



Global Observations of Aerosol and Ozone from SAGE III ISS – A First Year Showcase

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SAGE III ISS
Global Perspective

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SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

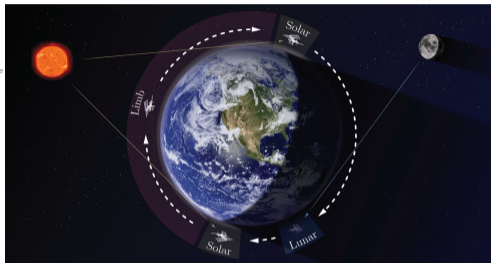
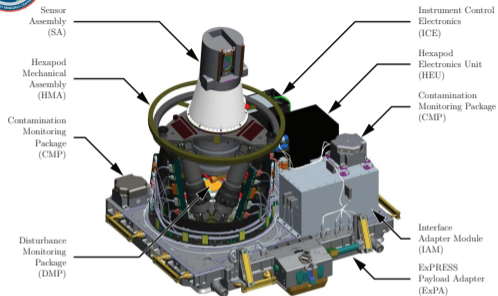
Satellite
Aerosol/Ozone

Conclusion

Questions



SAGE III ISS Overview



- ▶ Stratospheric Aerosol and Gas Experiment III (SAGE III) is an external payload that was launched on SpaceX CRS-10 on 19 February 2017 and robotically installed on ELC-4.
- ▶ 67 profiles within 1000 km of Boulder, 18 within 500 km, and 9 within 500 km and 2° latitude as of 31 March 2018.

SAGE III ISS Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

Questions

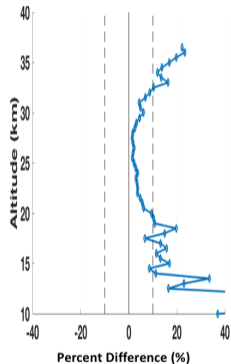


NDACC/SAGE Comparisons — Ozone

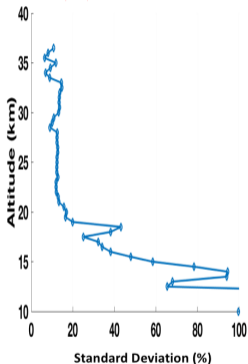


SAGE III Matched to NDACC Ozonesondes

Ozone Mean Percent Difference



Ozone Std Dev of Percent Difference



Lat Difference Max 5 Degrees
 Lon Difference Max 15 Degrees
 Time Difference Max 24 hours
 NOTE: SAGE III/ISS Solar Events Only

57 Matches total:		
Hohenpeissenberg	(48N, 11E)	31
Lauder	(45S, 170E)	5
Reunion, St Denis	(22S, 56E)	3
OHP	(44N, 6E)	2
Payerne	(47N, 7E)	13
Dumont d'Urville	(67S, 140E)	3

See Susan Kizer, "Validation of the Stratospheric Aerosol and Gas Experiment III on the International Space Station (SAGE III/ISS) Science Data Ozone Product: Preliminary Results," P-51 at the Poster Session.

SAGE III ISS
 Global Perspective

Kevin Leavor

SAGE Overview

NDACC
 Contributions

SAGE Wildfire
 Observations

Satellite
 Aerosol/Ozone

Conclusion

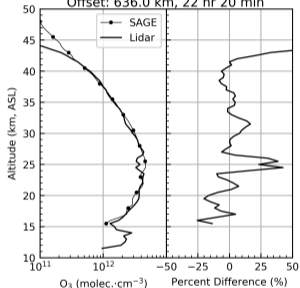
Questions



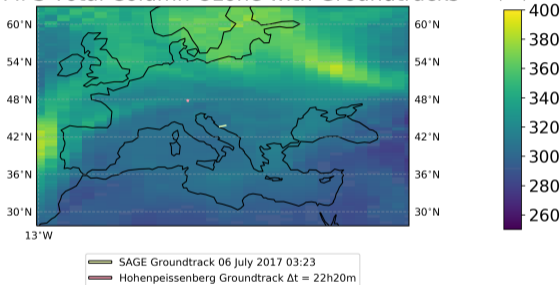
NDACC/SAGE Comparisons — Ozone



Hohenpeissenberg Aerosol O₃: 2017-07-06 03:23 UTC
Offset: 636.0 km, 22 hr 20 min



OMPS Total Column Ozone with Groundtracks



See Travis Knepp, “Validation of the Stratospheric Aerosol and Gas Experiment-III (SAGE-III) Aerosol Data Product,” P-50 at the Poster Session.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

