



# Air Force Research Laboratory



**Integrity ★ Service ★ Excellence**



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

## AE9/AP9 V1.20.002 Model Comparison Summary Report: Standard Orbit Comparisons

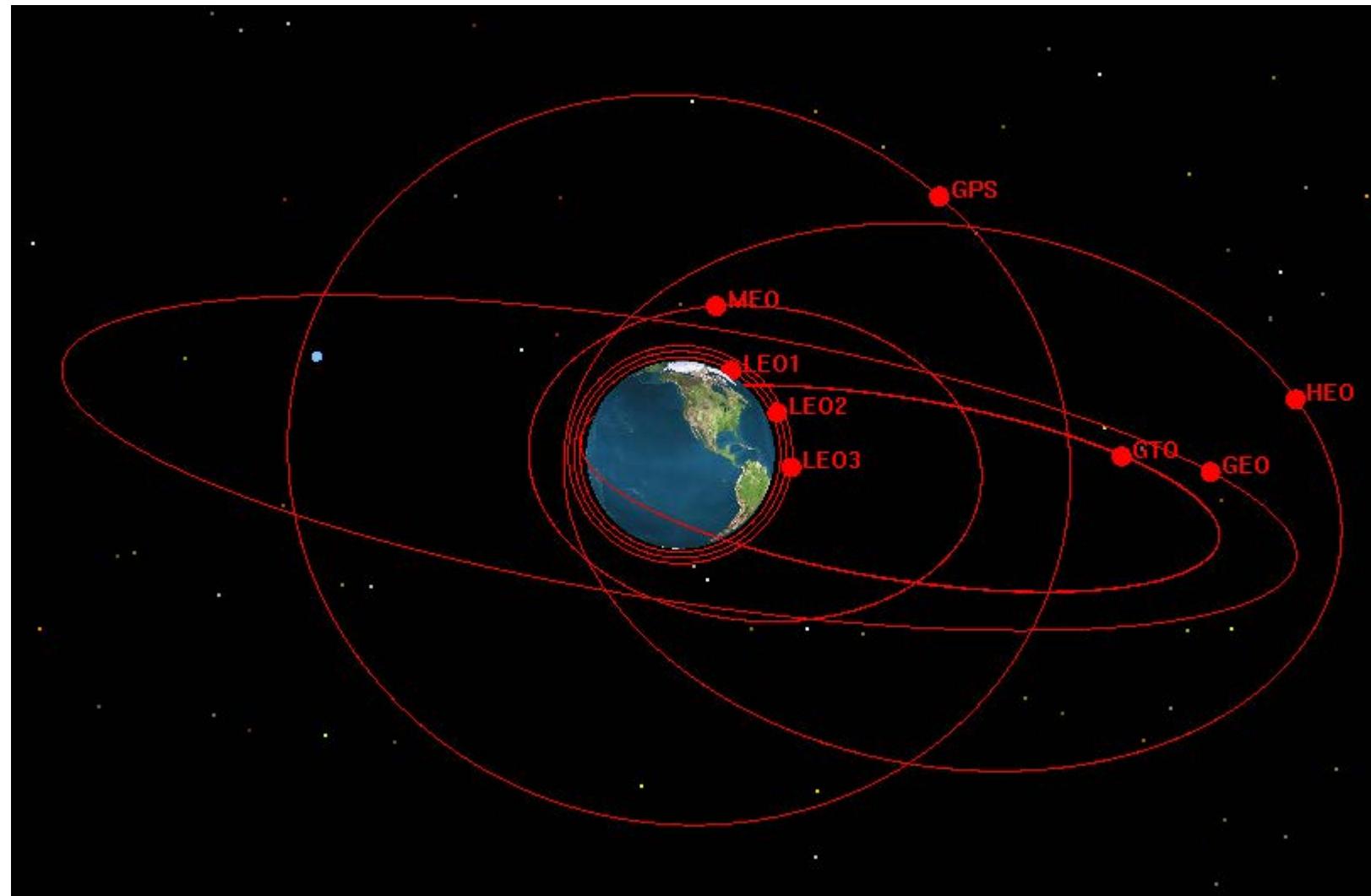
10 December 2014

**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.



# AE9/AP9/SPM Comparison to Other Models



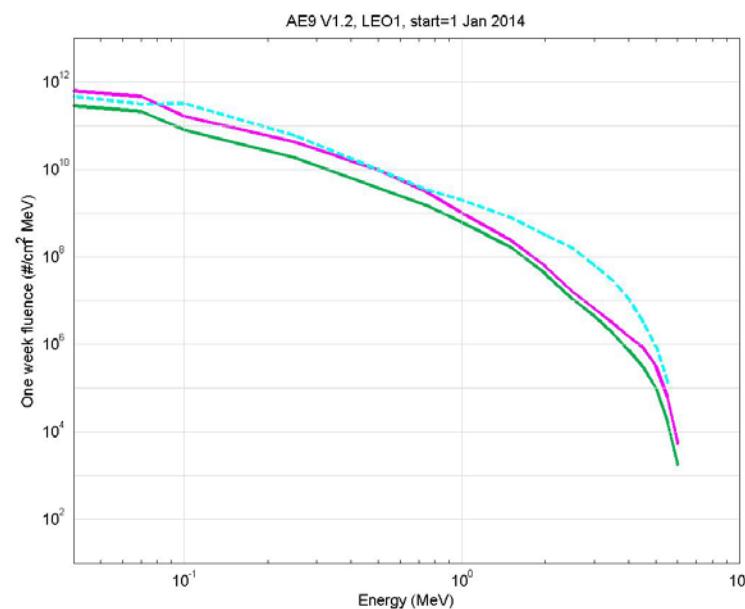
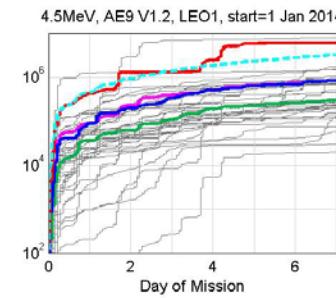
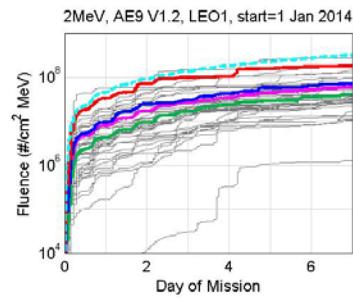
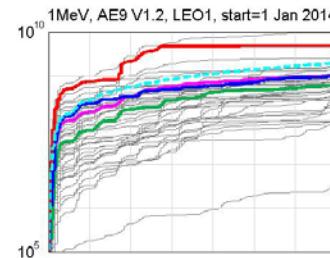
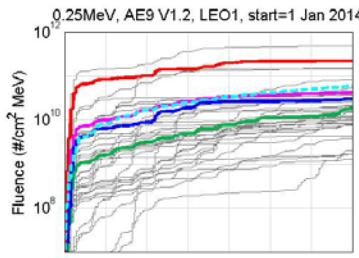
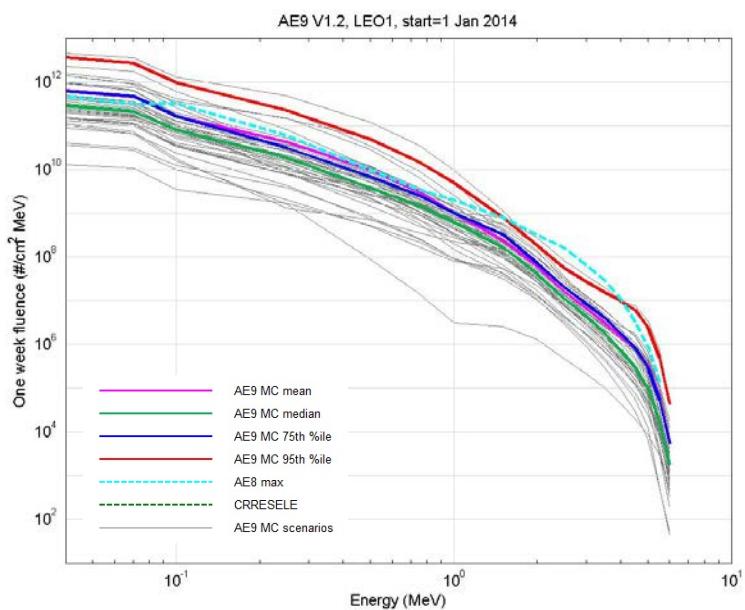
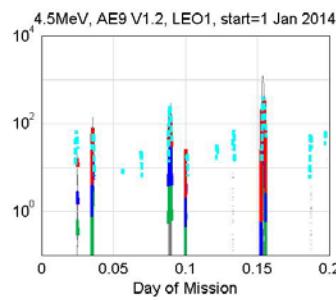
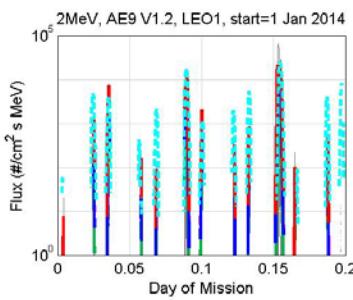
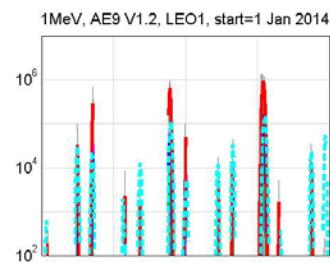
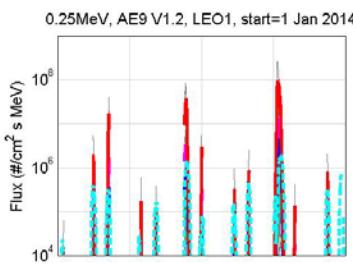
Orbit	Apogee (km)	Perigee (km)	Incl. (deg)	Models Compared
LEO-1	400	400	90.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
LEO-2	800	800	90.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
LEO-3	1200	1200	90.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
GTO	30600	500	10.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
HEO	38900	1475	63.4	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
MEO	14100	3900	120.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
GPS	20200	20200	55.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE
GEO	35786	35786	0.0	AP8, AE8, CRRESELE, CRRESPRO, CAMMICE, LANL-2007, IGE-2006

- All scenarios run for 2 weeks mission time
- AE9/AP9 mean, perturbed mean (40 scenarios) and Monte-Carlo (40 scenarios) computed
- SPMH/SPMHE/SPMO/SPME mean and perturbed mean (40 scenarios) computed
- Summarized in this set of charts:
  - AP9/AE9 - Monte-Carlo flux and fluence vs time; Monte-Carlo and mean spectra
  - SPM – Perturbed mean flux and fluence vs time; perturbed mean and mean spectra

# **LEO1**

**AE9**

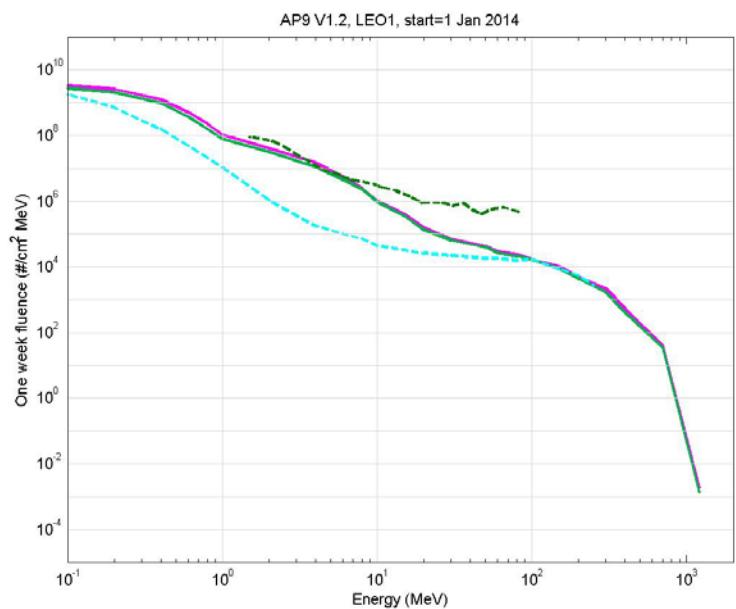
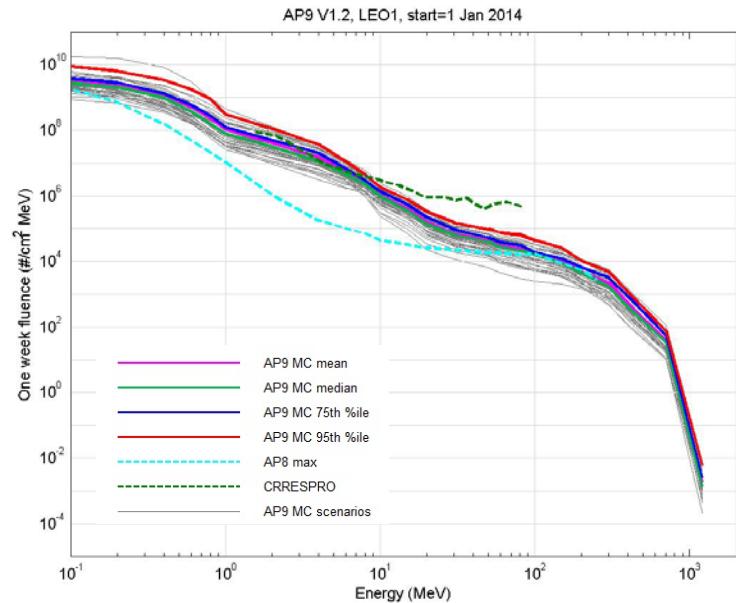
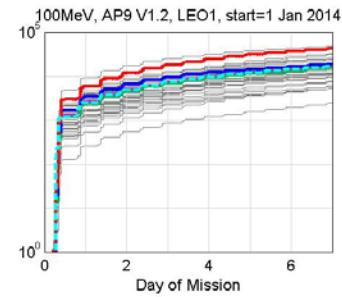
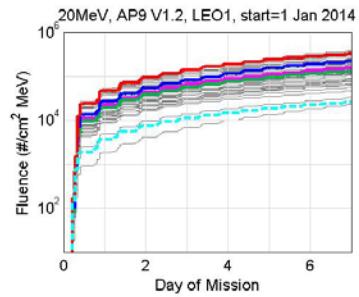
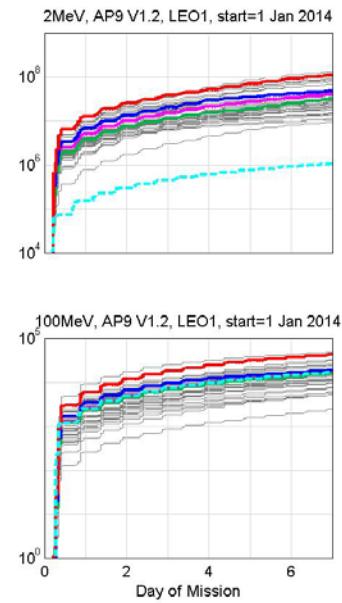
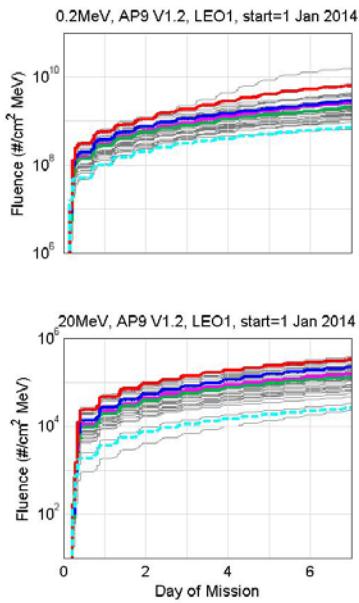
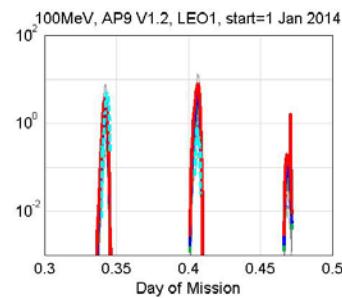
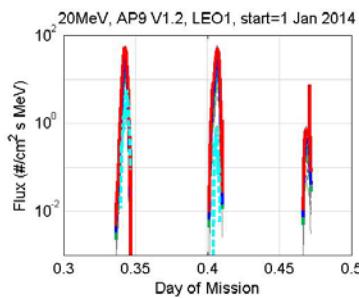
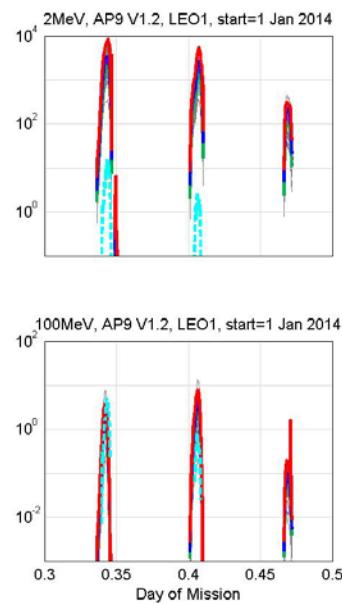
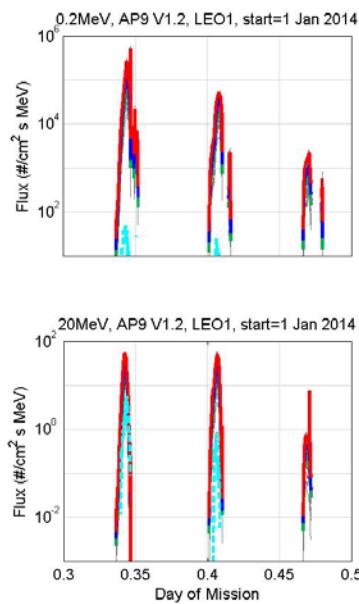
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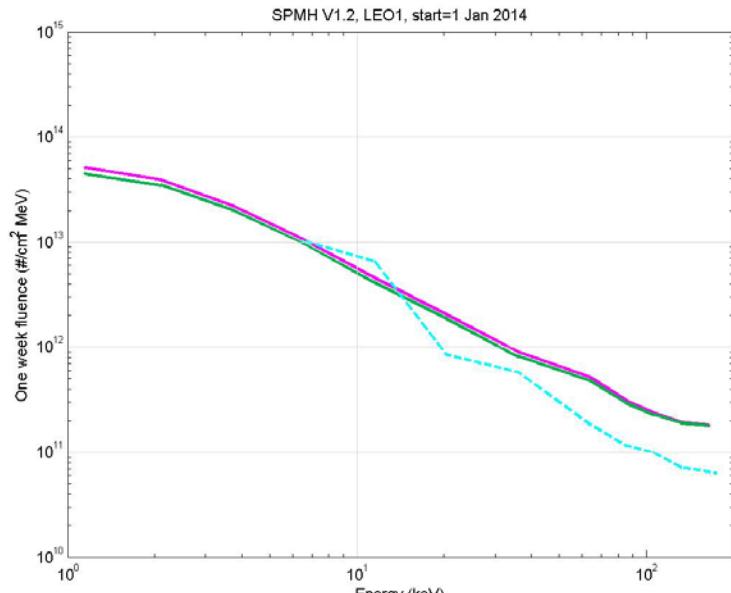
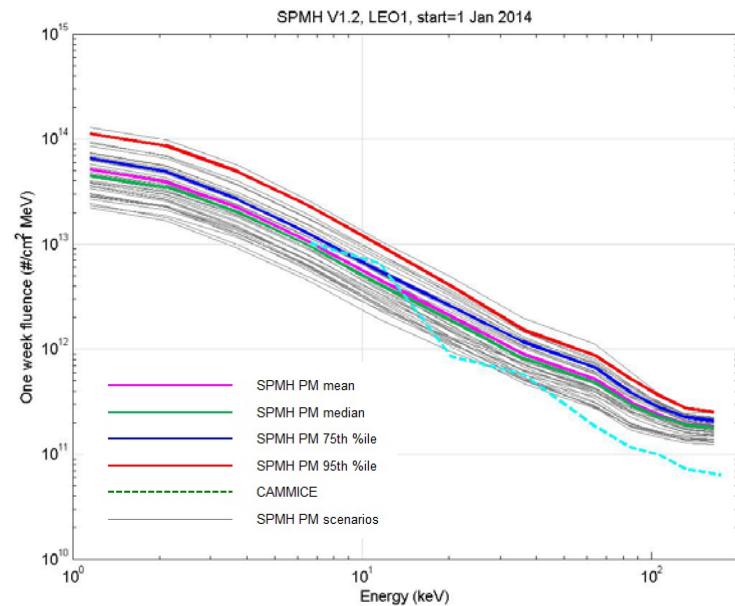
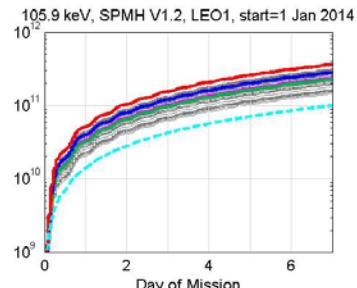
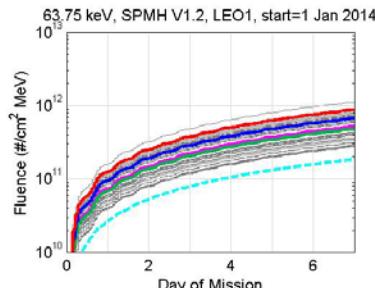
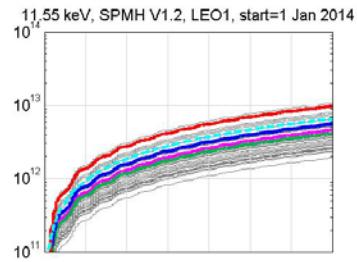
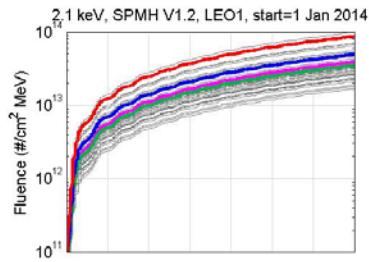
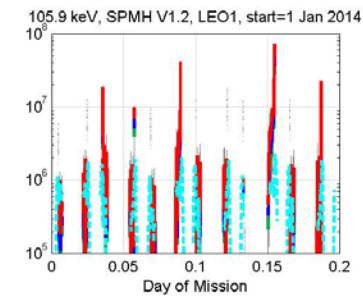
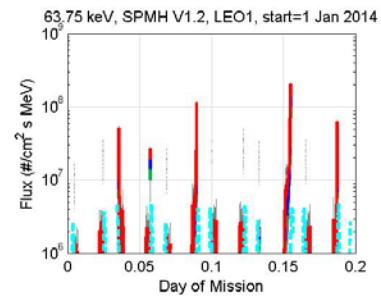
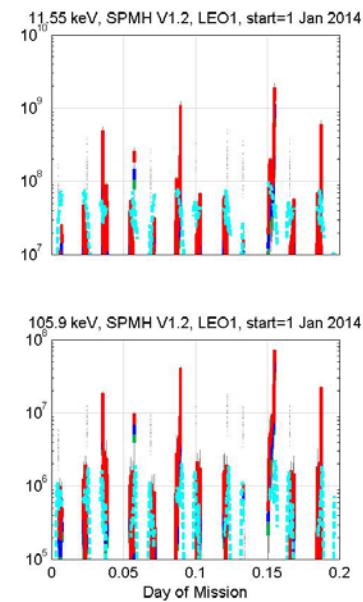
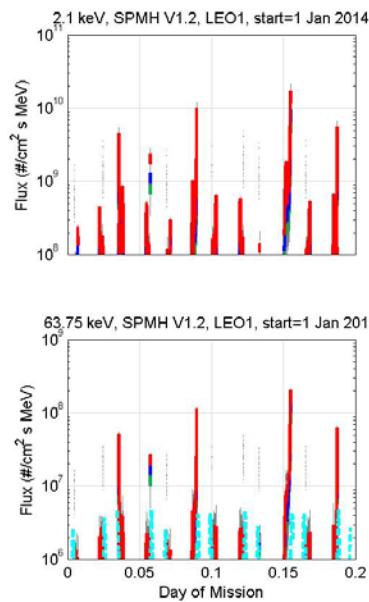
Distribution A: Approved for public release; distribution unlimited.

**AP9**

# LEO1 (400 km circular, 90 deg)

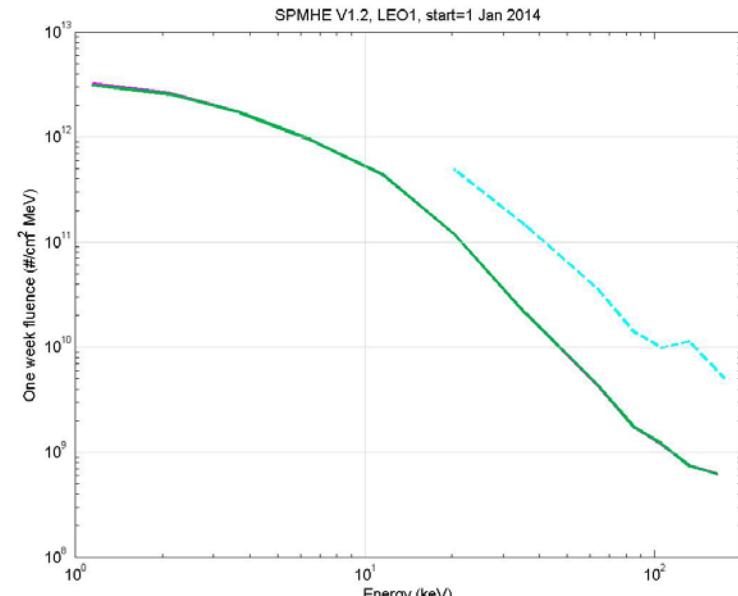
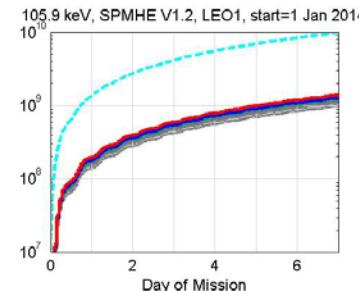
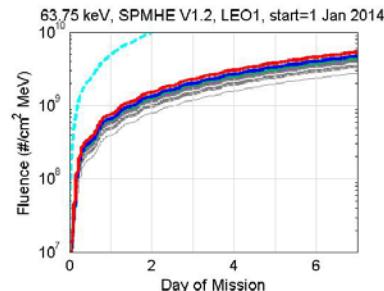
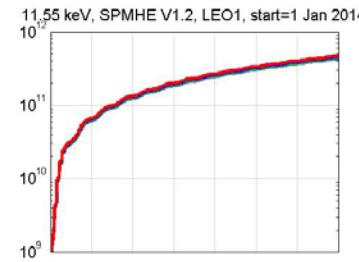
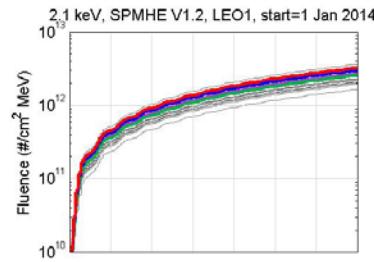
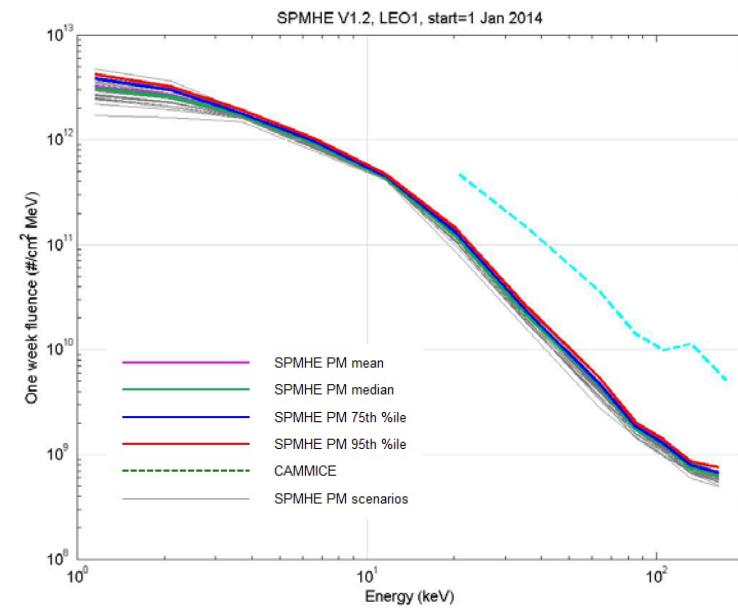
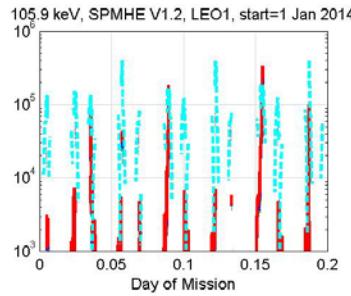
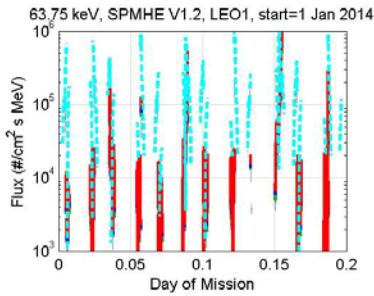
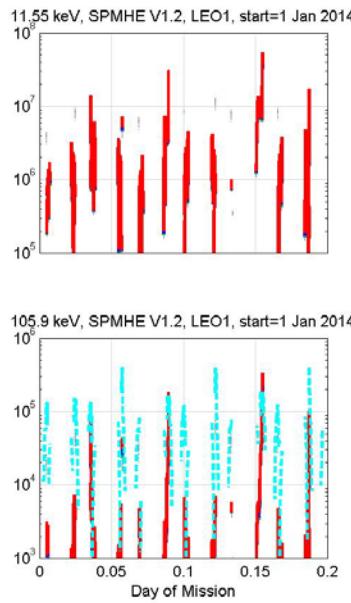
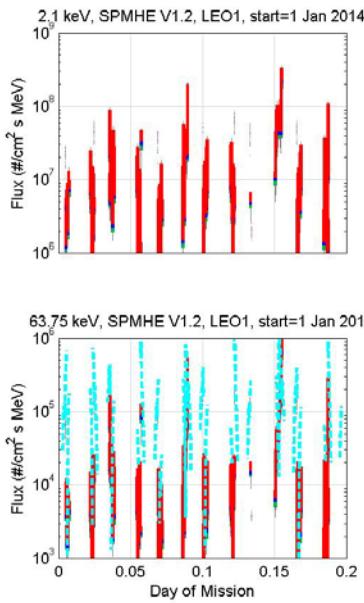


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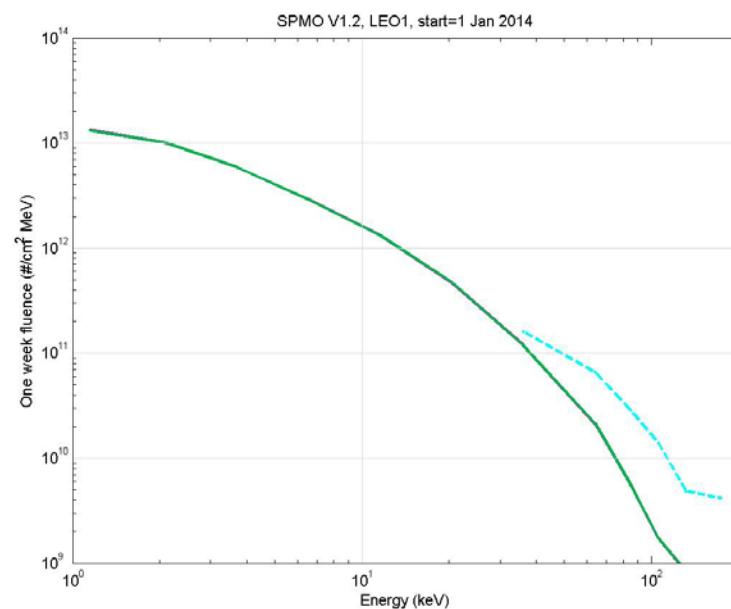
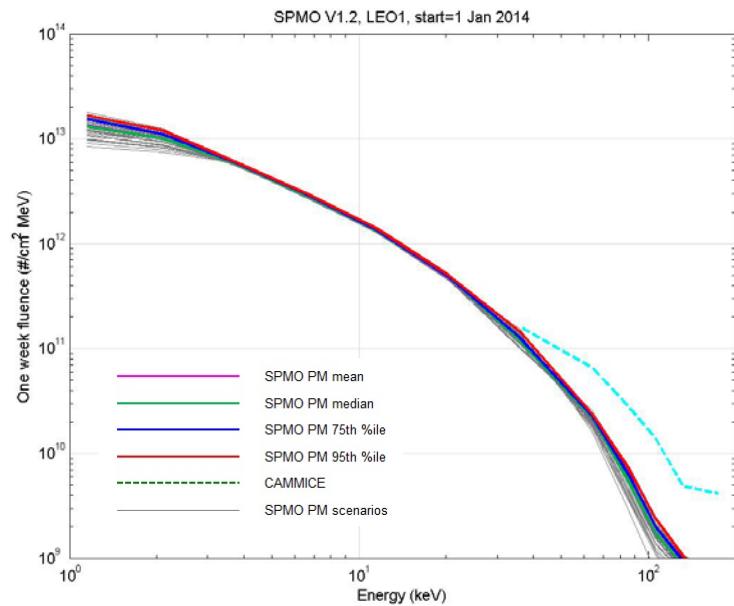
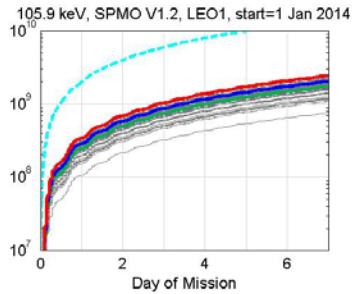
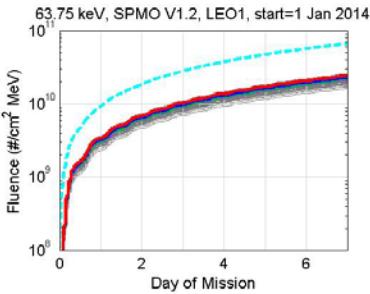
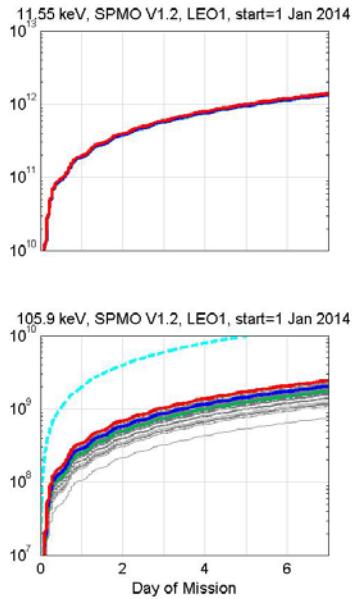
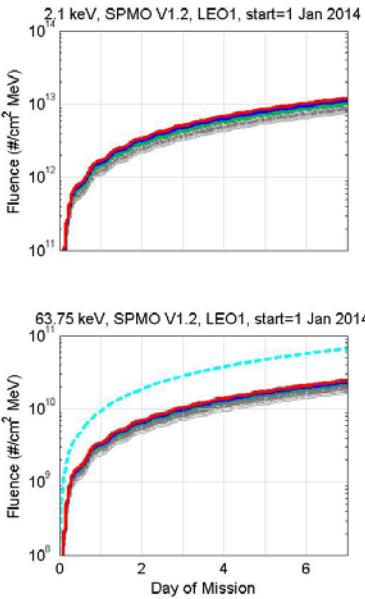
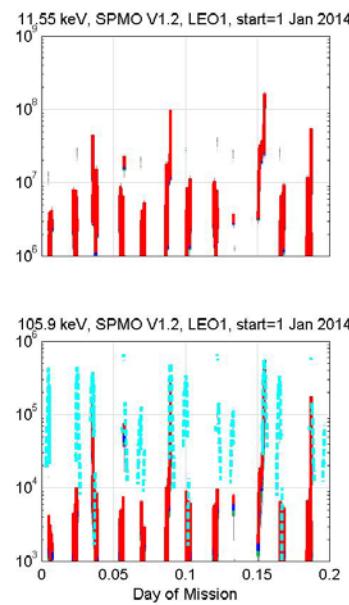
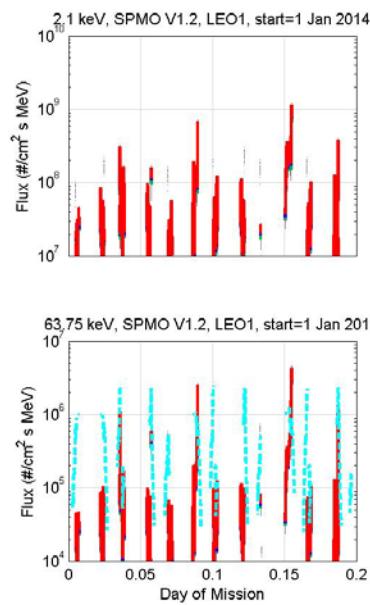
**SPMH****LEO1 (400 km circular, 90 deg)**

Distribution A: Approved for public release; distribution unlimited.

