

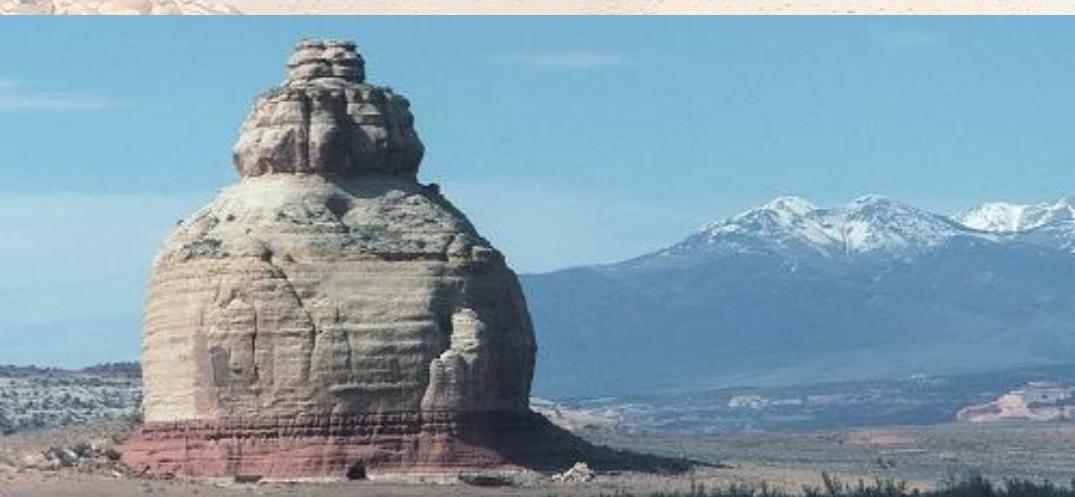
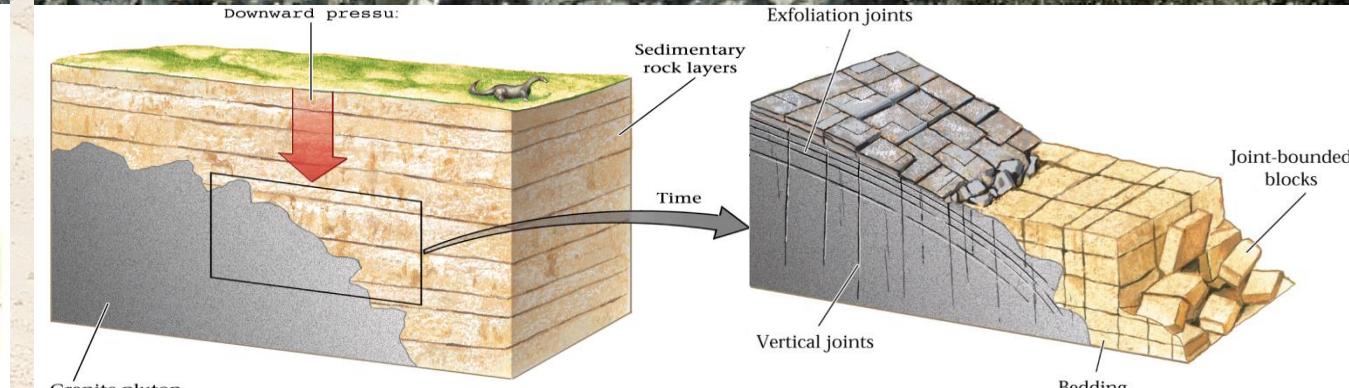
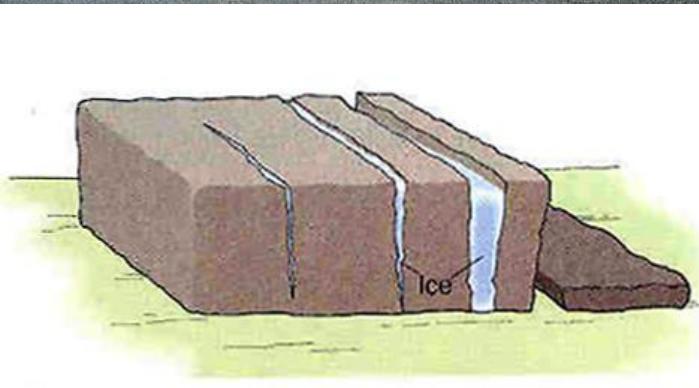
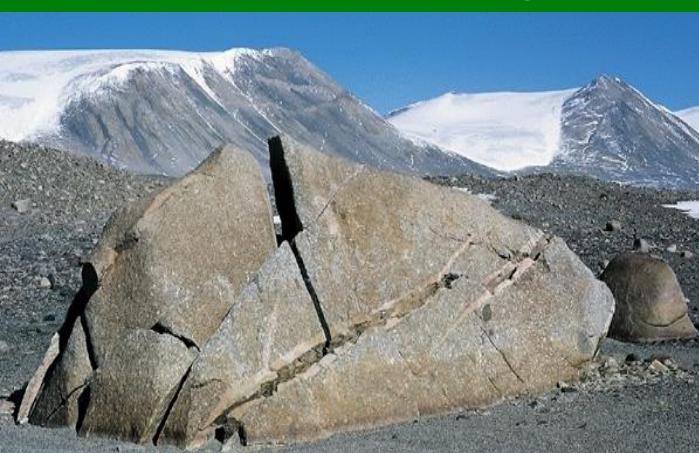
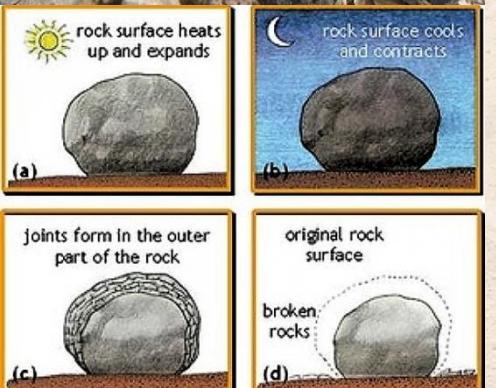


# Landscape Evolution

*Extraterrestrial Landscapes*

# Weathering | Mechanical weathering

GY4027: Landscape Evolution



# Weathering | Chemical Weathering

GY4027: Landscape Evolution



# Transport and Deposition | Transport Agents

GY4027: Landscape Evolution

Gravity



Water



Ice



Air



## Mars | Physical Geography

- **Gravity:** 3.73m/s<sup>2</sup> (*38% Earth*)
- **Surface atmospheric pressure:** 6.1mbar (*0.6% Earth*)
- **Liquid water:** None (now) (*0% Earth*)
- **Ice:** CO<sub>2</sub> polar icecaps
- **Atmospheric oxygen:** None (now) (*0% Earth*)

