Potential Lunar Subsolar Hydration Feature

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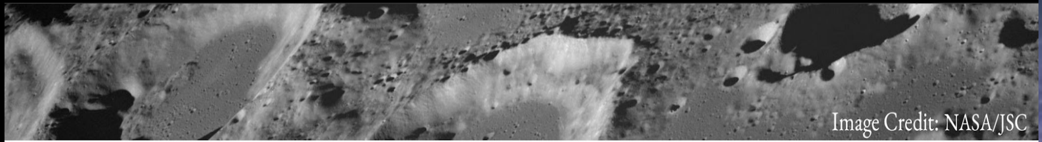


Cassini

Year: 1999

Findings: Hydration Found At the Poles and Highlands of the Moon

Deep Impact

Year: 2007 & 2009

Findings: Entire Lunar Surface Hydrated During Some Portions of the Day

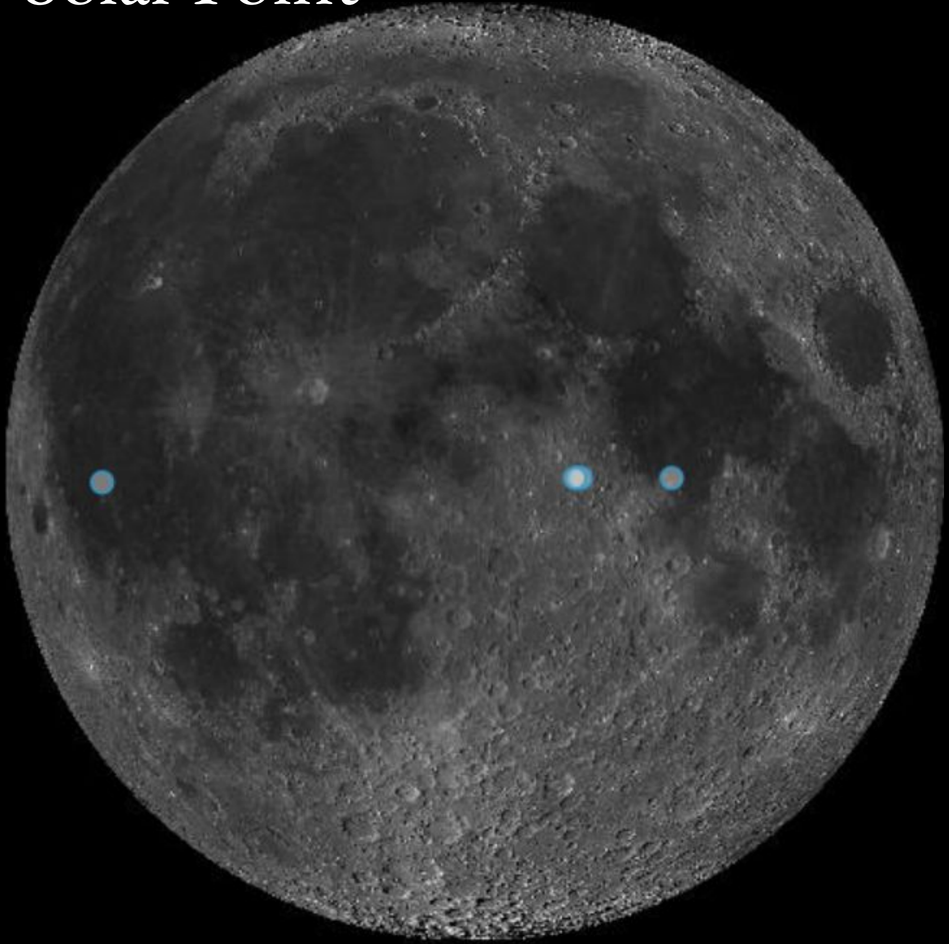
Moon Mineralogy Mapper on Chandraayan-1

Year: 2009

Findings: Water Molecules on the Poles of the Moon

The Sub-Solar Point

In order to establish how any water/hydroxyl absorbtion feature was present, considering it's presence may vary with Lunar time of day, one type of location was chosen and observed at different Lunar phases. Beside are the locations observed.



