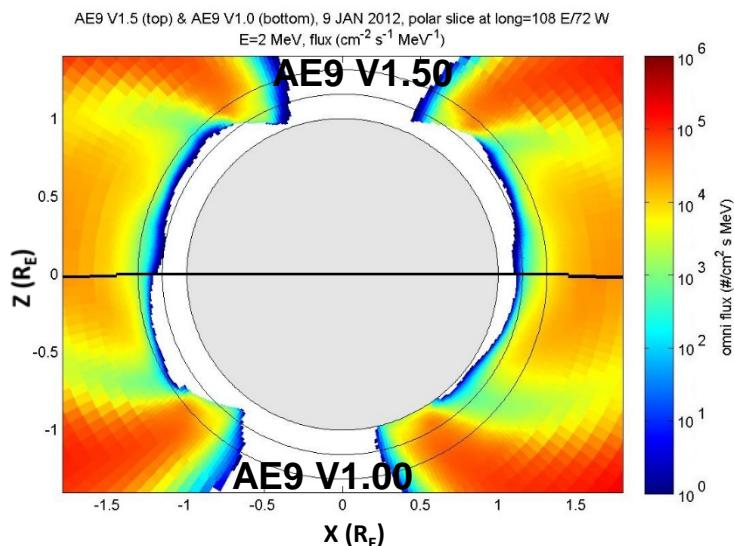
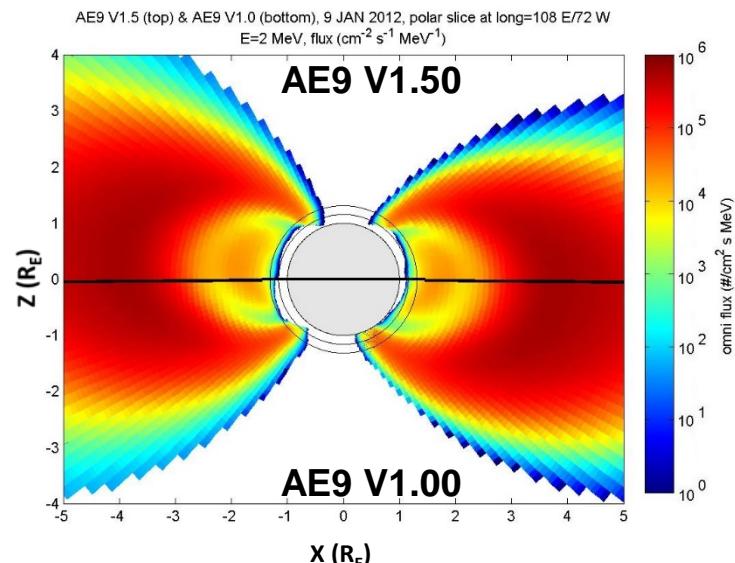
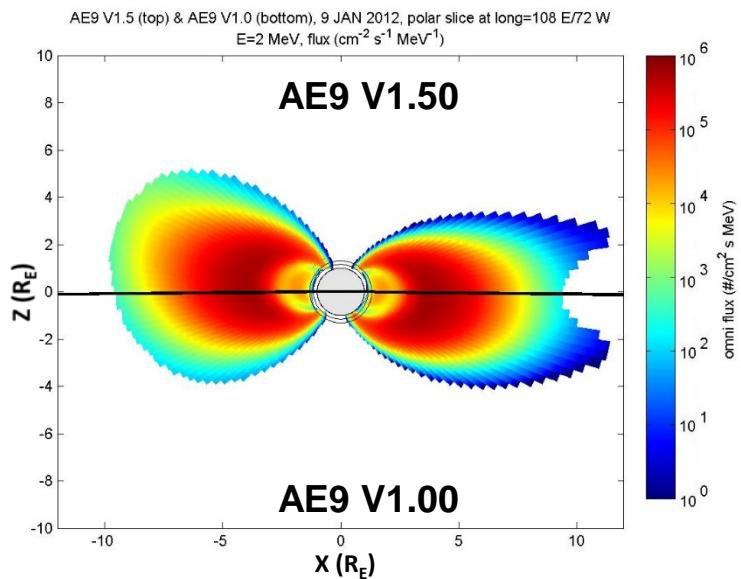