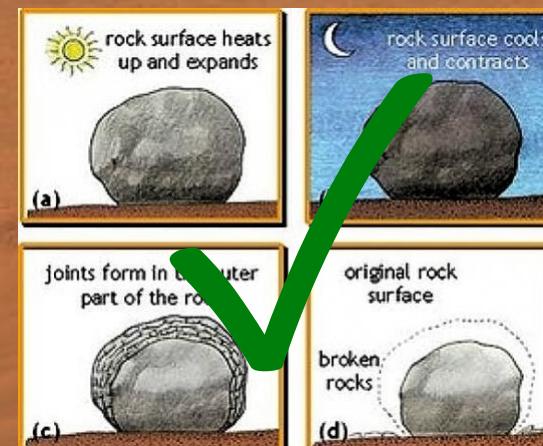
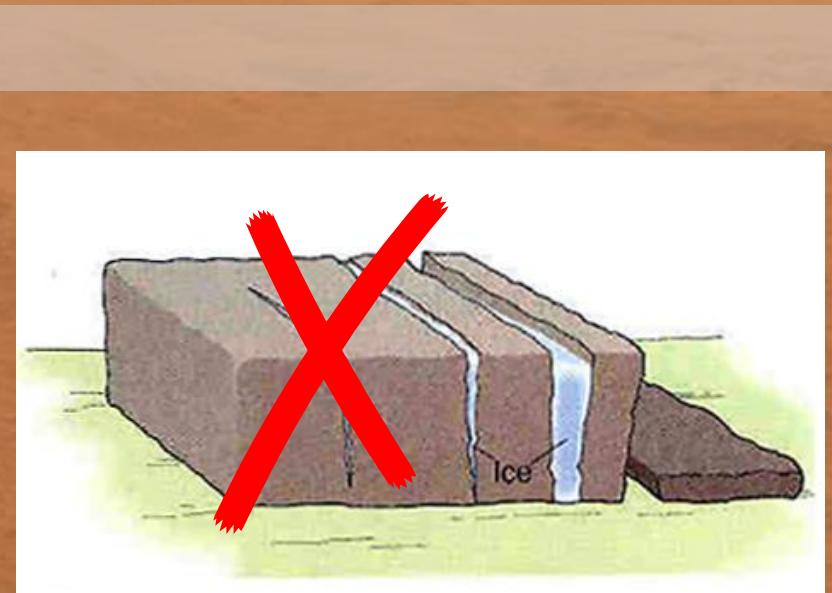
## Mars | Chemical Weathering

- No oxygen for oxidation
- No water for hydrolysis
- No water for dissolution
- No water to facilitate other chemical weathering



### Mars | Mechanical Weathering

- No water ice for freeze-thaw
- No water for abrasion
- Large temperature variations for thermal expansion/contraction
- Wind for aeolian abrasion



