

# Lunar Space Environment:

## *Interdisciplinary Exploration Science Enabled by Lunar Landers*

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# Lunar Space Environment, in a nutshell

The Lunar environment is characterized by dynamic couplings

- Plasma / Surface / Dust / Exosphere
- Various time scales are involved, from  $<$ microsec to billion years

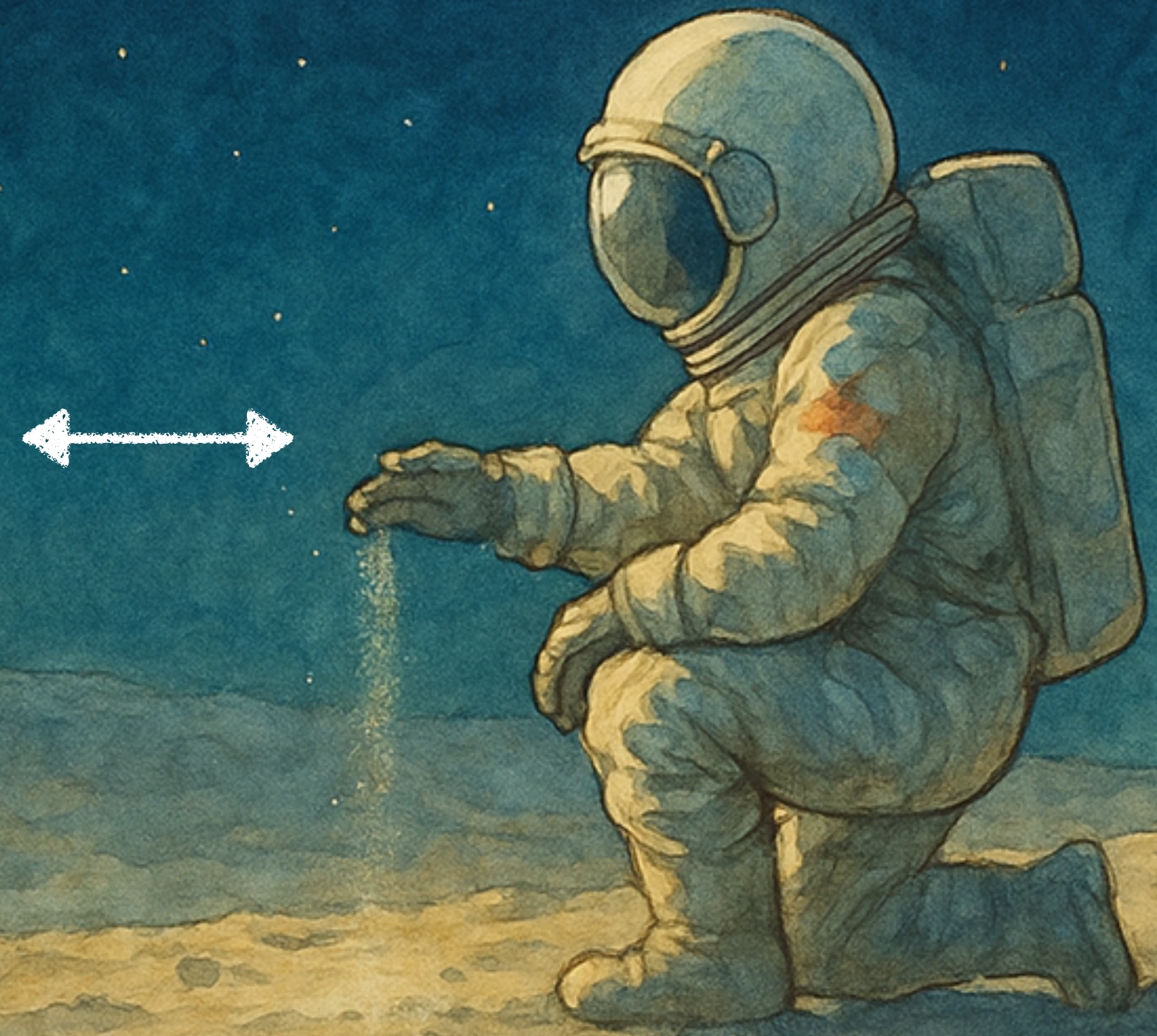
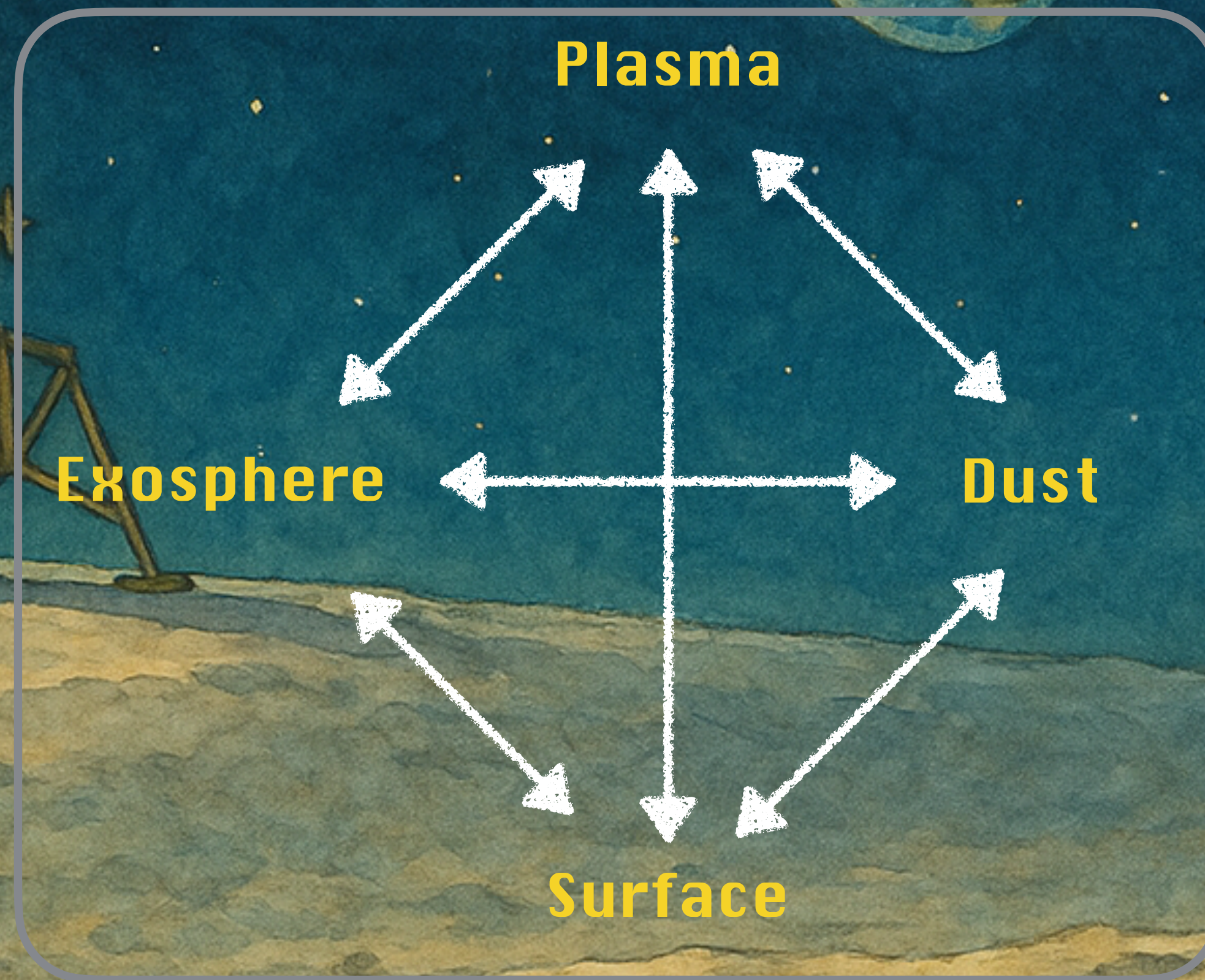