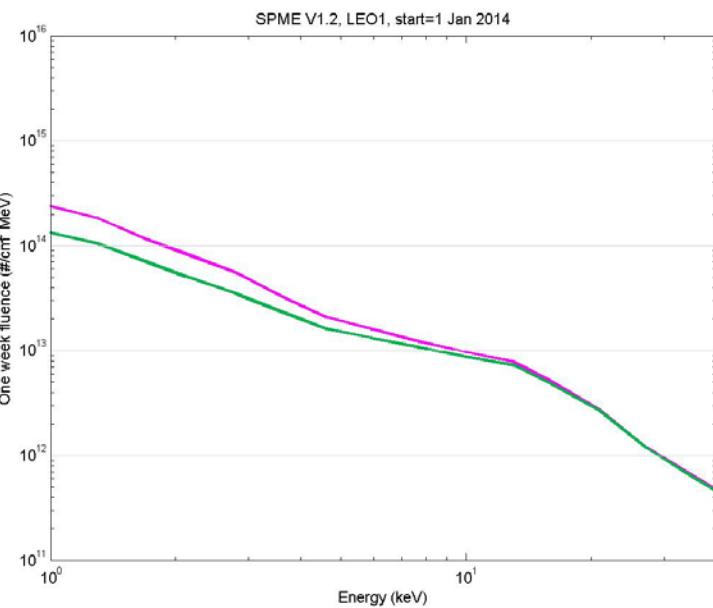
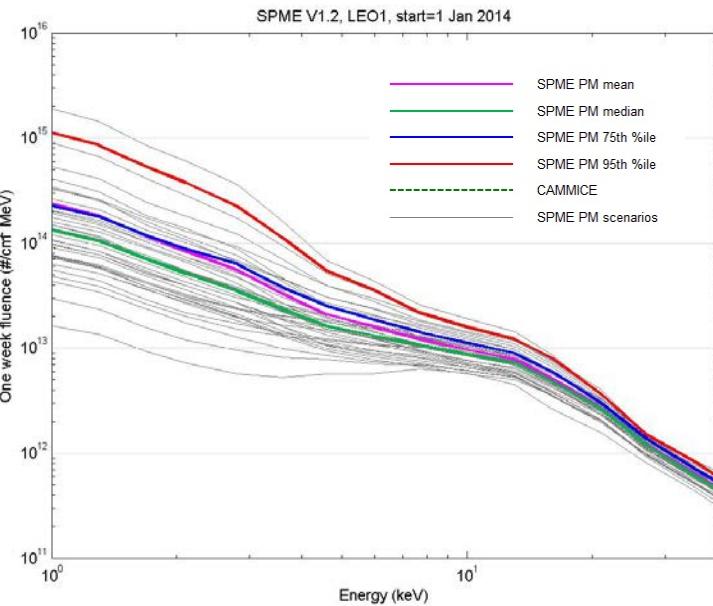
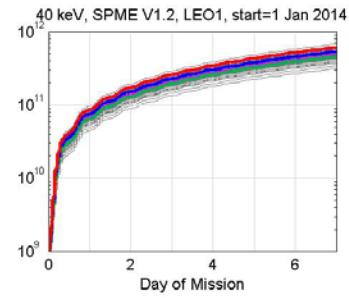
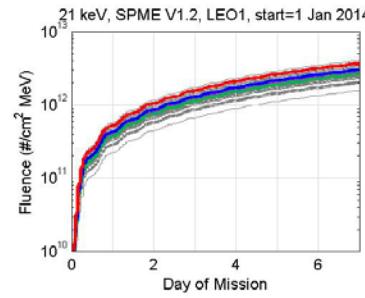
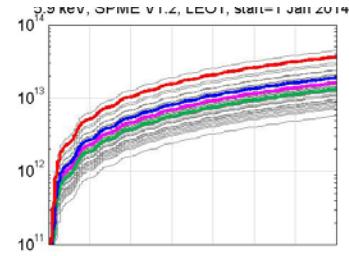
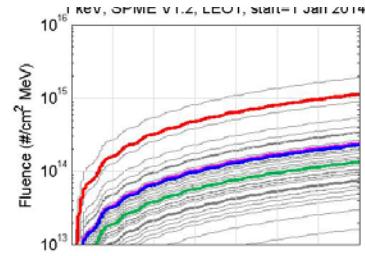
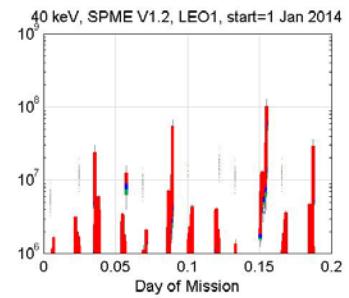
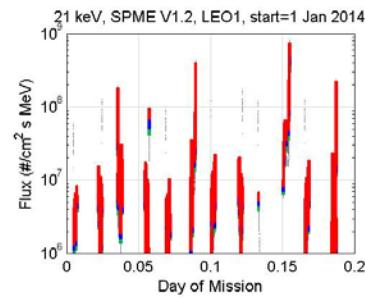
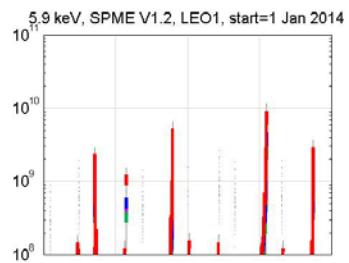
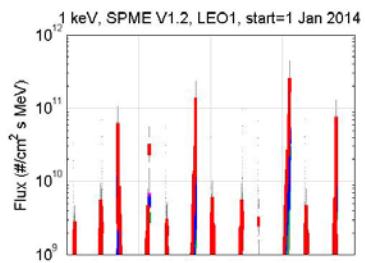
# SPMHE LEO1 (400 km circular, 90 deg)



Distribution A: Approved for public release; distribution unlimited.

**SPMO****LEO1 (400 km circular, 90 deg)**

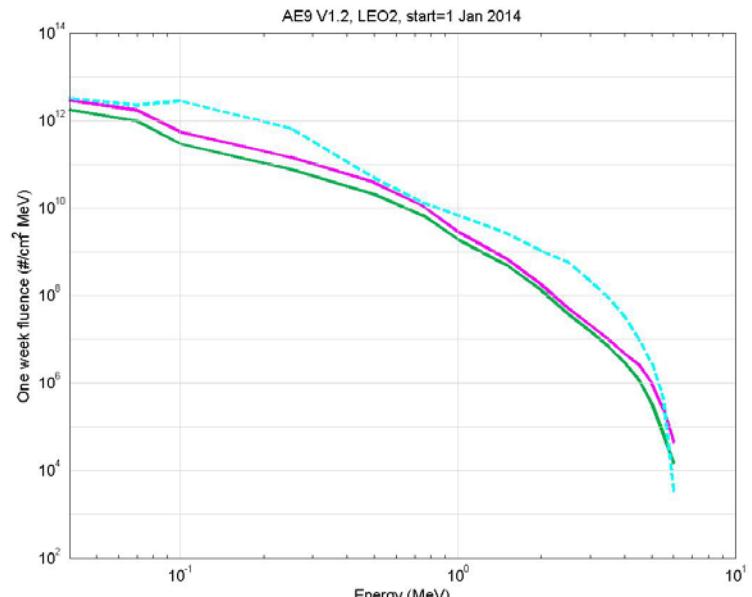
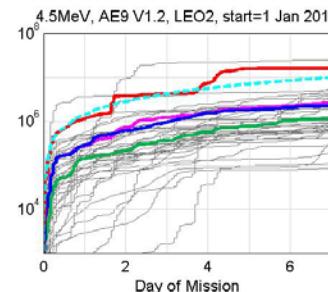
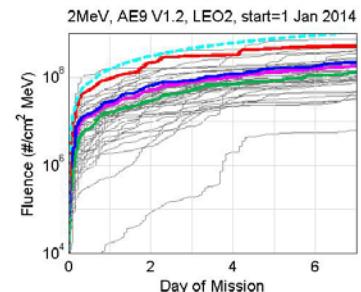
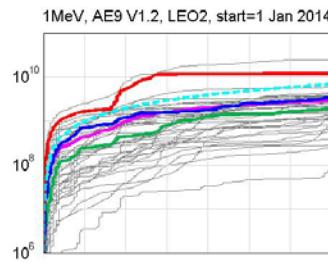
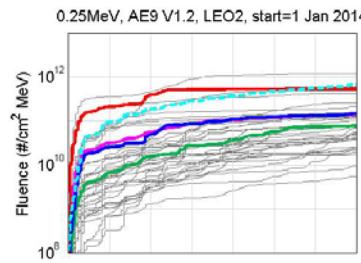
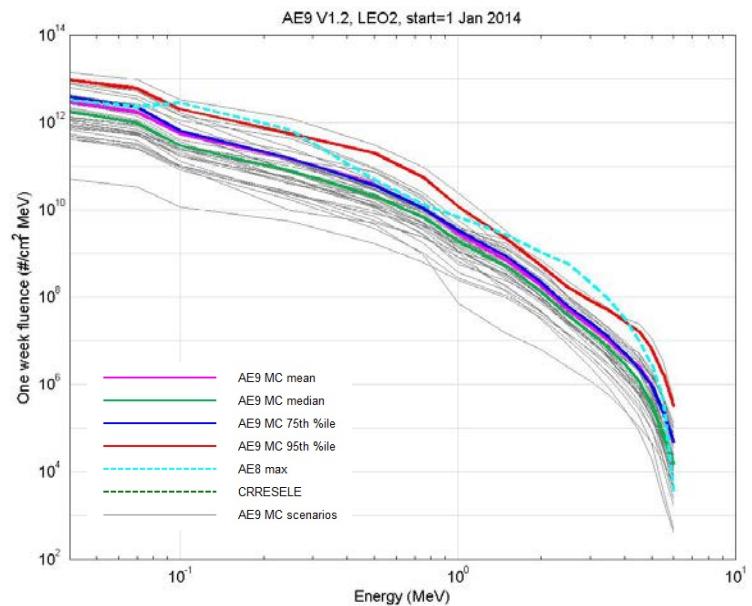
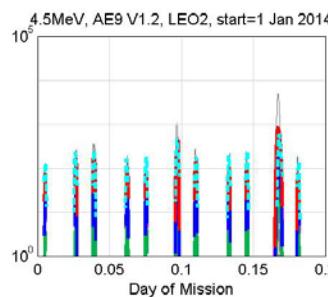
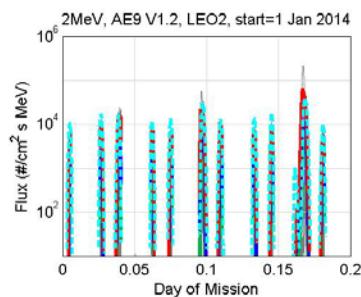
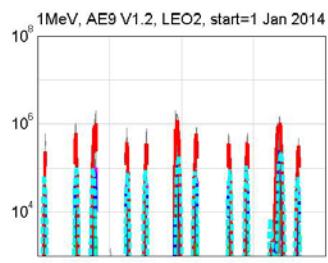
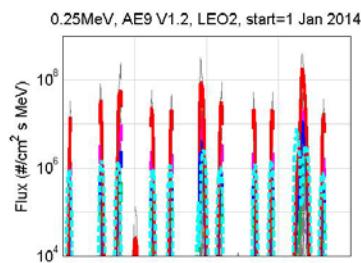
Distribution A: Approved for public release; distribution unlimited.

**SPME****LEO1 (400 km circular, 90 deg)**

# **LEO2**

**AE9**

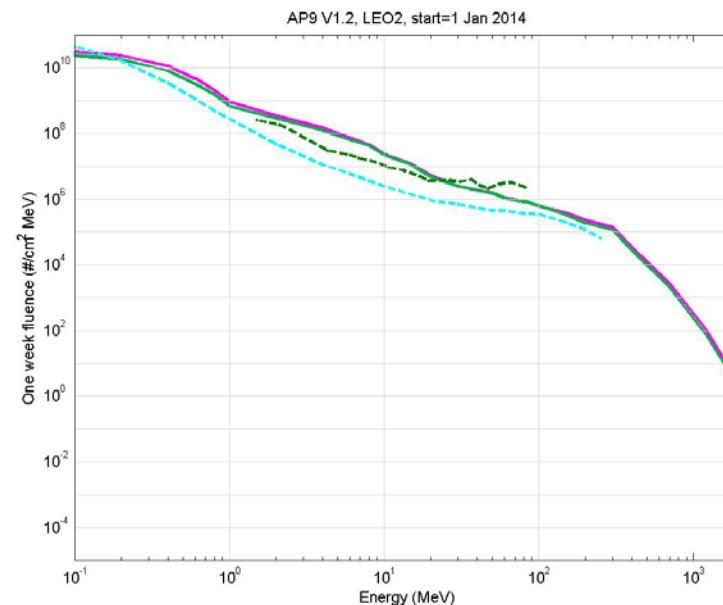
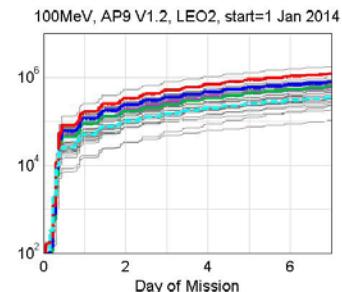
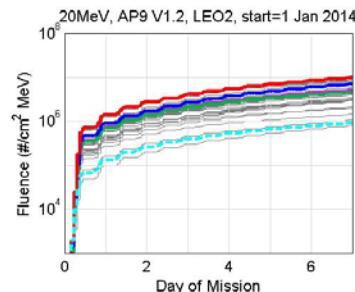
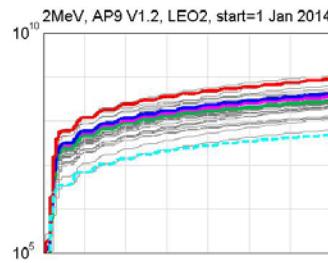
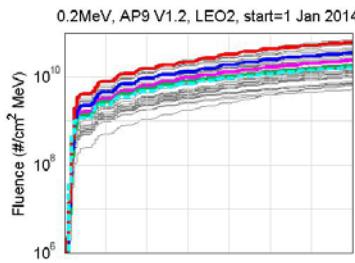
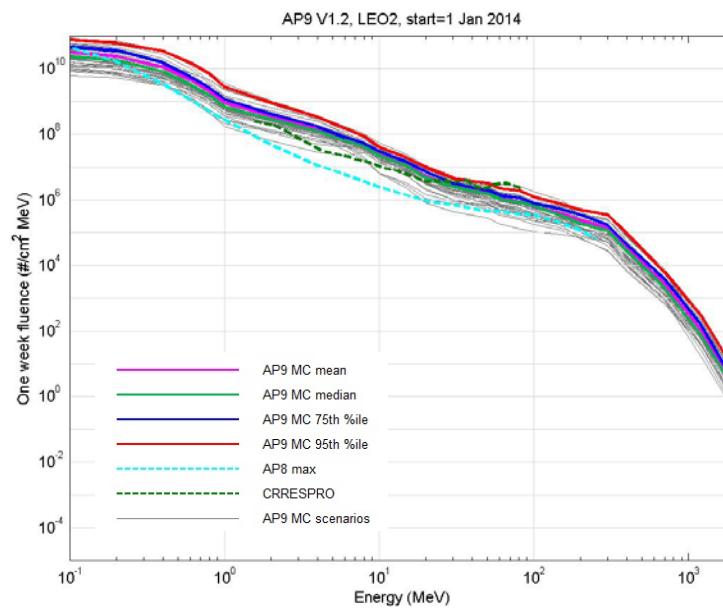
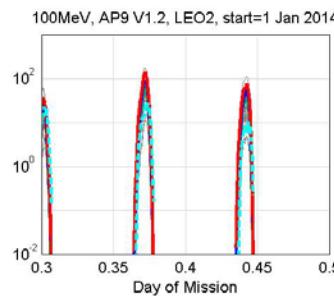
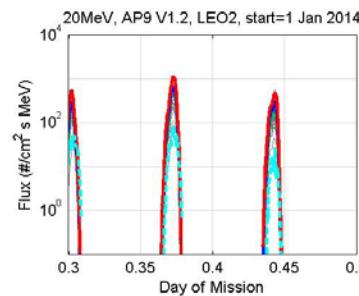
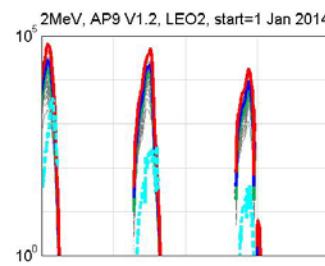
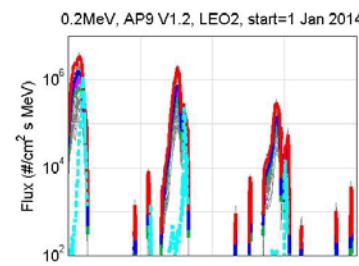
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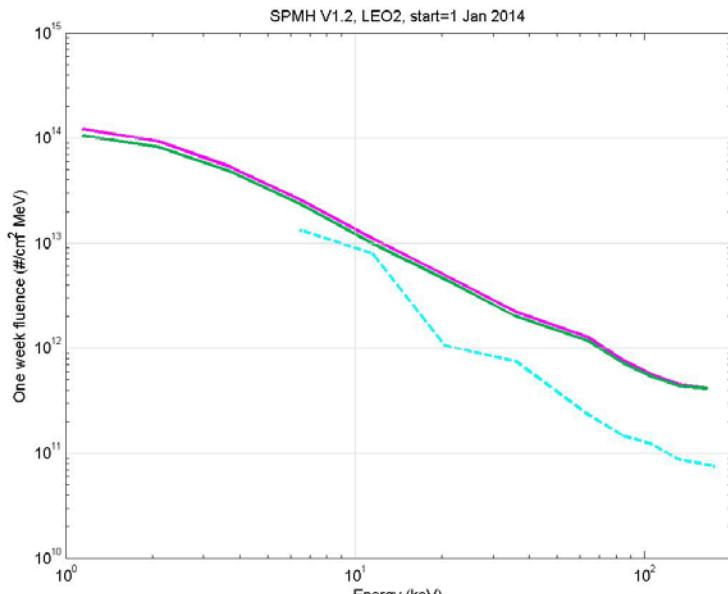
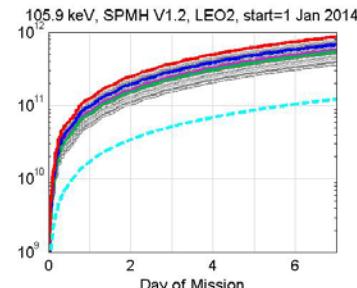
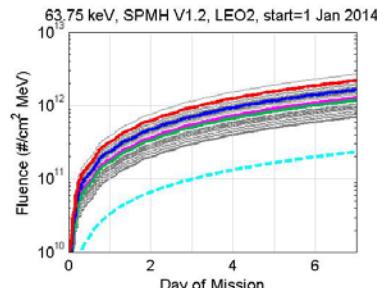
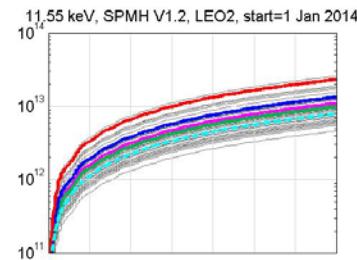
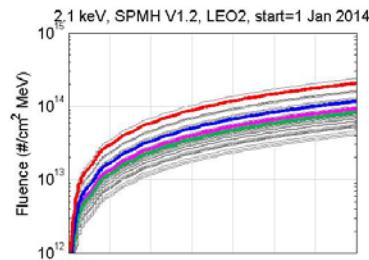
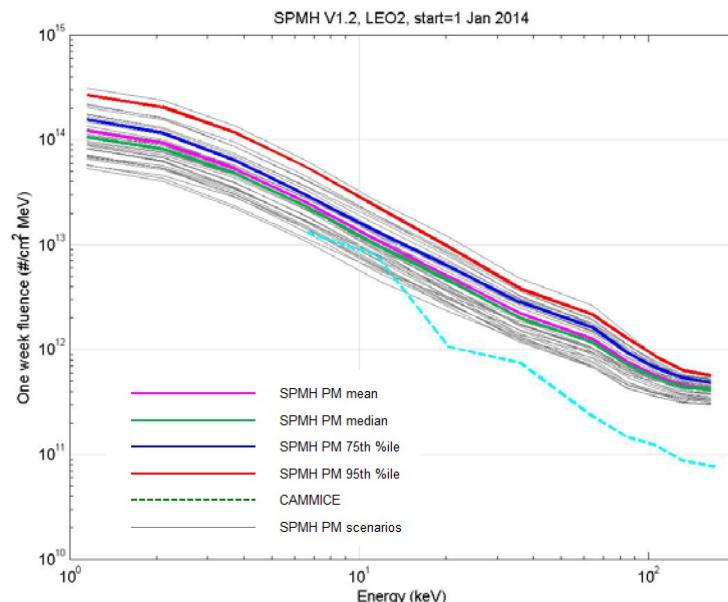
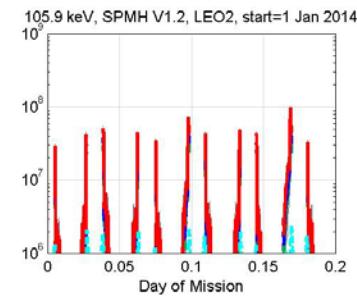
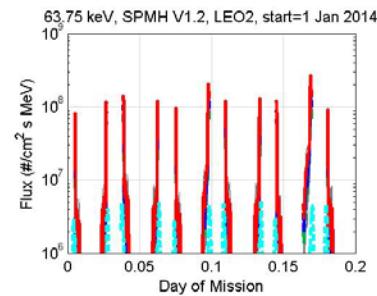
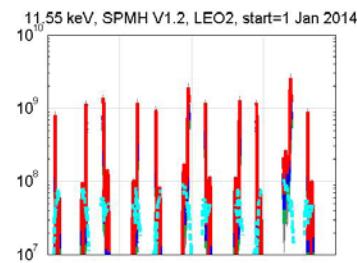
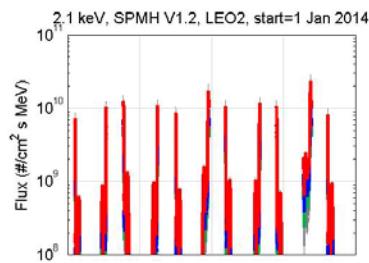
Distribution A: Approved for public release; distribution unlimited.

AP9

# LEO2 (800 km circular, 90 deg)

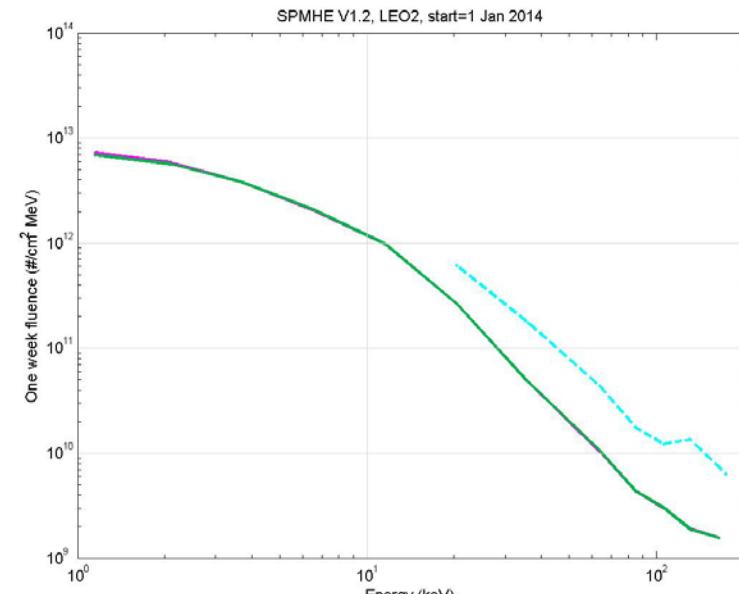
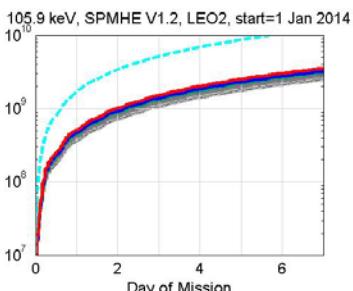
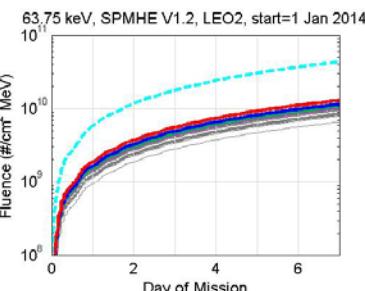
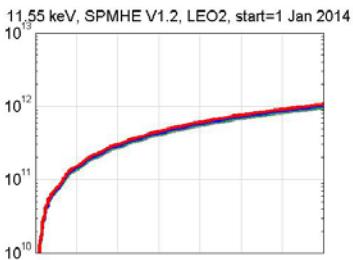
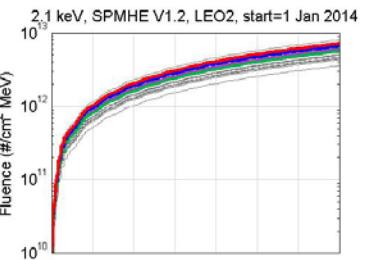
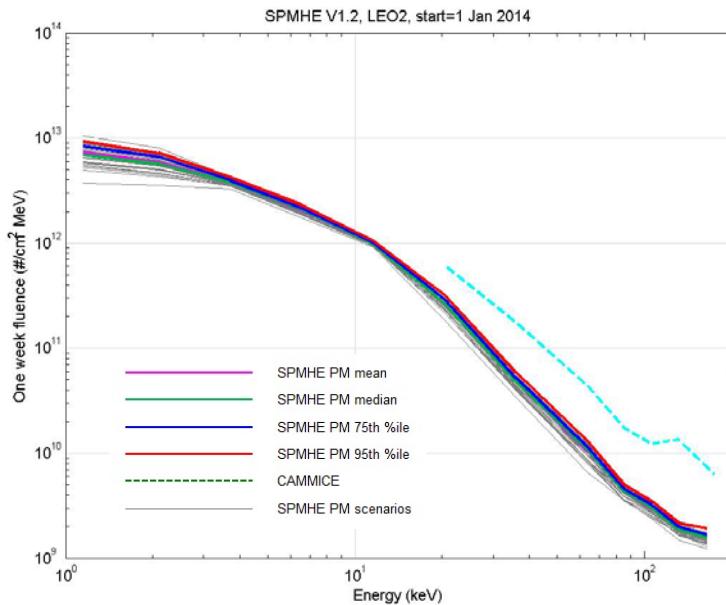
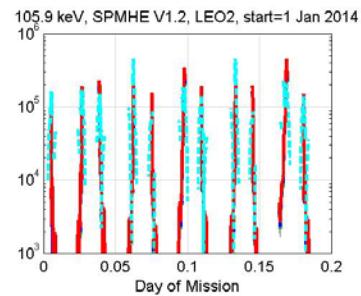
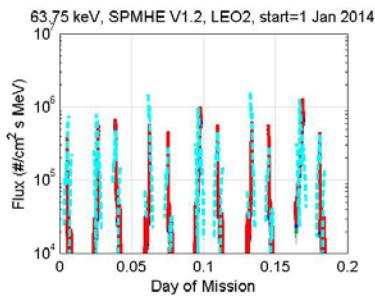
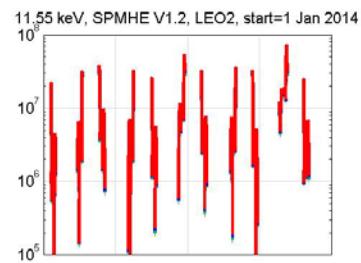
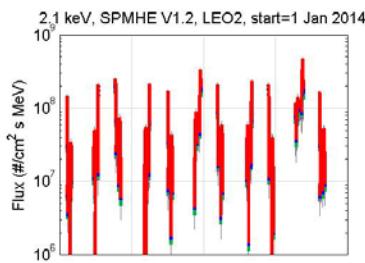


Distribution A: Approved for public release; distribution unlimited.

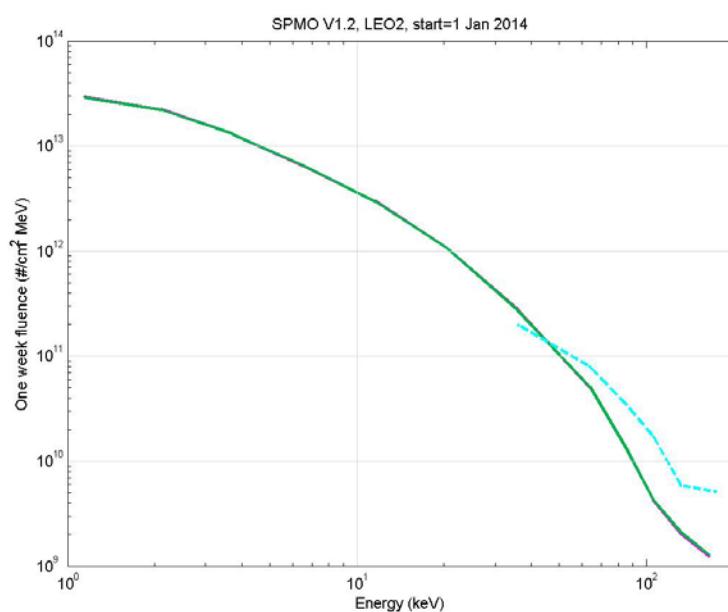
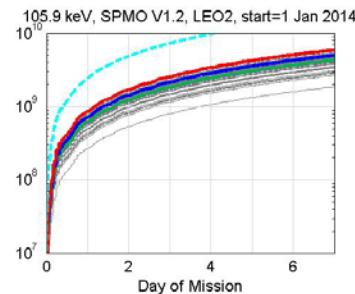
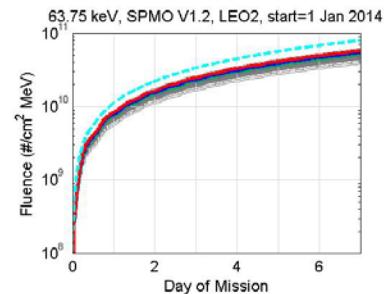
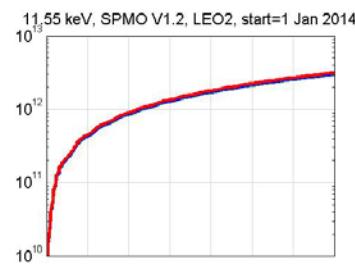
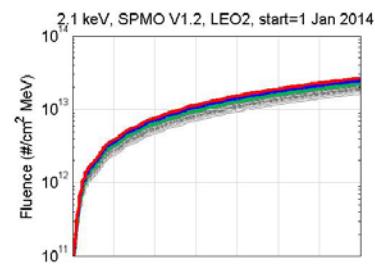
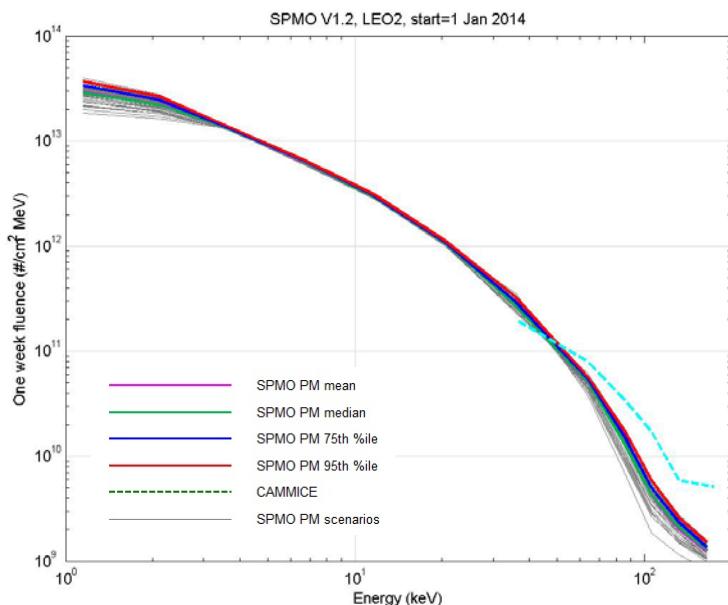
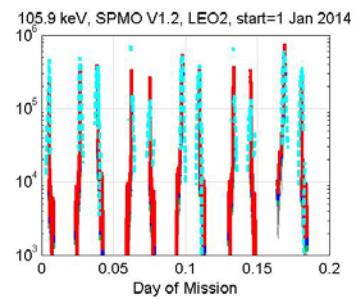
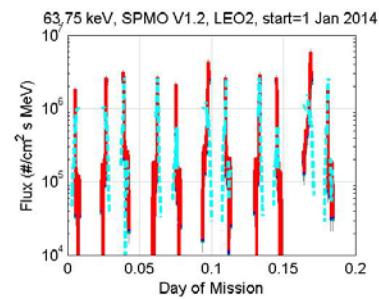
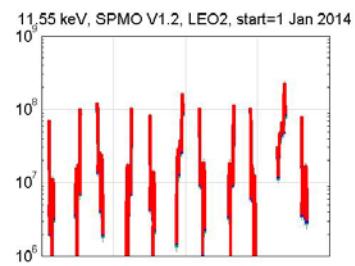
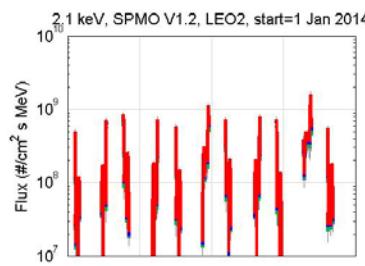
**SPMH****LEO2 (800 km circular, 90 deg)**

Distribution A: Approved for public release; distribution unlimited.