## Mars | Biological Weathering

- No biology



## Mars | Transport agents

- No liquid water
- No water ice
- 38% Earth gravity
- 0.6% Earth atmosphere



## Mars | Sediment Transport

Wind speeds typically ~7m/s, up to 100kph

0.6% Earth atmosphere  
-> 0.6% force

Wind →  
38% Earth gravity  
-> 62% lighter

Saltation

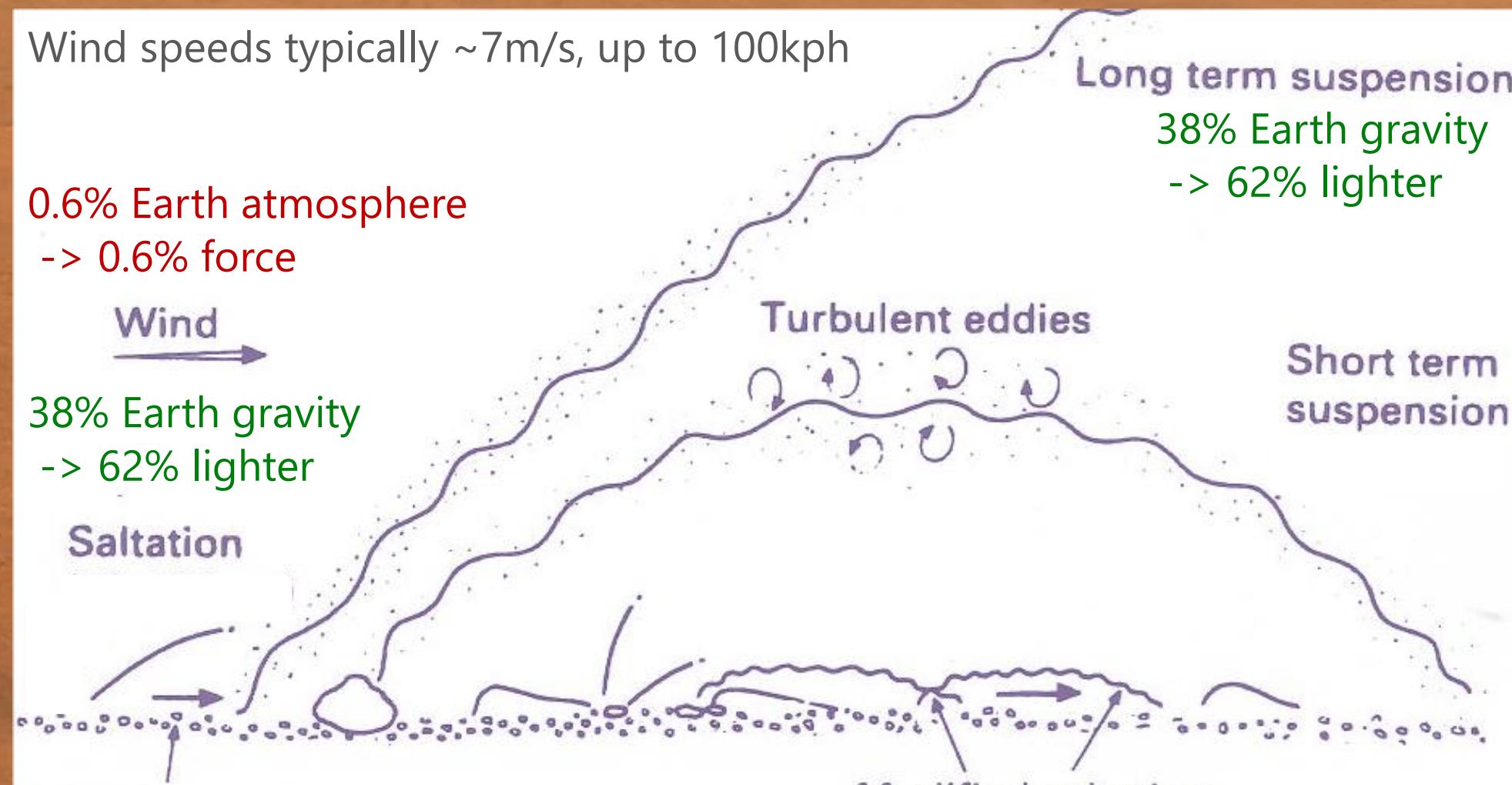
Creep