# 1 MeV electrons, AE9V1.50-to-AE9V1.0 ratio

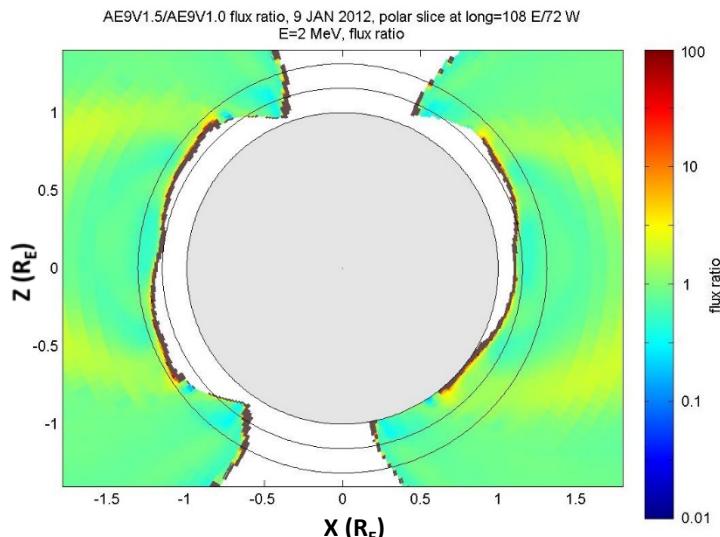
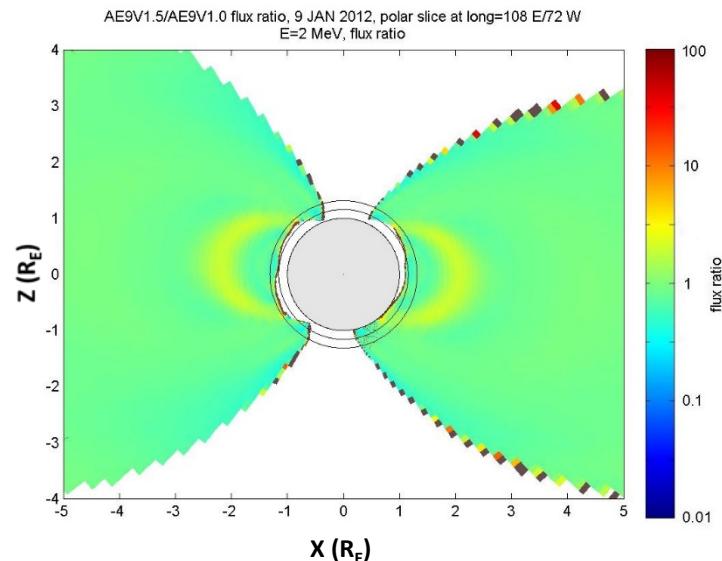
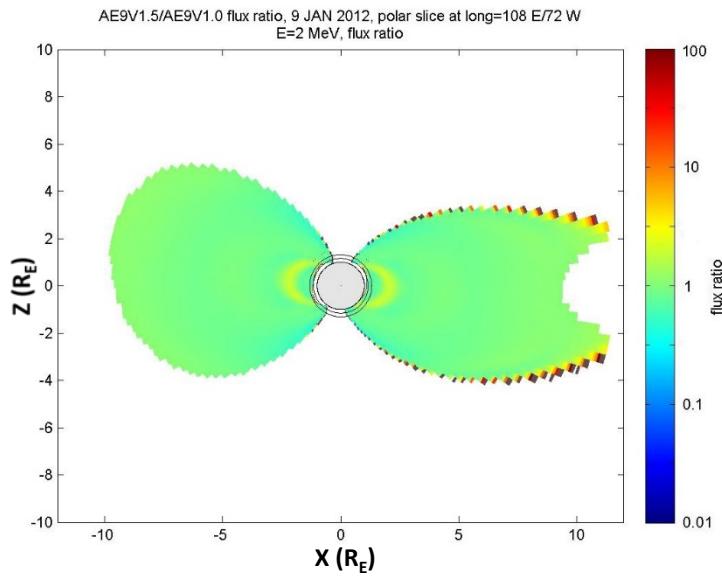


Distribution A

## 2 MeV electrons

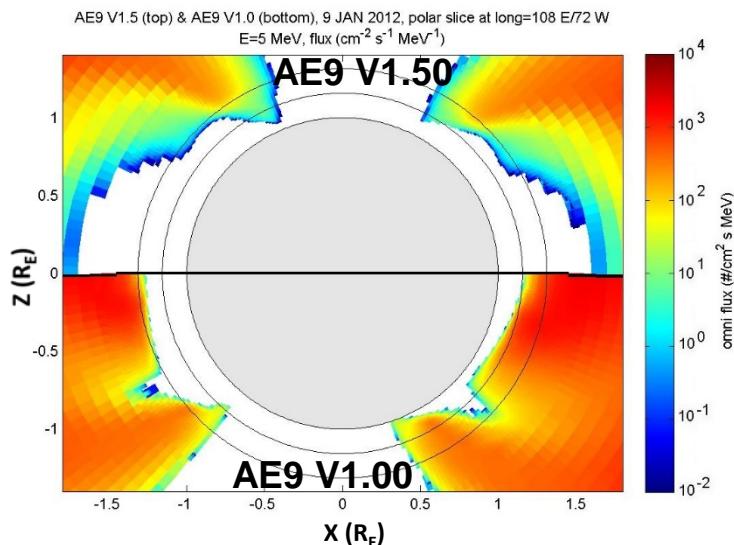
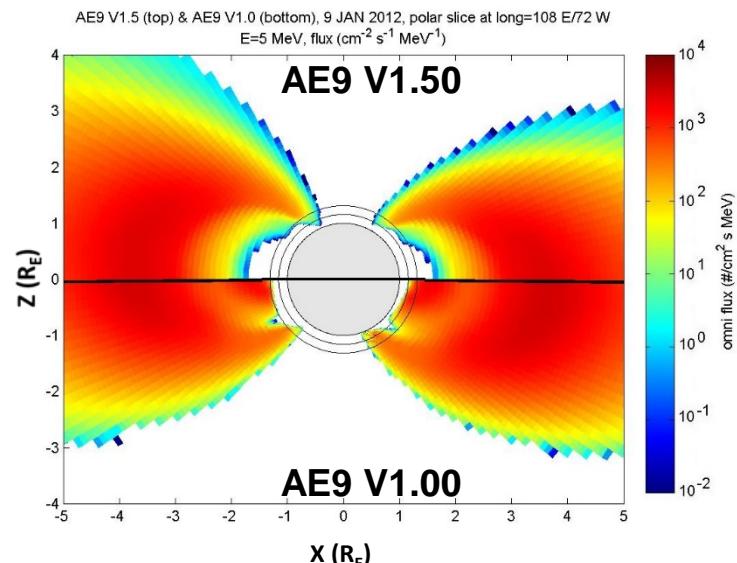
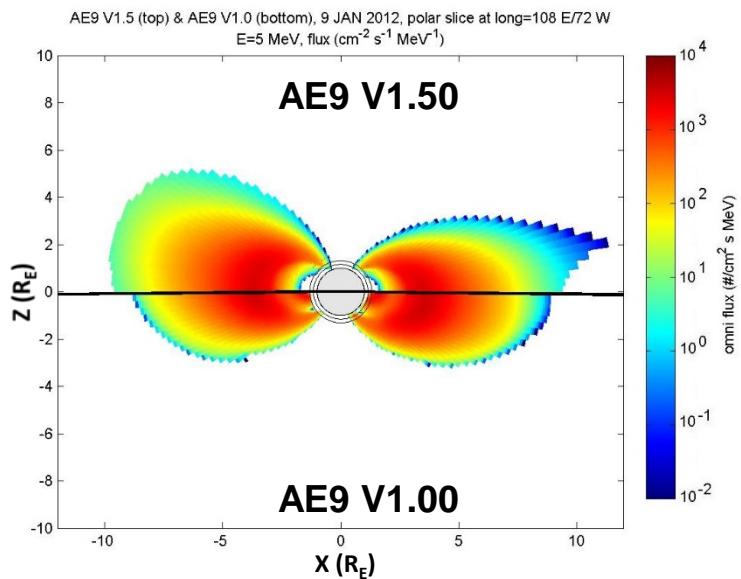


