



Utrecht
University



Experimental CO₂-driven granular flows under Martian atmospheric conditions

EGU

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Matará

HiRISE

PSP_006648_1300

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 @RoelofsLonneke

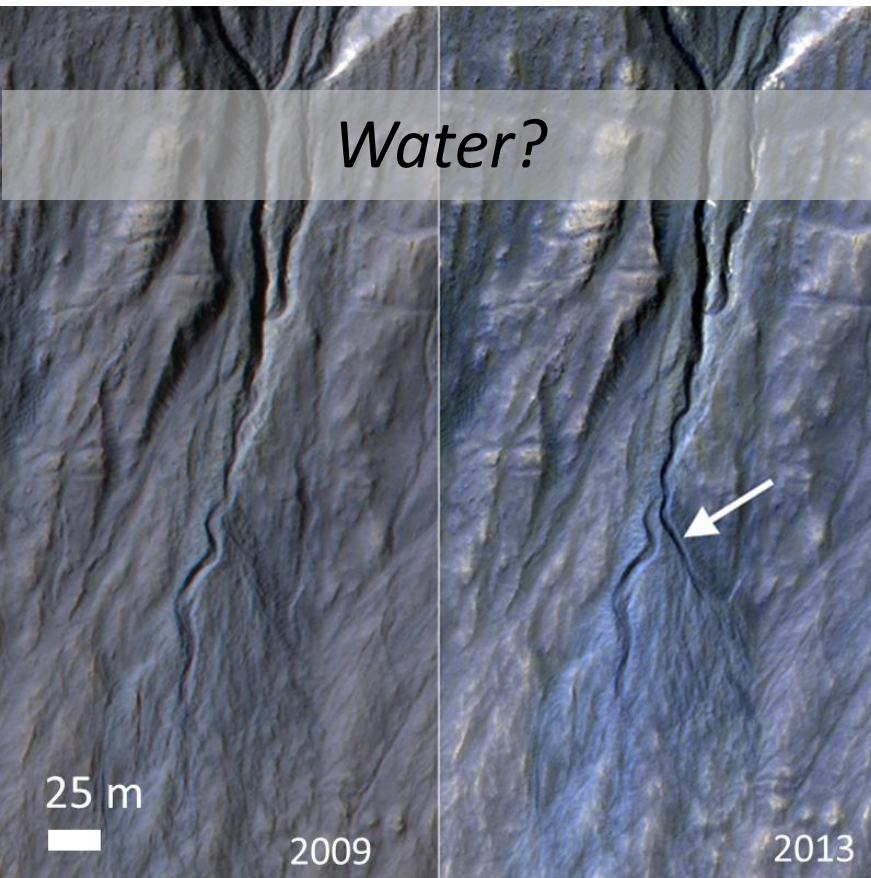


Sharing not
permitted

Susan Conway, Matthew Sylvest, Manish Patel, Jim McElwaine, Maarten Kleinhans, Tjalling de Haas