Long term suspension

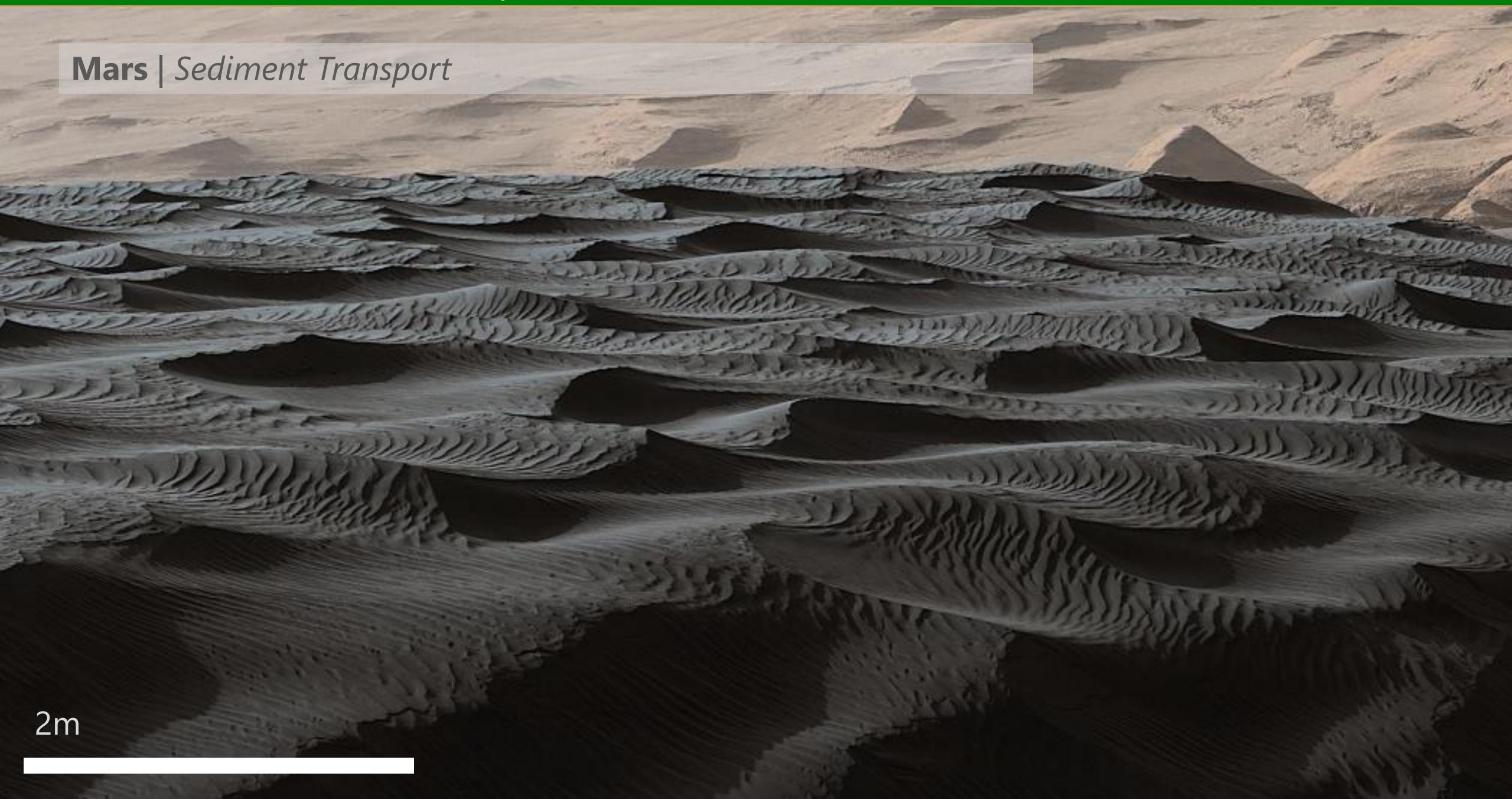
38% Earth gravity  
-> 62% lighter

Short term suspension

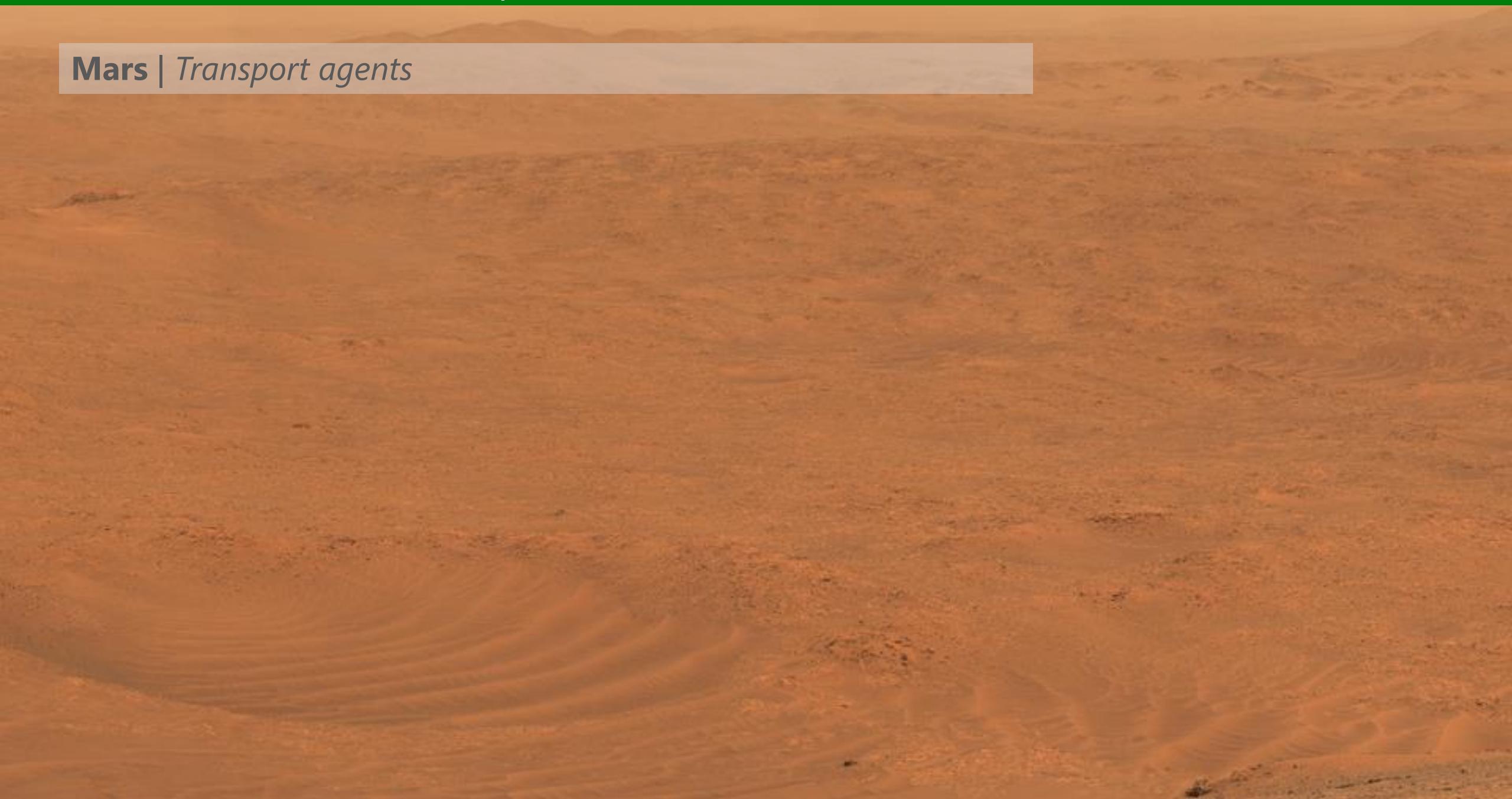
Modified saltation



