



SAGE III Analysis and Visualization

Alexas Iams

Mentor: Dr. Kevin Leavor

NASA Langley Research Center

Summer 2020

SAGE III Analysis
and Visualization

Alexas Iams

Personal
Background

Project Description

Ozone

Water Vapor

NO₂

Aerosol Extinction
Coefficient

Live Demo

Value Added

Future Plans

Acknowledgements



Personal Background



- ▶ Rising senior at Washington & Jefferson College majoring in Mathematics and minoring in Computing & Information Studies



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Project Description



My project involves analyzing information captured in the vertical profiles of species concentrations retrieved from its occultation events. Such species includes ozone, water vapor, nitrogen dioxide, and aerosol extinction coefficient. These data are injected into Jupyter notebooks that also serve to explain analyses and provide an interactive dashboard solution for visualizing the relationships and features present within the SAGE III ISS dataset.

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Data Products



- ▶ Ozone
- ▶ Water Vapor
- ▶ NO₂ (Nitrogen Dioxide)
- ▶ Aerosol Extinction Coefficient

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Graphing Data Products



- ▶ Altitude vs Latitude
- ▶ Altitude vs Time
- ▶ Latitude vs Time

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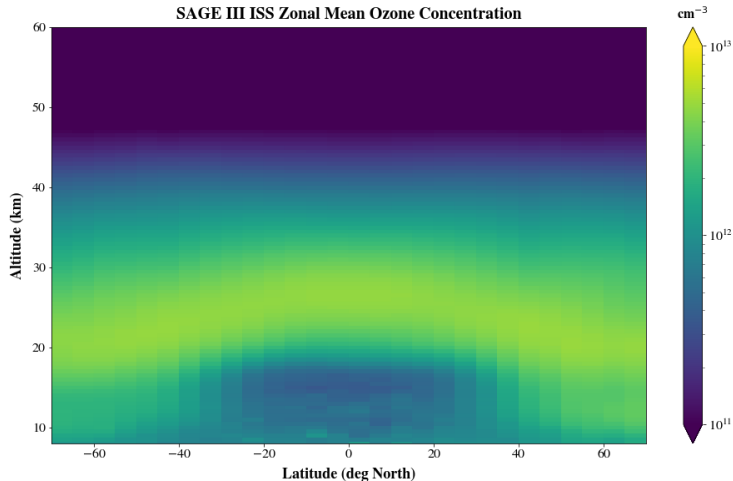
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Ozone



► Altitude vs Latitude



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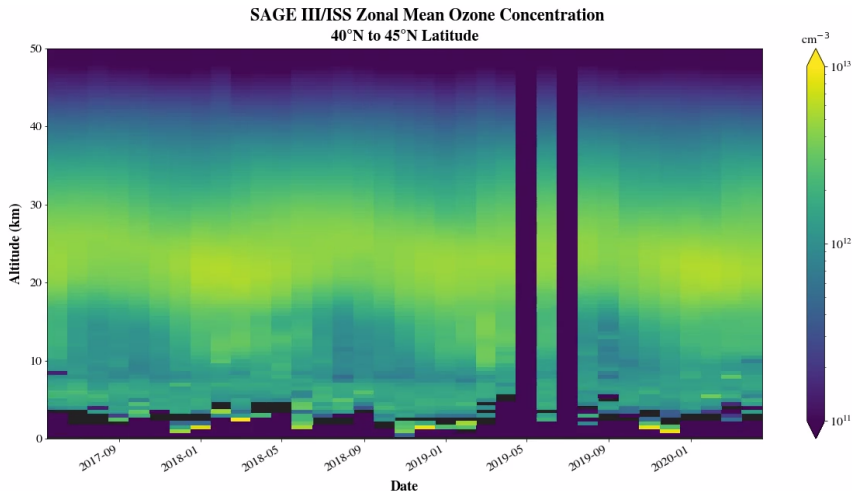
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► Altitude vs Time