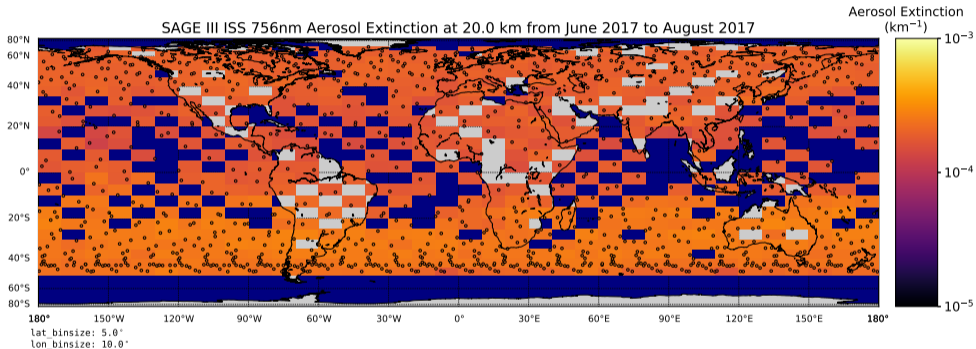
Questions



Pacific Northwest Wildfires/PyroCb



Before



- ▶ Uniform stratospheric aerosol layer before summer wildfires.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

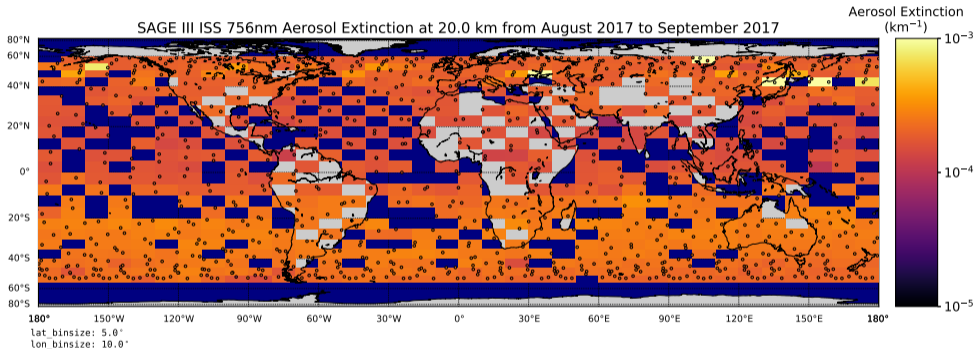
Questions



Pacific Northwest Wildfires/PyroCb



Concurrent



- ▶ Sparse observations of up to 10× increase of aerosol extinction in layer.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

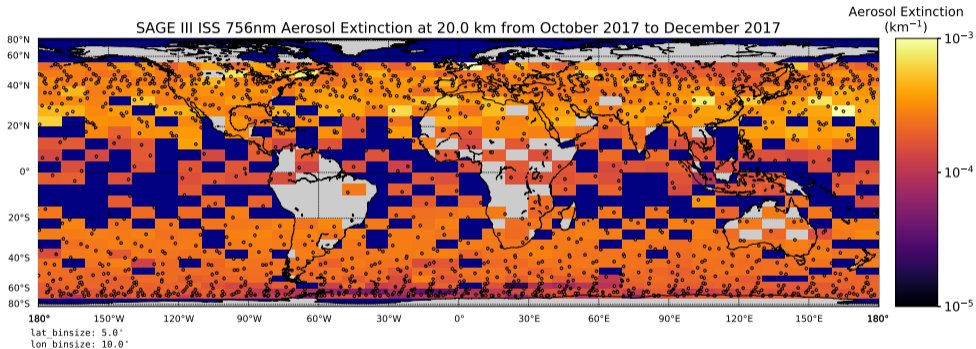
SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

Questions

After



- ▶ Aerosol dispersed through Northern latitudes after fires ceased.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