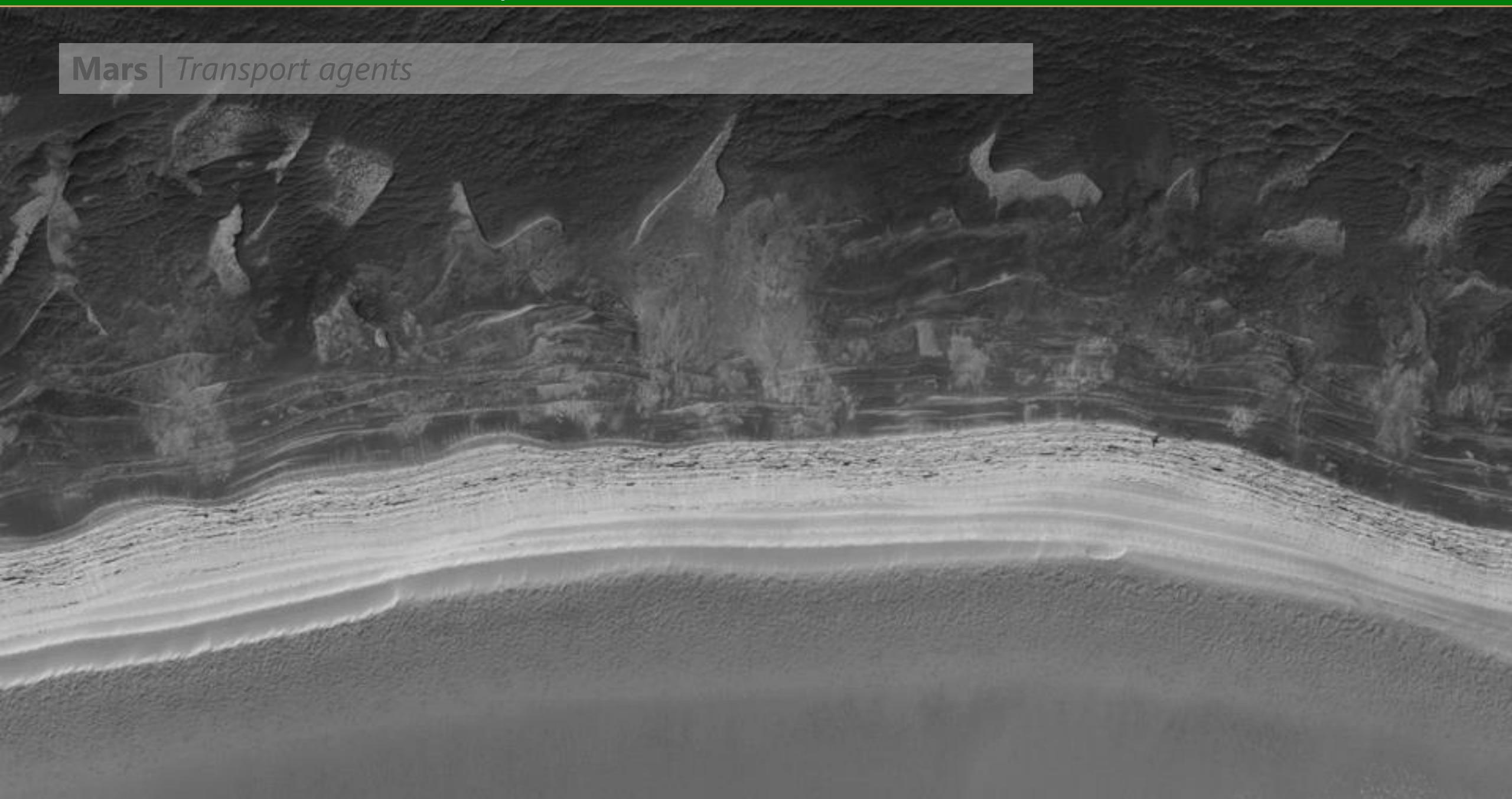
Mars | Sediment Transport



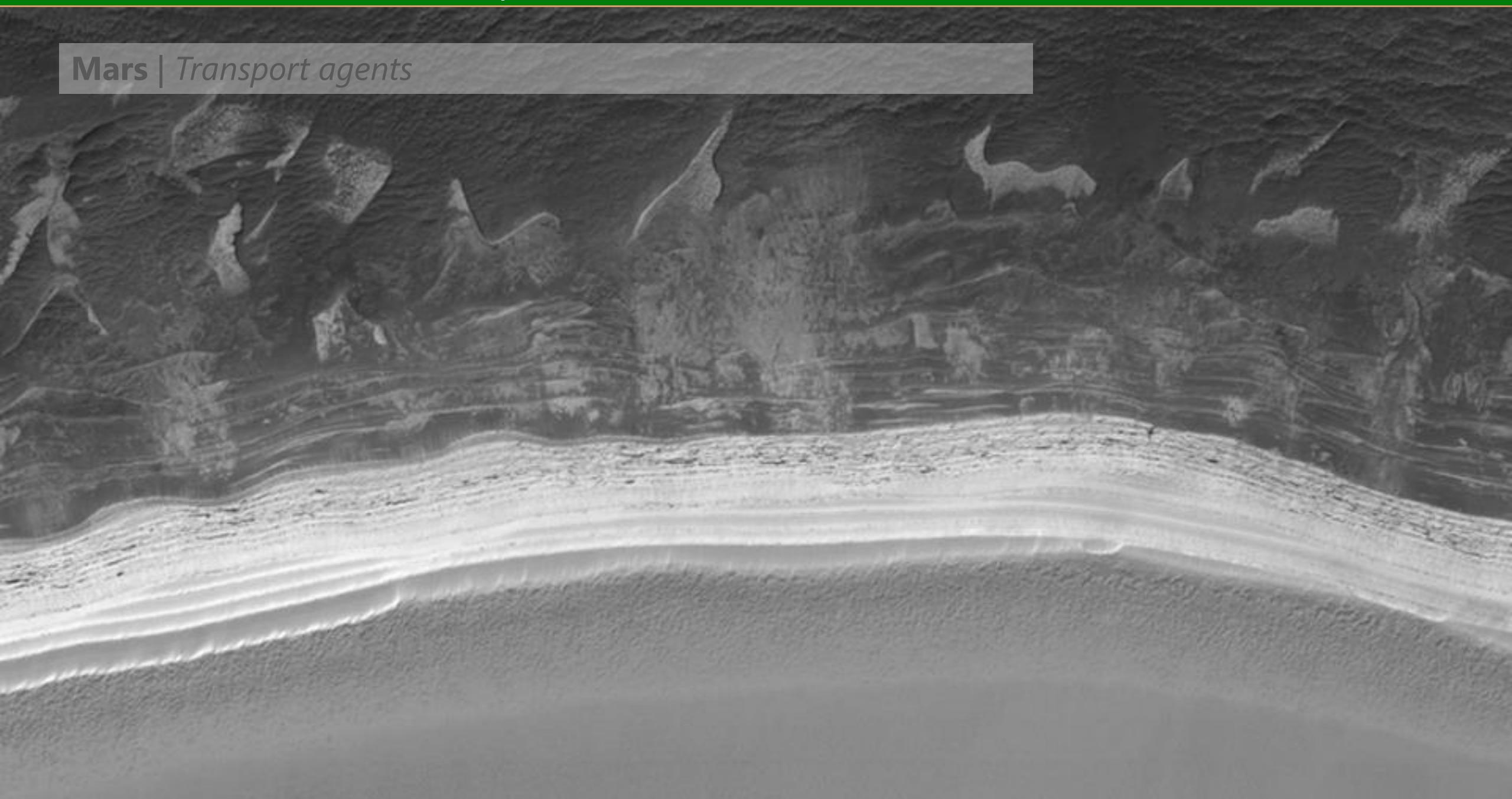
Mars | *Transport agents*



Mars | *Transport agents*

