Icon Satellite Measurements, Uncertainty, and Error Calculations

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Background

- **Icon Satellite Launched Oct 11, 2019**
- Continuing research from previous satellite missions such as TIMED and SABER
- Research overlap with USU's own NA Lidar measurements and research whose measurements have proven to be reliable

Goals

- Understand effects of small scale waves on ionosphere
- Calculate error, and notice limitations of ICON' Measurements from its MIGTI instrument
- Reduce amount of time necessary to calculate temperature profile of mesopause region

Methods

The research performed for this project did not require any experimentation however

1. Icon Satellite measurements were gathered and Analyzed to
2. Similar calculations with the NA Lidar were performed
3. Results were gathered and compared through which Errors were able to be calculated

Conclusion

Icon measurements struggle and are not precise close to the 90 km altitudes. This will cause it to be hard to measure small scale waves propagating from Earths Atmosphere

ICON: Ionospheric Connection Explorer

Mission: To understand relation between earths atmosphere and the space environment. Variability in the ionosphere is due to both Solar radiation, and energy and momentum due to Earths atmosphere

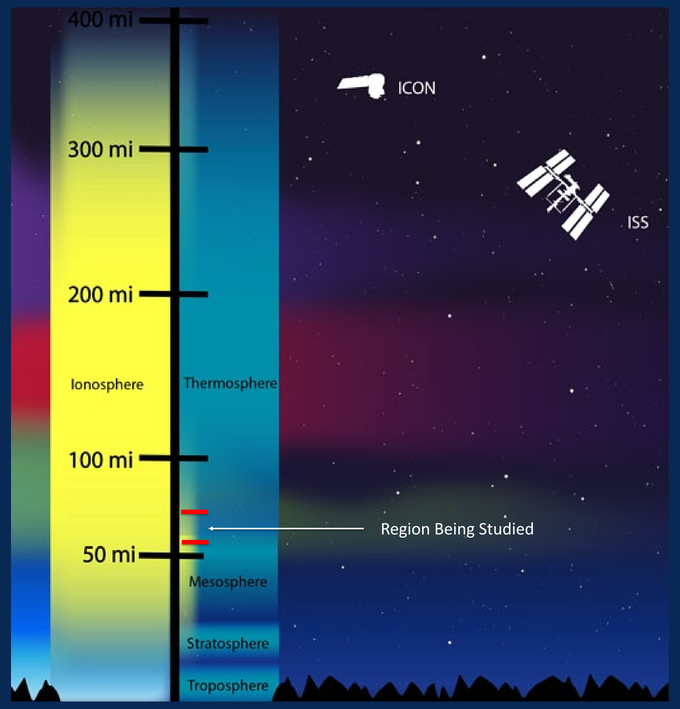

Figure 1 – *Atmospheric layers and Mesopause Region being studied*

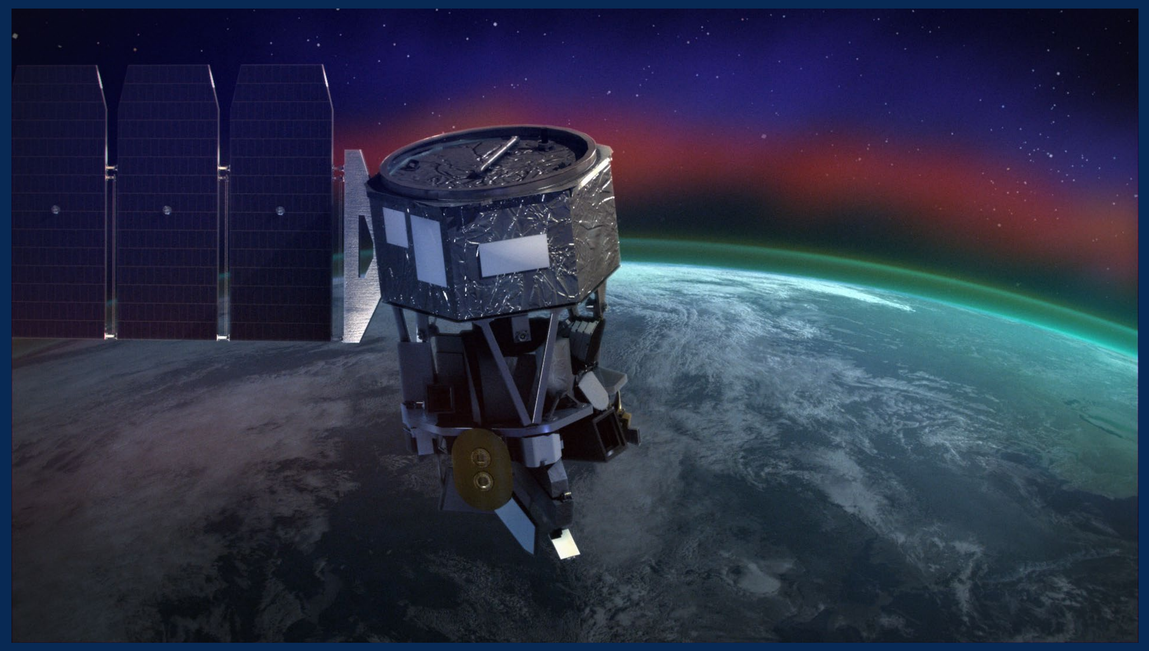

Figure 2 – *Atmospheric image of the Icon Satellite whose measurements are being studied and understood in this research project*

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Results

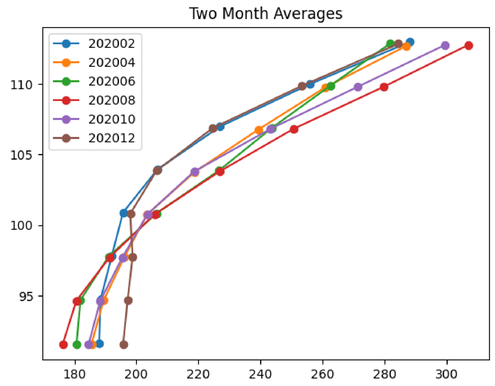

Figure 2 – Icon measurements taken and averaged for 2month periods over 2020

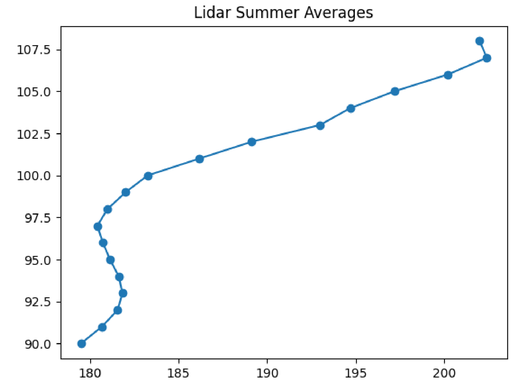

Figure 3 – *Lidar averages over the summer of 2020*

OTHER RESOURCES USED:

- NASA Public Data from ICON
- USU's NA Lidar Measurements
- Figure 1 and 2 from NASA image archives https://www.nasa.gov/content/icon-images
- Understanding of ICON's Mission from Immel, T.J., England, S.L., Mende, S.B. et al. The Ionospheric Connection Explorer Mission: Mission Goals and Design.

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