## 2 MeV electrons, AE9V1.50-to-AE9V1.0 ratio

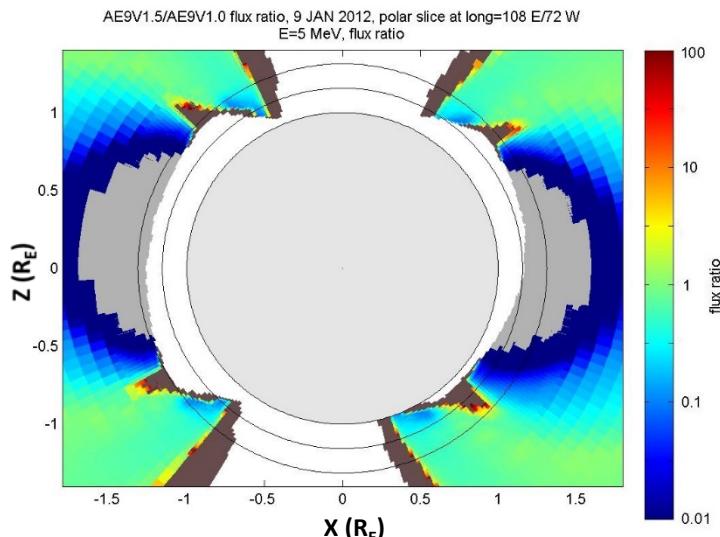
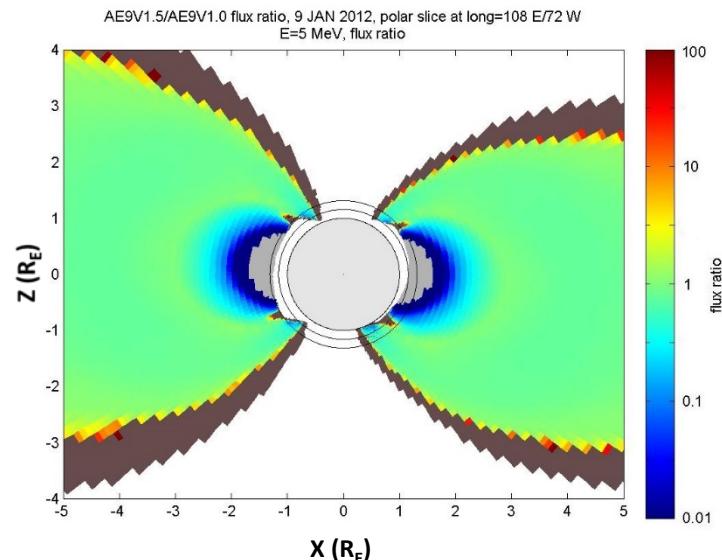
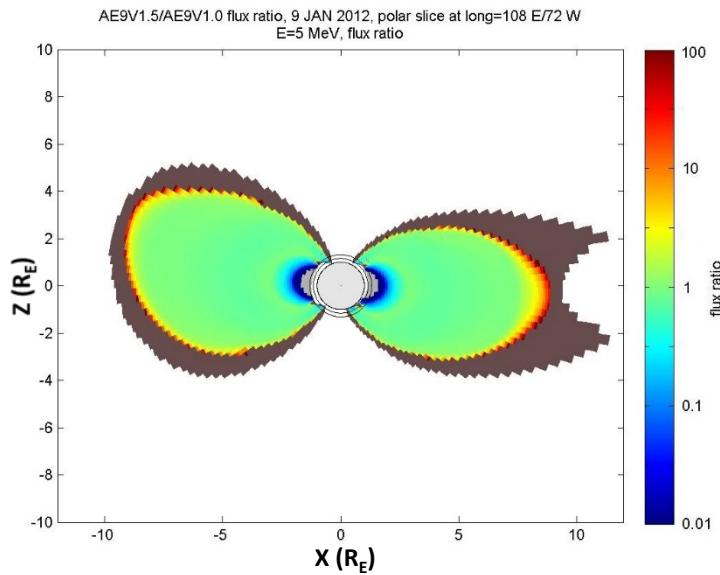