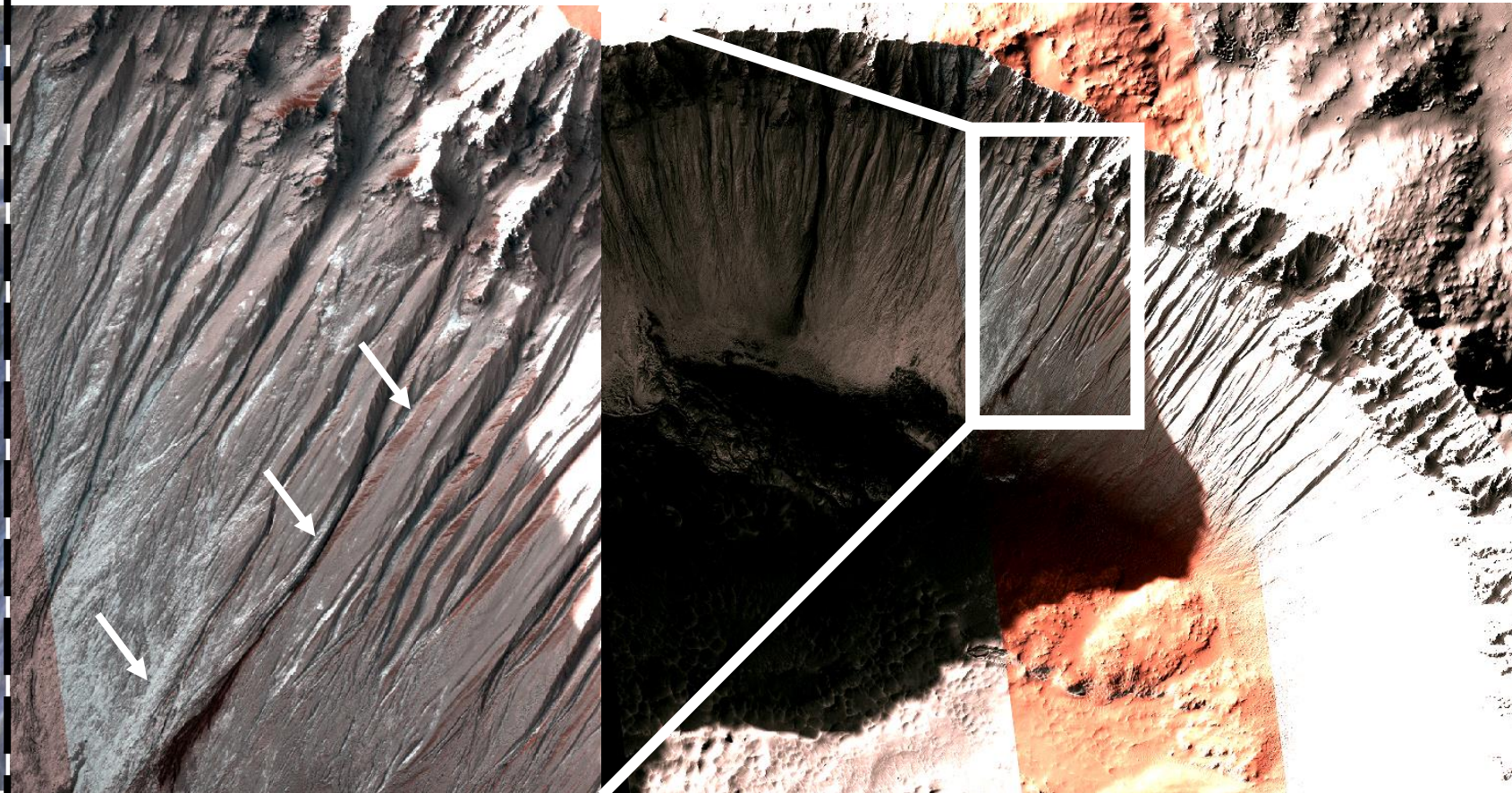
Background & Motivation

Present-day activity in gullies



Dundas et al. Icarus 2014