# SPMHE LEO2 (800 km circular, 90 deg)



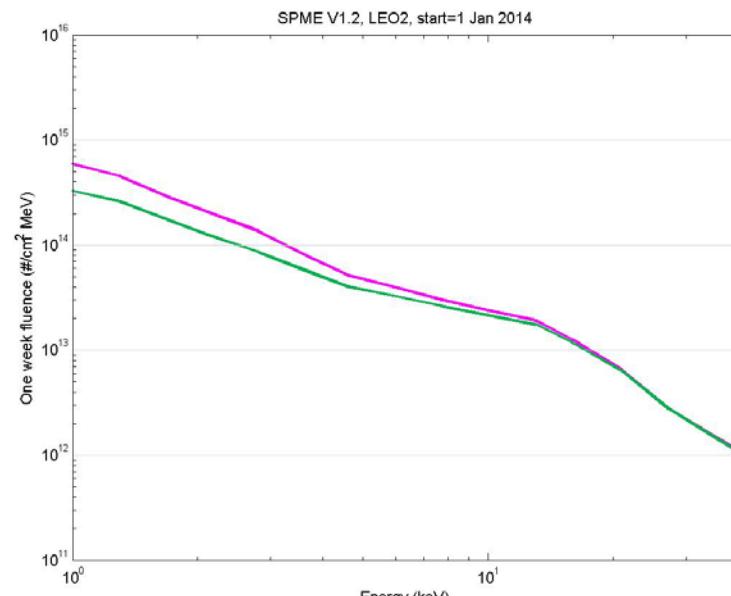
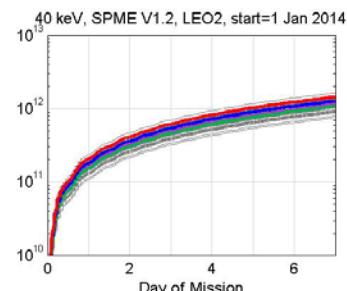
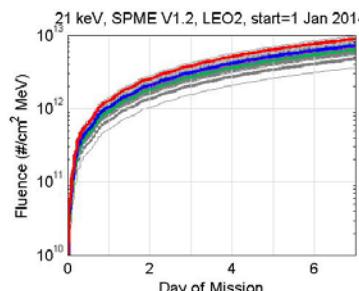
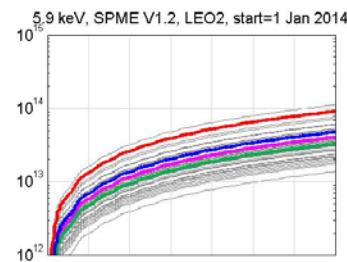
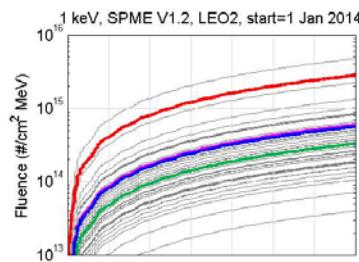
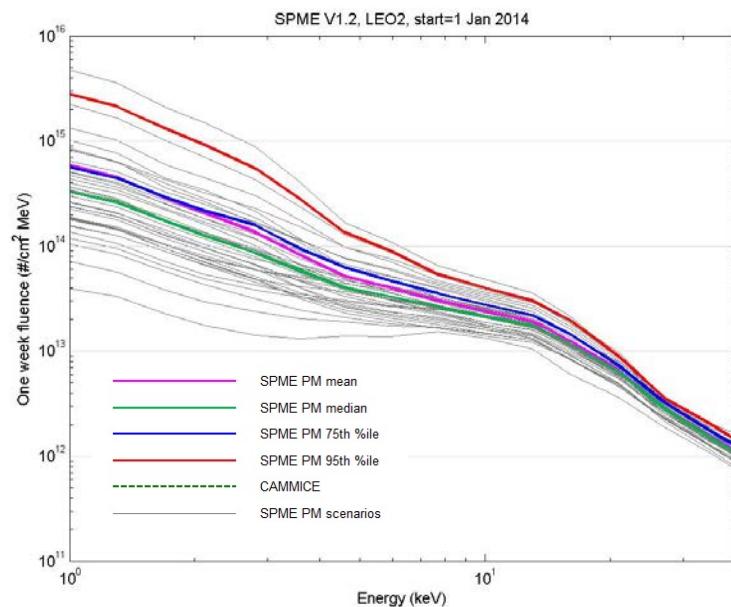
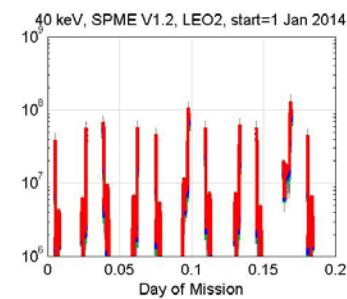
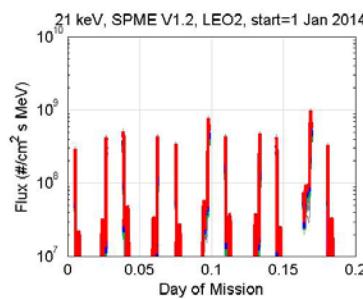
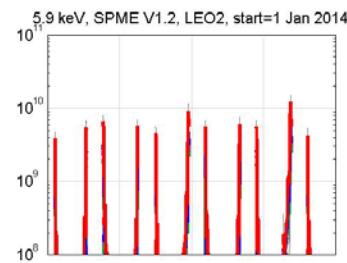
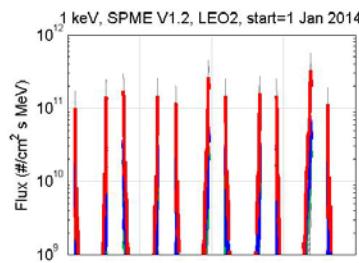
Distribution A: Approved for public release; distribution unlimited.



Distribution A: Approved for public release; distribution unlimited.

**SPME**

# LEO2 (800 km circular, 90 deg)

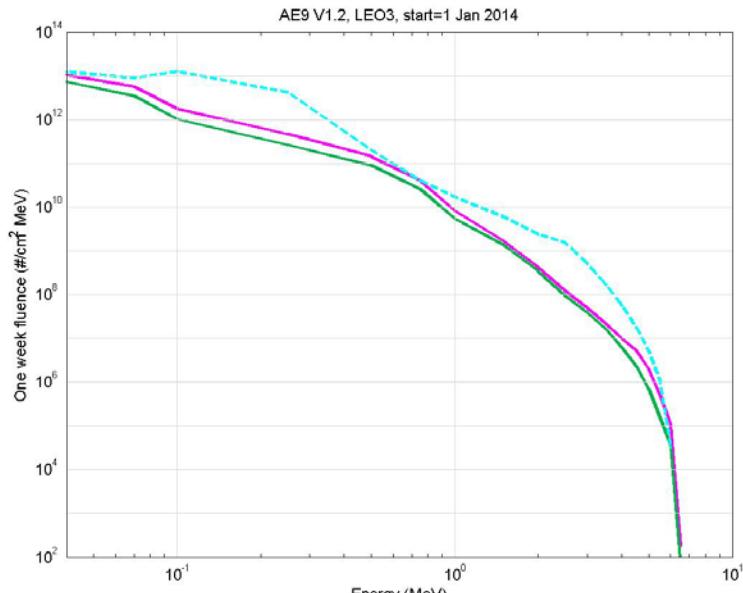
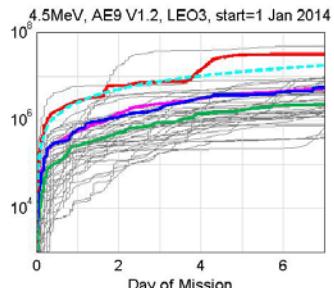
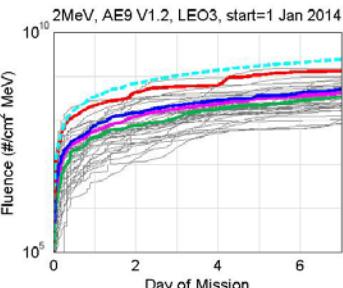
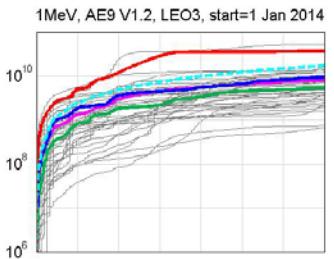
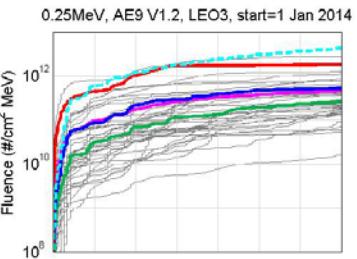
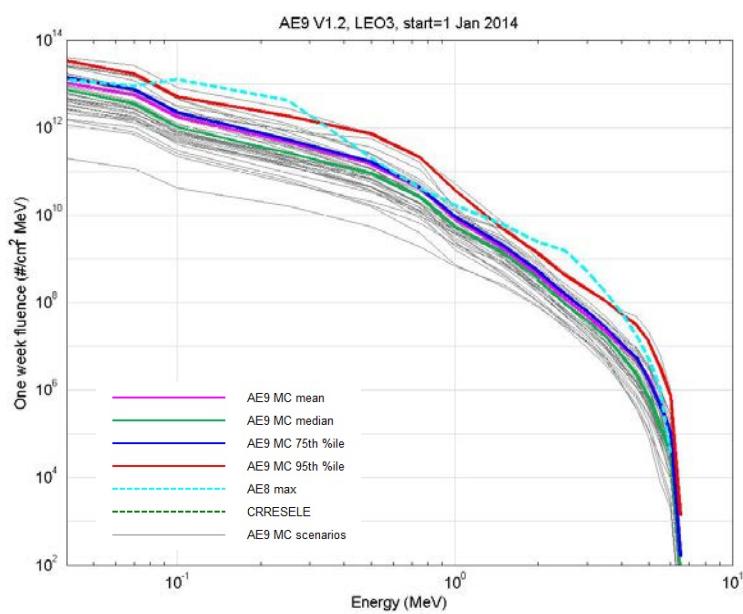
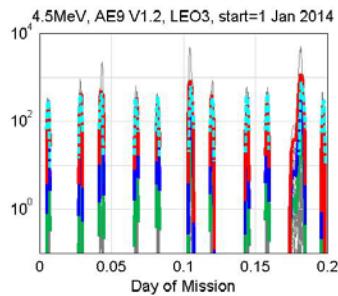
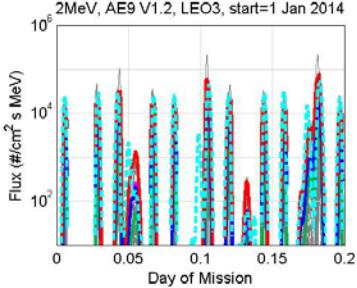
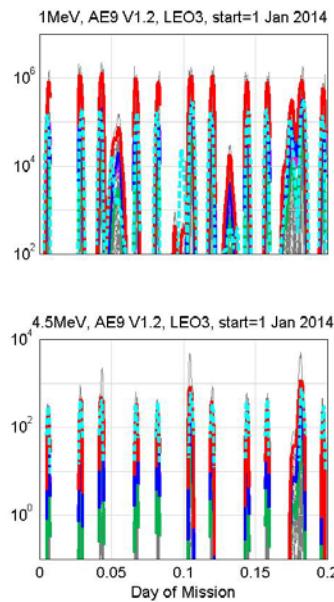
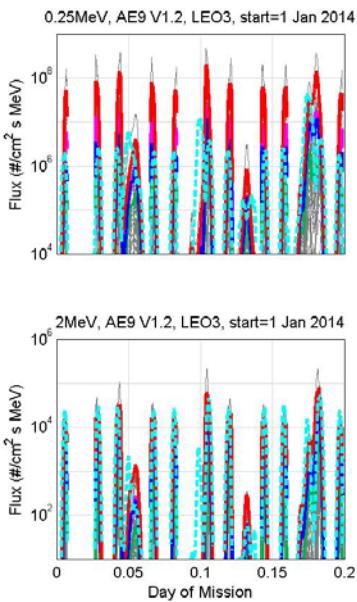


Distribution A: Approved for public release; distribution unlimited.

# **LEO3**

**AE9**

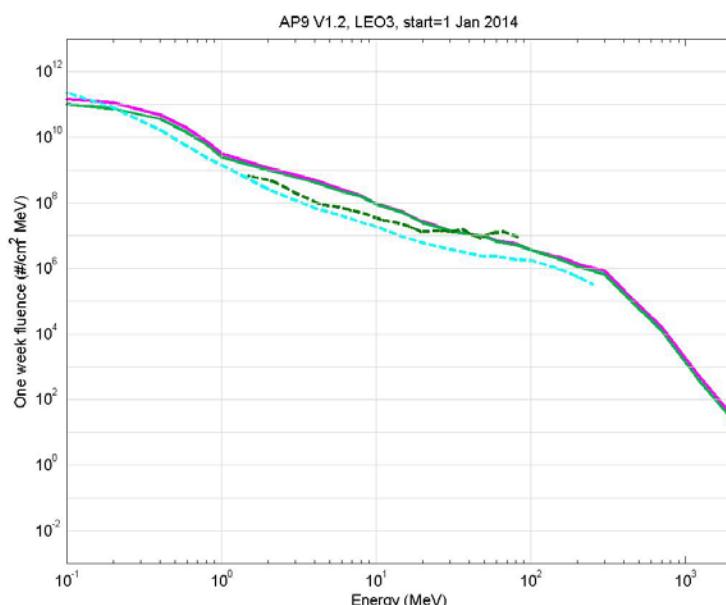
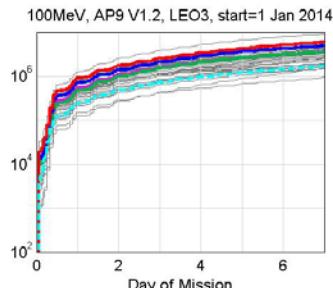
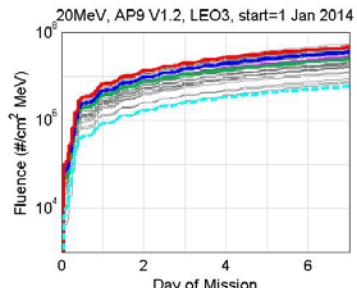
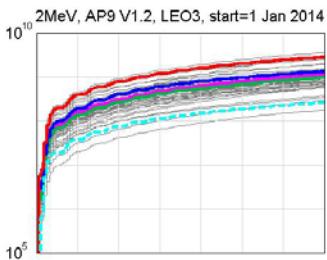
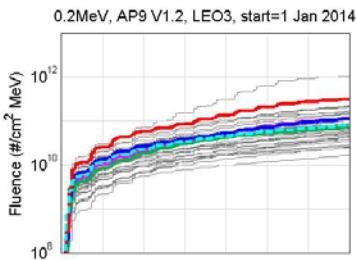
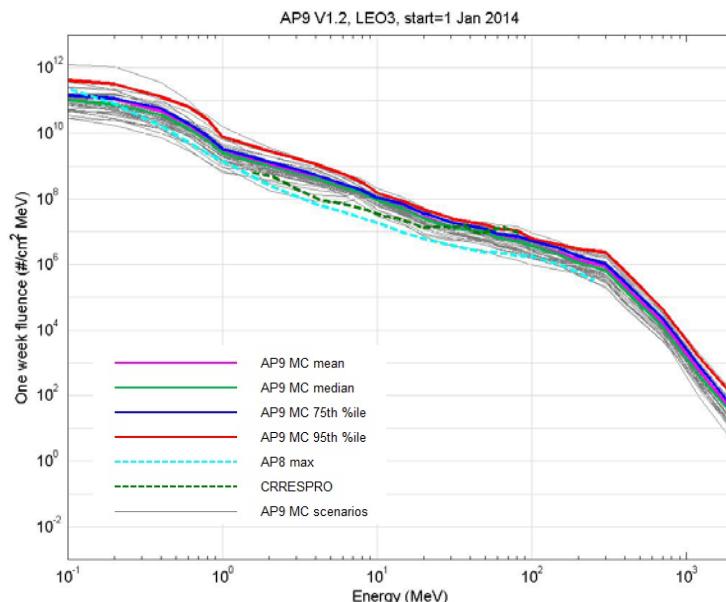
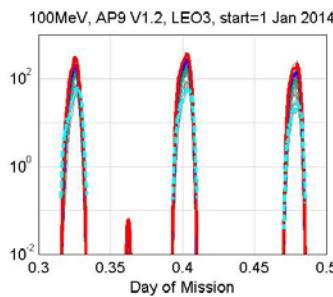
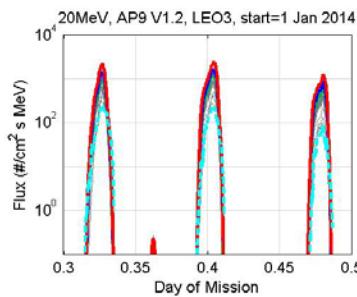
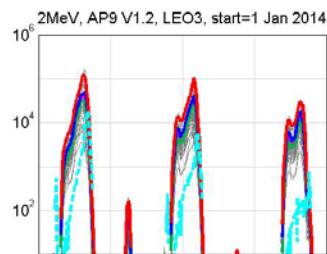
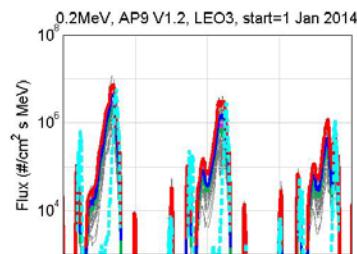
# LEO3 (1200 km circular, 90 deg)



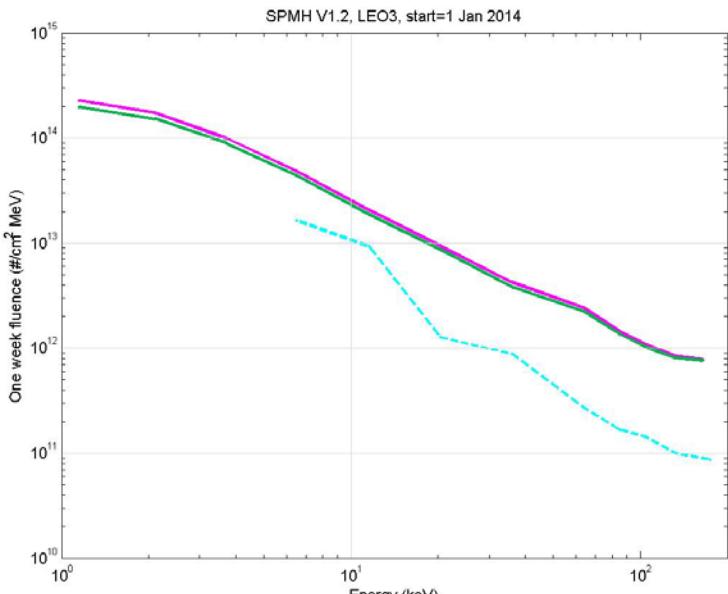
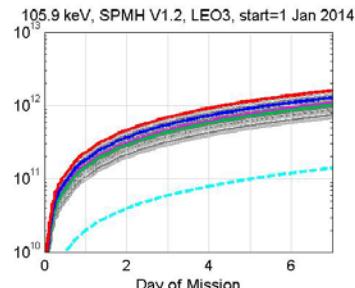
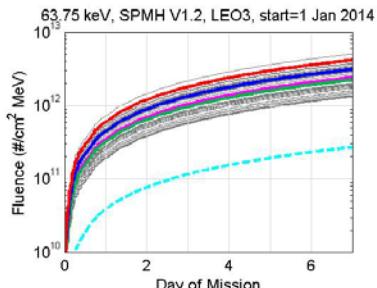
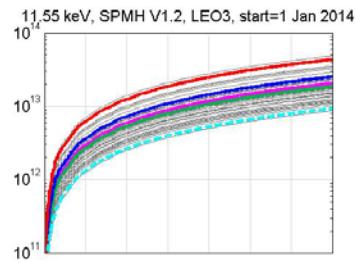
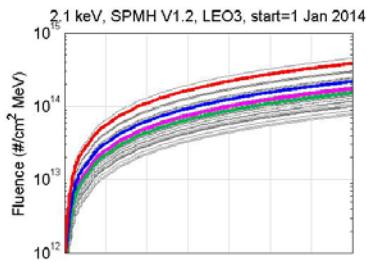
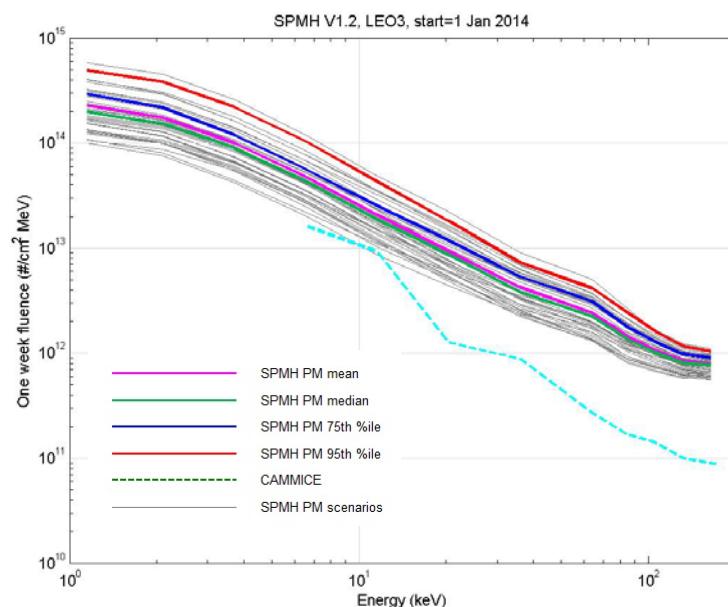
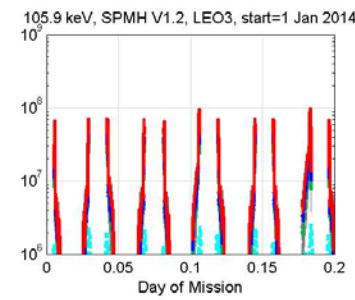
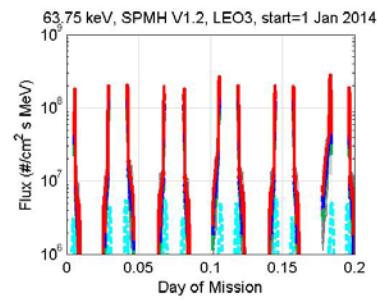
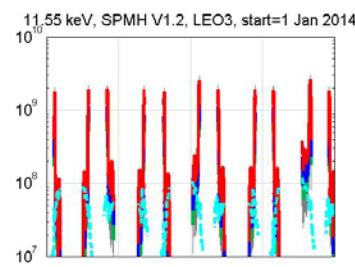
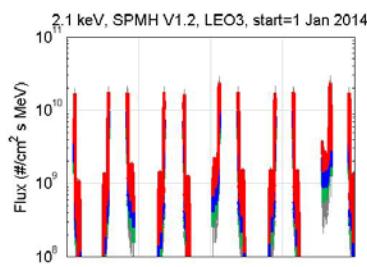
Distribution A: Approved for public release; distribution unlimited.

AP9

# LEO3 (1200 km circular, 90 deg)

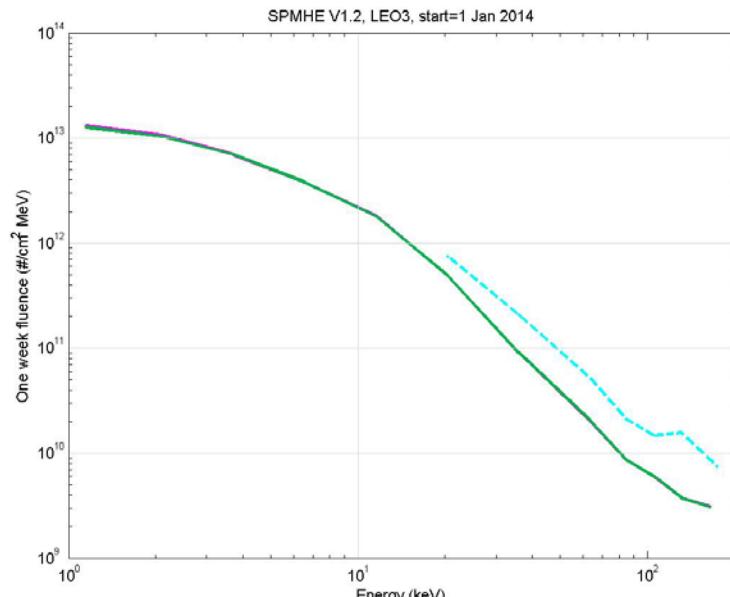
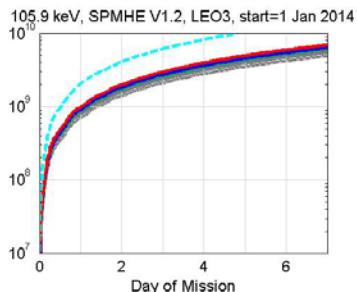
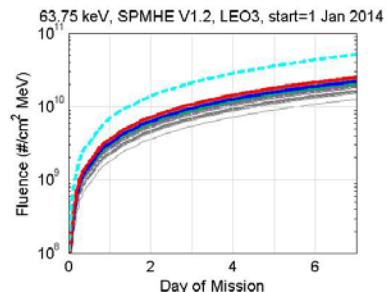
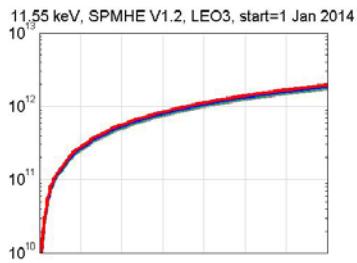
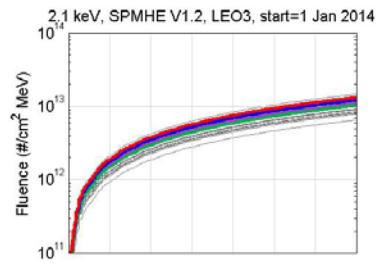
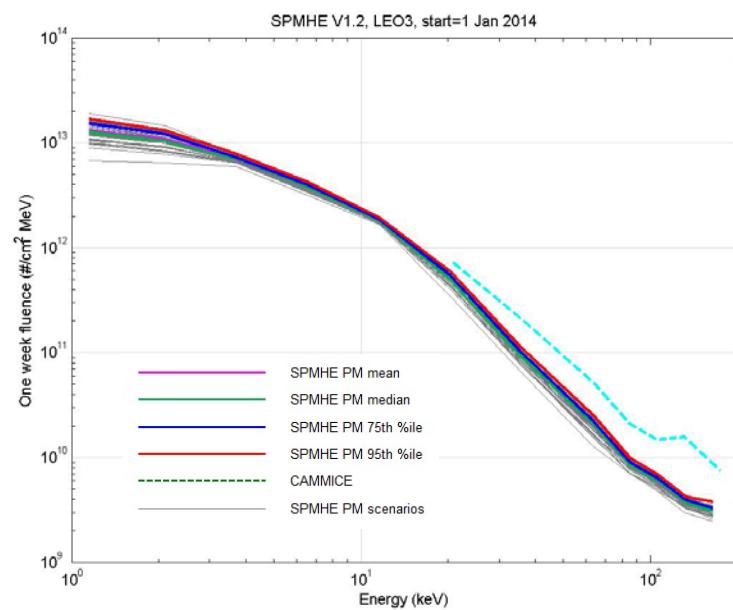
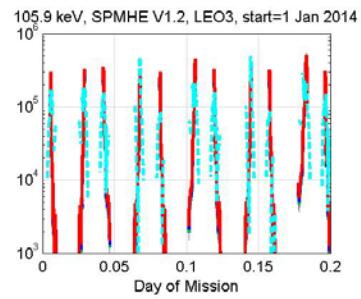
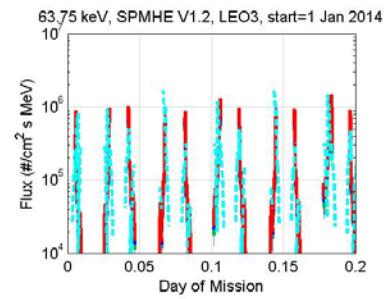
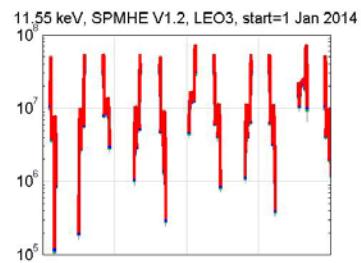
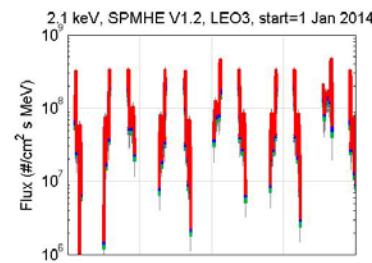


Distribution A: Approved for public release; distribution unlimited.

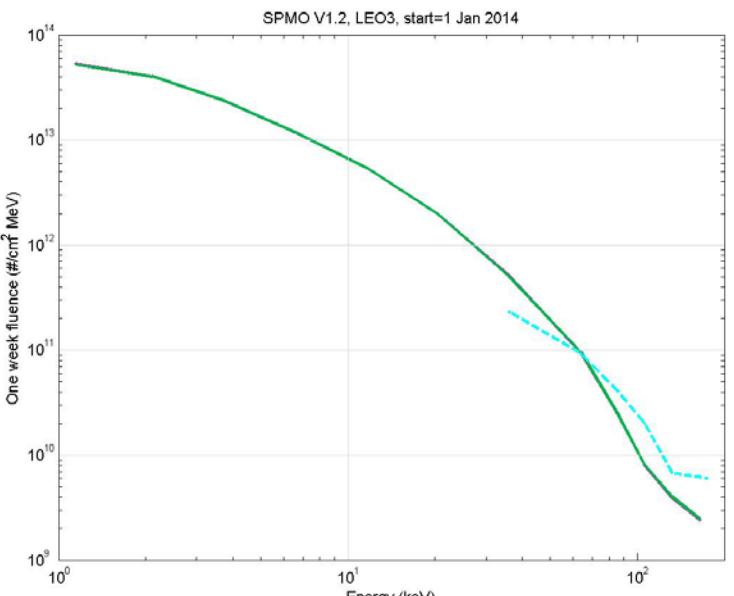
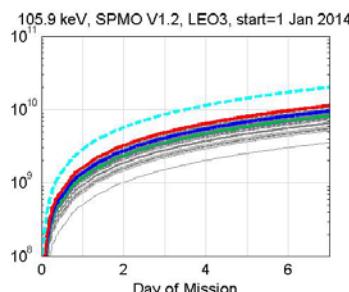
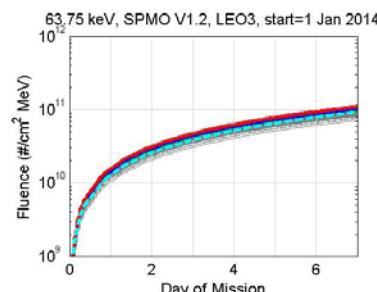
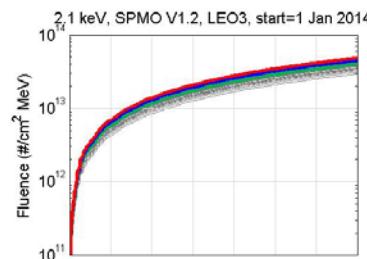
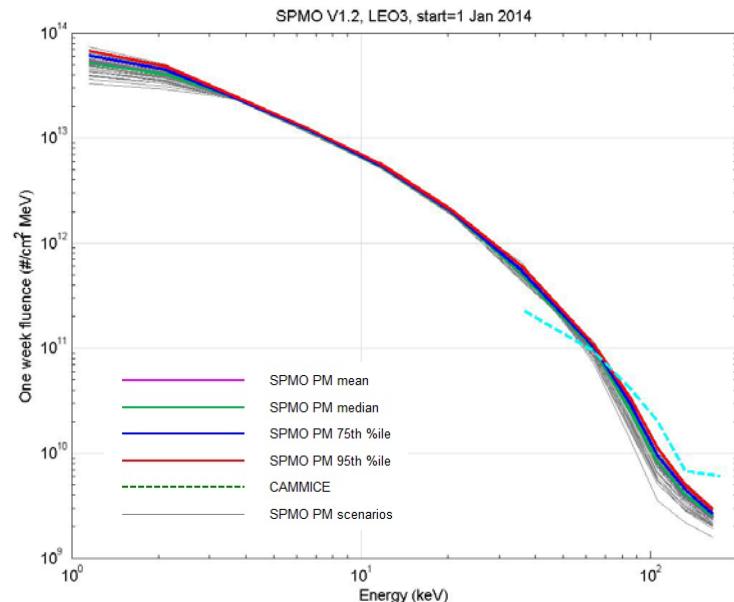
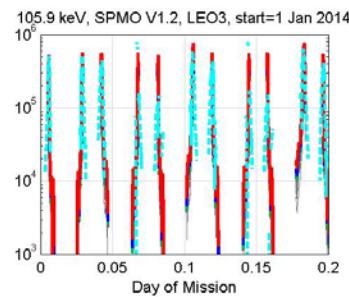
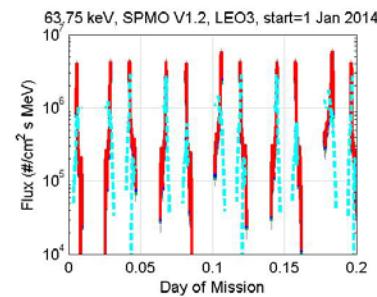
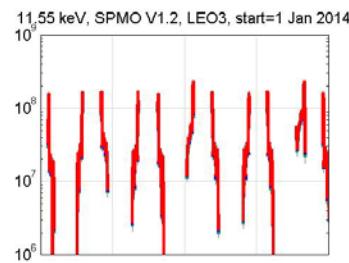
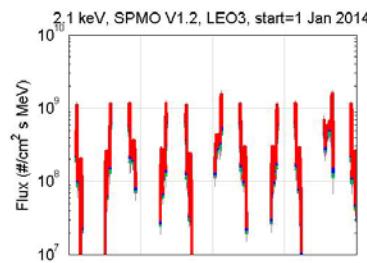