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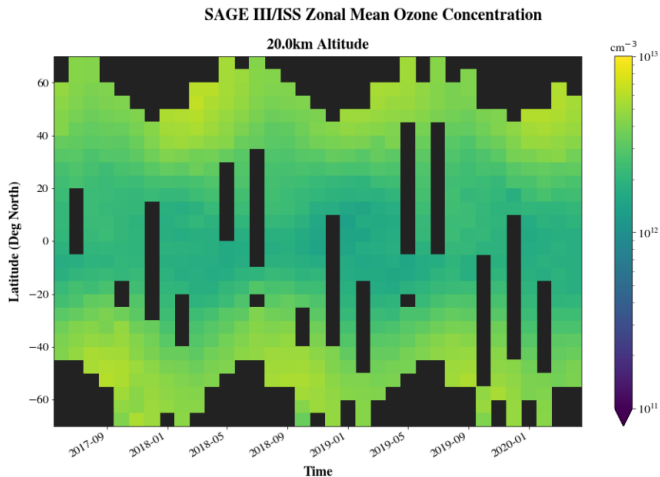
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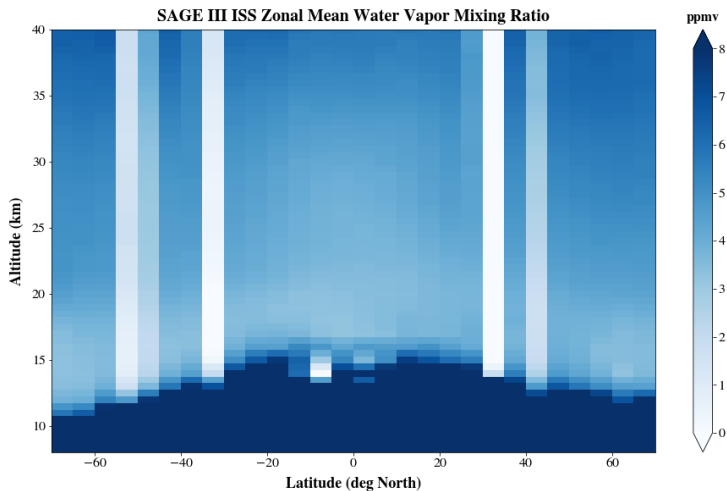
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Water Vapor



► Altitude vs Latitude



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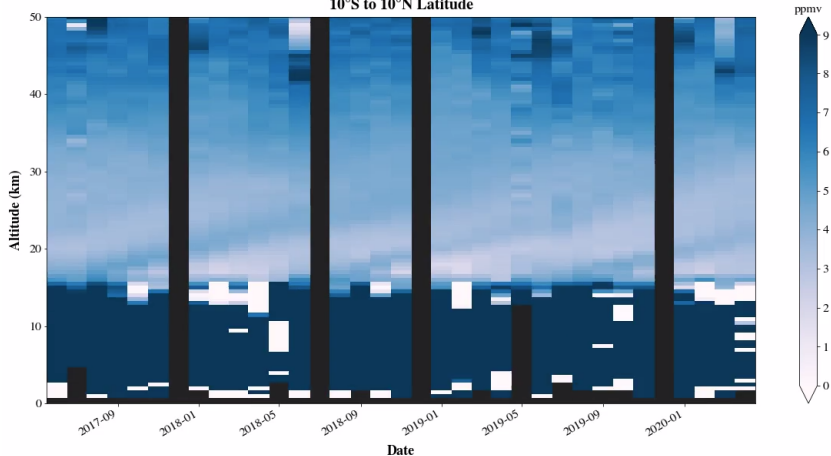


Water Vapor



► Altitude vs Time

SAGE III/ISS Zonal Mean Water Vapor Mixing Ratio Concentration
10°S to 10°N Latitude



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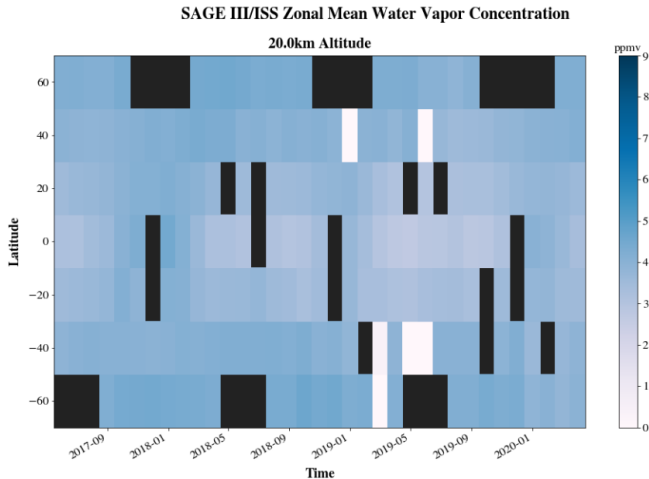
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Water Vapor