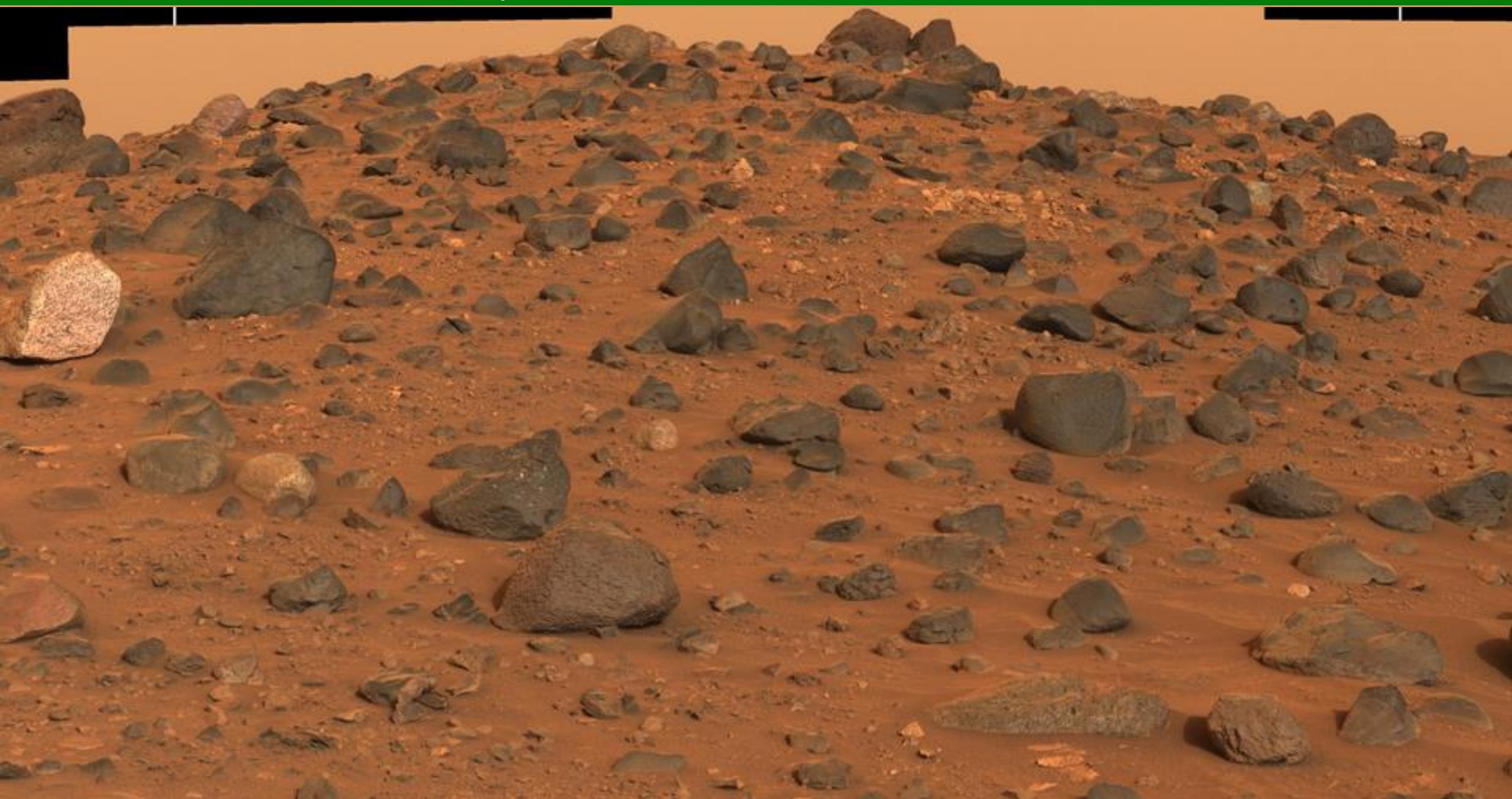


Mars | Transport agents









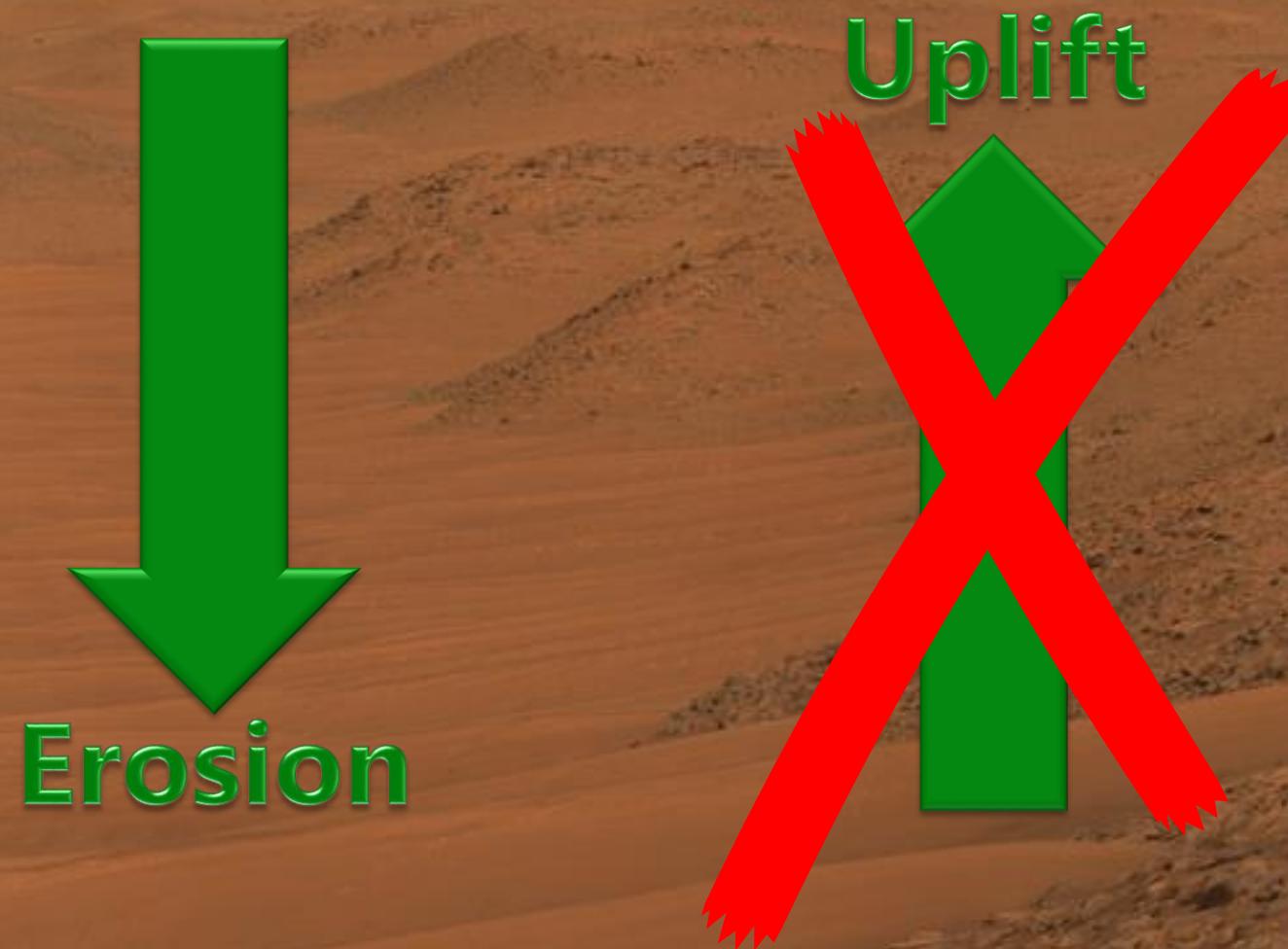


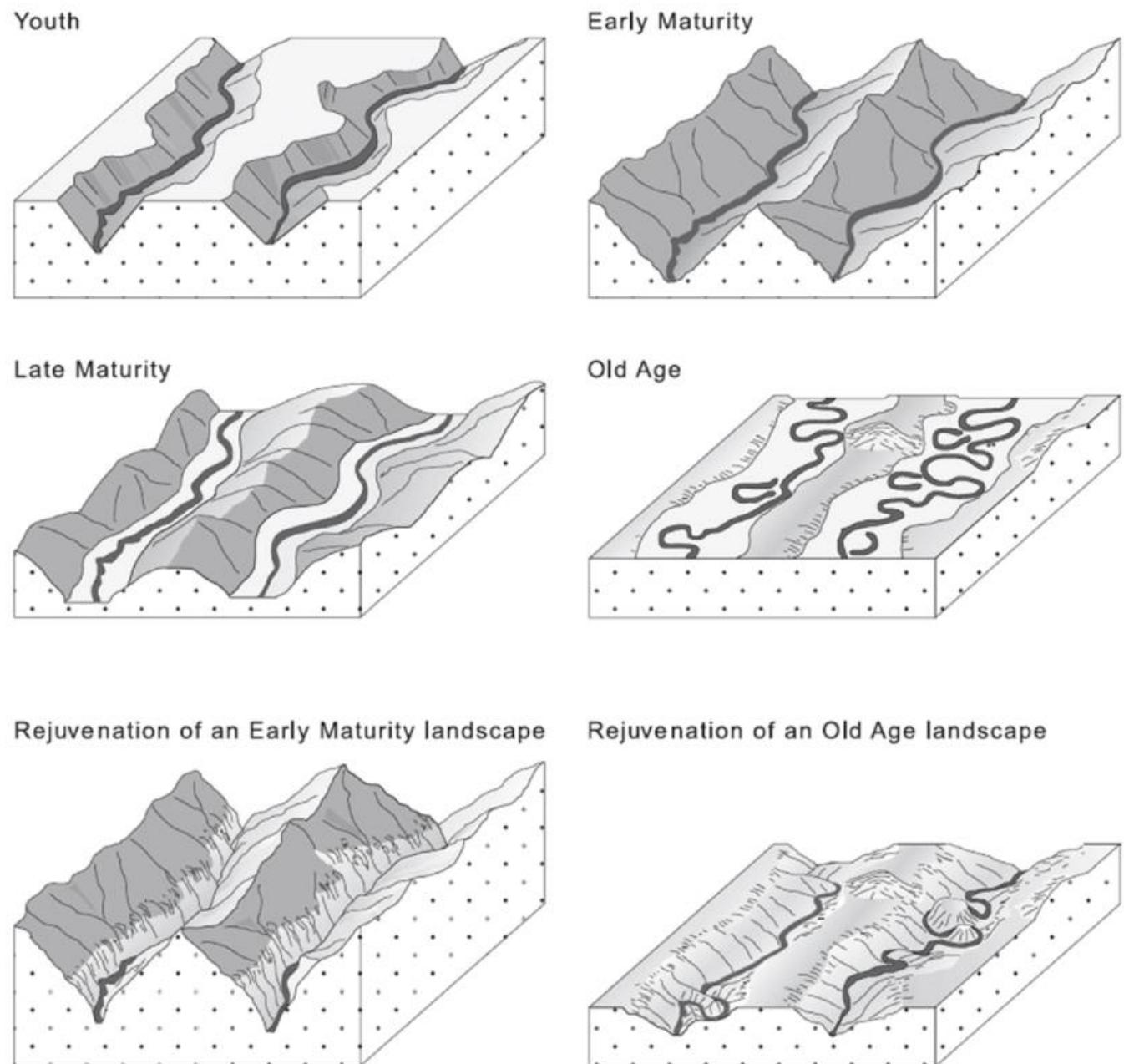
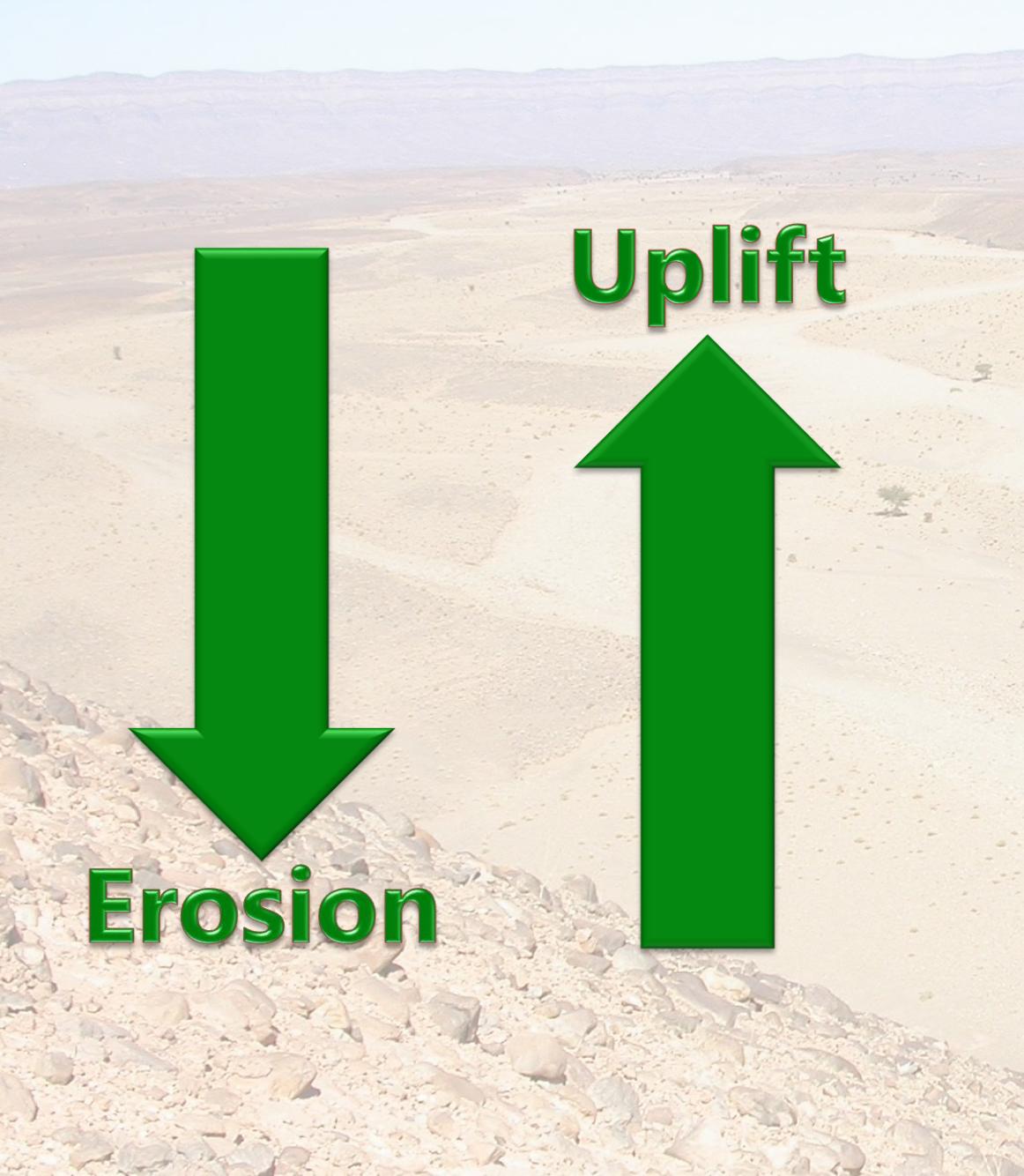