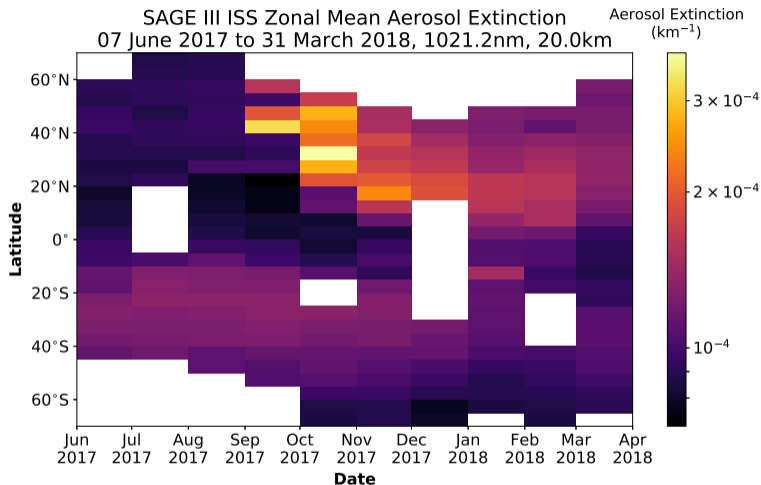
Satellite
Aerosol/Ozone

Conclusion

Questions



Zonal Mean Aerosol Extinction



- ▶ Clear injection of aerosols into stratosphere with latitudinal dispersion.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

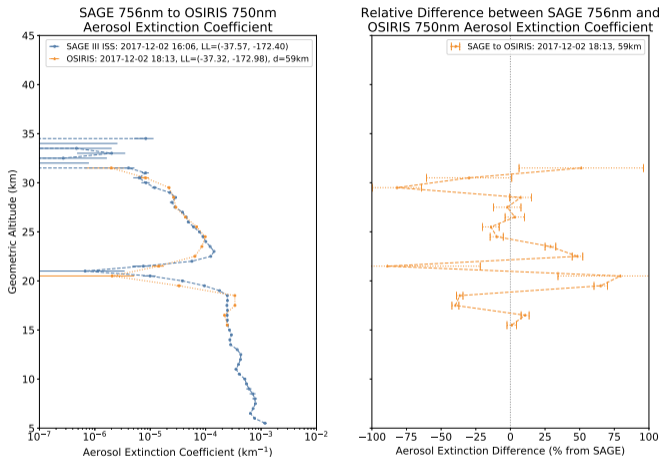
Satellite
Aerosol/Ozone

Conclusion

Questions



Aerosol Validation — OSIRIS. Co-Located



- ▶ Independent, nearly concurrent observations of an effectively aerosol-free layer in the stratosphere.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

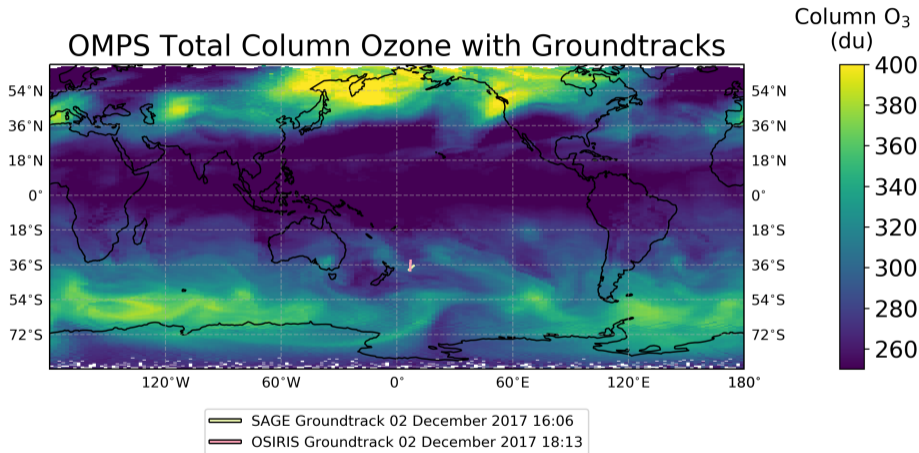
Satellite
Aerosol/Ozone

Conclusion

Questions



Aerosol Validation — Groundtracks, OMPS O₃



- ▶ Profiles intersect “Clean” filament to North.