**Distribution A: Approved for public release; distribution unlimited.**

# SPMHE LEO3 (1200 km circular, 90 deg)



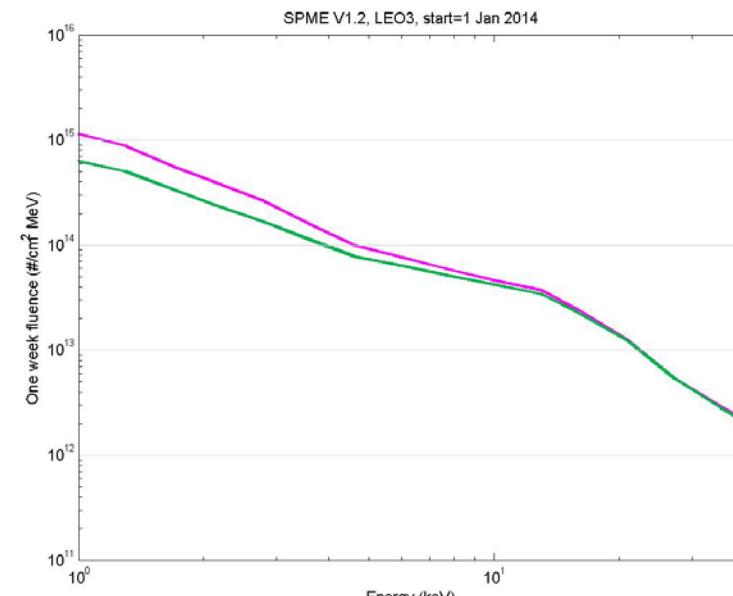
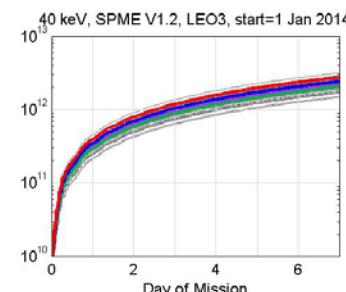
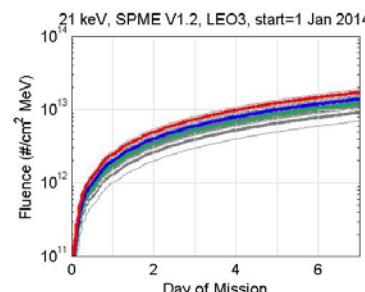
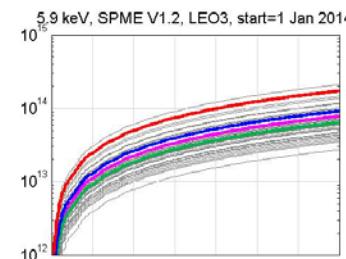
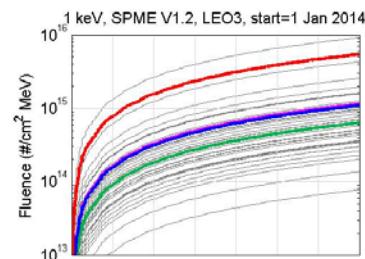
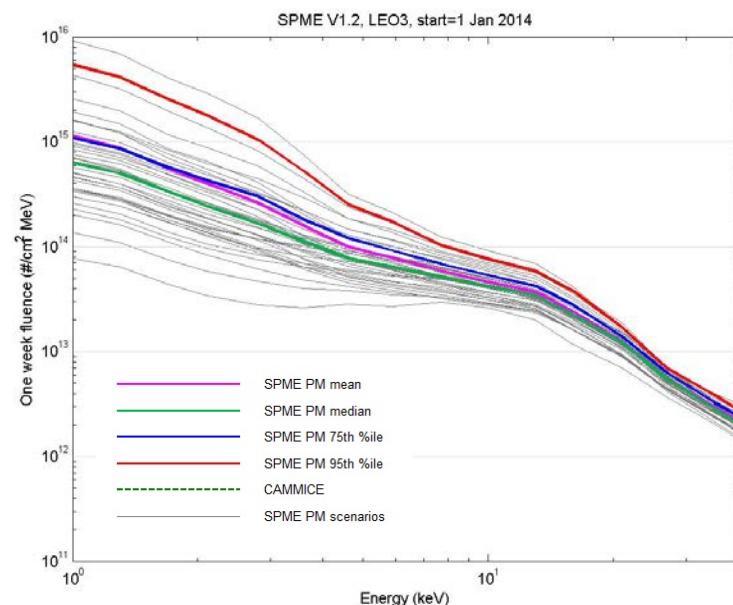
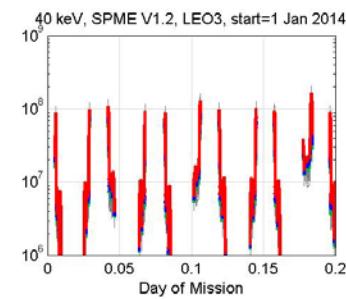
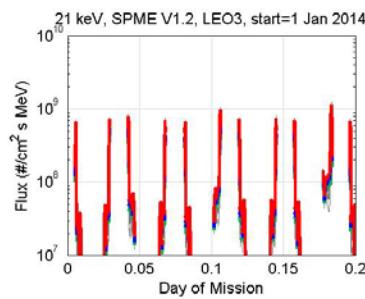
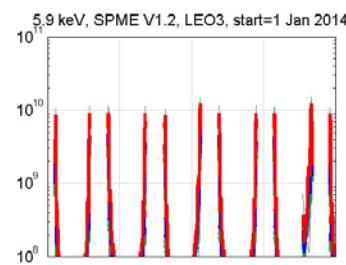
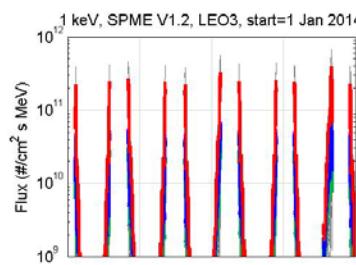
**Distribution A: Approved for public release; distribution unlimited.**



Distribution A: Approved for public release; distribution unlimited.

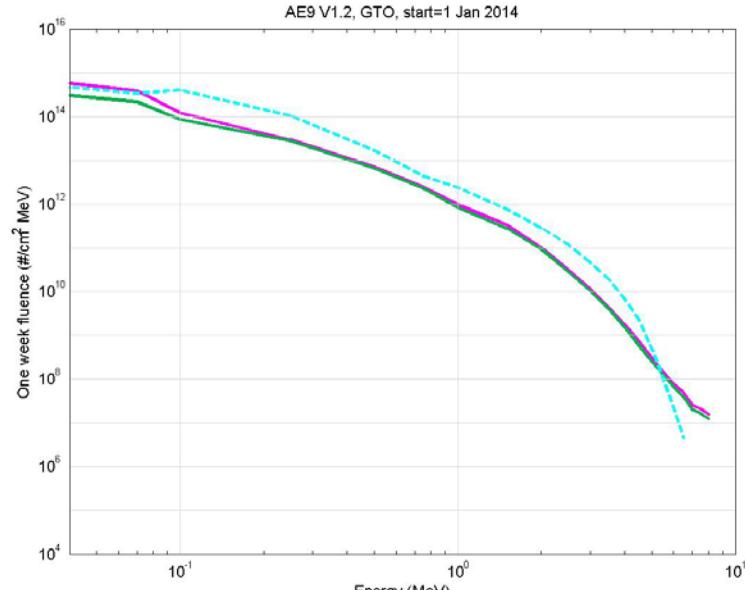
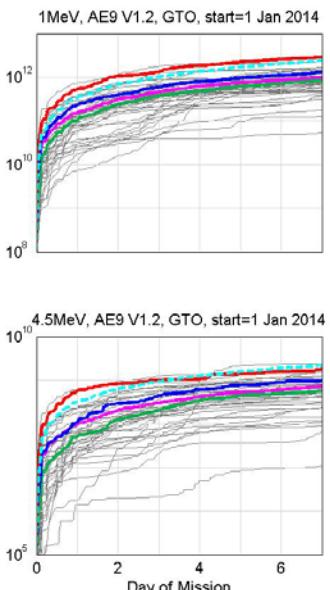
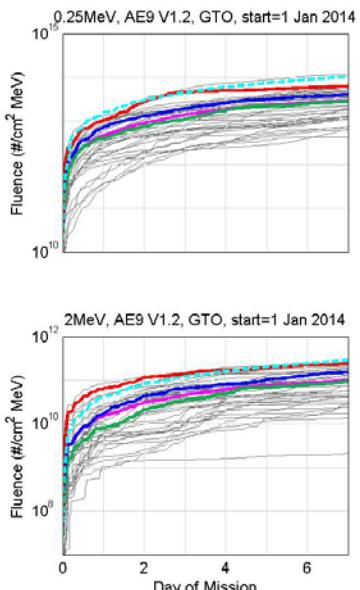
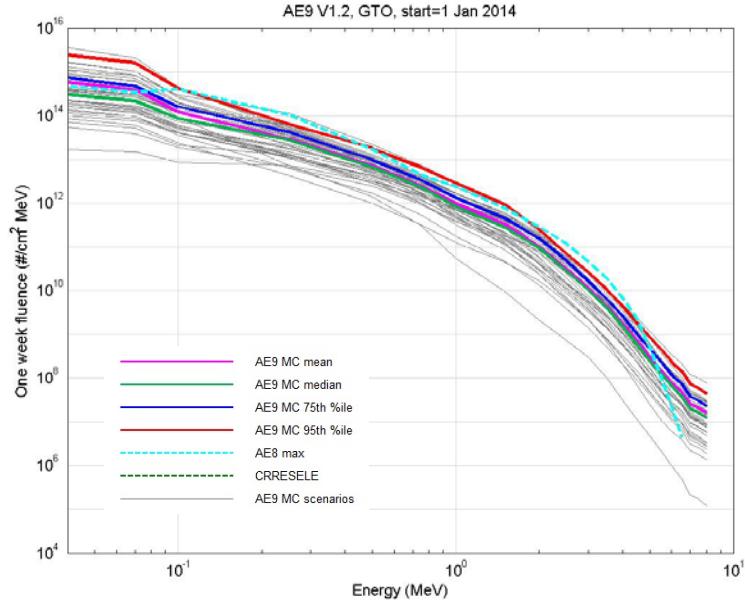
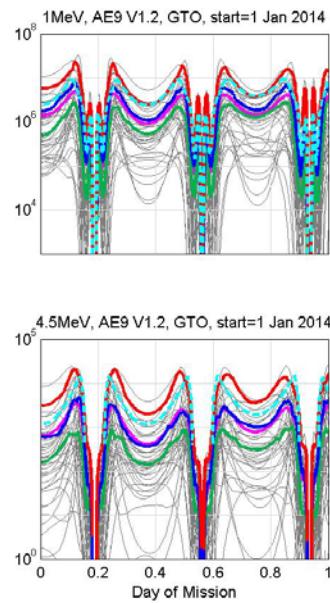
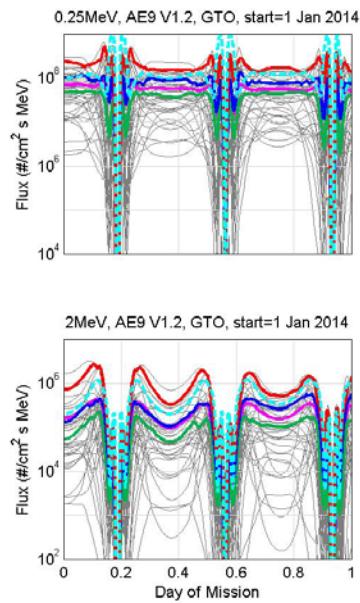
**SPME**

# LEO3 (1200 km circular, 90 deg)



Distribution A: Approved for public release; distribution unlimited.

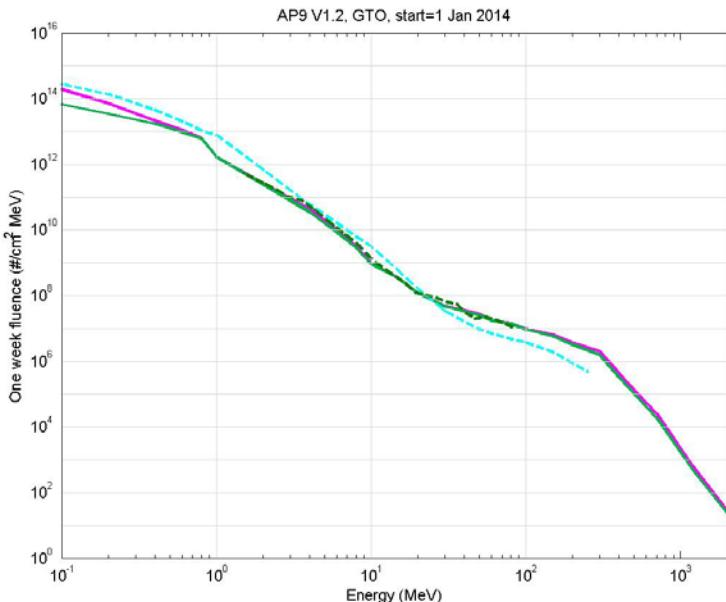
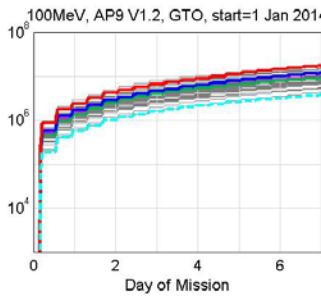
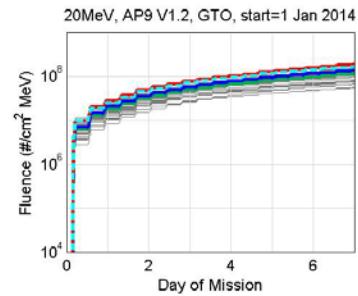
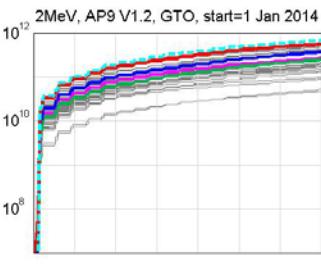
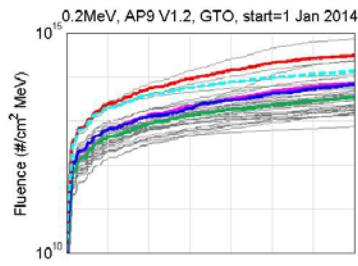
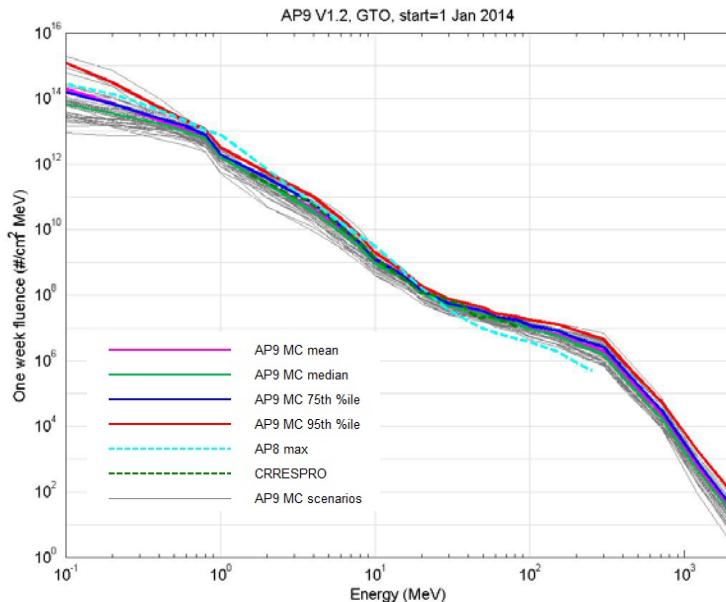
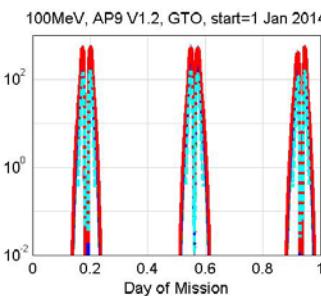
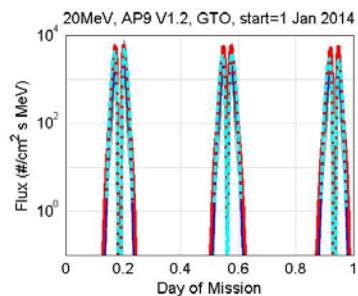
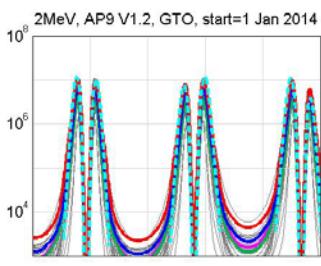
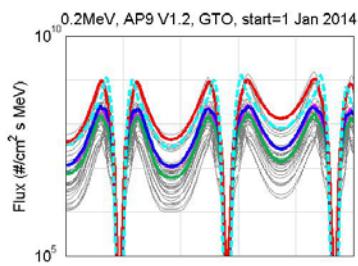
# **GTO**

**AE9****GTO (30600 km x 500 km circular, 10 deg) (RBSP)**

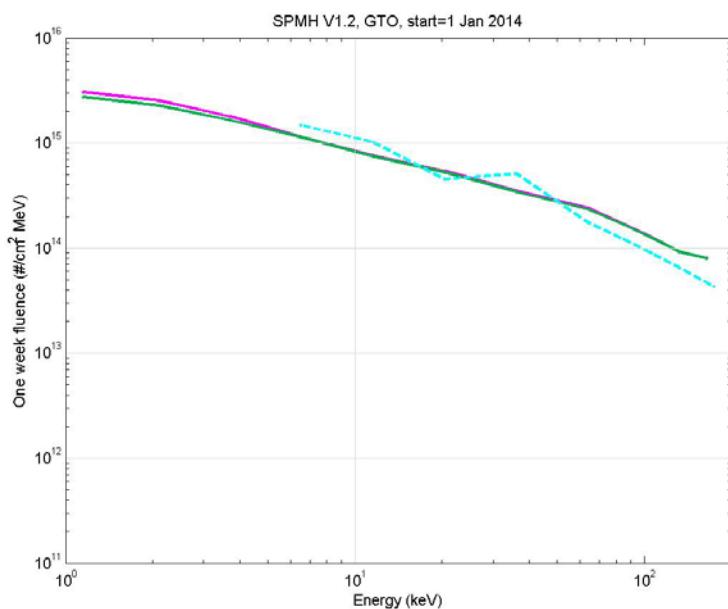
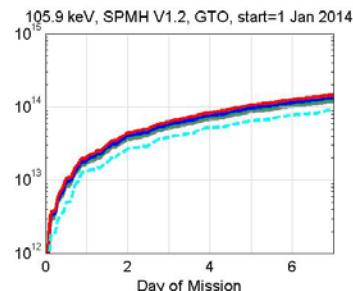
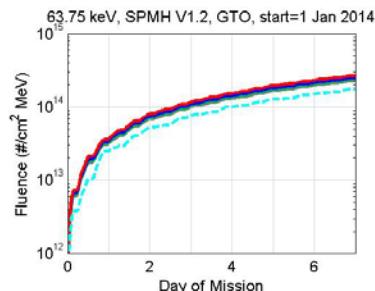
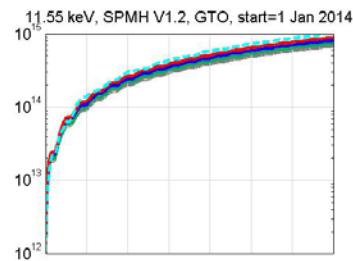
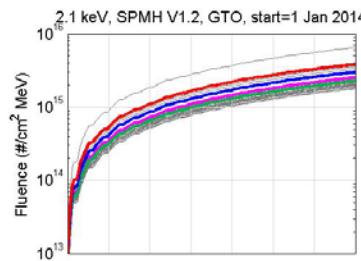
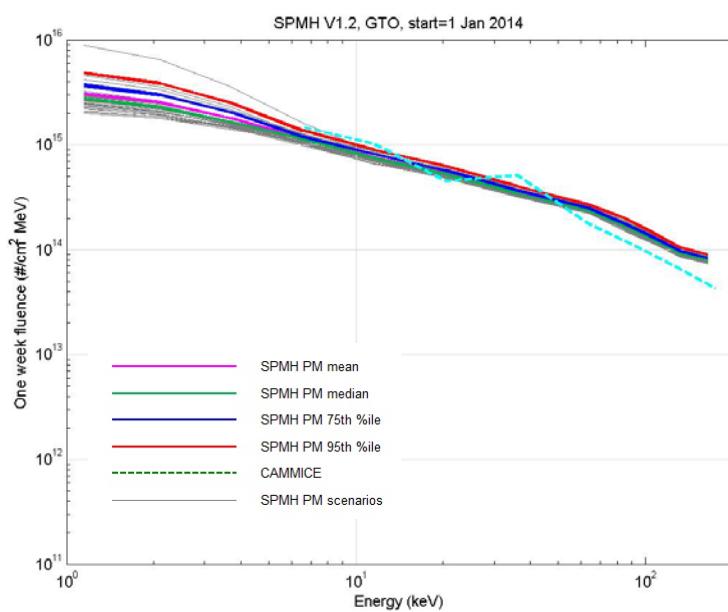
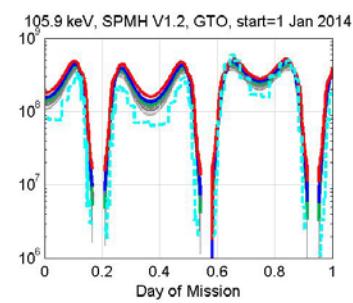
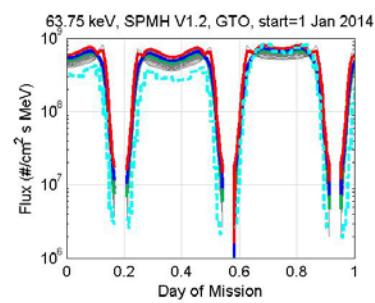
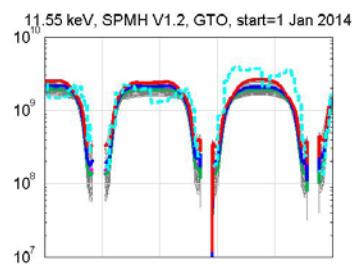
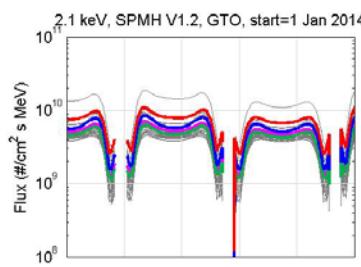
Distribution A: Approved for public release; distribution unlimited.

AP9

# GTO (30600 km x 500 km circular, 10 deg) (RBSP)

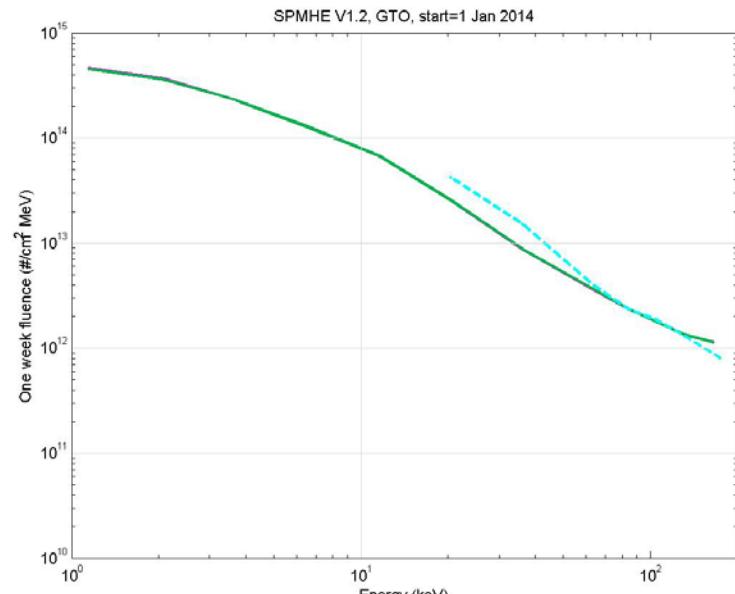
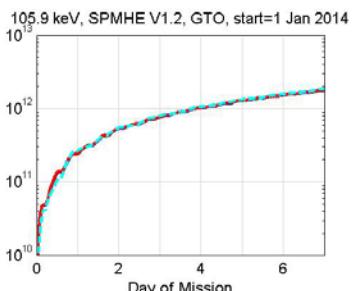
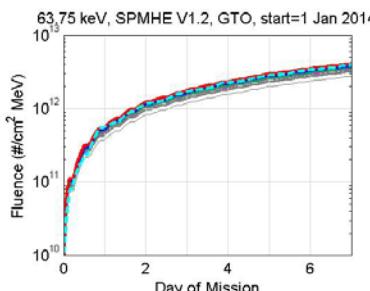
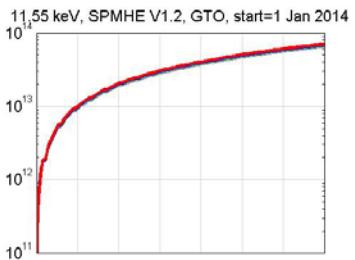
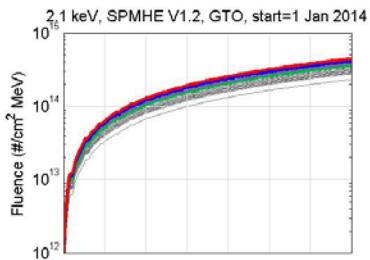
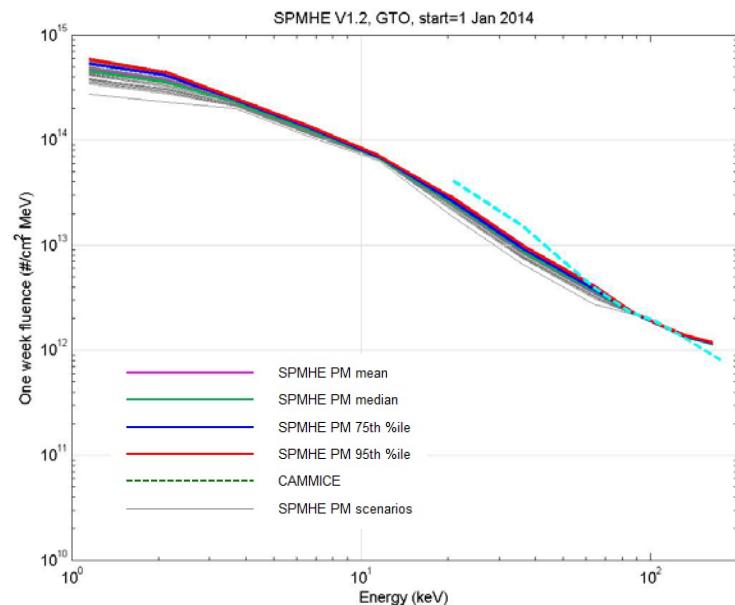
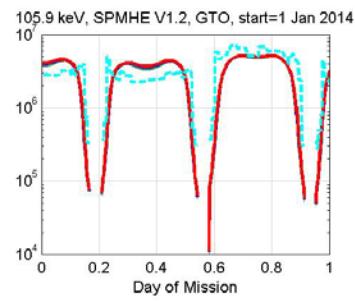
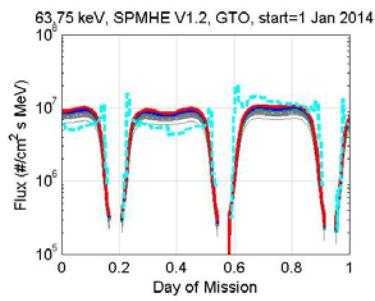
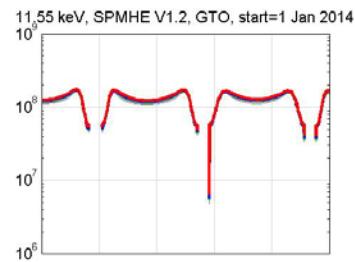
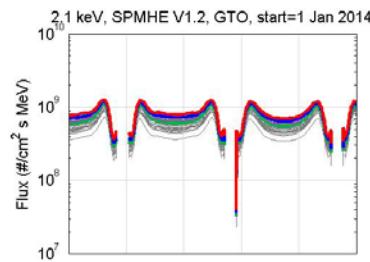


**Distribution A: Approved for public release; distribution unlimited.**

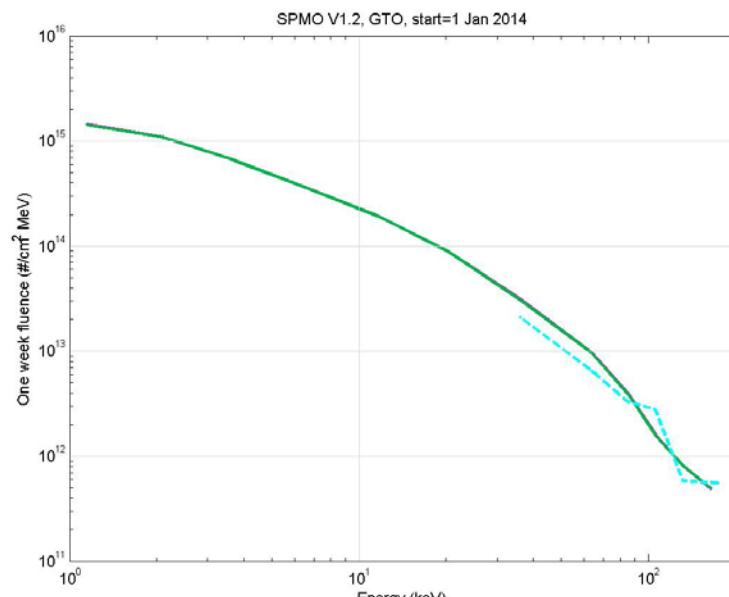
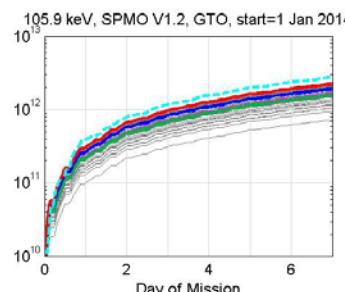
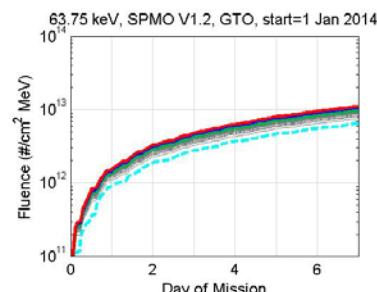
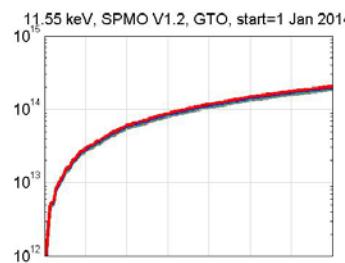
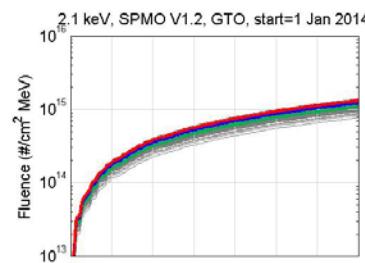
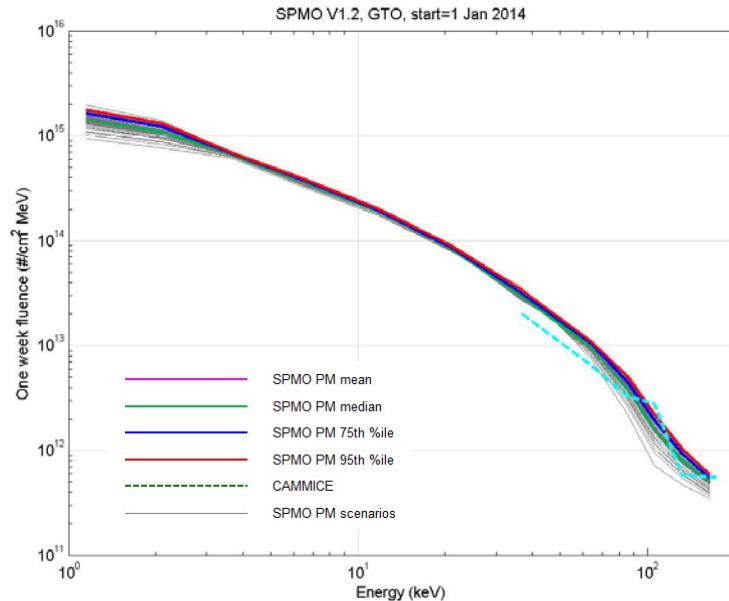
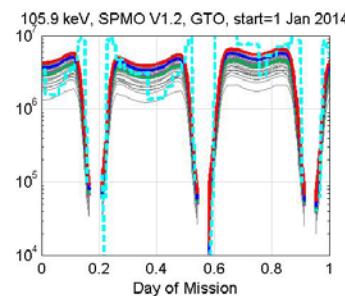
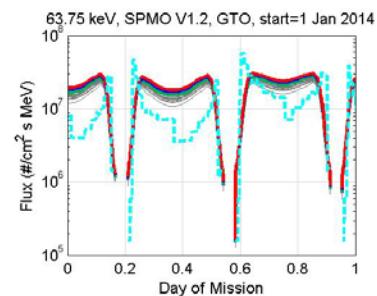
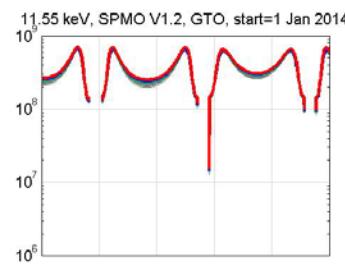
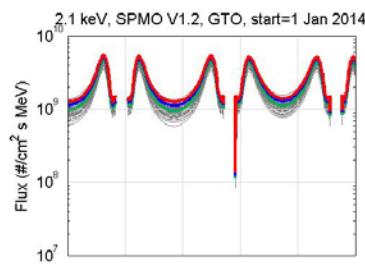
**SPMH****GTO (30600 km x 500 km circular, 10 deg) (RBSP)**

Distribution A: Approved for public release; distribution unlimited.