Distribution A

# 5 MeV electrons



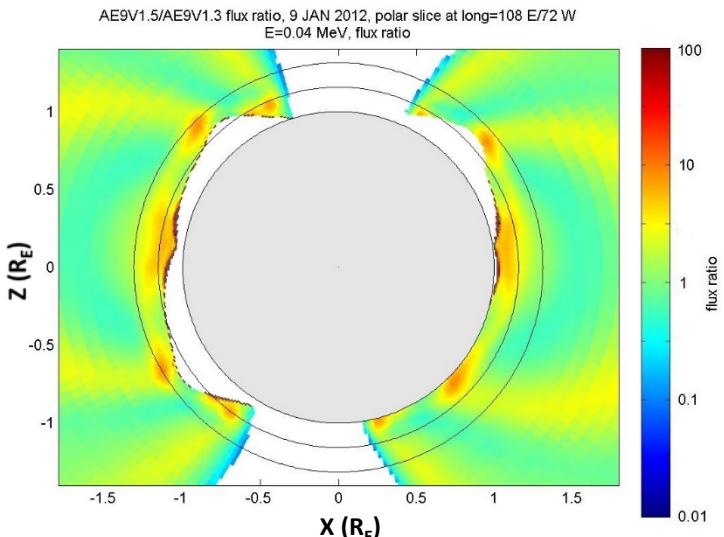
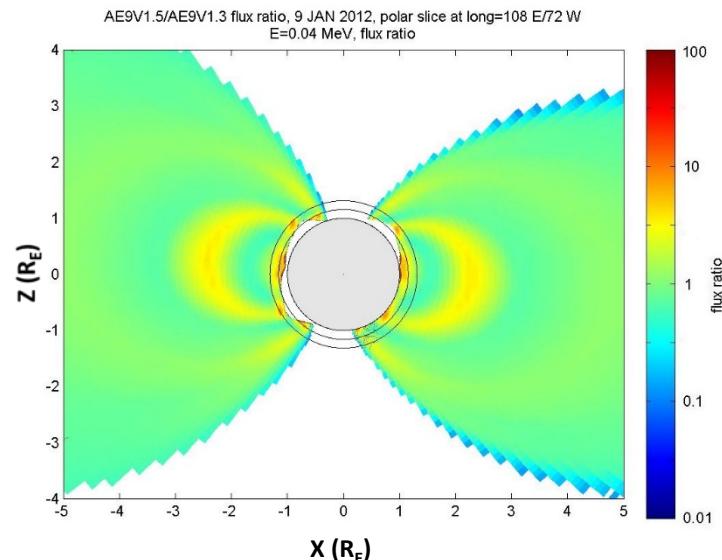
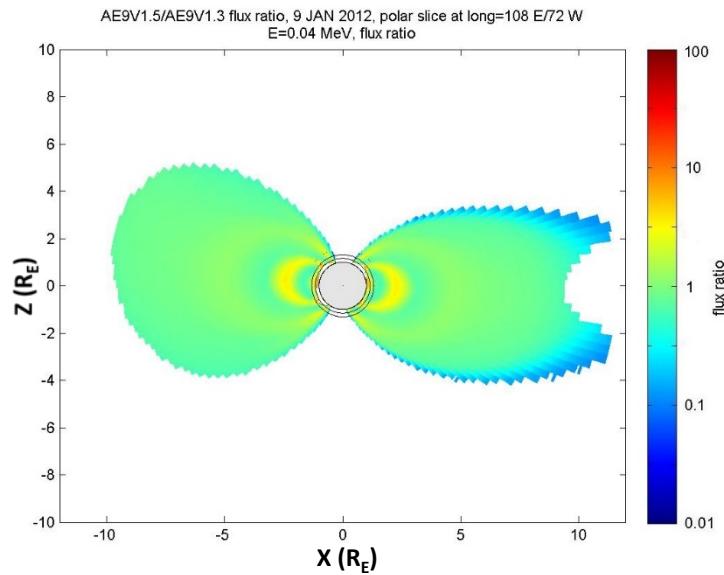
# 5 MeV electrons, AE9V1.50-to-AE9V1.0 ratio