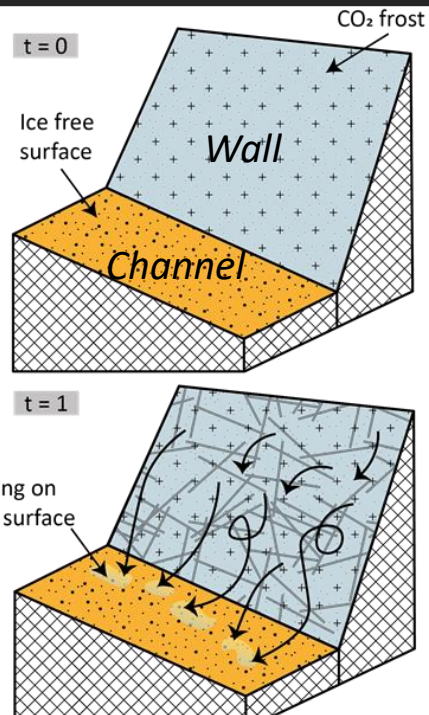
CO₂ frost



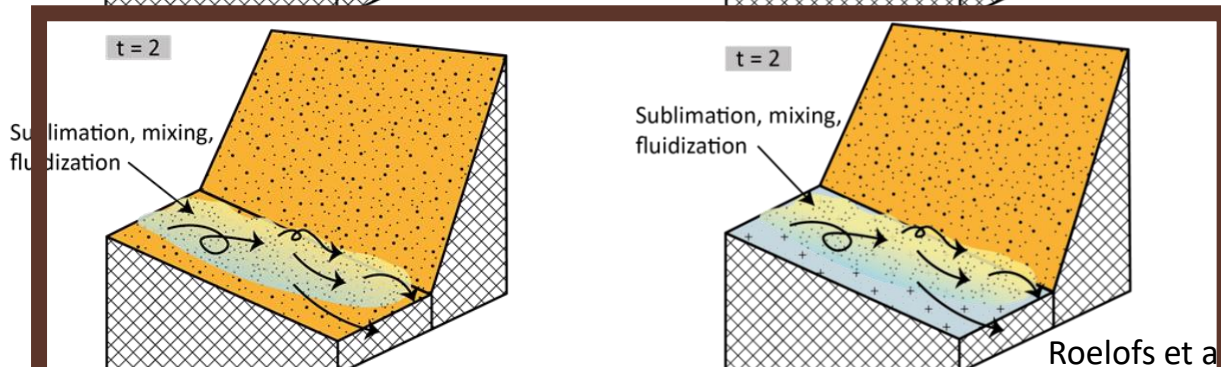
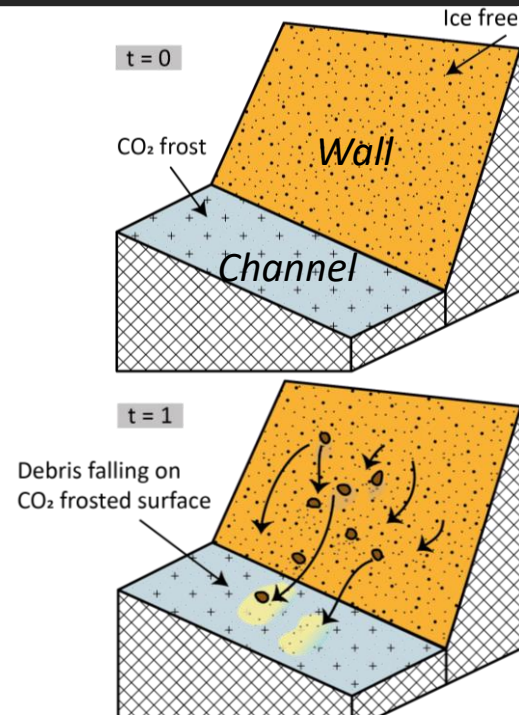
Selevac crater ESP_027567_1425