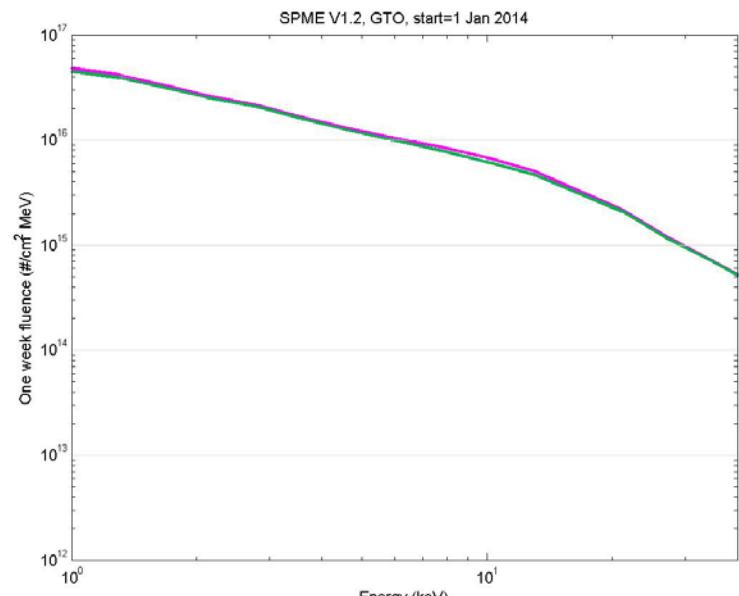
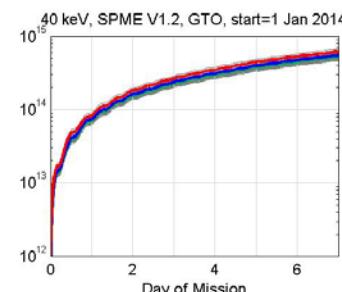
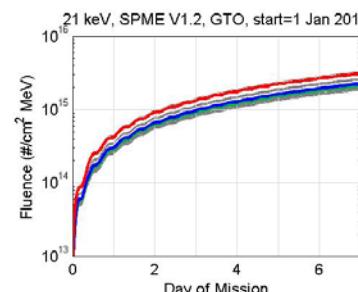
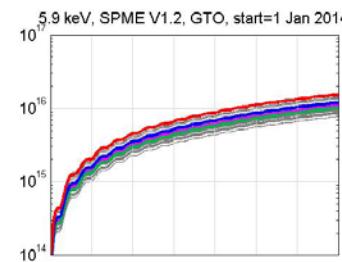
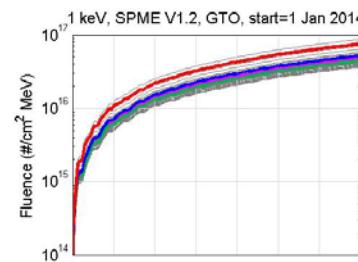
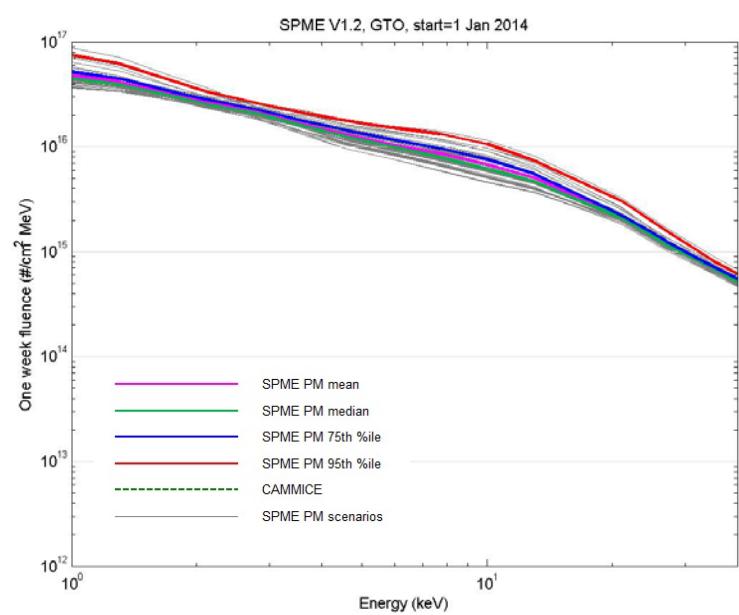
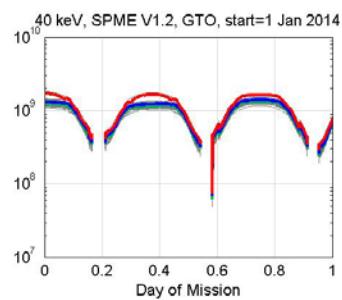
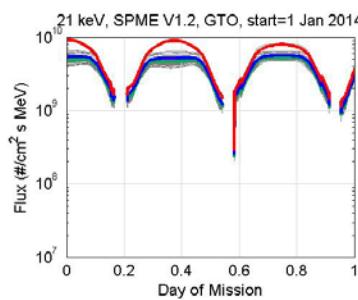
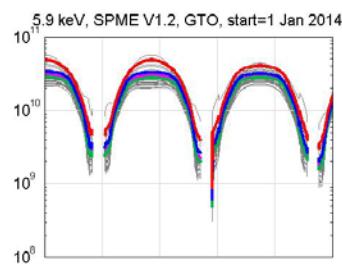
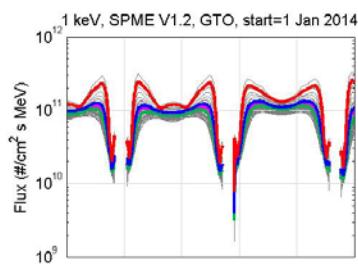
# SPMHE GTO (30600 km x 500 km circular, 10 deg) (RBSP)



Distribution A: Approved for public release; distribution unlimited.

**SPMO****GTO (30600 km x 500 km circular, 10 deg) (RBSP)**

Distribution A: Approved for public release; distribution unlimited.

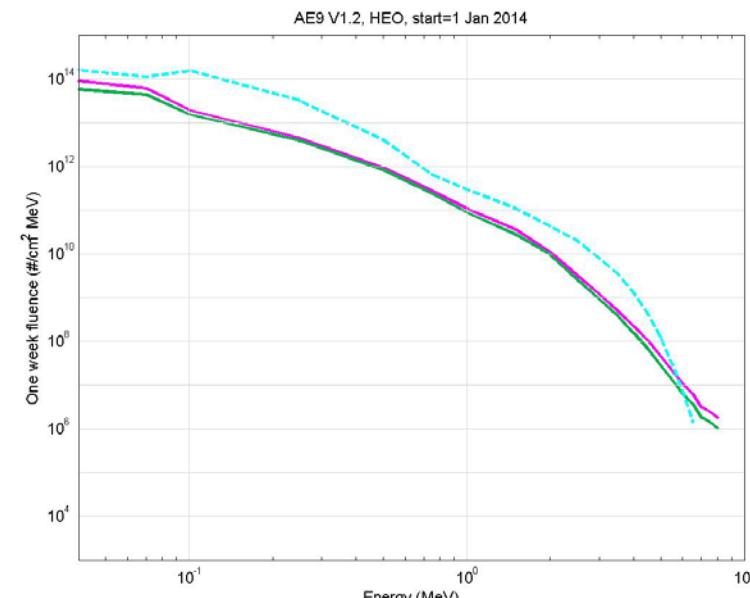
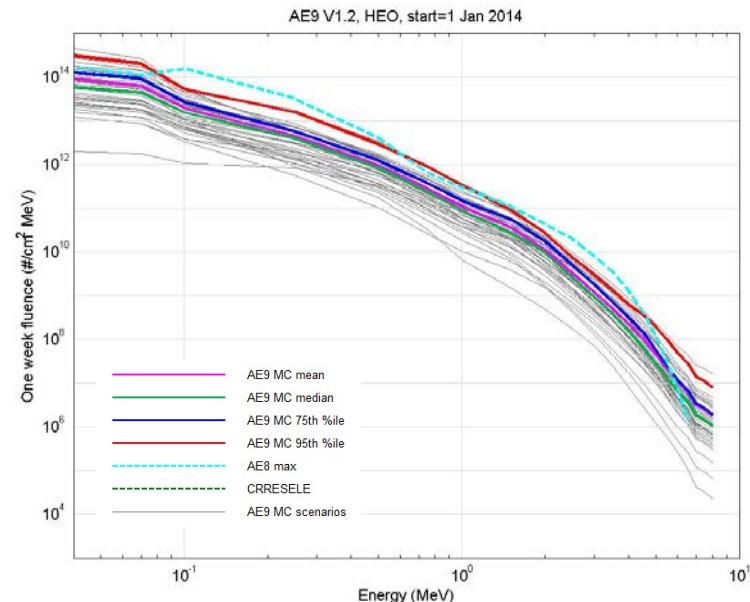
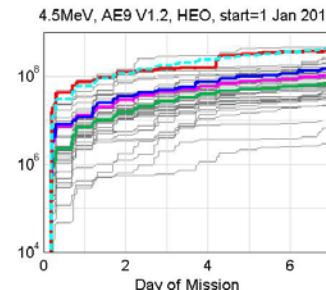
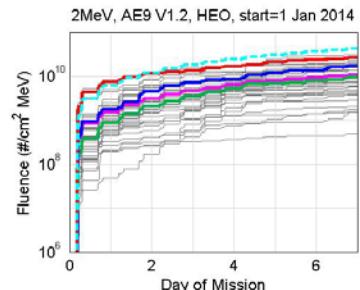
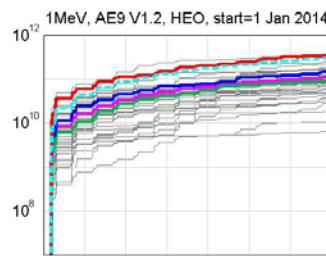
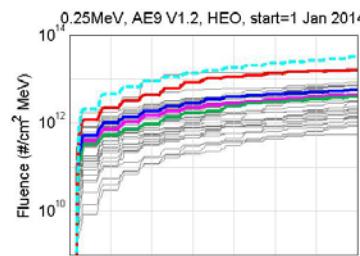
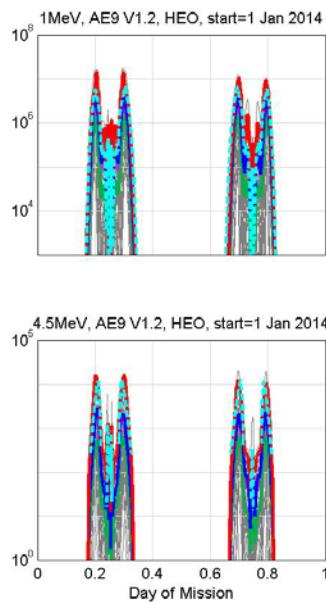
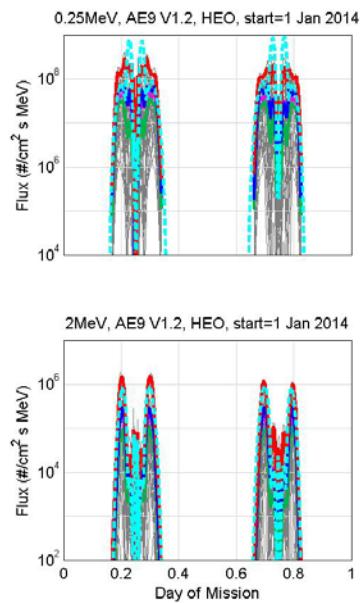
**SPME****GTO (30600 km x 500 km circular, 10 deg) (RBSP)**

Distribution A: Approved for public release; distribution unlimited.

**HEO**

**AE9**

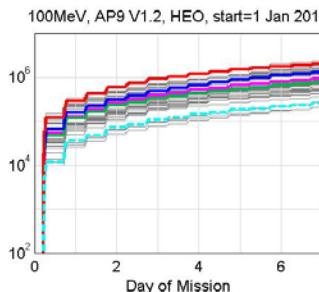
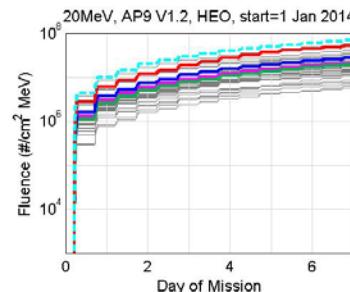
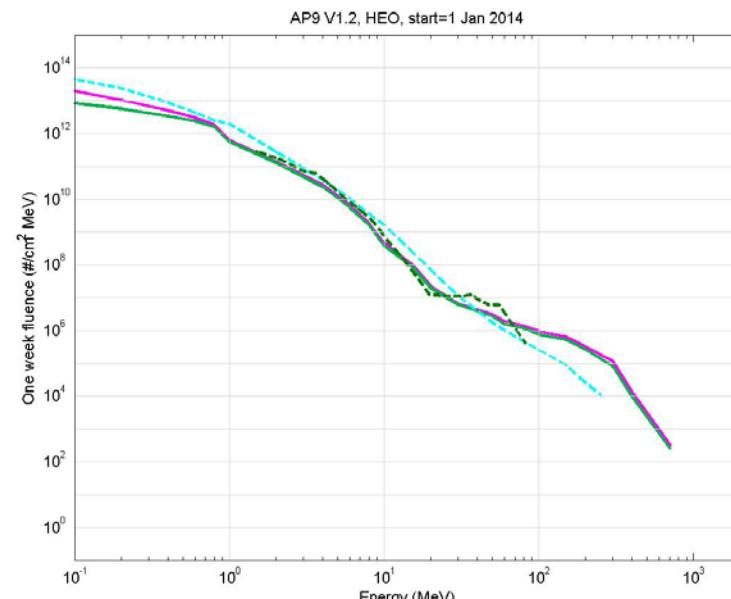
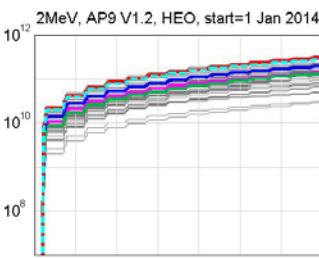
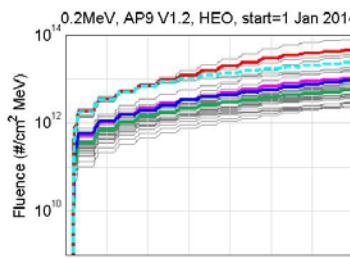
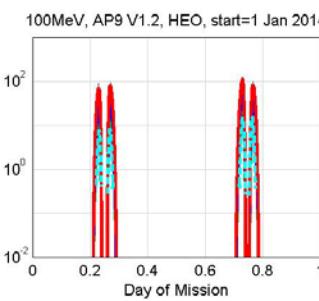
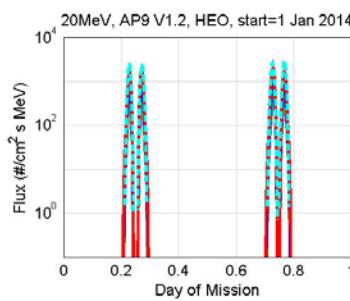
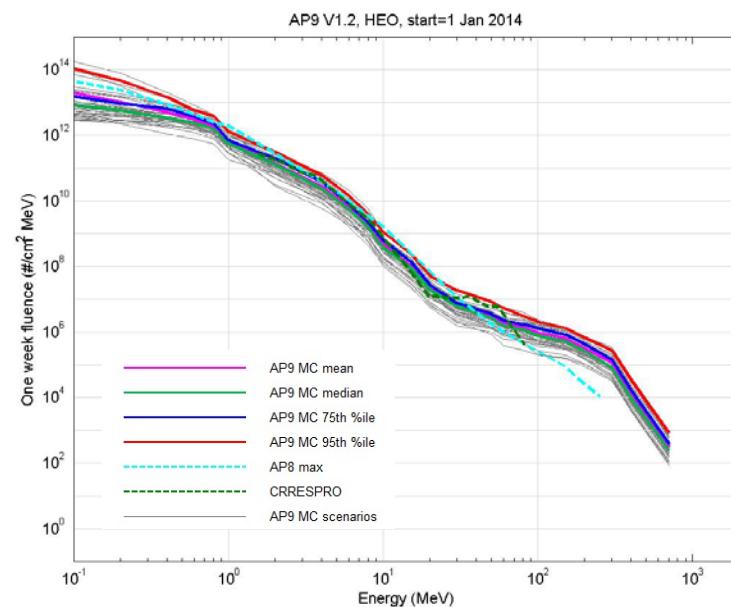
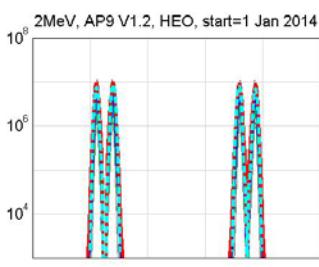
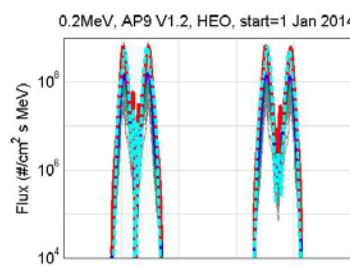
# HEO (38900 km x 1475 km circular, 63.4 deg)



Distribution A: Approved for public release; distribution unlimited.

AP9

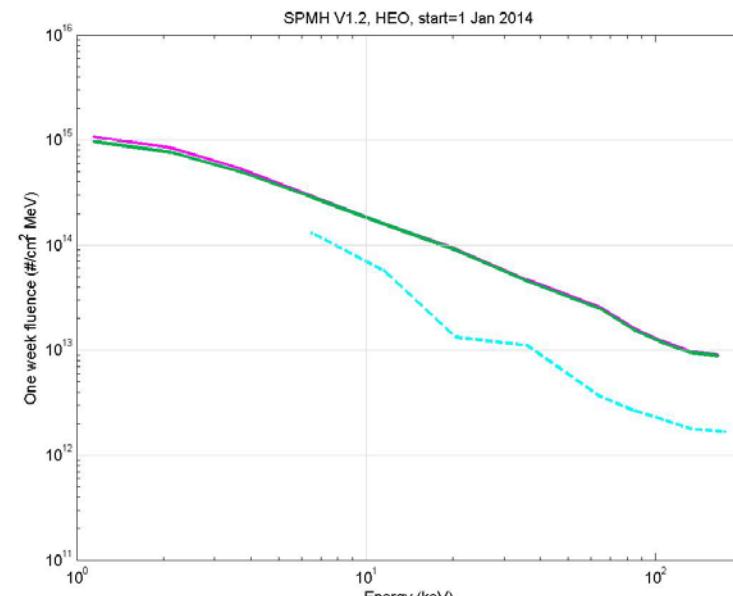
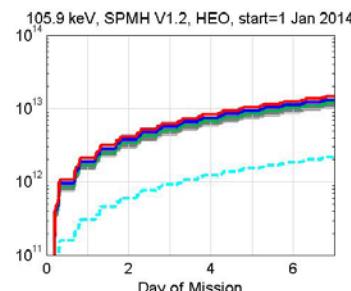
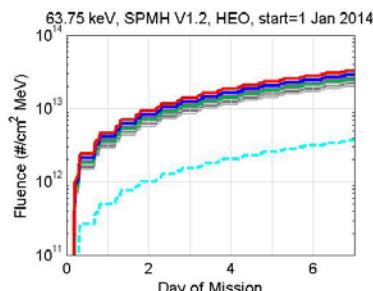
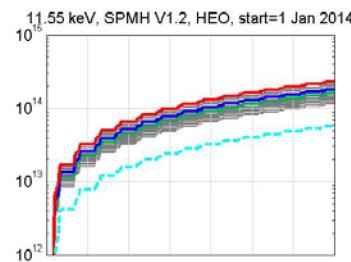
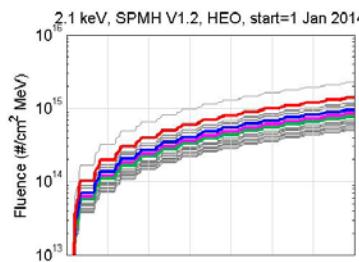
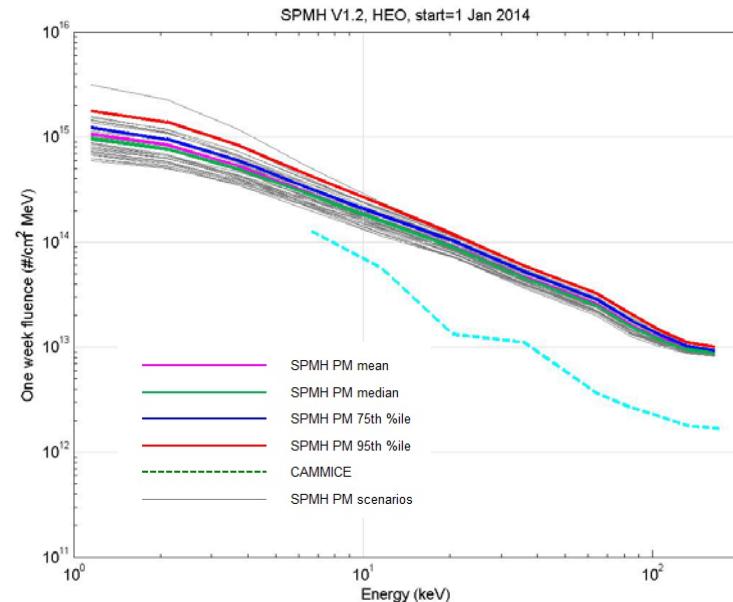
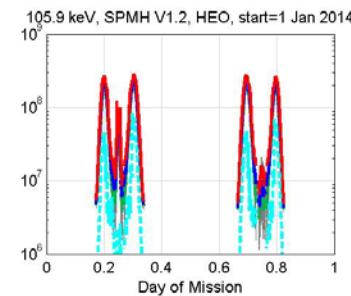
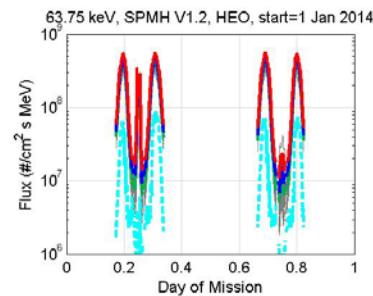
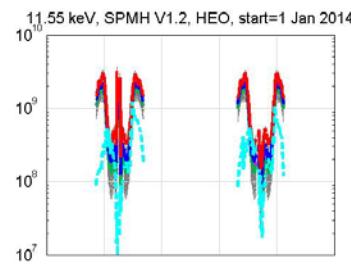
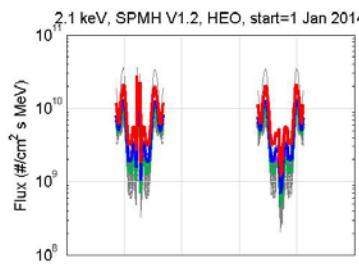
# HEO (38900 km x 1475 km circular, 63.4 deg)



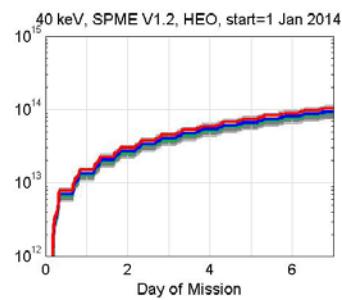
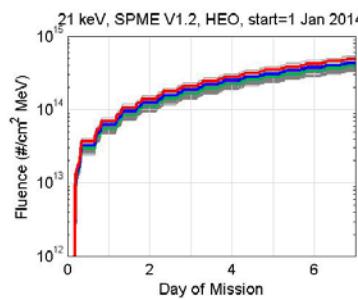
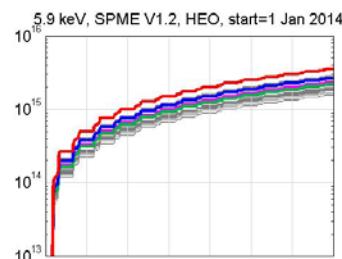
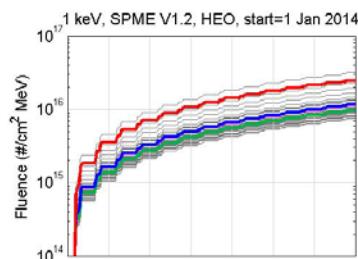
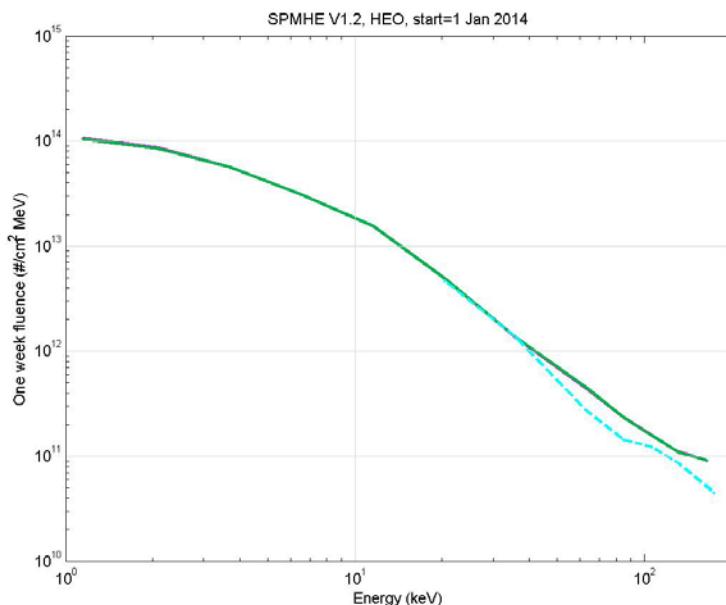
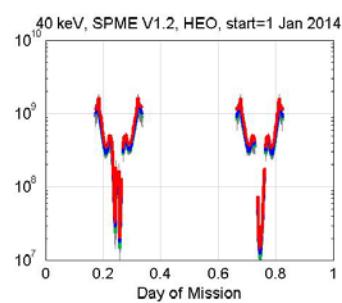
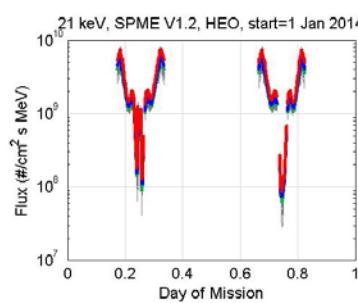
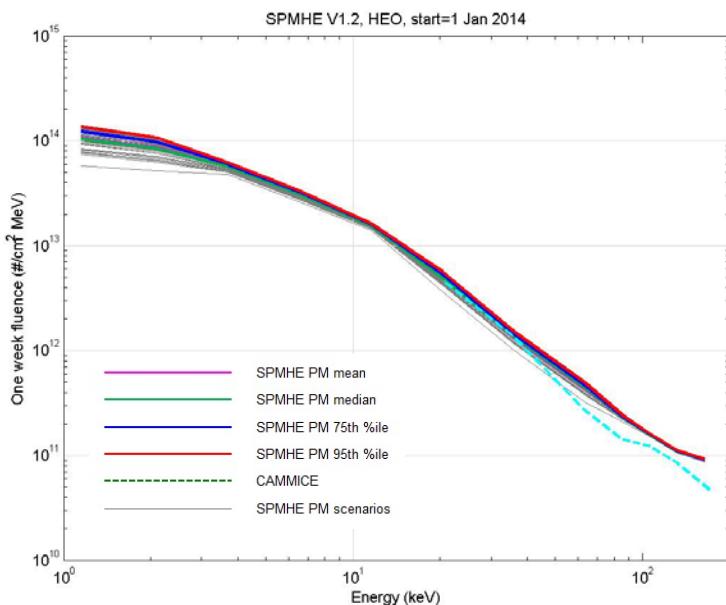
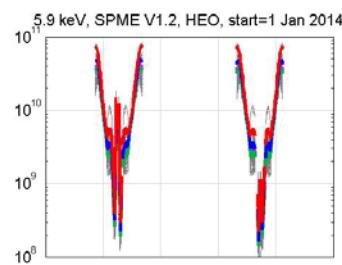
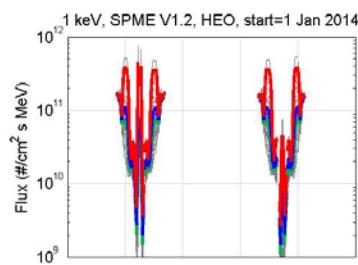
**Distribution A: Approved for public release; distribution unlimited.**

**SPMH**

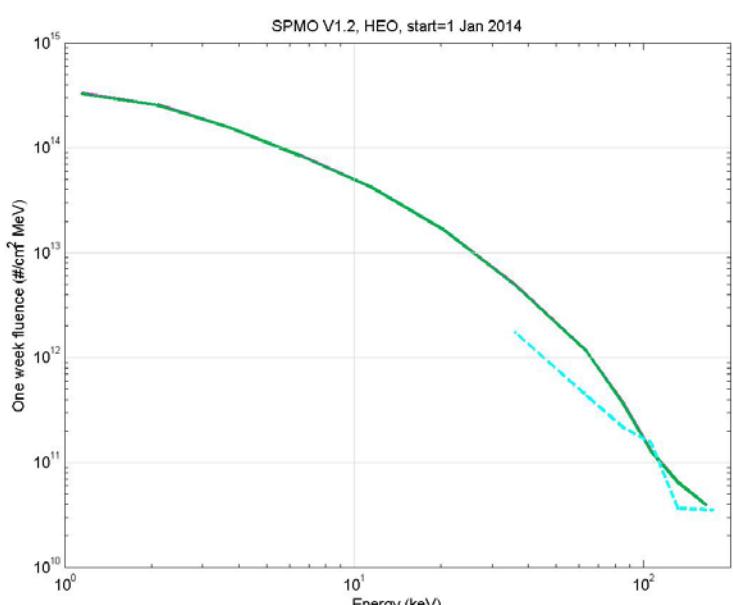
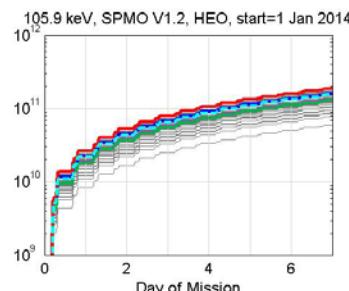
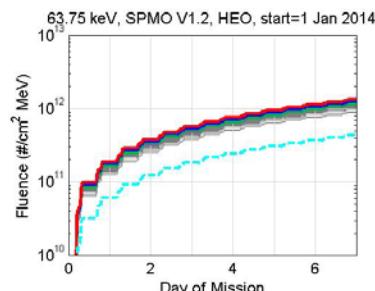
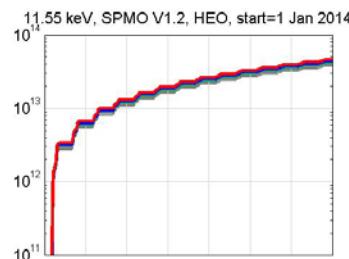
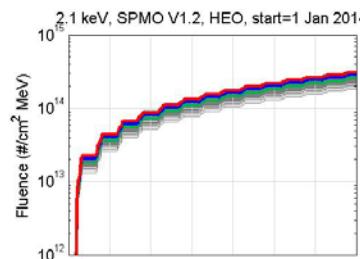
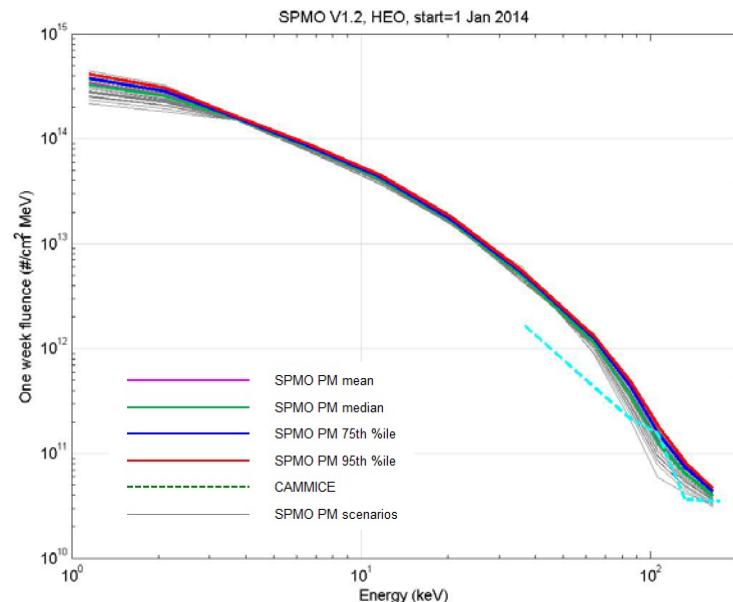
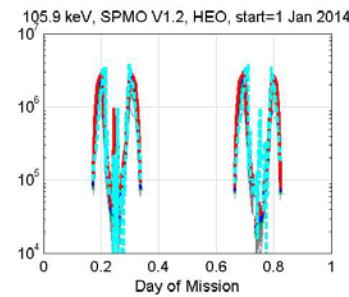
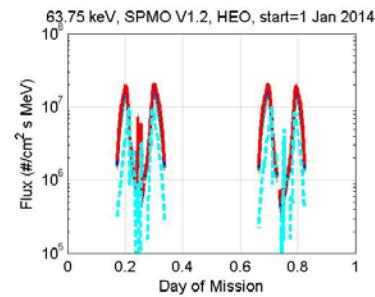
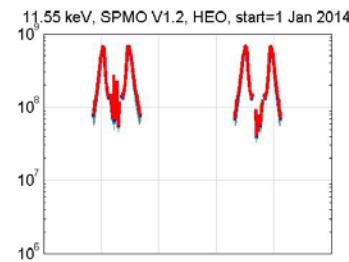
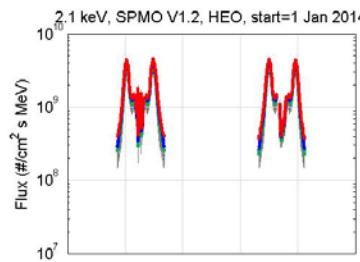
# HEO (38900 km x 1475 km circular, 63.4 deg)



Distribution A: Approved for public release; distribution unlimited.