Distribution A

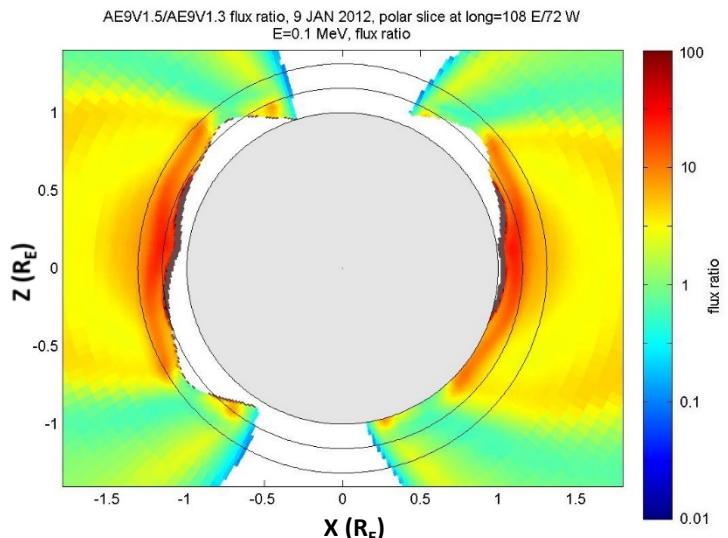
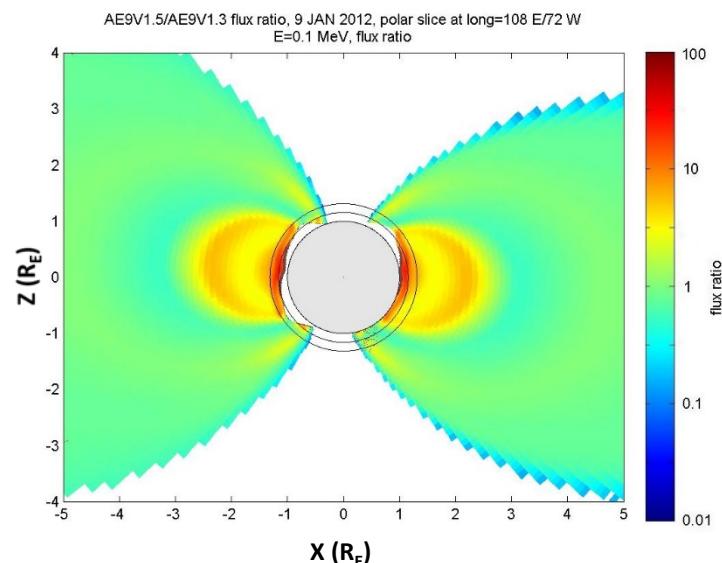
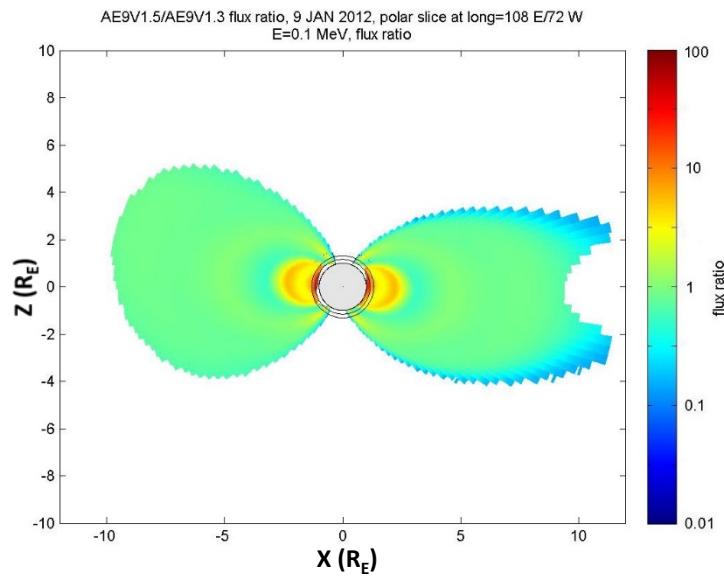
# **AE9 V1.50 vs. AE9 V1.3**

# 0.04 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



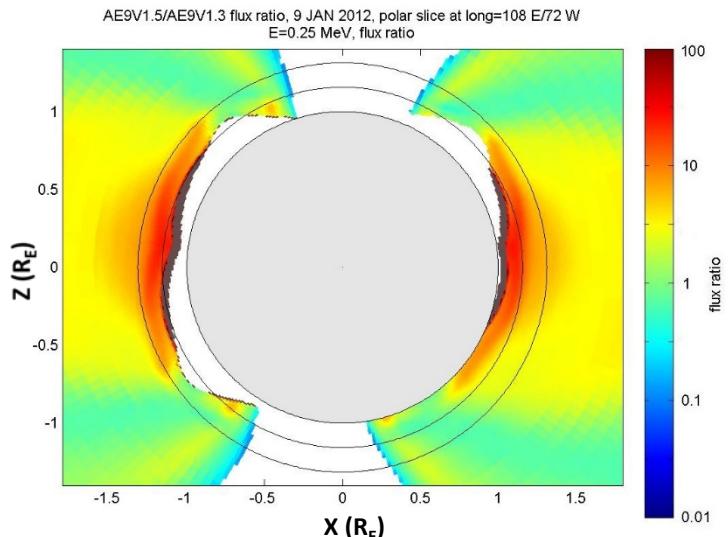
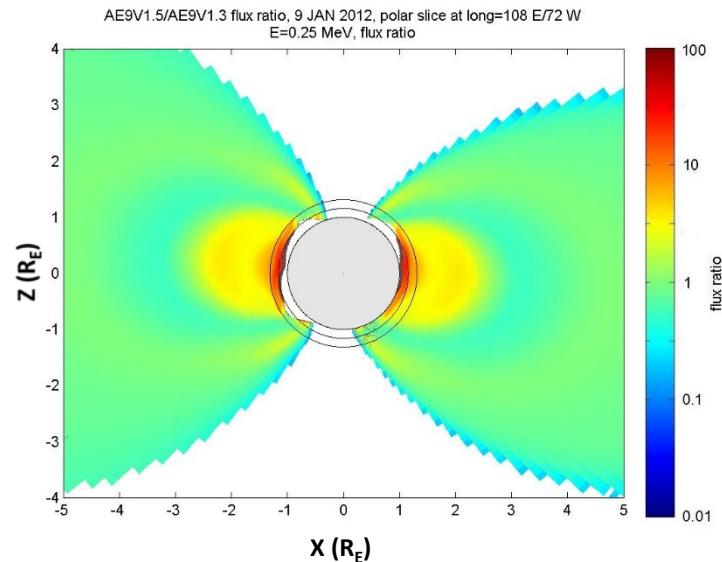
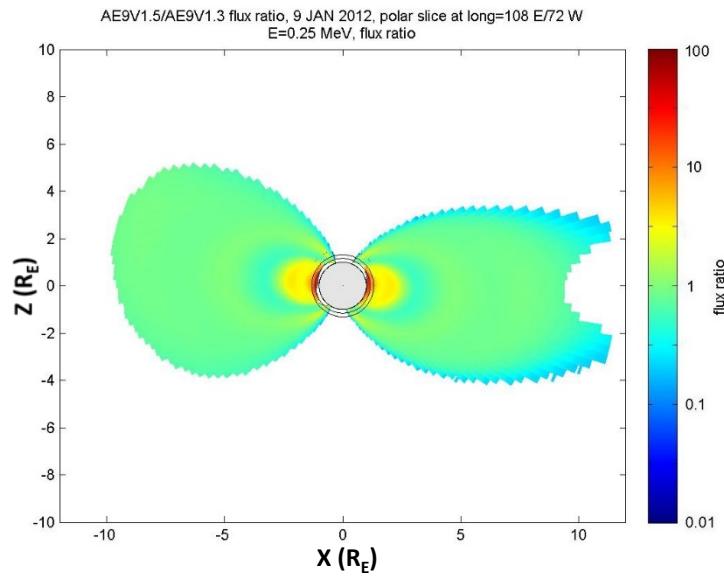
Distribution A