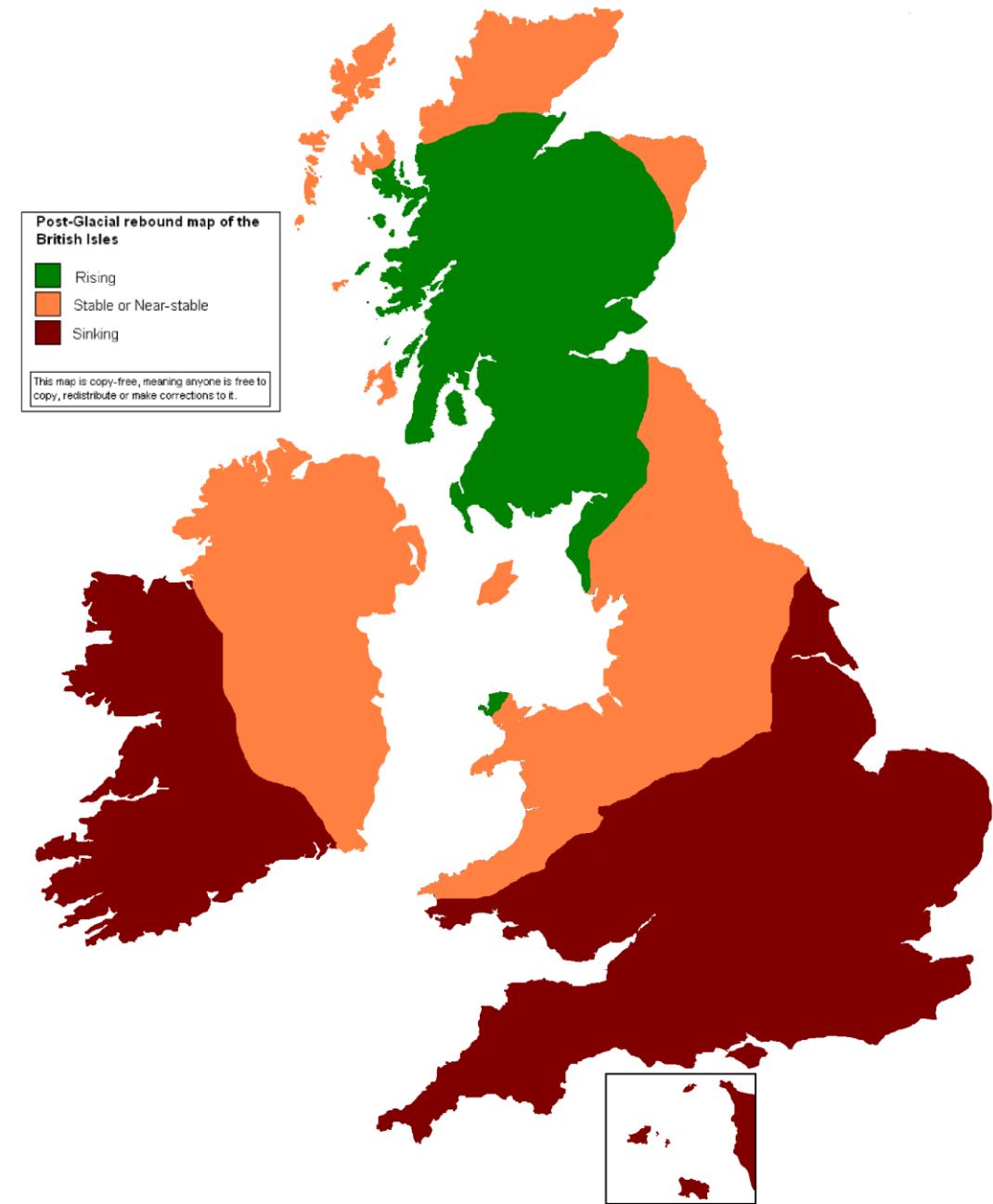
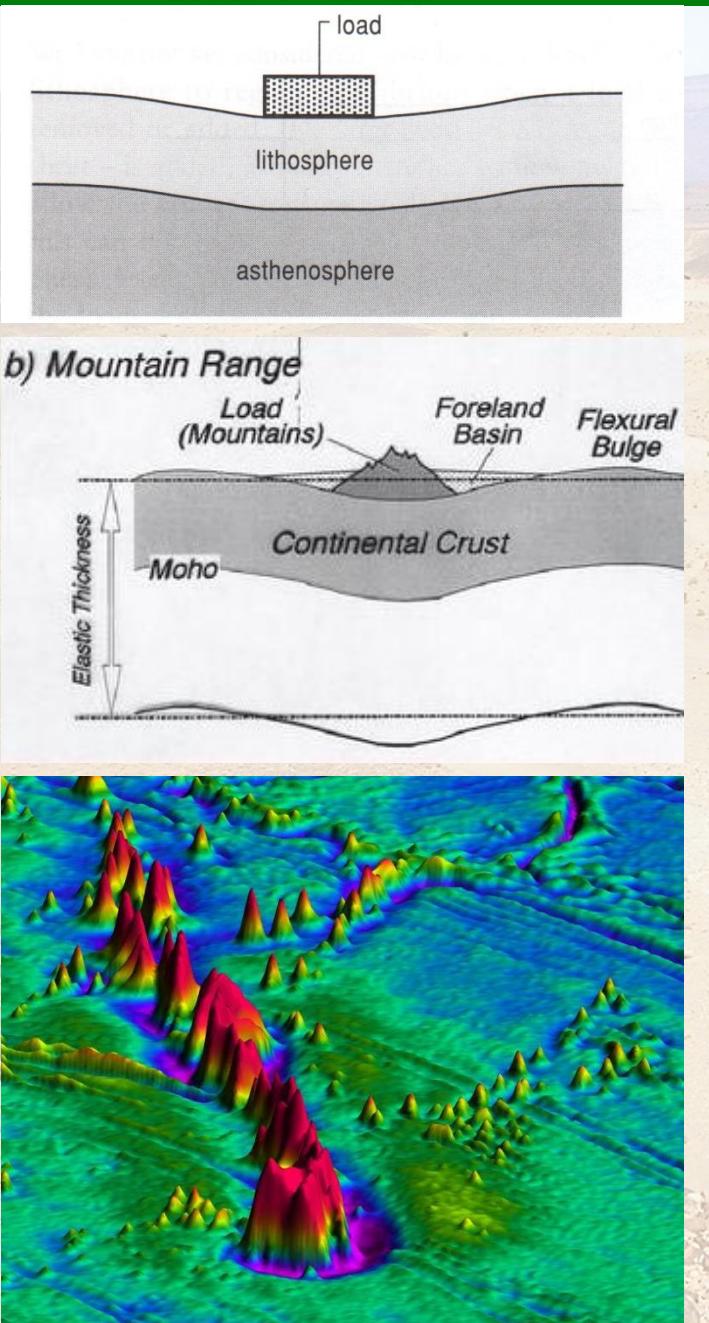












# Landscape Evolution | Landscape Evolution

## GY4027: Landscape Evolution