**SPMHE****HEO (38900 km x 1475 km circular, 63.4 deg)**

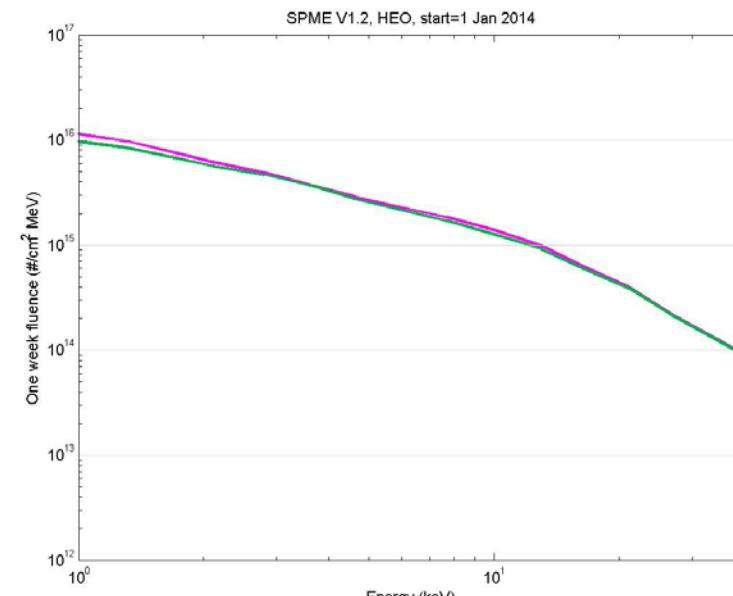
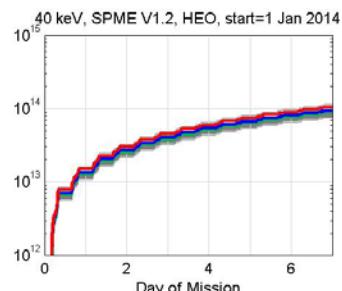
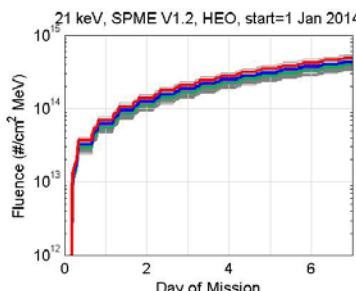
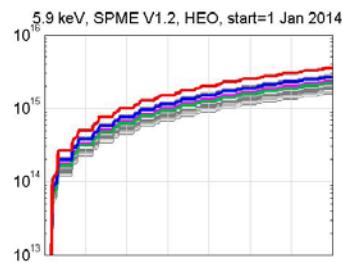
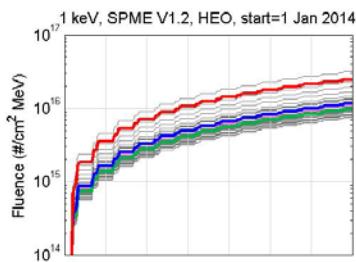
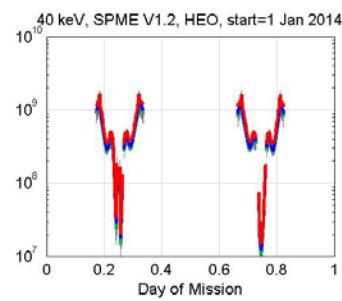
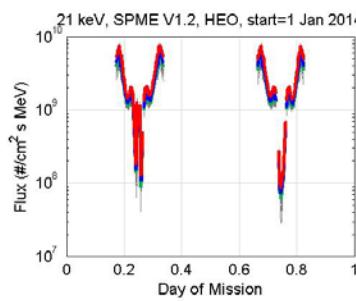
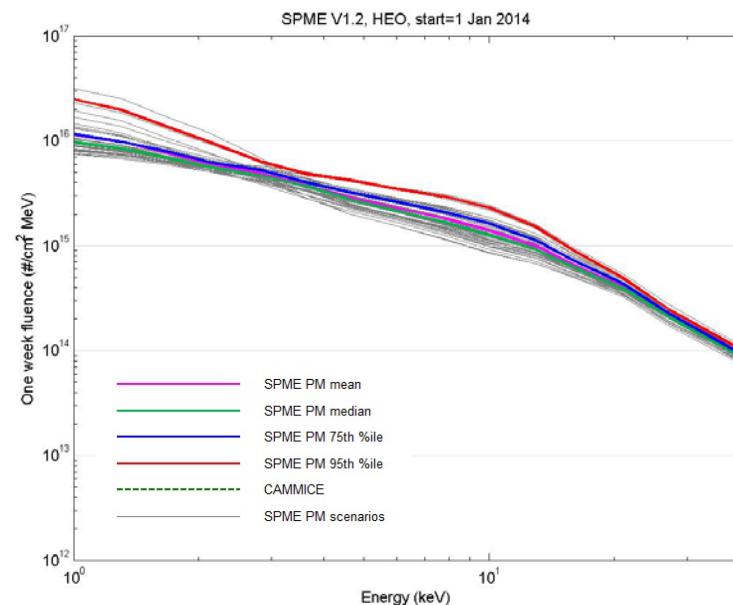
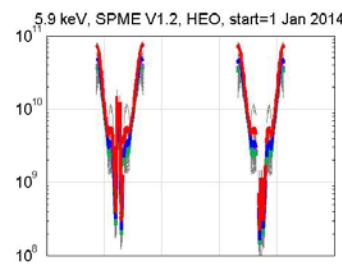
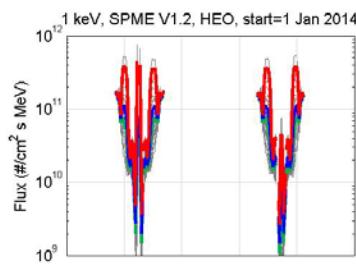
Distribution A: Approved for public release; distribution unlimited.



Distribution A: Approved for public release; distribution unlimited.

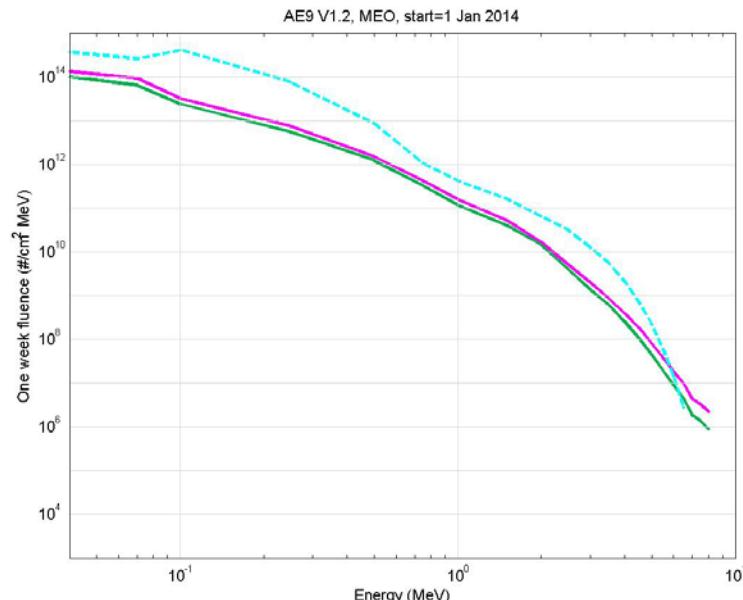
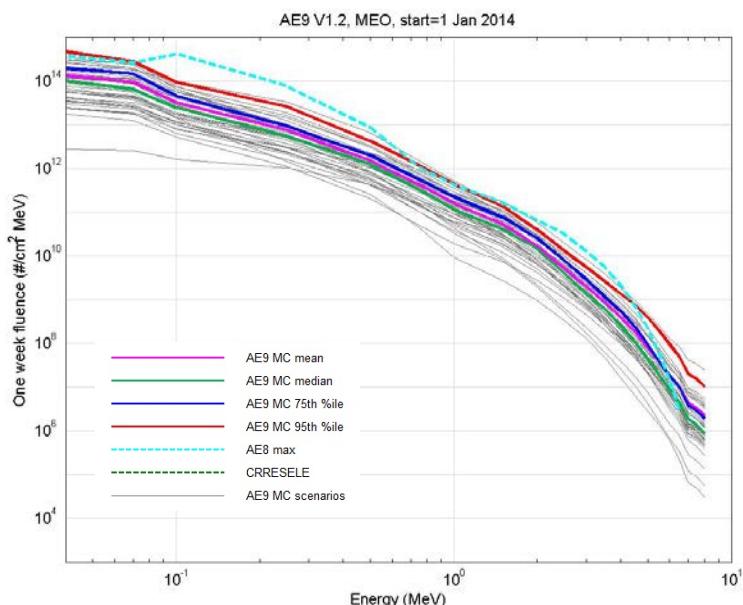
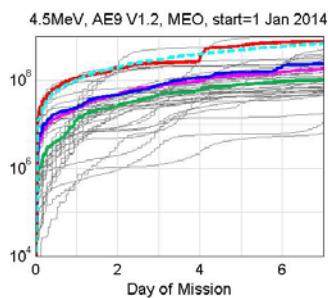
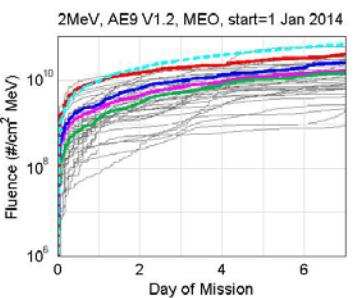
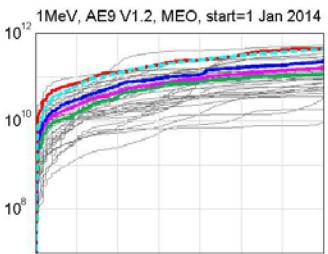
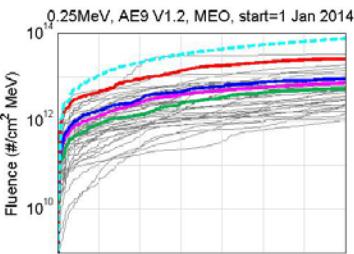
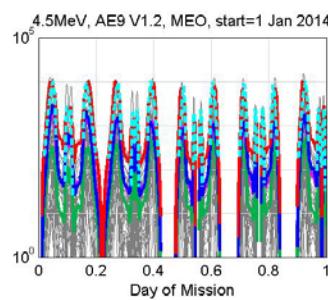
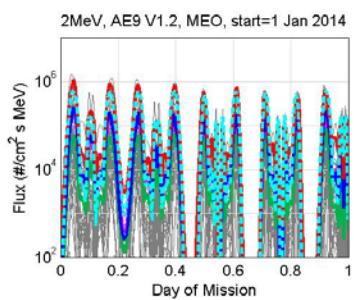
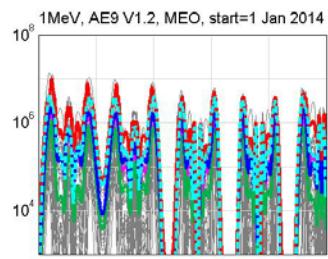
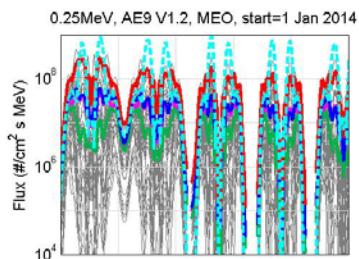
**SPME**

# HEO (38900 km x 1475 km circular, 63.4 deg)



Distribution A: Approved for public release; distribution unlimited.

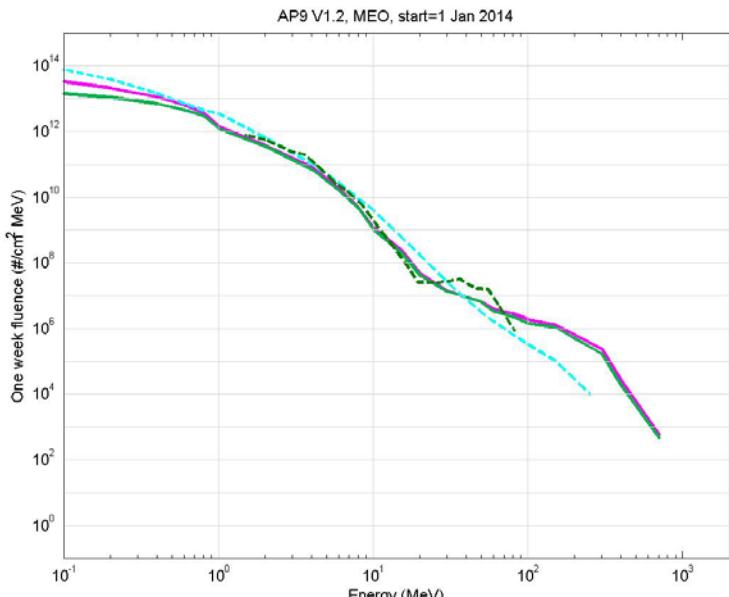
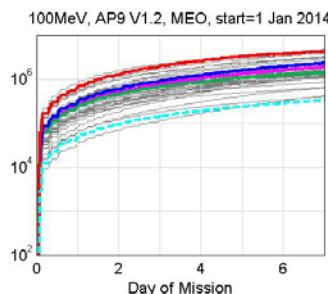
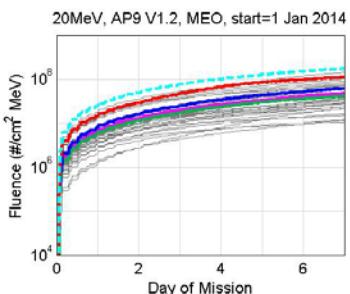
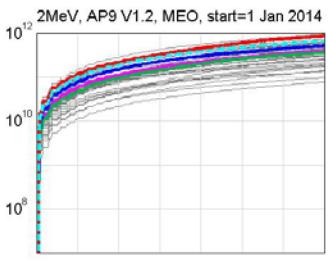
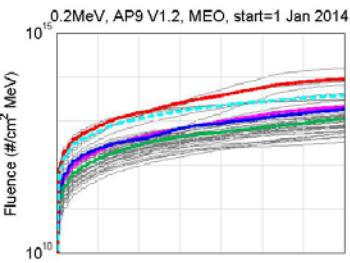
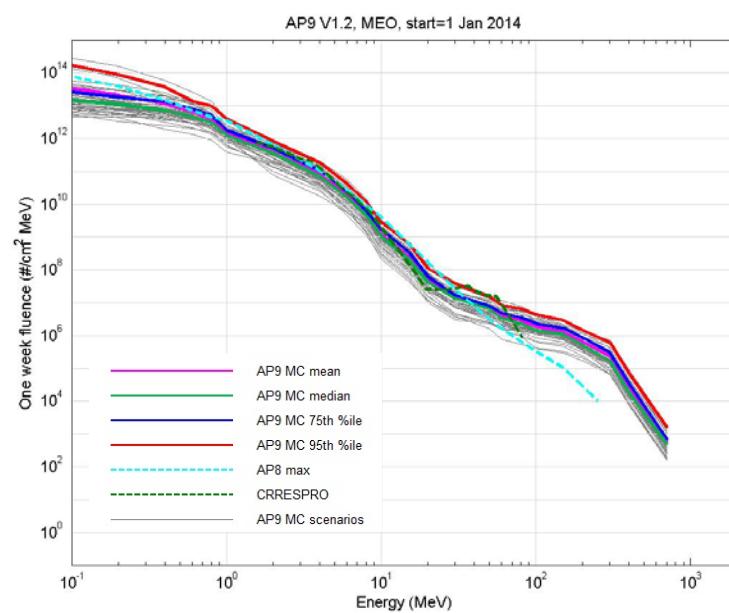
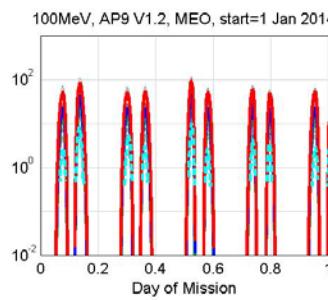
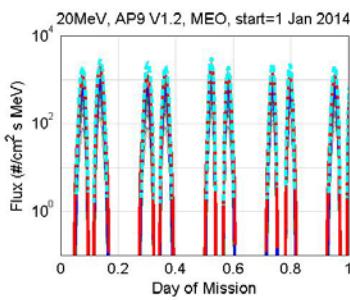
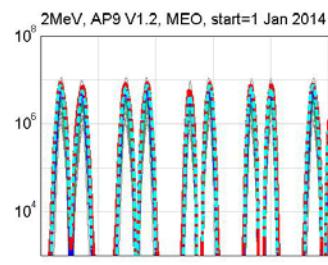
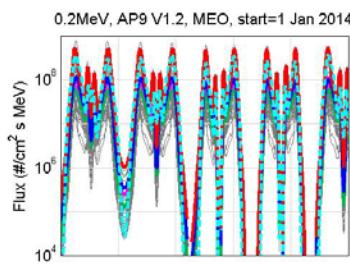
**MEO**

**AE9****MEO (14100km x 3900 km circular, 1200 deg) (DSX)**

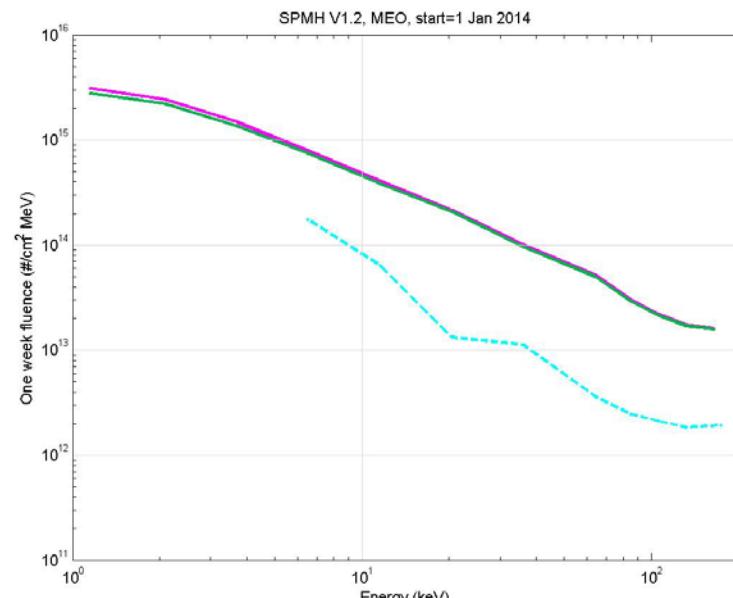
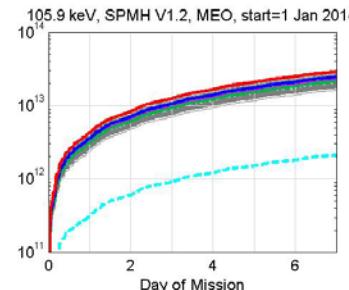
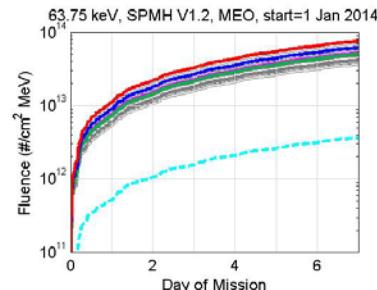
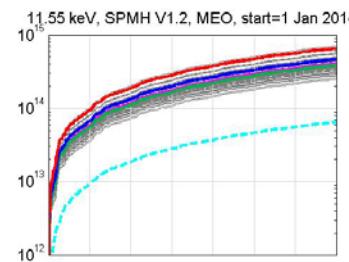
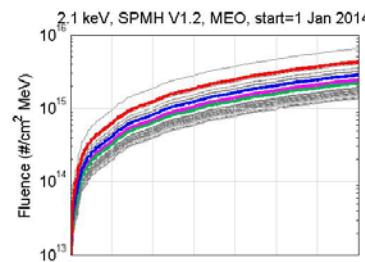
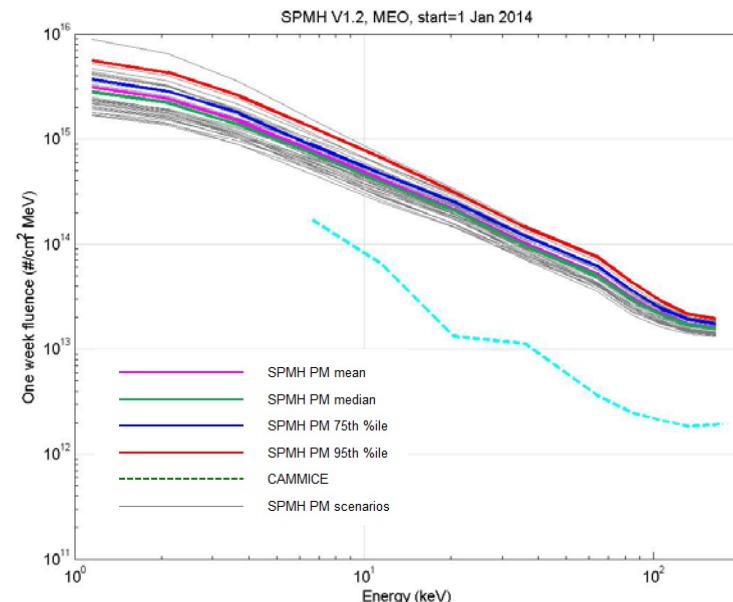
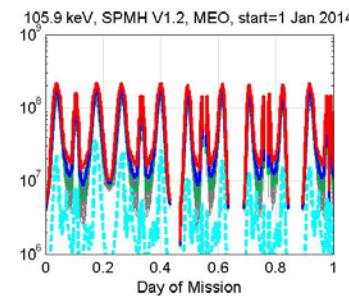
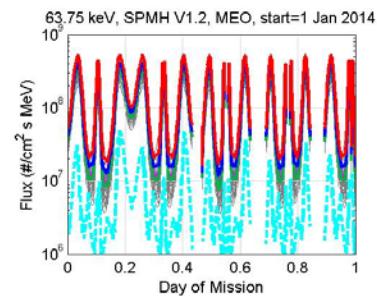
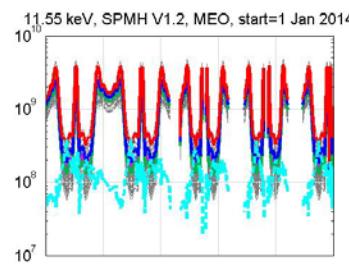
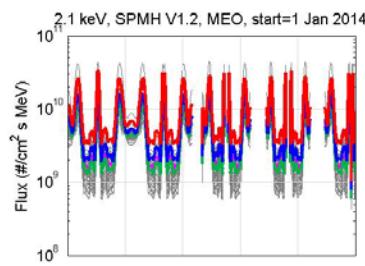
Distribution A: Approved for public release; distribution unlimited.

AP9

# MEO (14100km x 3900 km circular, 1200 deg) (DSX)

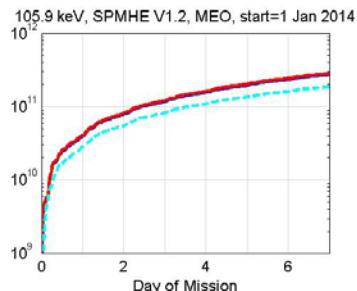
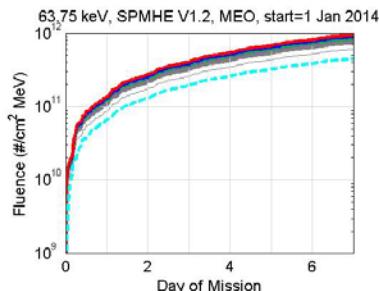
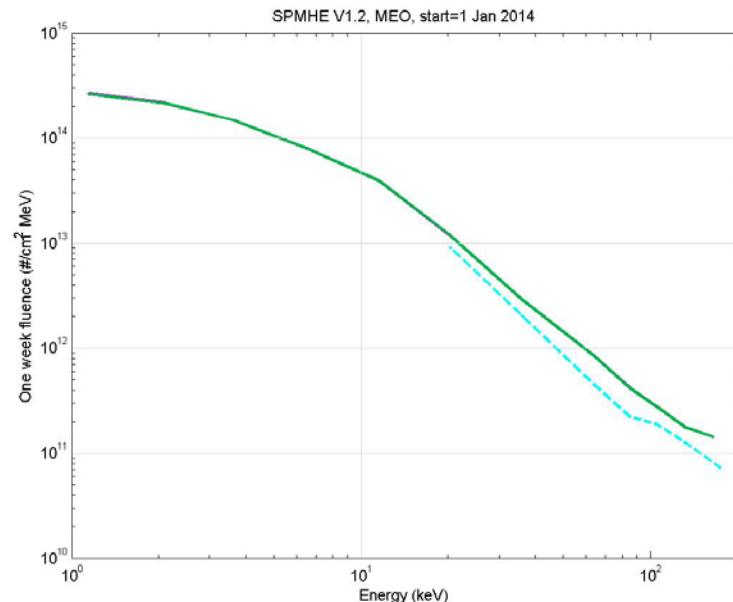
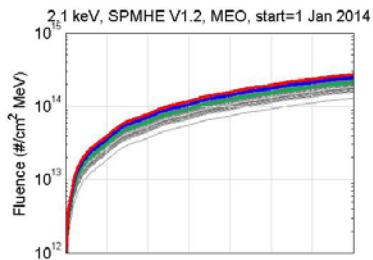
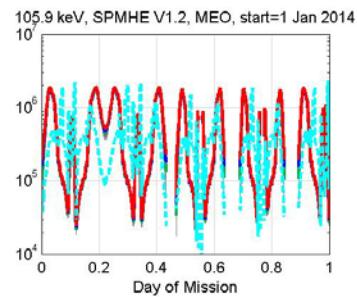
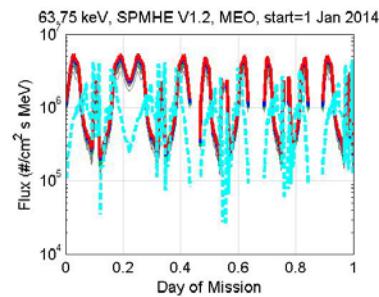
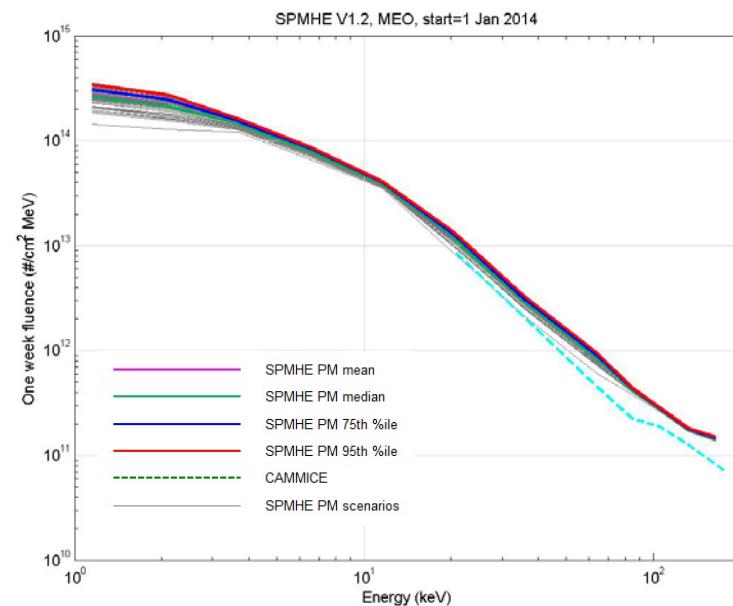
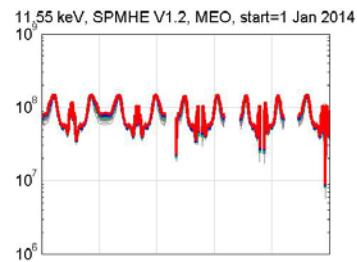
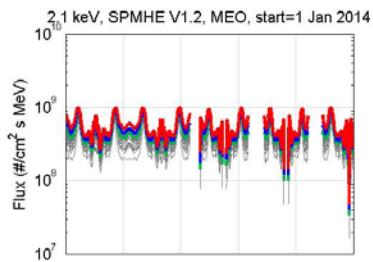


**Distribution A: Approved for public release; distribution unlimited.**

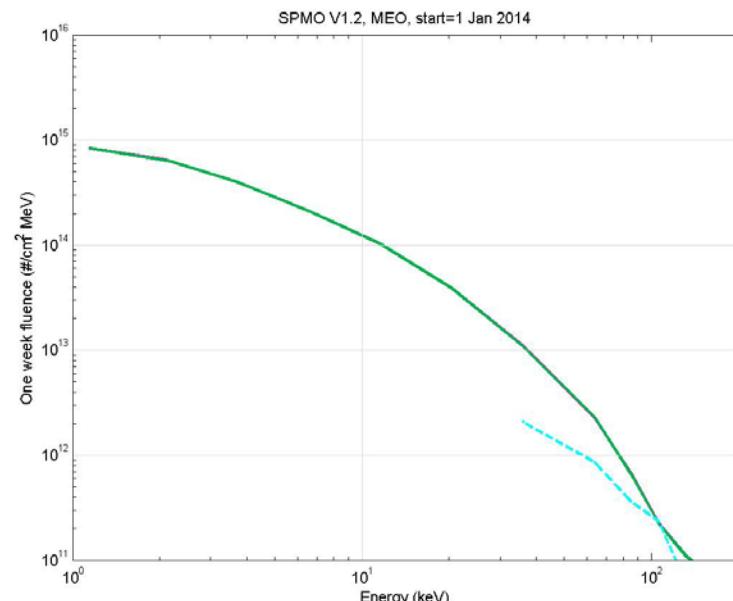
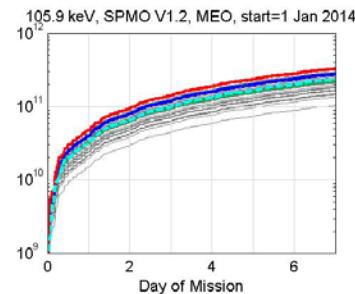
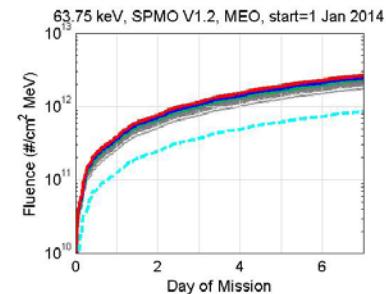
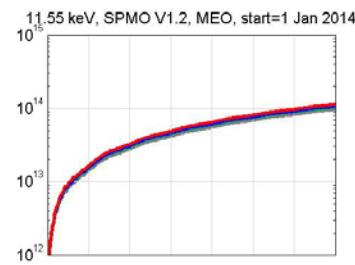
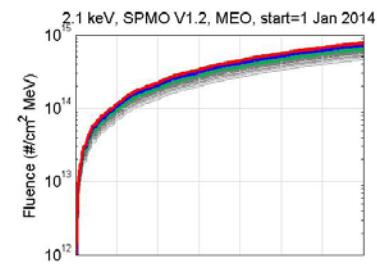
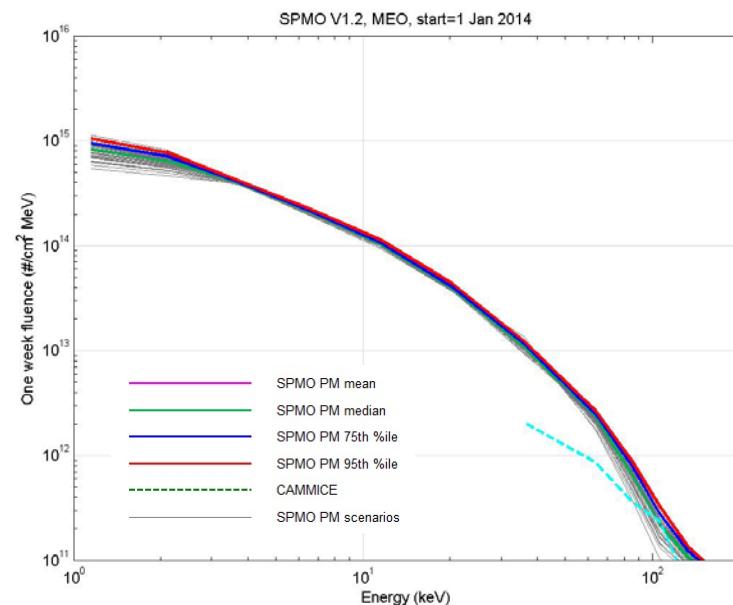
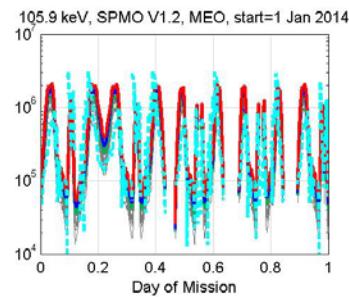
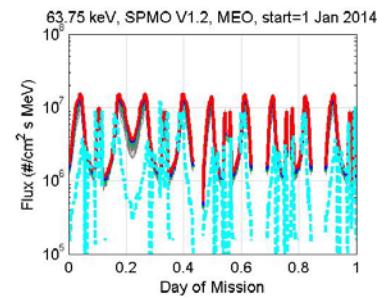
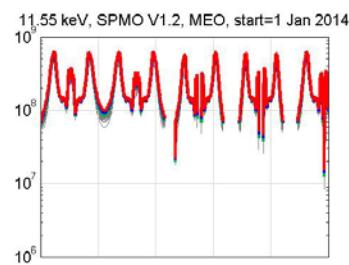
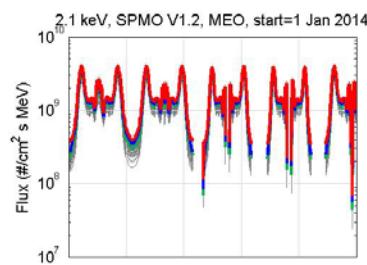
**SPMH****MEO (14100km x 3900 km circular, 1200 deg) (DSX)**

Distribution A: Approved for public release; distribution unlimited.

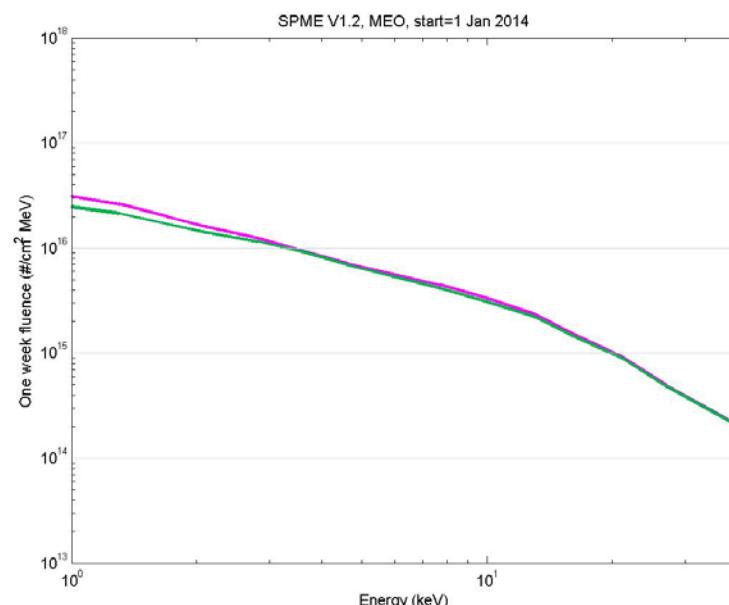
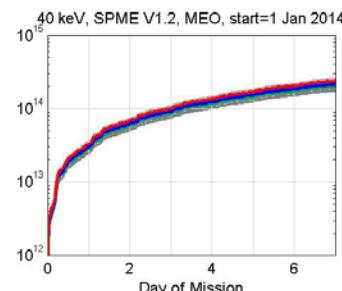
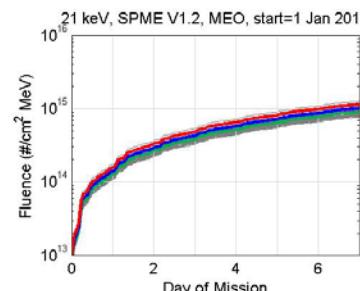
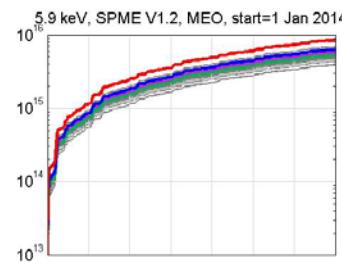
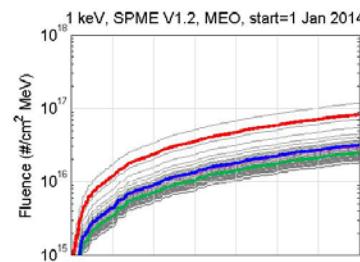
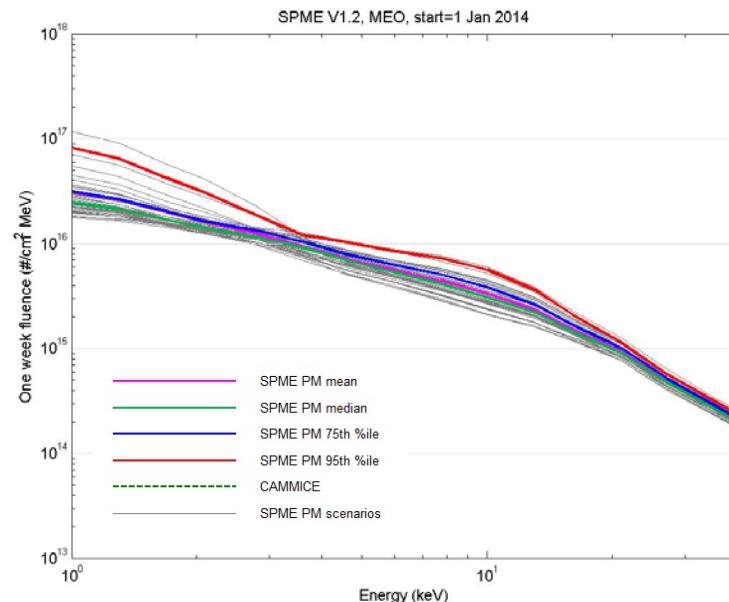
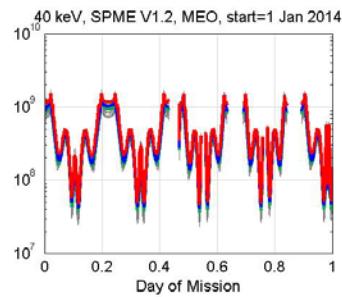
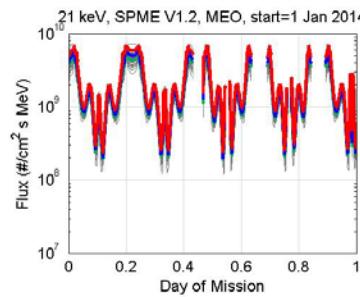
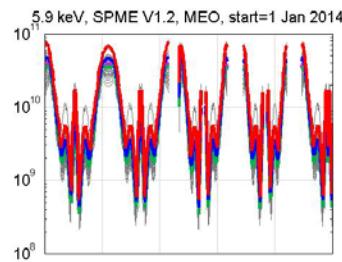
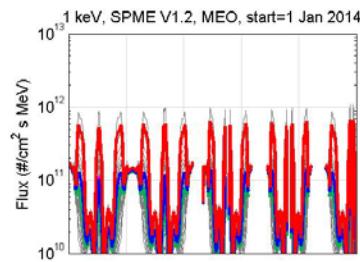
# SPMHE MEO (14100km x 3900 km circular, 1200 deg) (DSX)



**Distribution A: Approved for public release; distribution unlimited.**

**SPMO****MEO (14100km x 3900 km circular, 1200 deg) (DSX)**

Distribution A: Approved for public release; distribution unlimited.