# 0.1 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



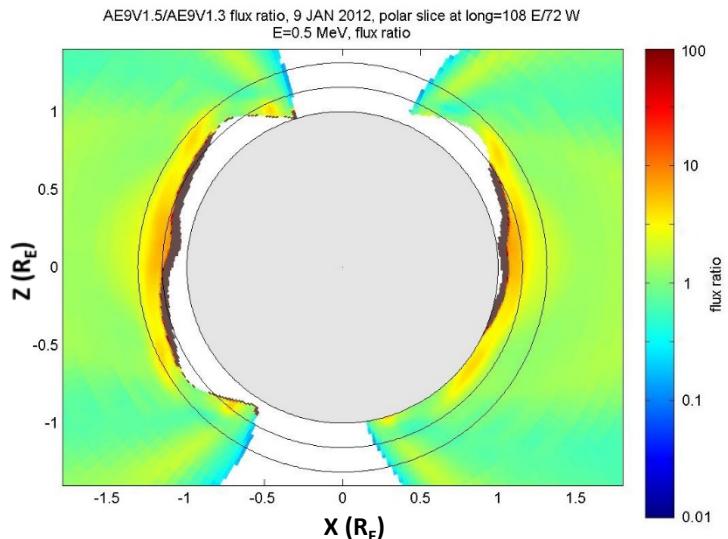
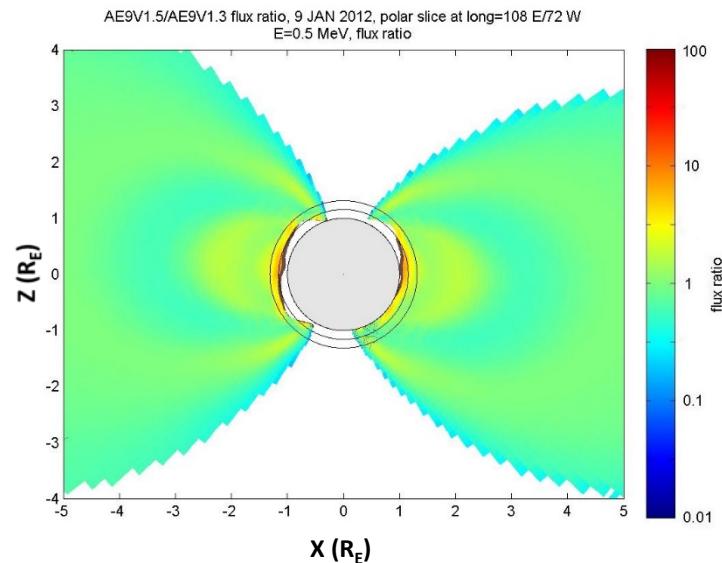
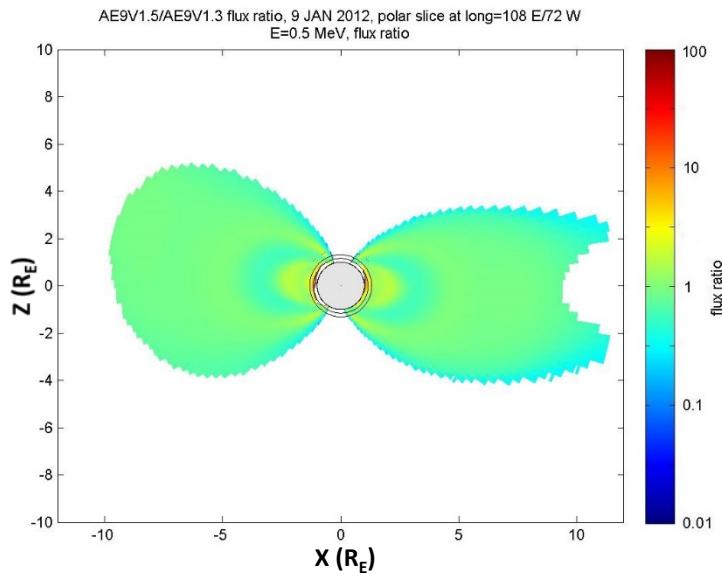
Distribution A