► Latitude vs Time



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NO_2

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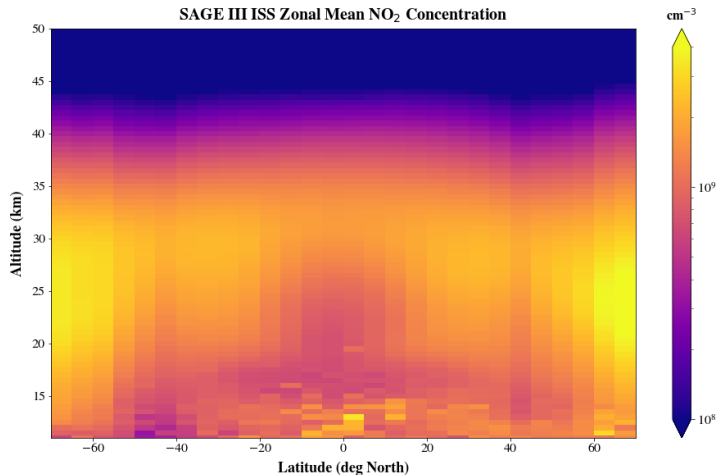
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► Altitude vs Latitude



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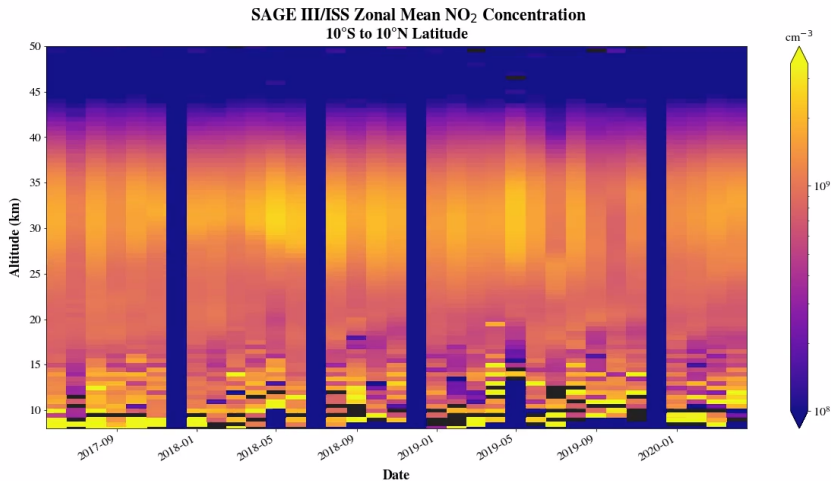
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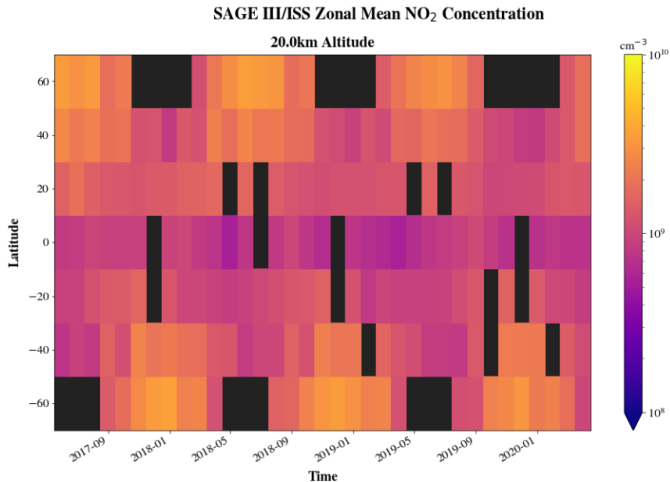
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Aerosol Extinction Coefficient

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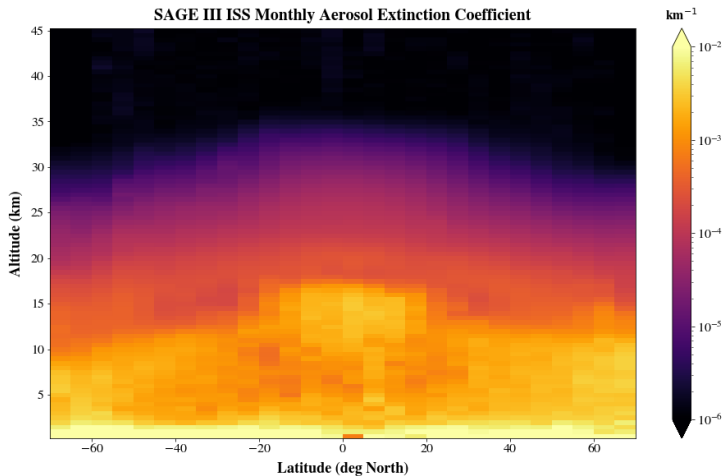
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Aerosol Extinction Coefficient