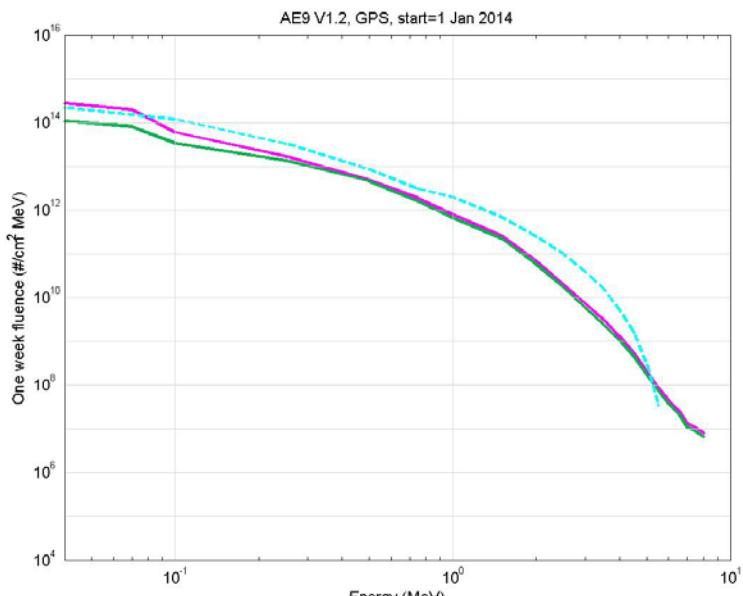
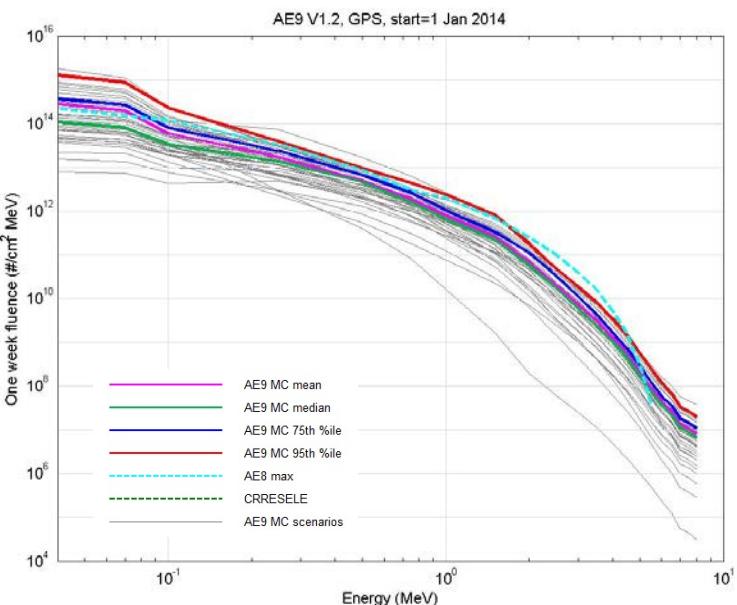
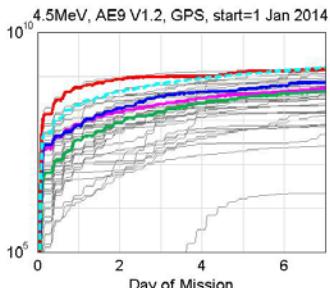
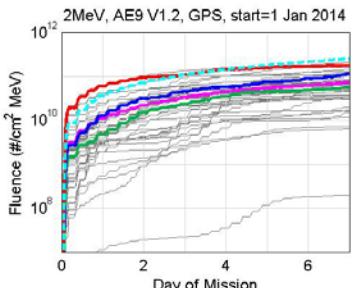
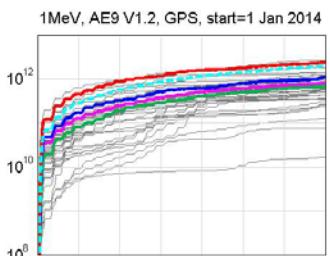
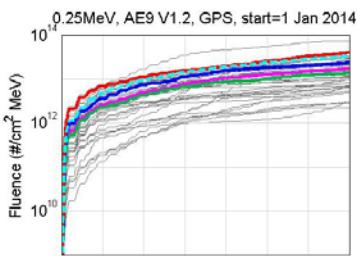
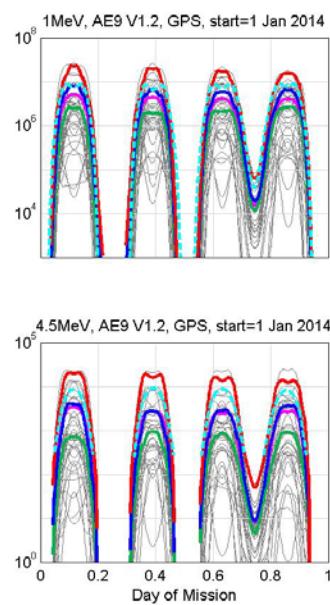
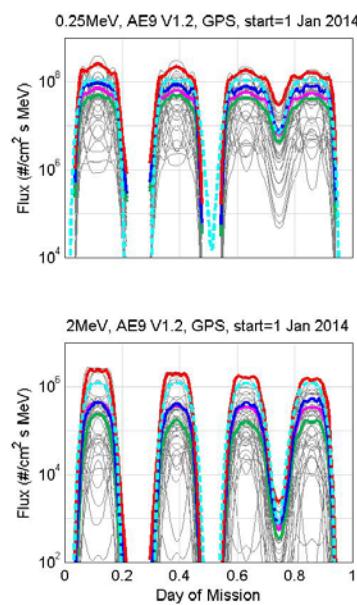
**SPME****MEO (14100km x 3900 km circular, 1200 deg) (DSX)**

Distribution A: Approved for public release; distribution unlimited.

# **GPS**

**AE9**

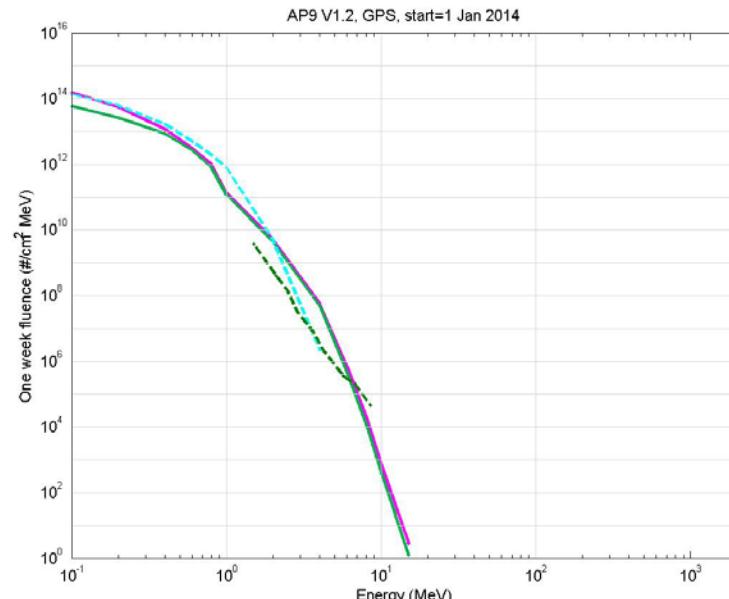
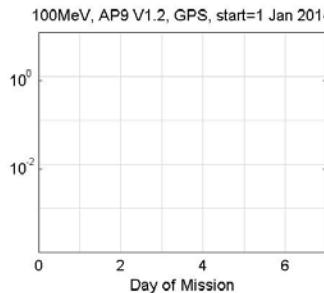
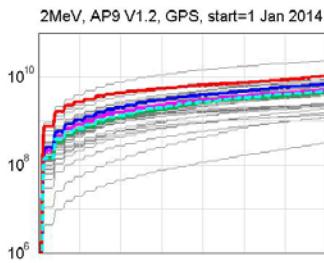
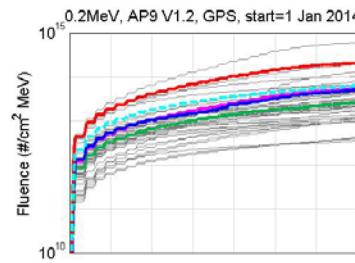
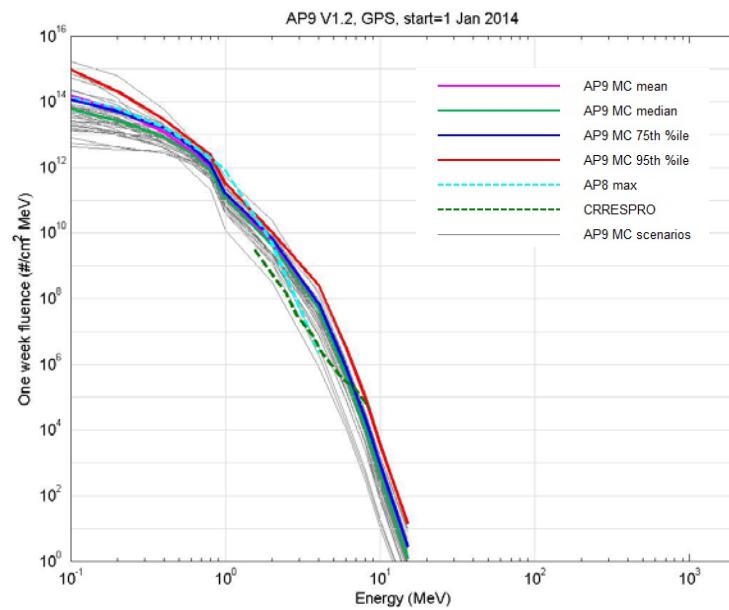
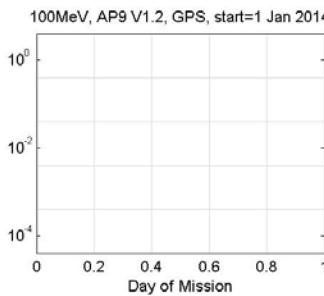
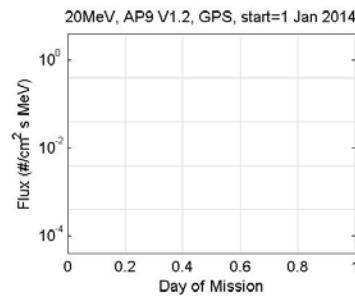
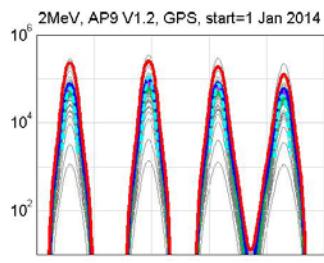
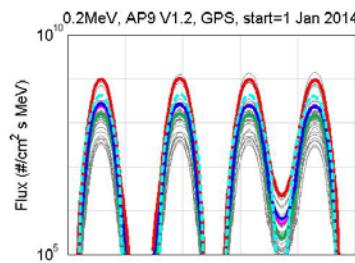
# GPS (20200 km circular, 55 deg)



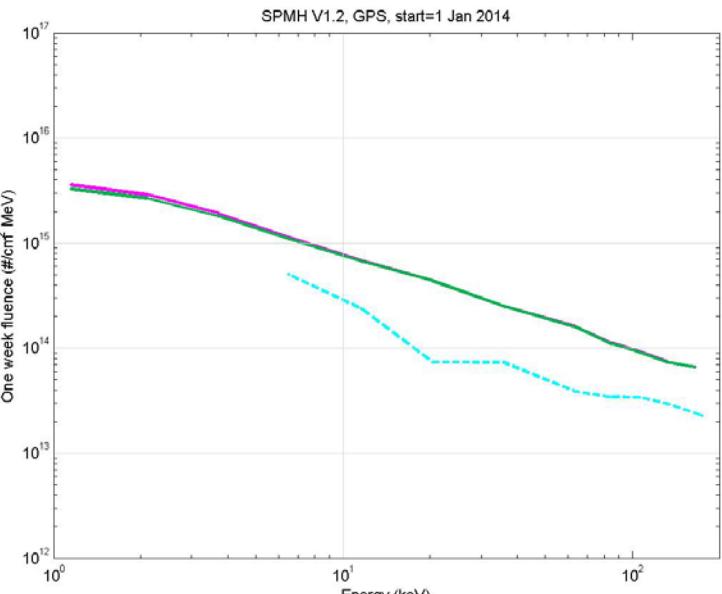
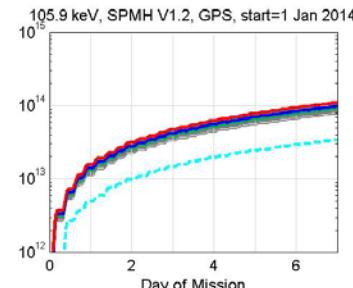
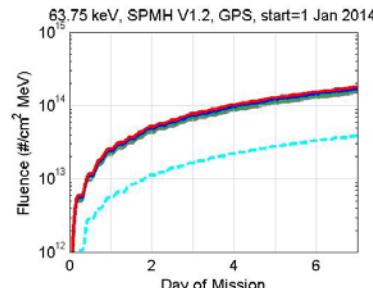
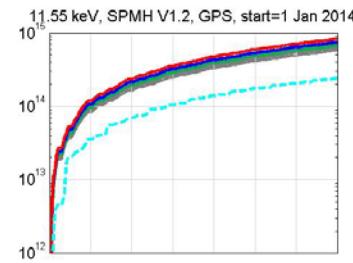
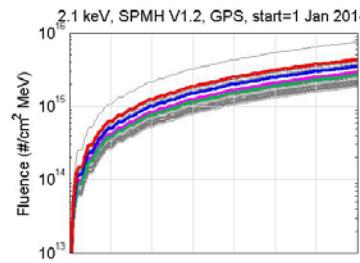
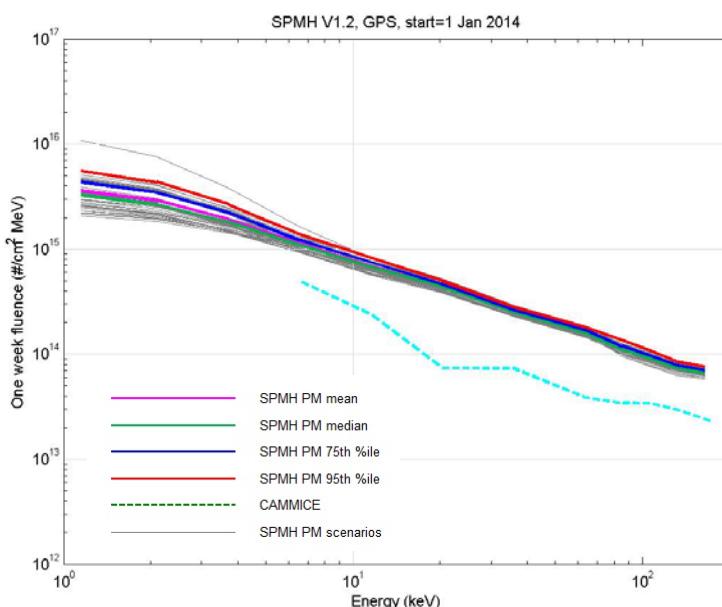
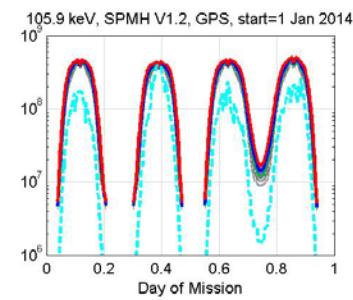
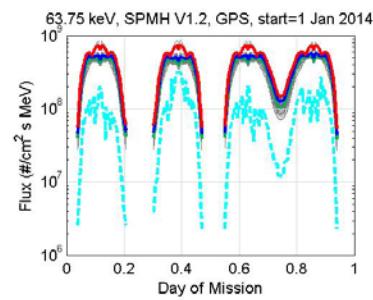
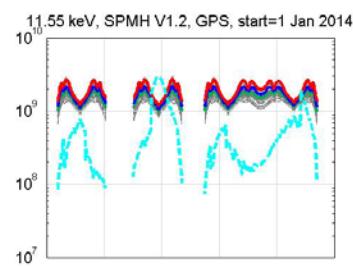
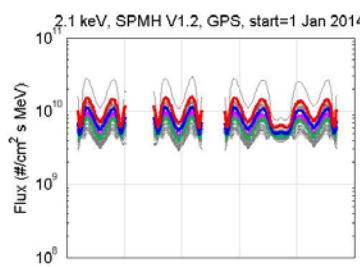
Distribution A: Approved for public release; distribution unlimited.

AP9

# GPS (20200 km circular, 55 deg)

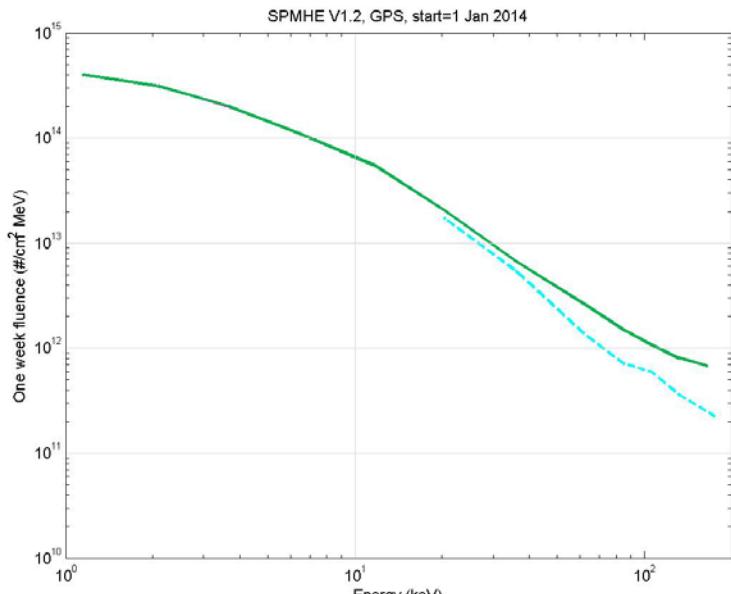
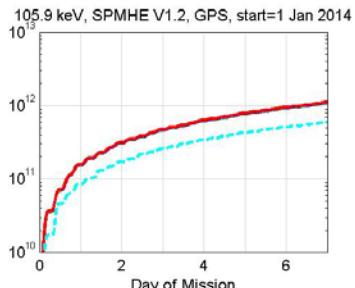
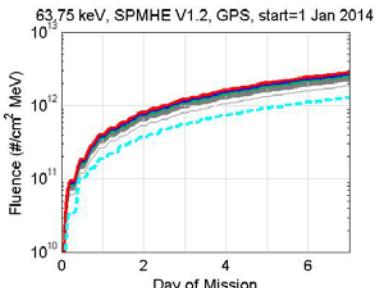
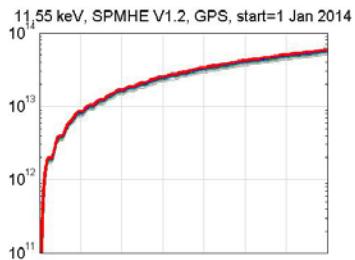
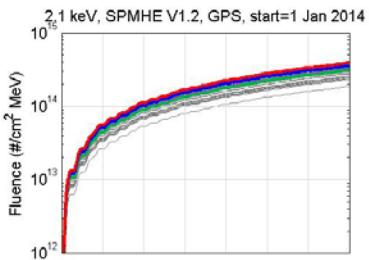
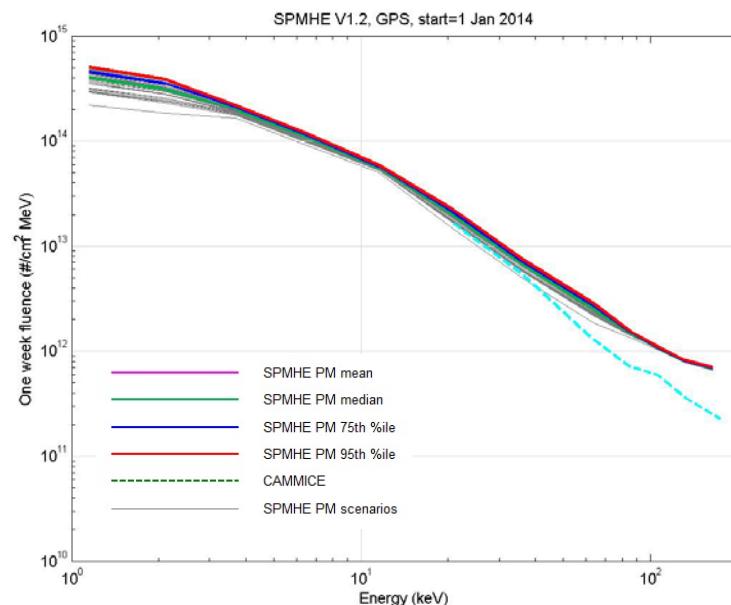
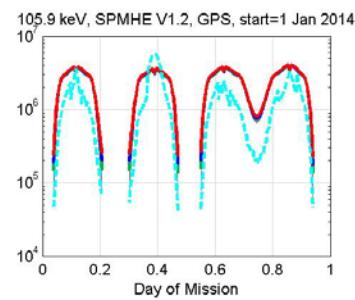
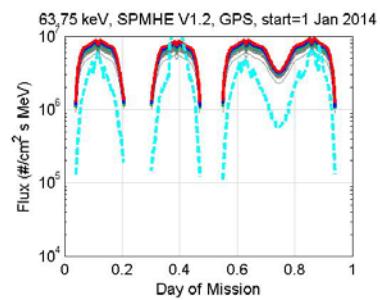
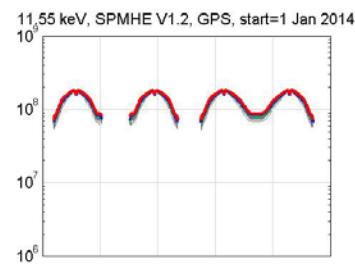
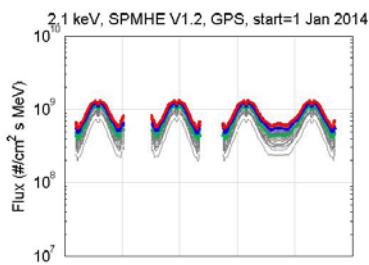


**Distribution A: Approved for public release; distribution unlimited.**

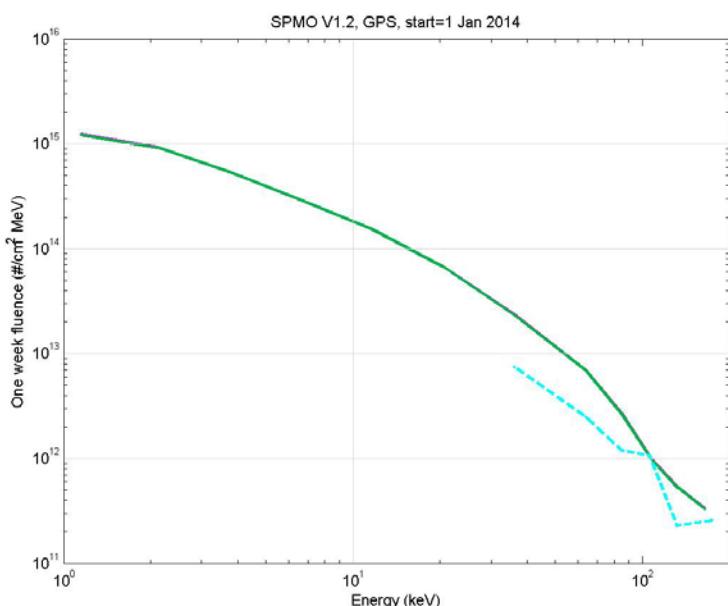
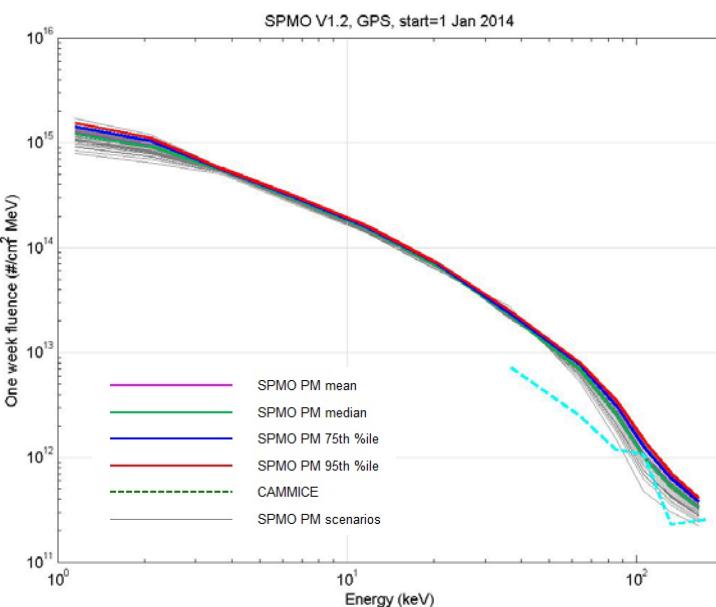
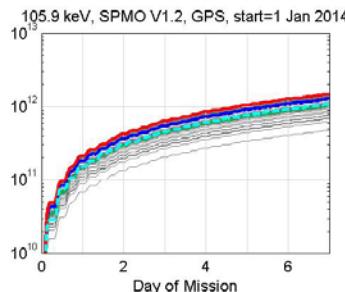
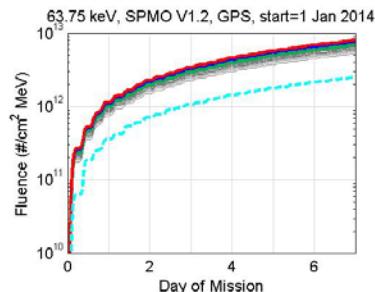
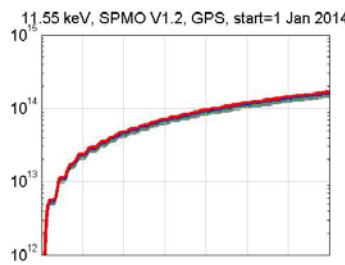
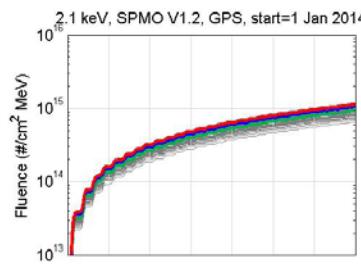
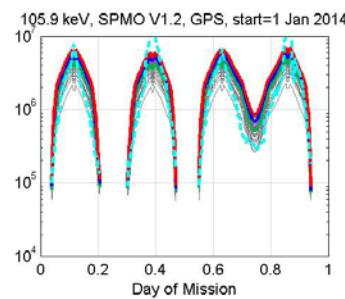
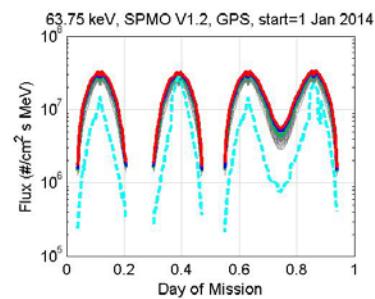
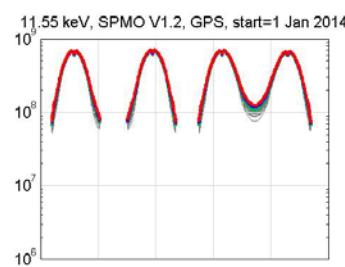
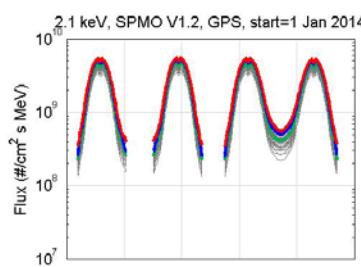


Distribution A: Approved for public release; distribution unlimited.

# SPMHE GPS (20200 km circular, 55 deg)



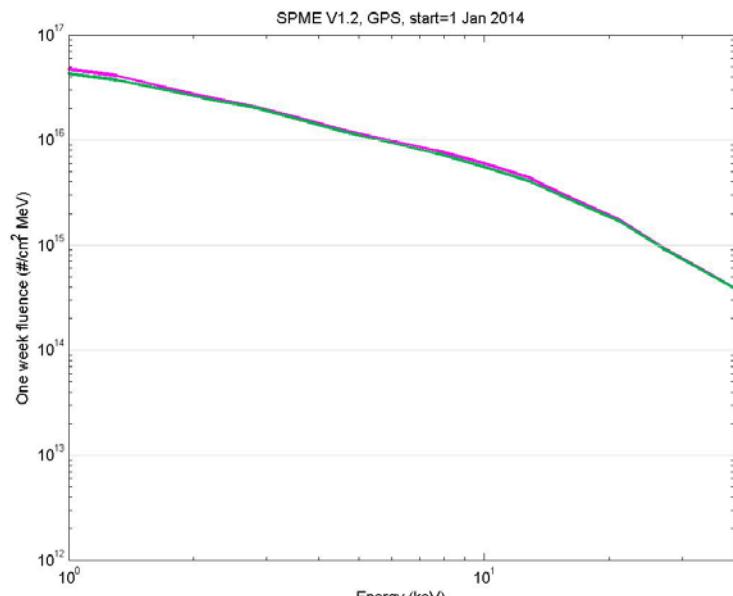
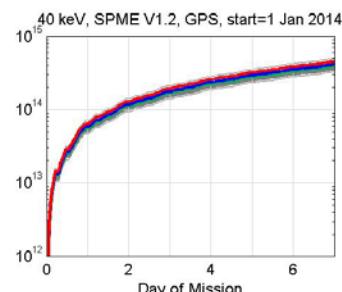
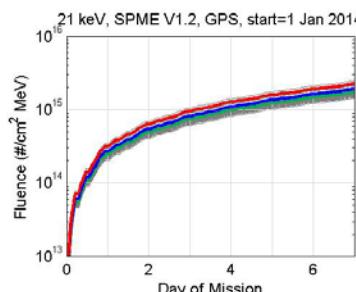
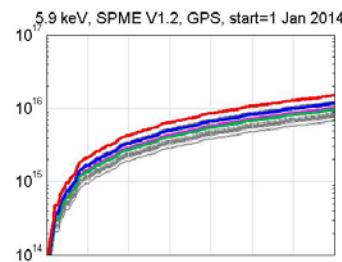
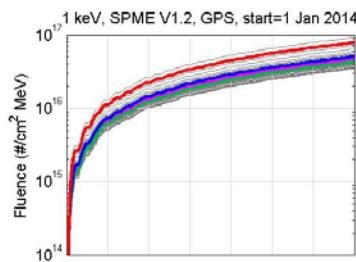
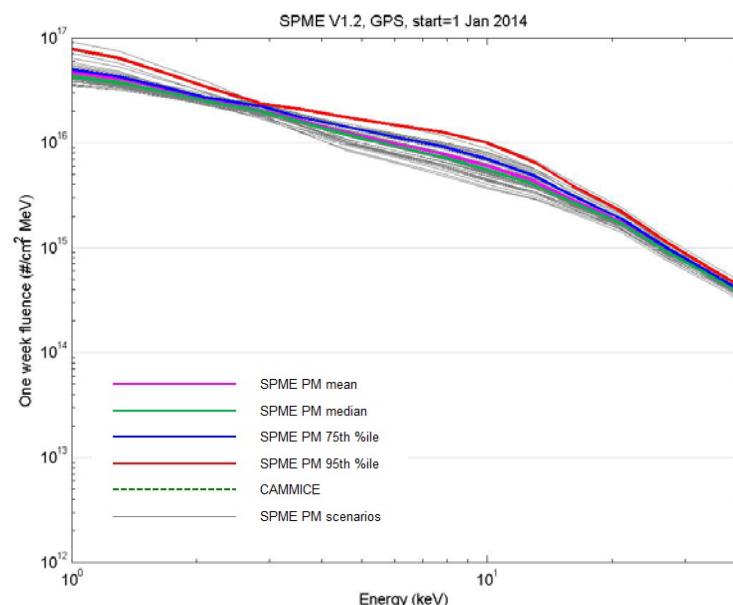
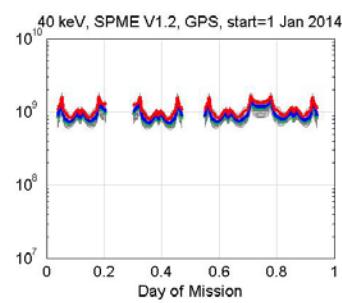
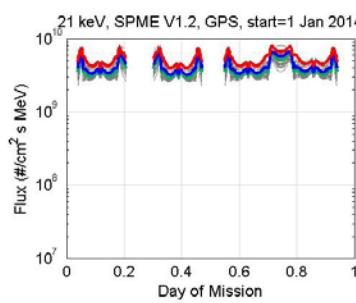
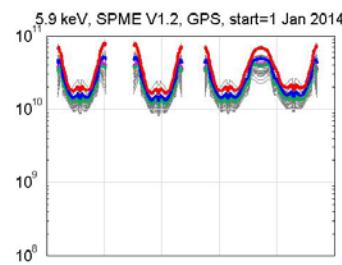
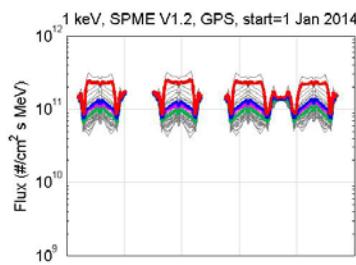
**Distribution A: Approved for public release; distribution unlimited.**



Distribution A: Approved for public release; distribution unlimited.