# 0.25 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



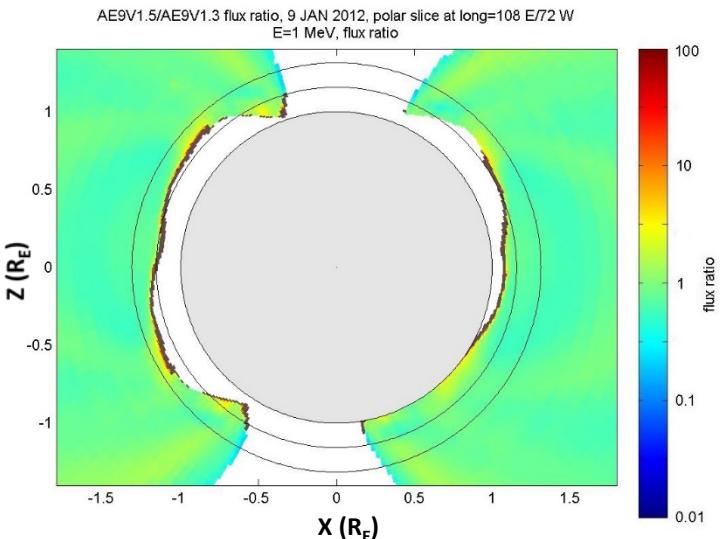
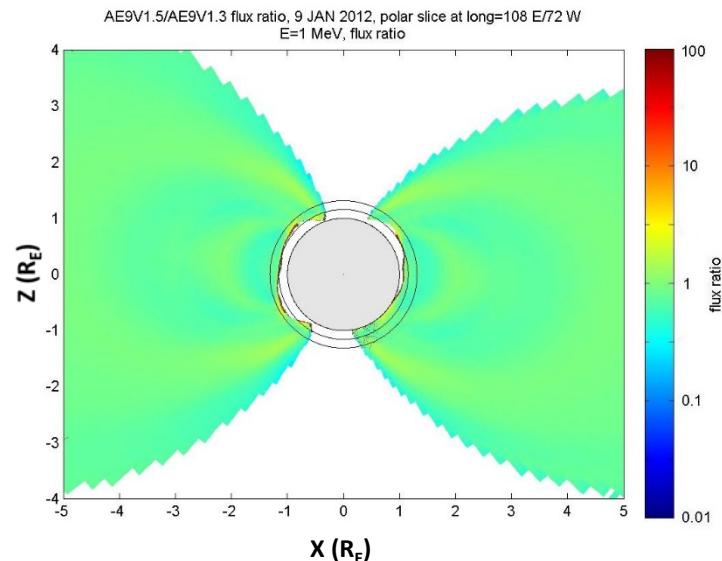
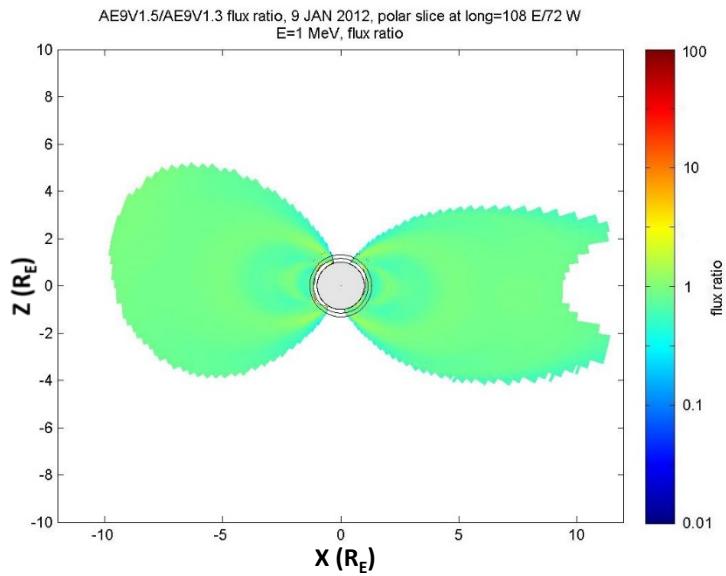
Distribution A

# 0.5 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



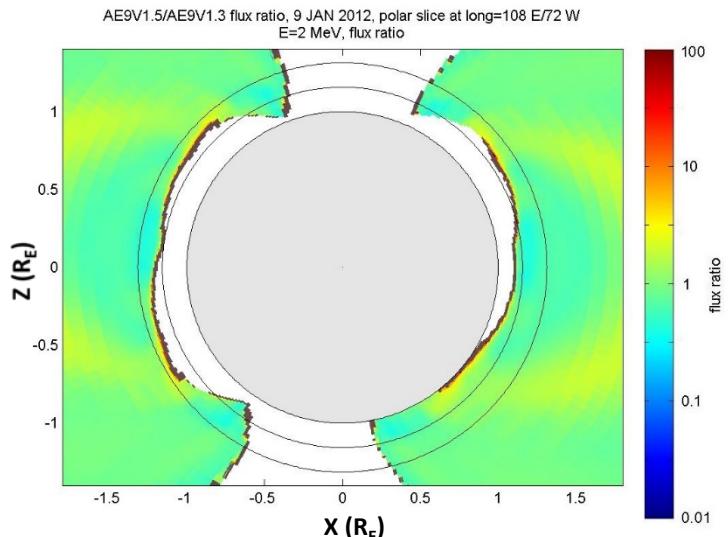
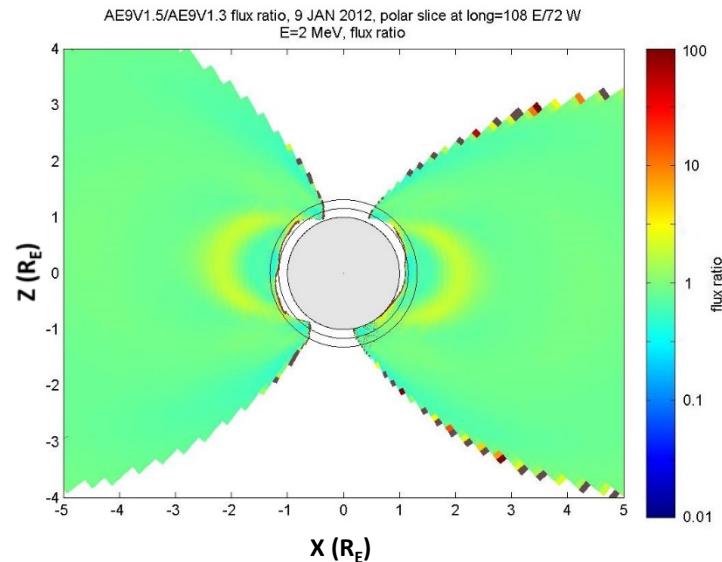
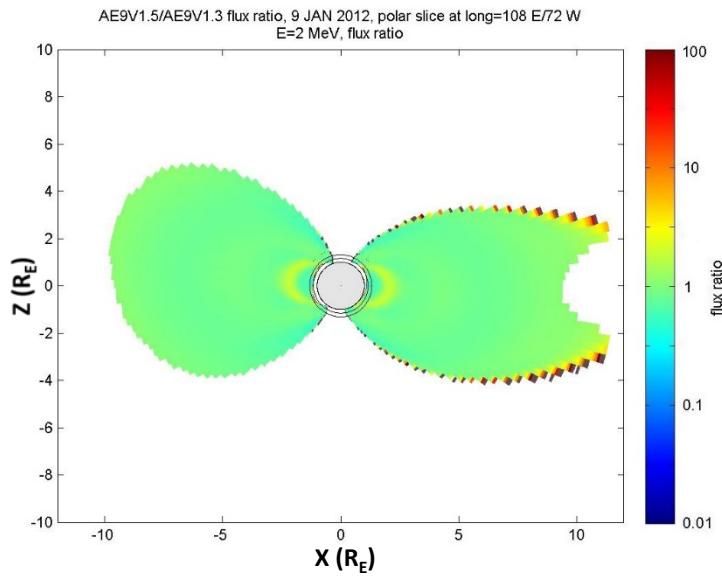
Distribution A