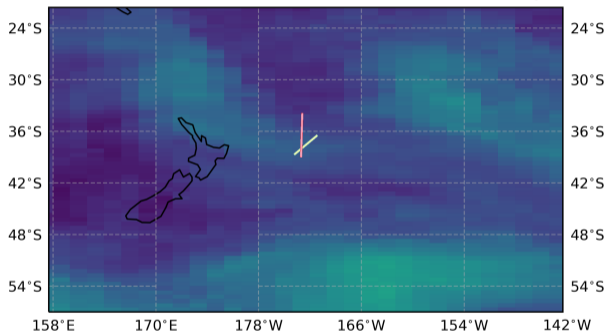
- SAGE III ISS
Global Perspective
- Kevin Leavor
- SAGE Overview
- NDACC
Contributions
- SAGE Wildfire
Observations
- Satellite
Aerosol/Ozone
- Conclusion
- Questions



Aerosol Validation — Groundtracks, OMPS O₃

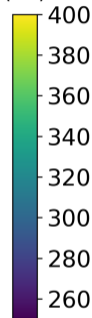


OMPS Total Column Ozone with Groundtracks



— SAGE Groundtrack 02 December 2017 16:06
— OSIRIS Groundtrack 02 December 2017 18:13

Column O₃
(du)



► Profiles intersect “Clean” filament to North.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

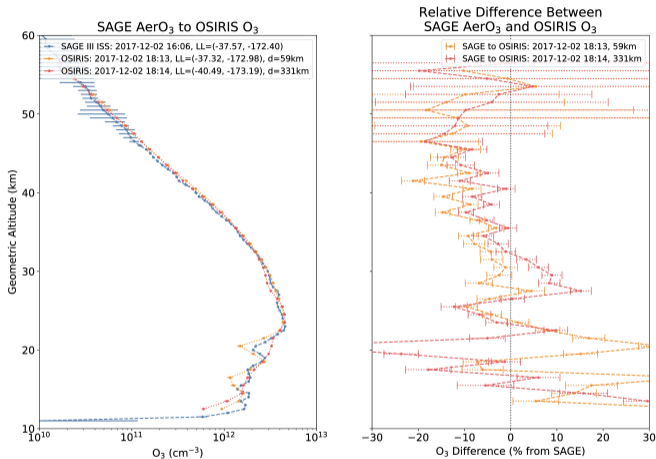
Satellite
Aerosol/Ozone

Conclusion

Questions



Ozone Validation — OSIRIS



- ▶ Layer not present in the following OSIRIS profile to the Southwest.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

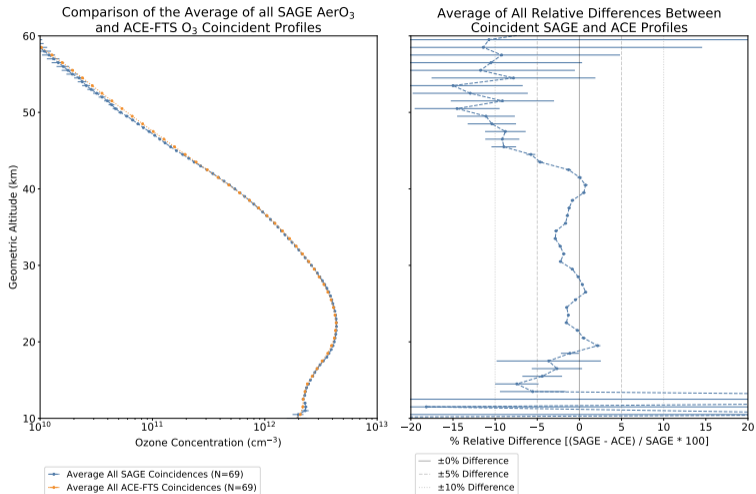
Satellite
Aerosol/Ozone

Conclusion

Questions



Ozone Validation — ACE-FTS



- ▶ SAGE and ACE compare to within 5% for most of the stratosphere.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

Questions



Conclusions



- ▶ GMD offers significant opportunities for collaborative research and validation.
- ▶ NDACC ozonesondes and lidar already play a crucial role in validation and explanatory efforts.
- ▶ SAGE III ISS's first year has shown tremendous promise for the new instrument.
- ▶ Both ground and satellite coincident observations will be crucial in future data releases.

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

Questions



Questions?



More info at <https://sage.nasa.gov/>

Data can be found at

[https://eosweb.larc.nasa.gov/project/sageiii-iss/sageiii-iss_table.](https://eosweb.larc.nasa.gov/project/sageiii-iss/sageiii-iss_table)

SAGE III ISS
Global Perspective

Kevin Leavor

SAGE Overview

NDACC
Contributions

SAGE Wildfire
Observations

Satellite
Aerosol/Ozone

Conclusion

Questions