Lunar Reconnaissance Orbiter Camera • Lunar QuickMap

NEATM: Near Earth Asteroid Thermal Model

- The basis of the STM is the assumption of instantaneous equilibrium between insolation and thermal emission and a simple temperature distribution on a smooth spherical (Lebofsky et al.)
- The near-Earth asteroid thermal model (NEATM) (Harris and Lagerros) is an improved version of STM that takes into account the surface roughness and thermal inertia
- the sub-solar temperature of the Moon is calculated by assuming equilibrium between solar insolation and emitted thermal flux. The temperature across the disk is then assumed to vary as [cos(i)]^.25.
- The Planck function is then integrated over the visible surface of the disk to get the emitted intensity, which is multiplied by the solid angle to get the flux as seen at the earth.

$$S_{abs} = \pi \frac{D^2}{4} S(1 - A)$$

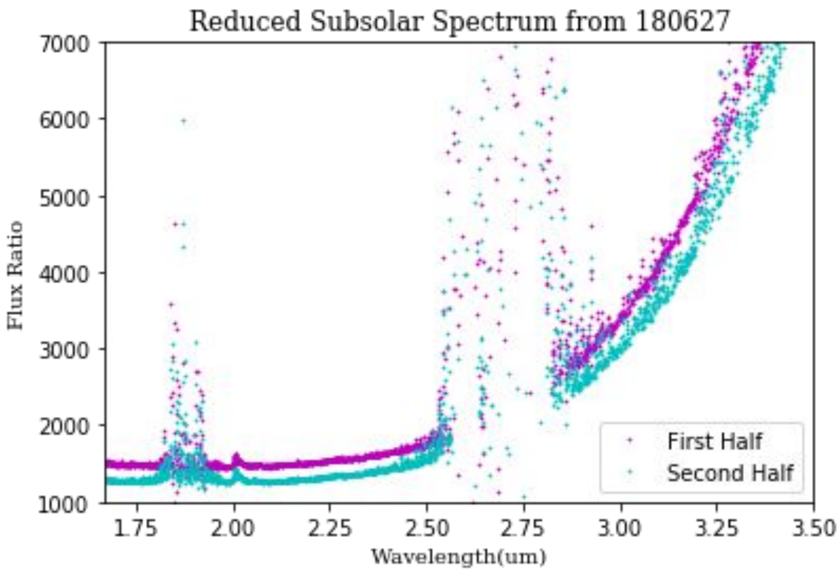
$$A = A_v = q\, p_v$$

$$T(\varphi) = T(0) \cos^{1/4} \varphi$$

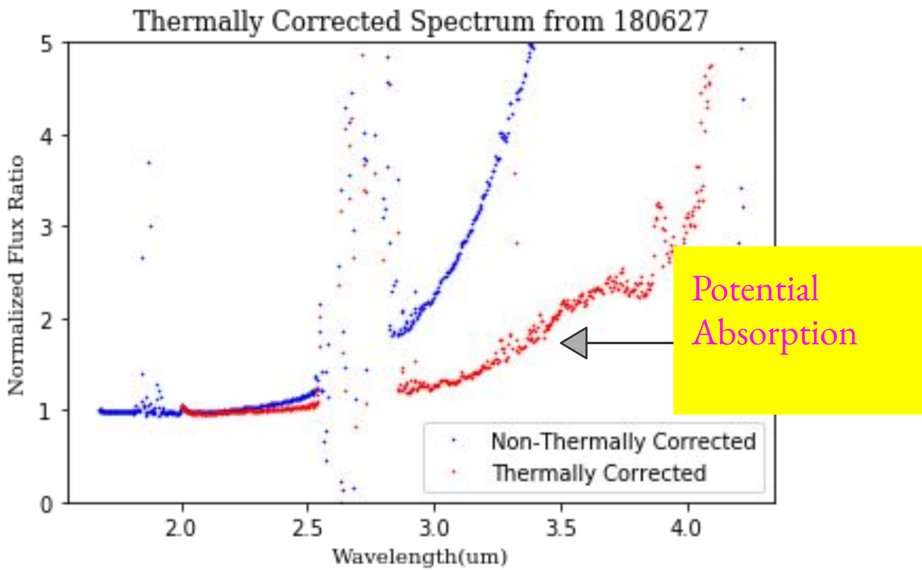
$$T(0) = [(1 - A)S/(\eta\, \varepsilon\, \sigma)]^{1/4}$$

Best Results from Three Nights of Data

Before Thermal Correction



After Thermal Correction



In Summary

- Potential Absorption Feature Detected Using NEATM
- Consistent with Hydration Feature at Lunar Noon

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