# 1 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



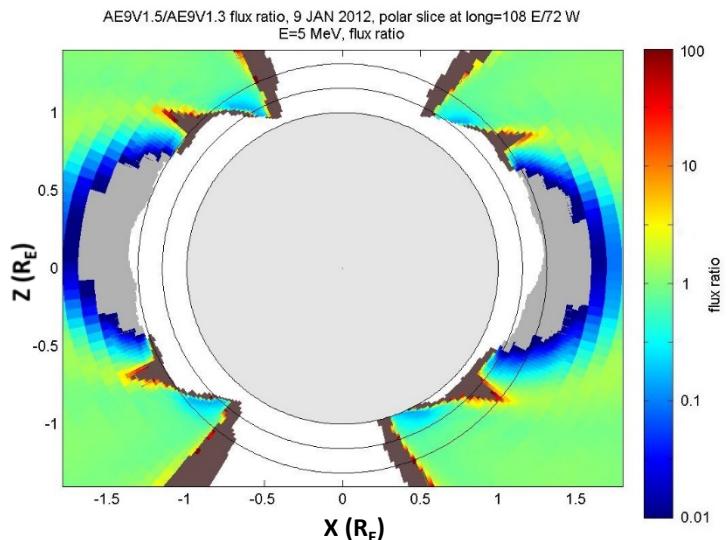
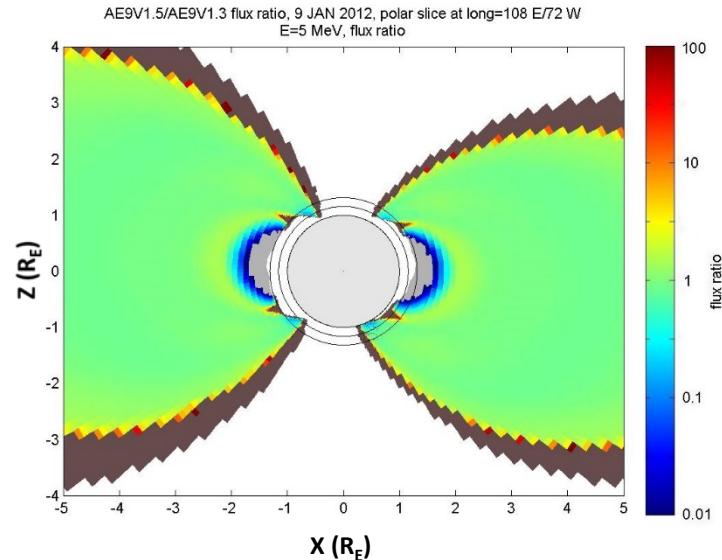
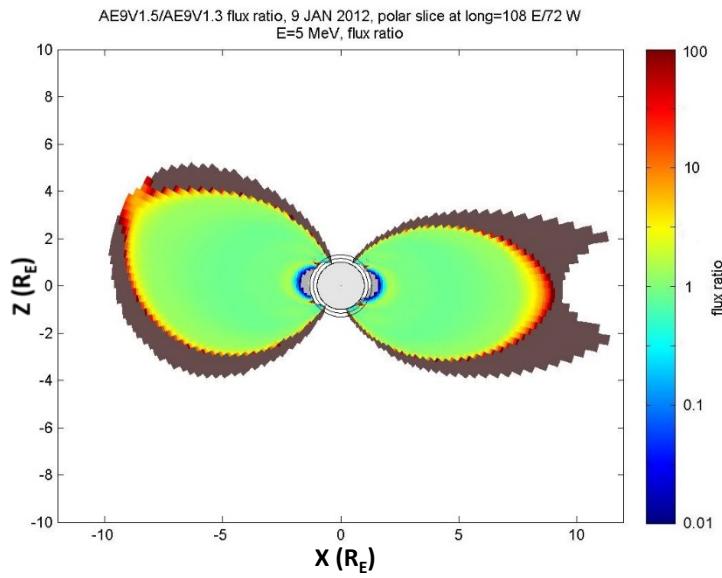
Distribution A

## 2 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



Distribution A

# 5 MeV electrons, AE9V1.50-to-AE9V1.3 ratio



Distribution A

# AE9 profiles in $L_m$