Hypotheses & objectives

Mechanism 1



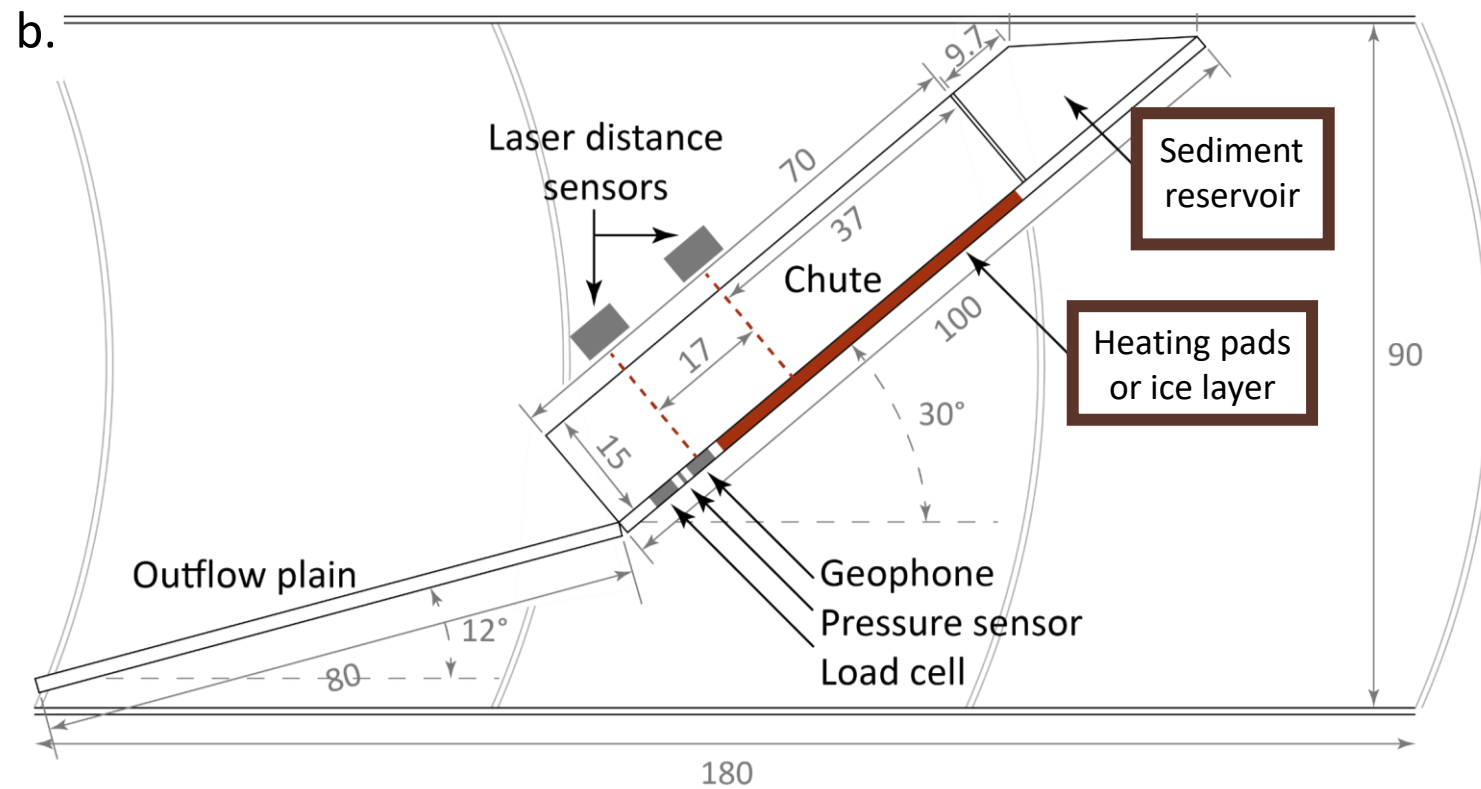
Mechanism 2



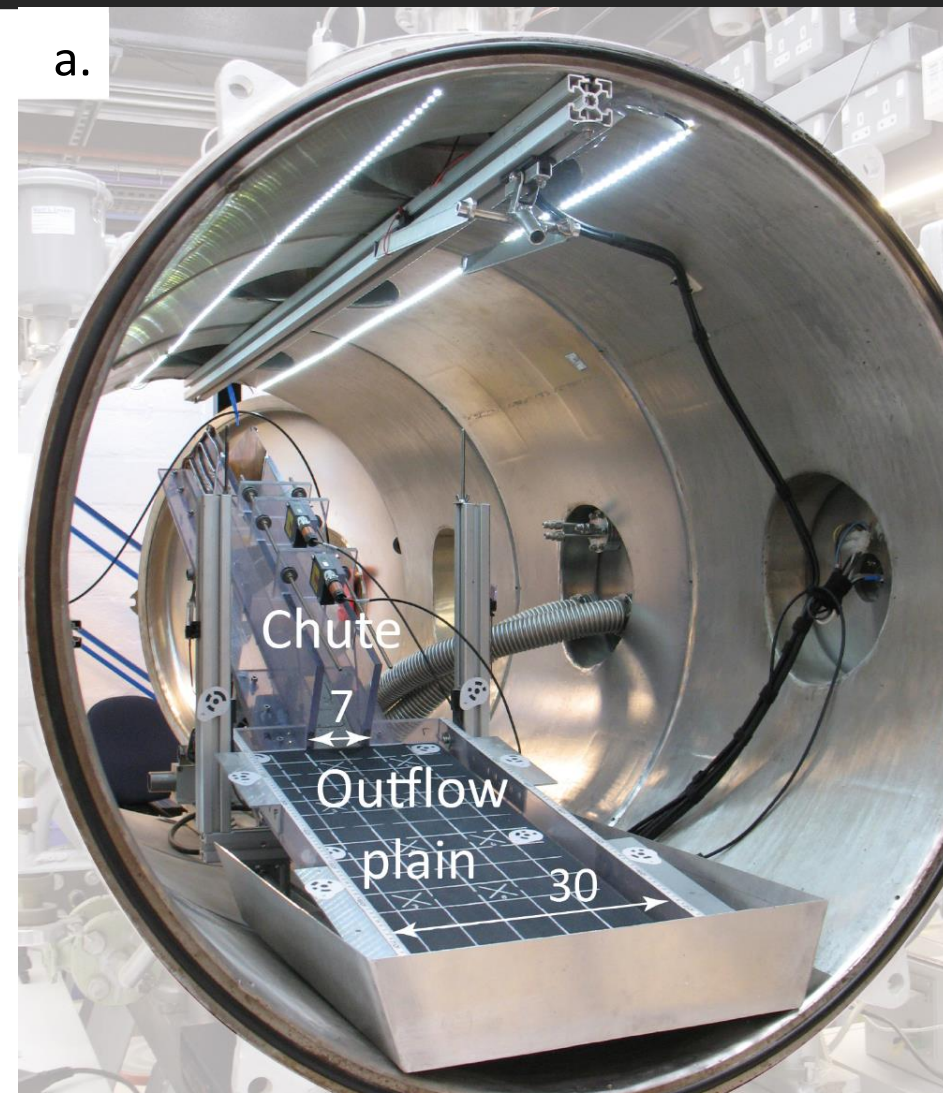
Roelofs et al in prep.