The Lunar environment shares physics with other non-atmospheric objects

**Environment** (Oxford Dictionary):  
the surroundings or conditions in which a person, animal, or plant lives or operates

Natural phenomena, Coupling, Variations

Anthropogenic impact



# Space weather, natural hazard to exploration

Lunar exploration hazards are largely driven by the space environment

- Solar activities
- Radiation, secondary emission
- Electrostatic discharges
- Dust grains

Understanding of science is critical for exploration → **Exploration Science**

- Prioritized time scale may be **minutes–years**



# Anthropogenic surface changes

Plume, adding a water molecule on regolith

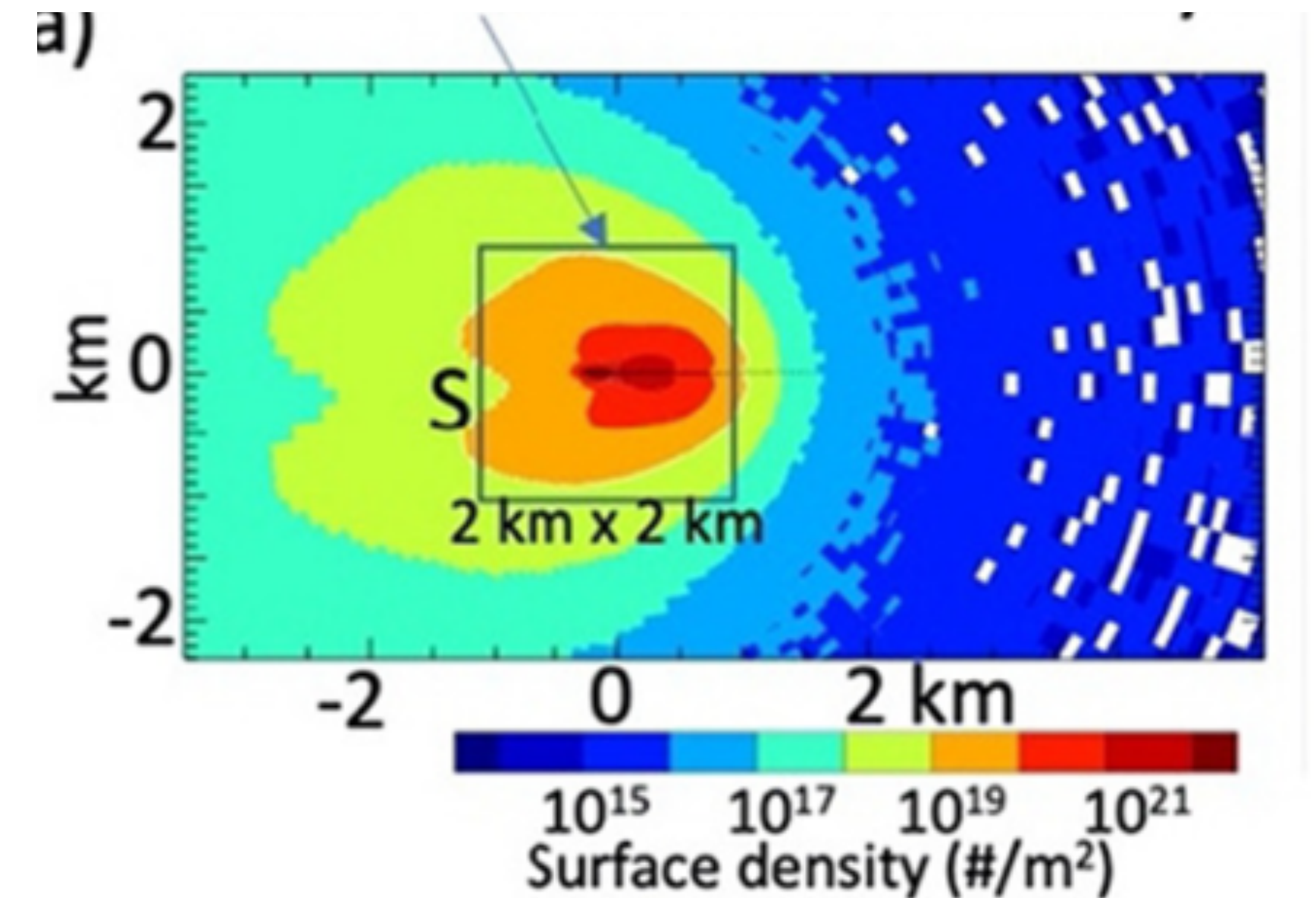
Lofting dust

Alternation of surface properties

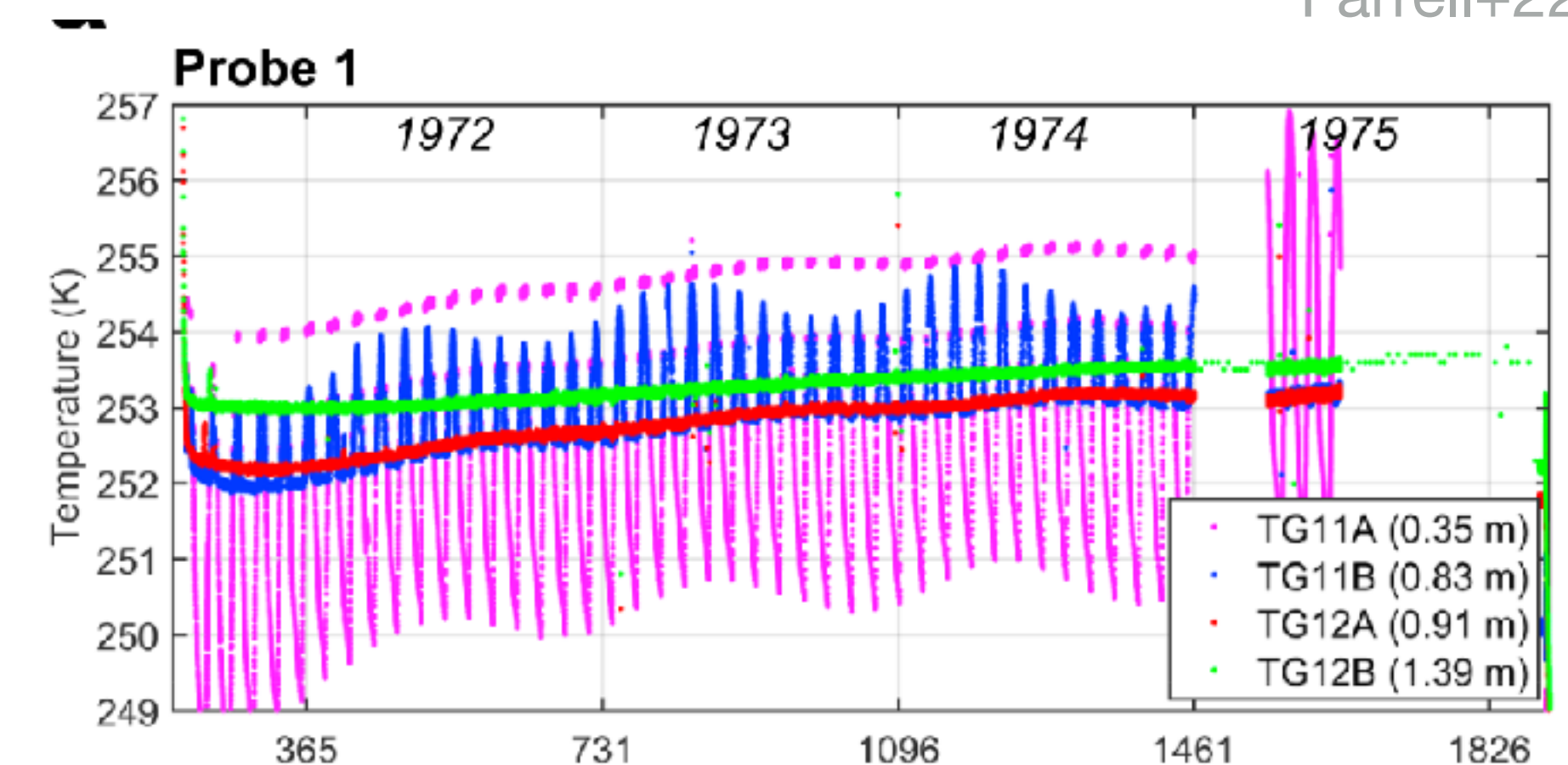
- Darker albedo due to astronauts activities, leading temperature increase by 1.6–3.5K
- → Impact on electromagnetic characteristics



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# Lunar Space Environment Session

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**Posters**

**Ongoing!**

**Orals**

**Tuesday 16:00–17:30 Uranus**