► Altitude vs Latitude



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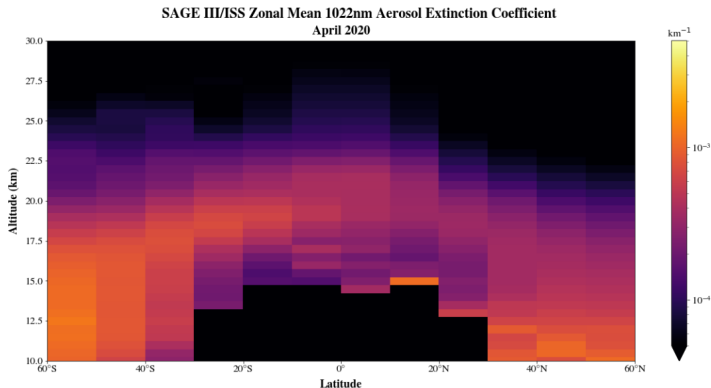
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Aerosol Extinction Coefficient



- ▶ Altitude vs Latitude
 - ▶ Aerosol Index = 7 (1022.07nm)



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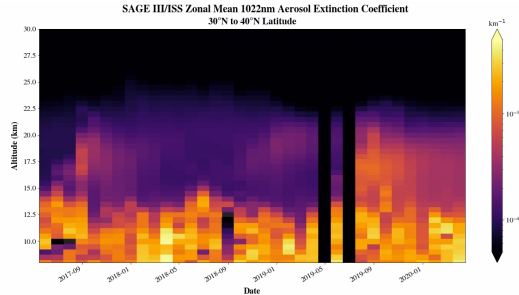
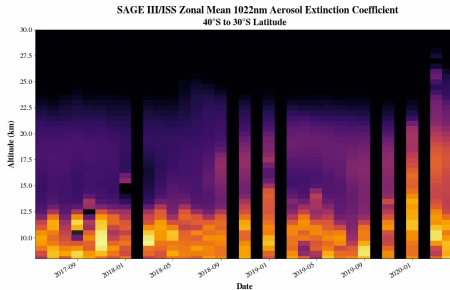
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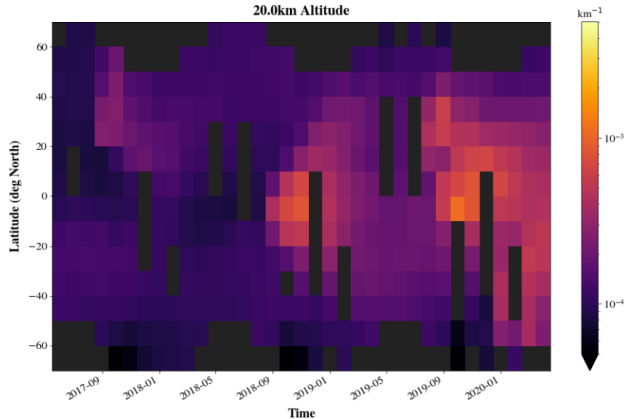
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Aerosol Extinction Coefficient



► Latitude vs Time



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- ▶ To NASA:
 - ▶ Interactive graphs of SAGE III ISS Level 2 data products that can be used for the NASA SAGE III website
 - ▶ Dashboard that allows a user to choose which data product for which they want to see graphs
- ▶ To me:
 - ▶ Developed and strengthened skills in Python and Jupyter notebooks that I can use in my future academic and professional life
 - ▶ Communicating with others, especially in a virtual environment
 - ▶ Interpreting large amounts of data

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Future Plans



- ▶ Graduate with a Bachelor's degree in mathematics
- ▶ Attend graduate school and earn a Master's degree in mathematics or a related field
- ▶ Work for a federal government agency doing cryptography or data science/engineering

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- ▶ My primary mentor, Kevin Leavor
- ▶ SAGE III mentors
 - ▶ Amy Rowell
 - ▶ Charles Hill
 - ▶ Dave Flittner
 - ▶ Tom Johnson
- ▶ SAGE III Interns
 - ▶ Laila Howar
 - ▶ Ney-Ling Navarro
 - ▶ Kate Perkins
 - ▶ Preston Robinette
- ▶ All of the internship coordinators

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