- Can sublimating **CO₂ ice fluidize and transport** sediment?
- Does this produce **morphologies** similar to Mars?

Method

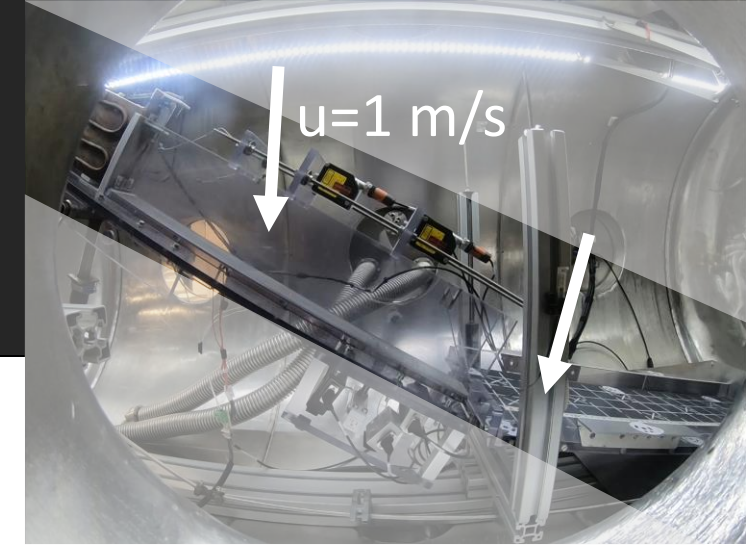


a.

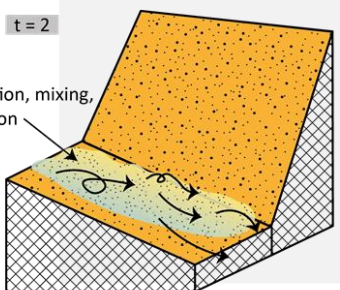
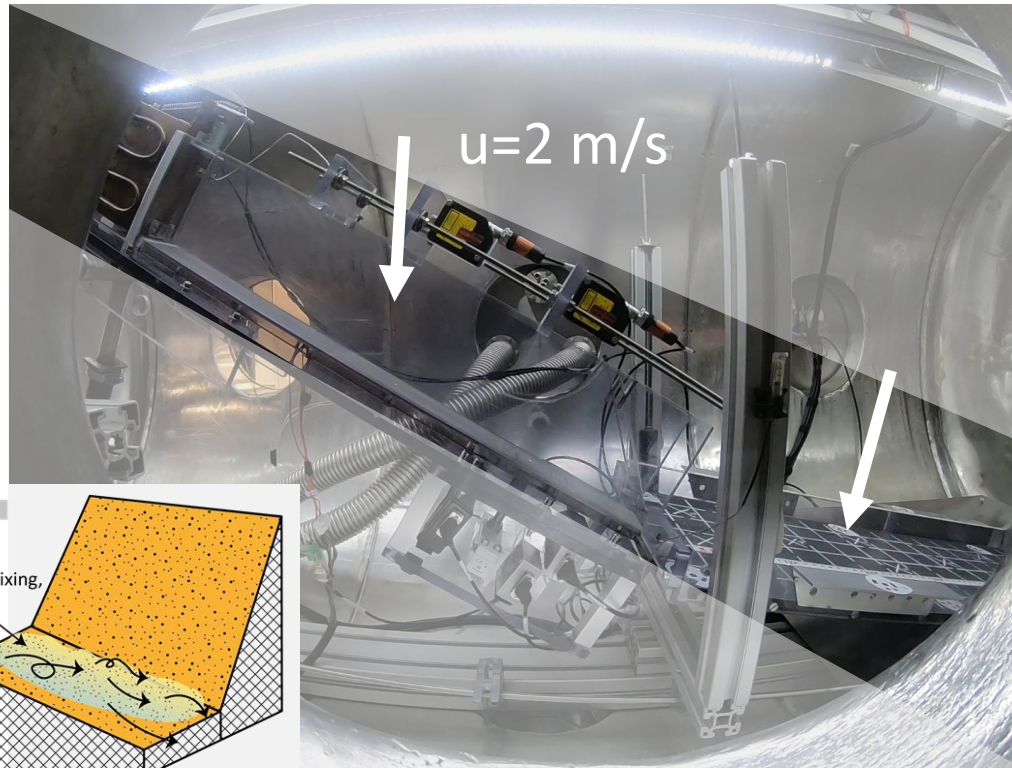