**SPME**

# GPS (20200 km circular, 55 deg)

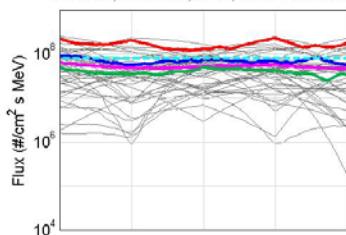


Distribution A: Approved for public release; distribution unlimited.

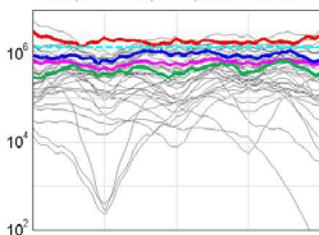
# GEO

**AE9****GEO (25786 km circular, 0 deg)**

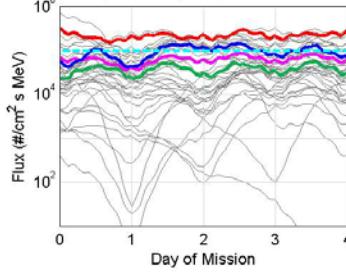
0.25MeV, AE9 V1.2, GEO, start=1 Jan 2014



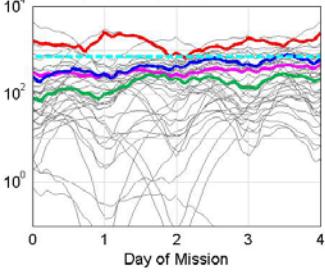
1MeV, AE9 V1.2, GEO, start=1 Jan 2014



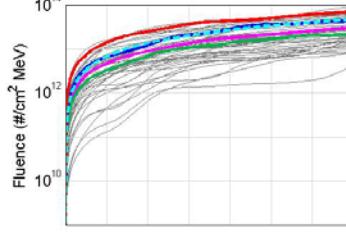
2MeV, AE9 V1.2, GEO, start=1 Jan 2014



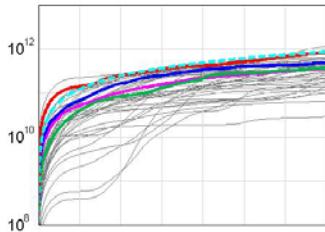
4.5MeV, AE9 V1.2, GEO, start=1 Jan 2014



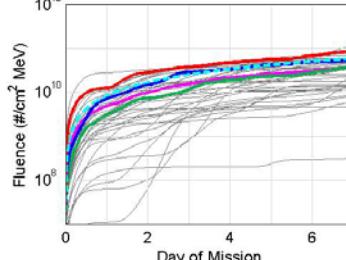
0.25MeV, AE9 V1.2, GEO, start=1 Jan 2014



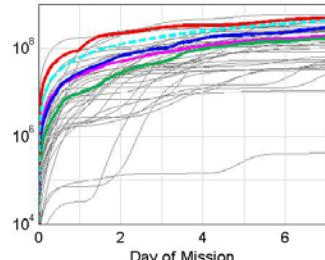
1MeV, AE9 V1.2, GEO, start=1 Jan 2014



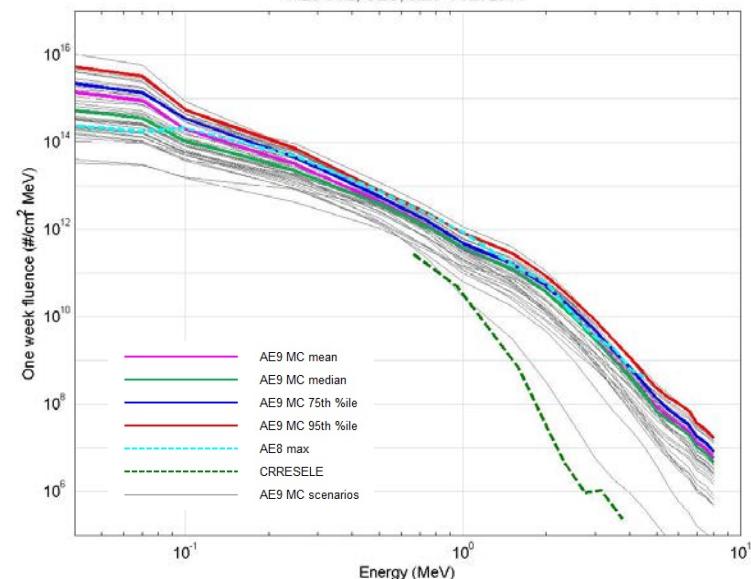
2MeV, AE9 V1.2, GEO, start=1 Jan 2014



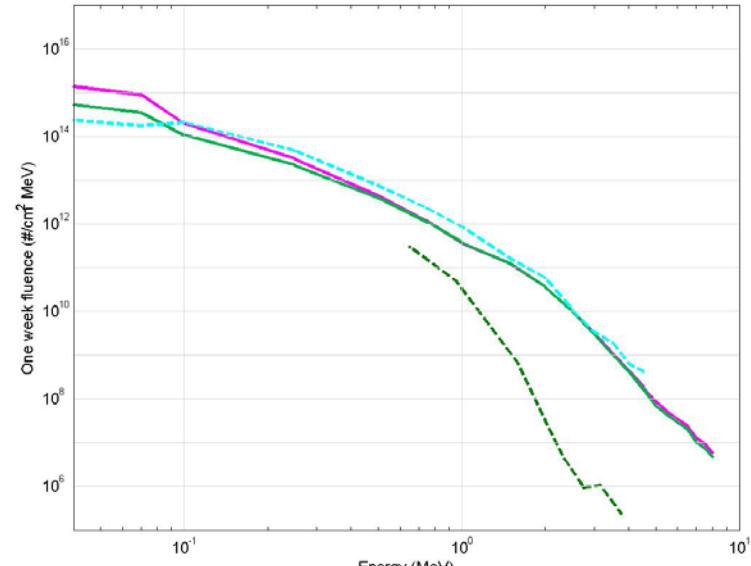
4.5MeV, AE9 V1.2, GEO, start=1 Jan 2014



AE9 V1.2, GEO, start=1 Jan 2014

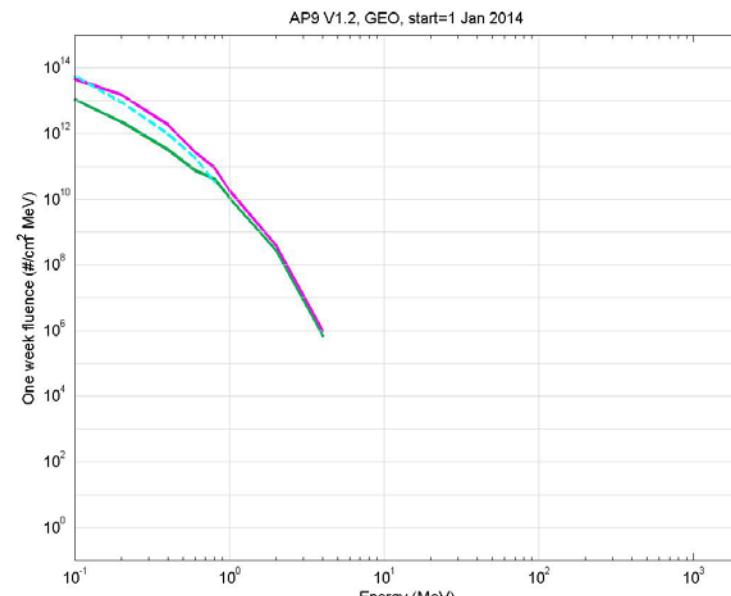
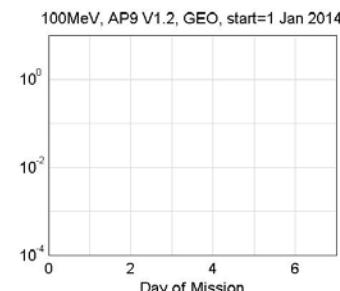
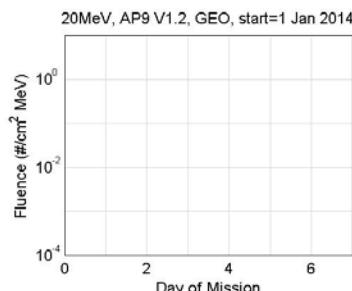
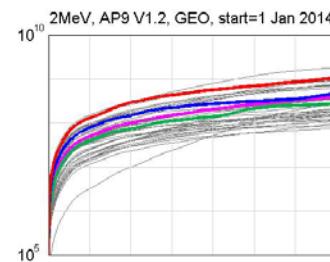
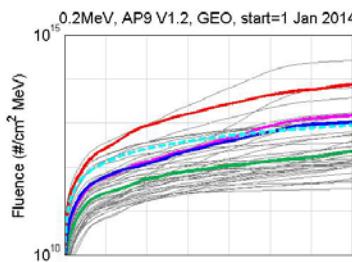
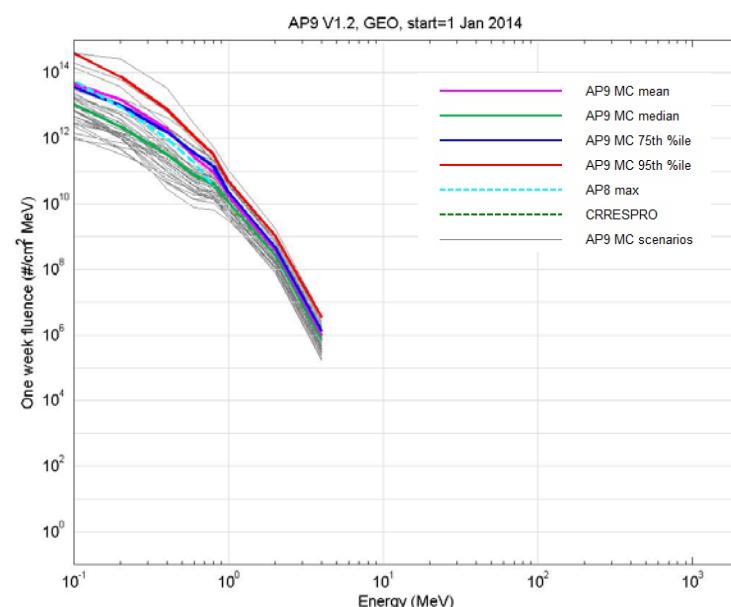
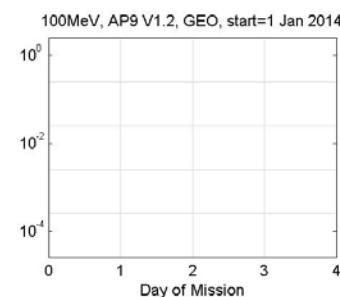
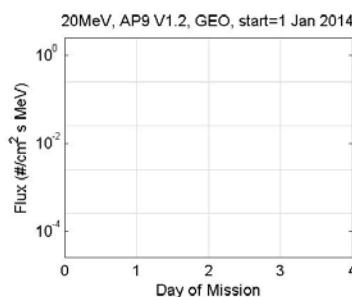
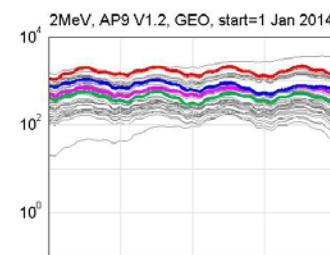
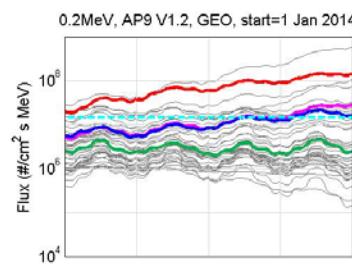


AE9 V1.2, GEO, start=1 Jan 2014

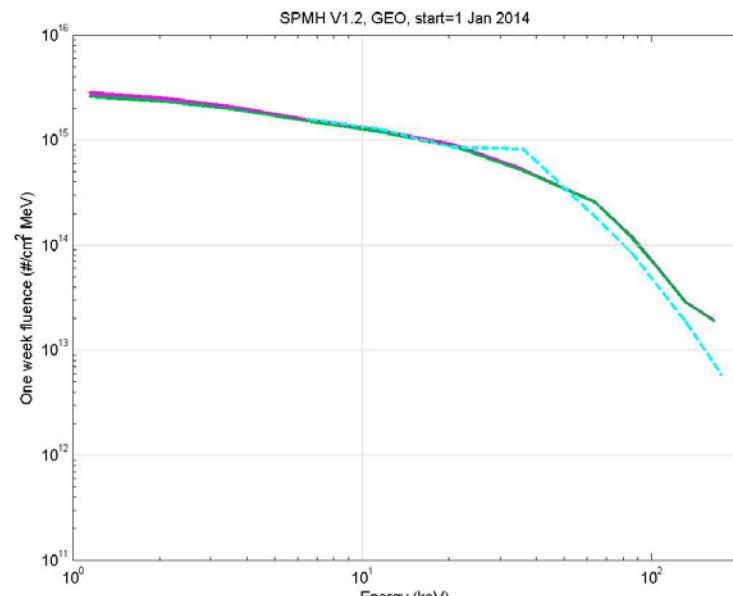
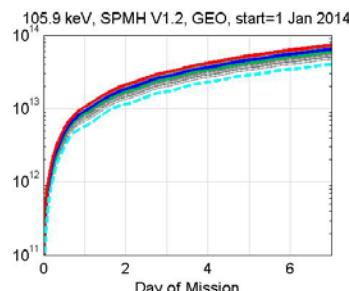
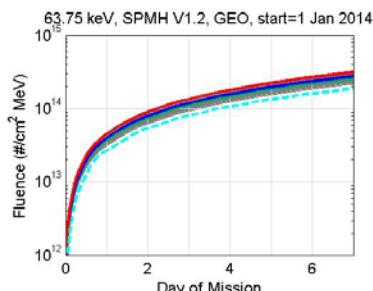
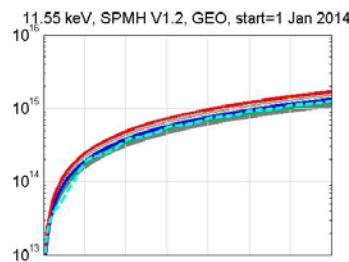
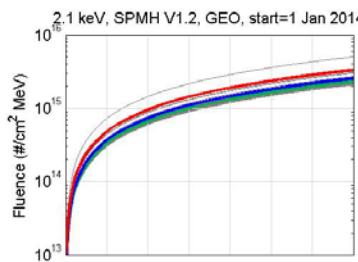
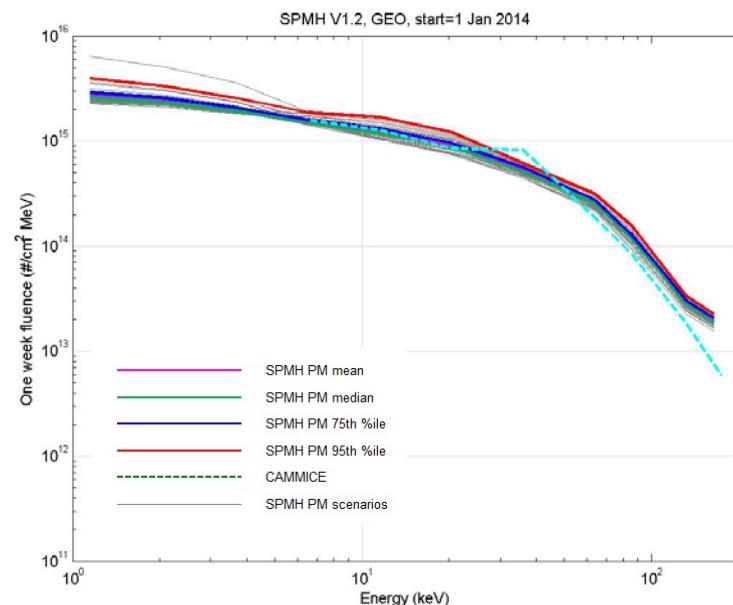
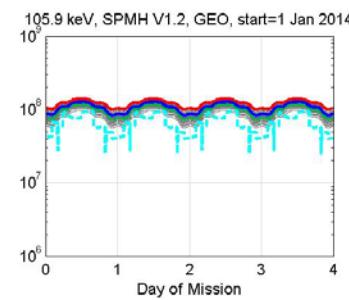
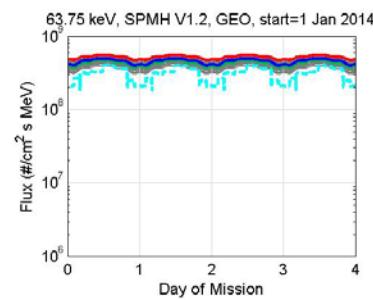
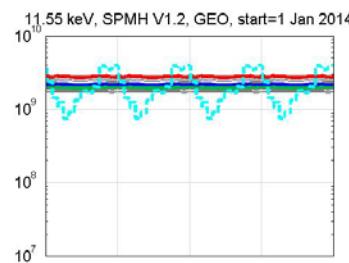
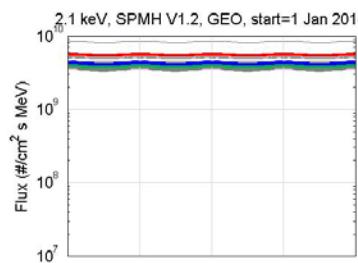
**Distribution A: Approved for public release; distribution unlimited.**

AP9

# GEO (25786 km circular, 0 deg)

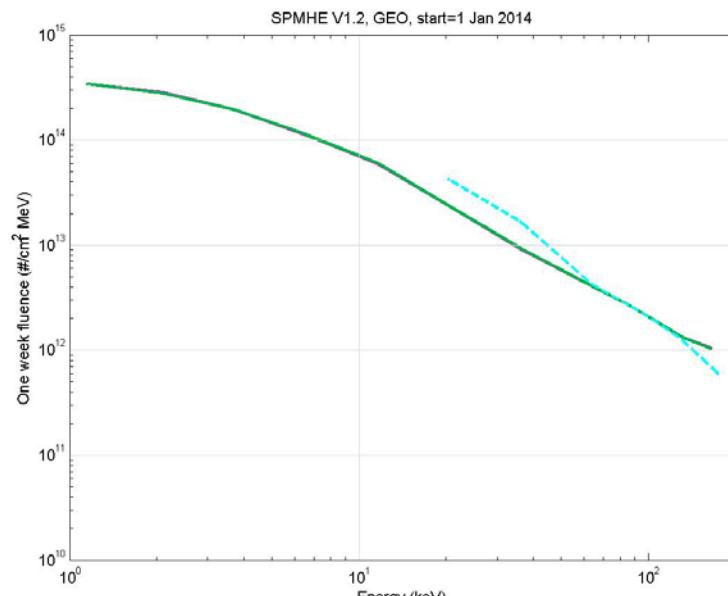
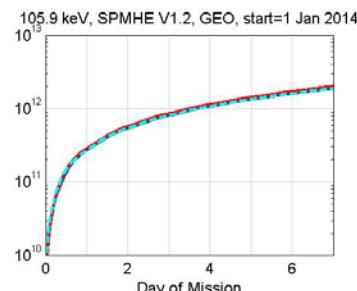
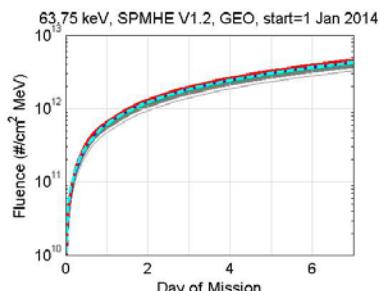
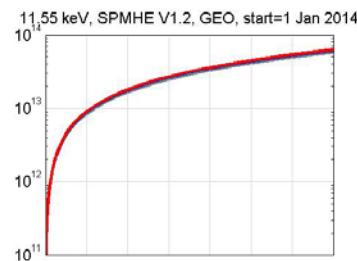
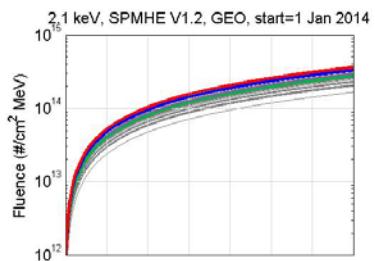
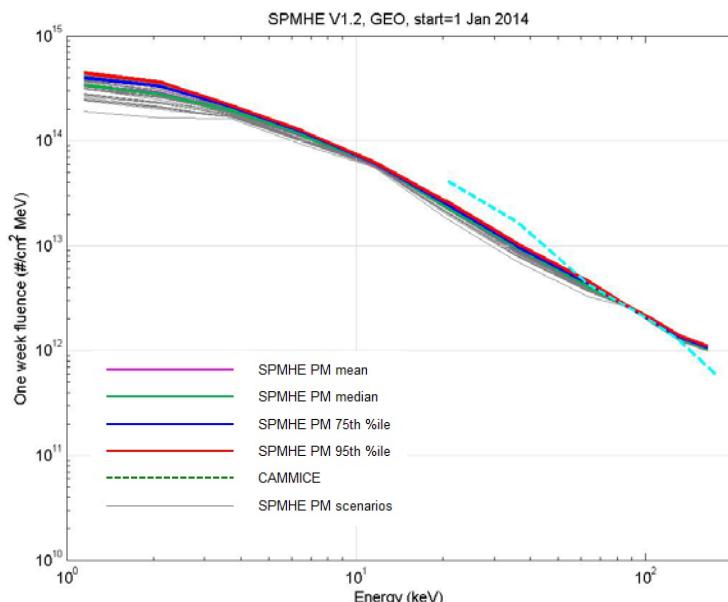
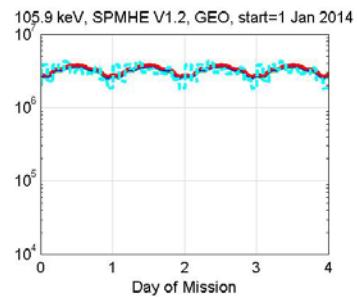
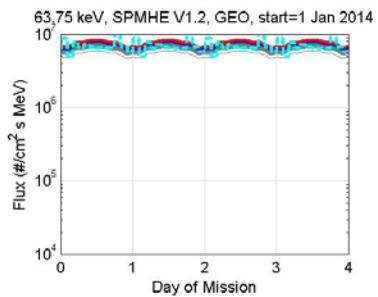
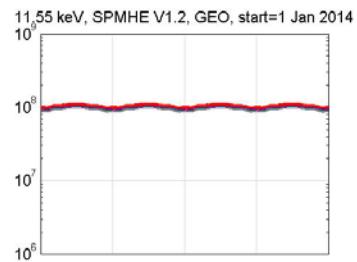
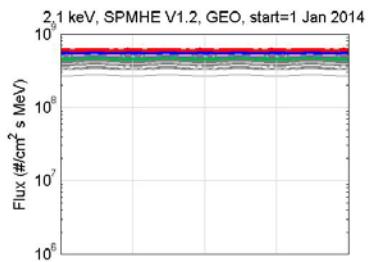


**Distribution A: Approved for public release; distribution unlimited.**

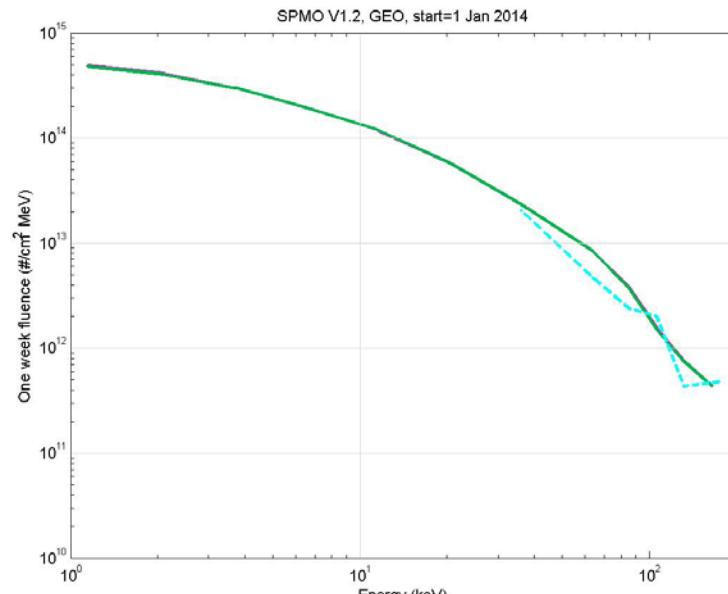
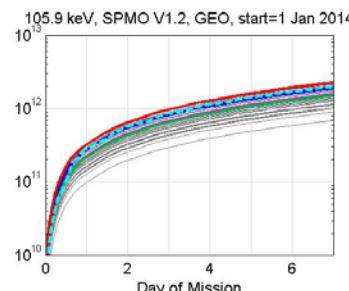
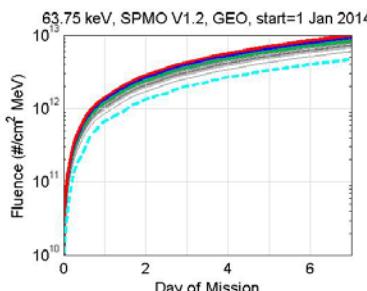
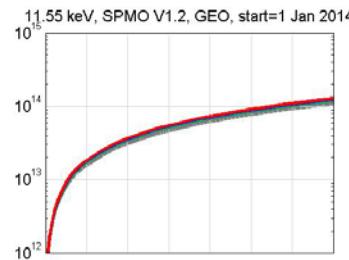
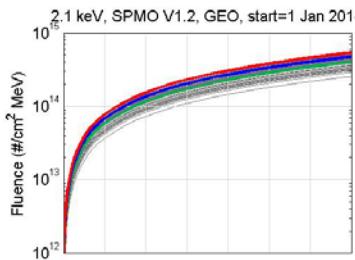
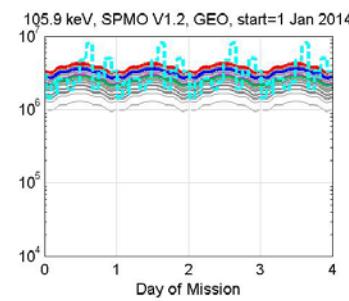
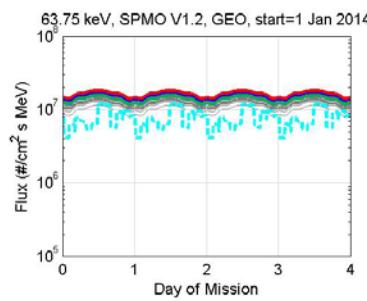
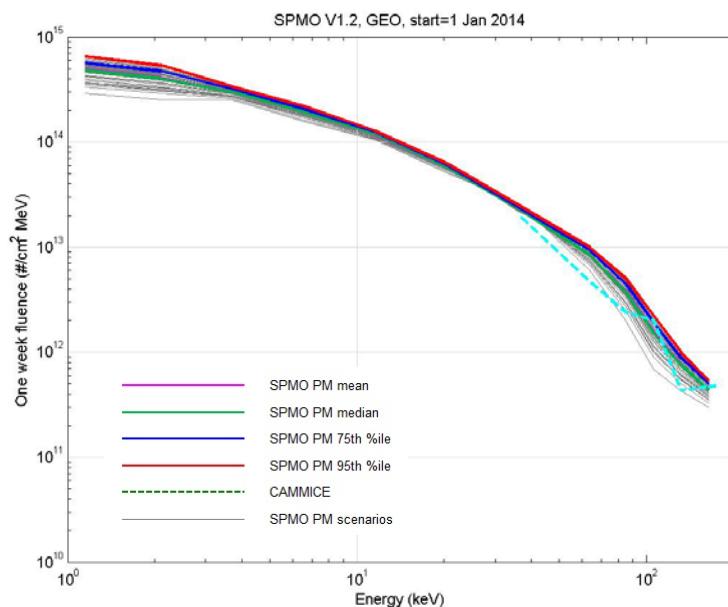
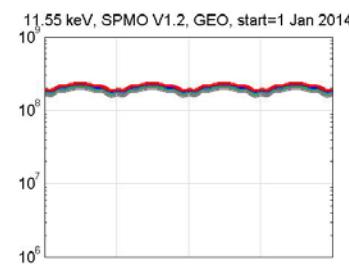
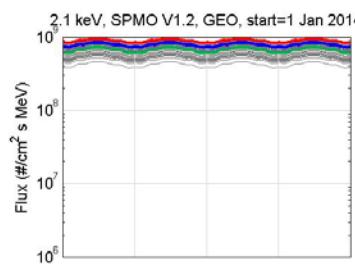
**SPMH****GEO (25786 km circular, 0 deg)**

Distribution A: Approved for public release; distribution unlimited.

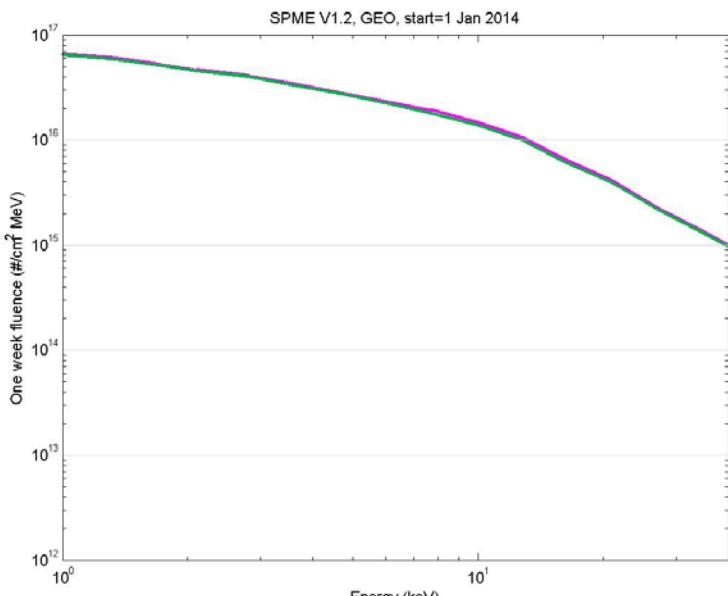
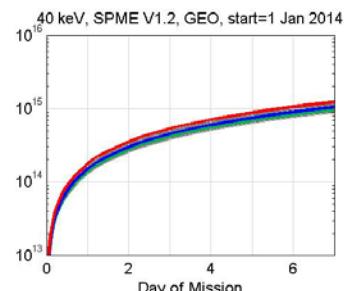
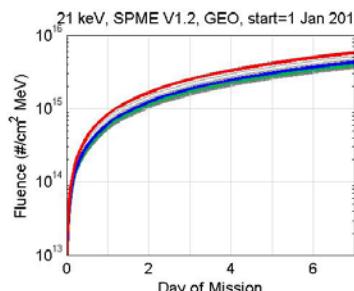
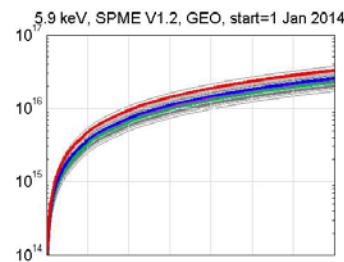
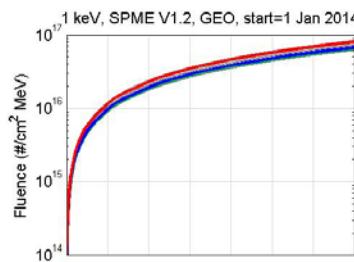
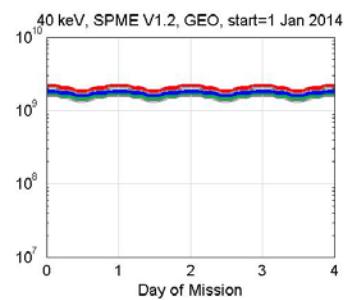
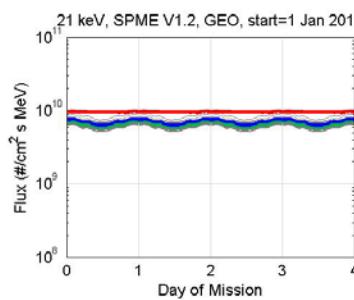
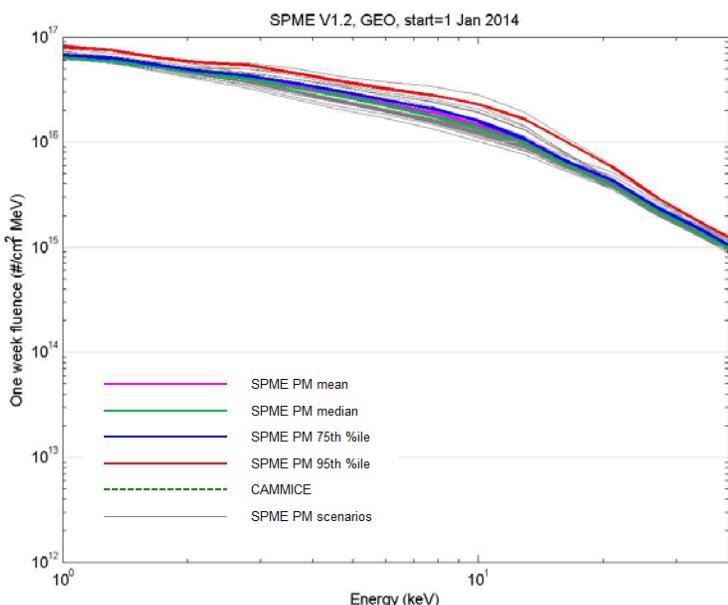
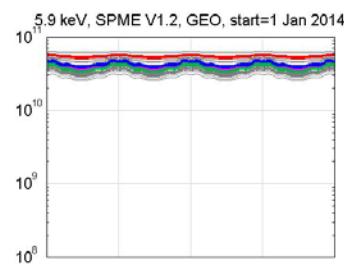
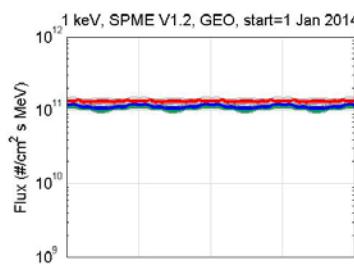
# SPMHE    GEO (25786 km circular, 0 deg)



**Distribution A: Approved for public release; distribution unlimited.**

**SPMO****GEO (25786 km circular, 0 deg)**

Distribution A: Approved for public release; distribution unlimited.

**SPME****GEO (25786 km circular, 0 deg)**

**Distribution A: Approved for public release; distribution unlimited.**