Results

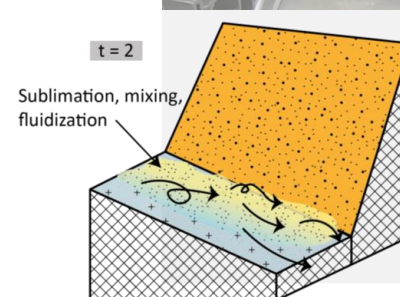
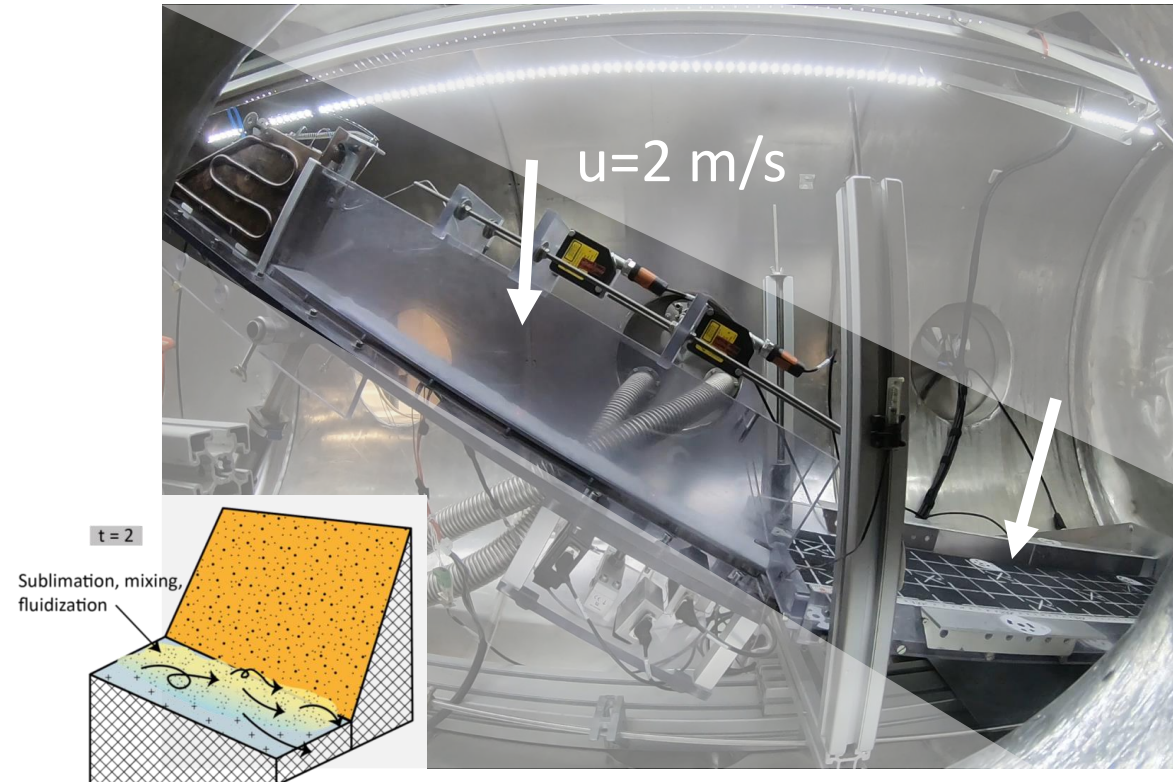
Mechanism 1
Sand & ice mix
Earth atmosphere



Mechanism 1
Sand & ice mix – Mars atmosphere



Mechanism 2
Sand over ice – Mars atmosphere

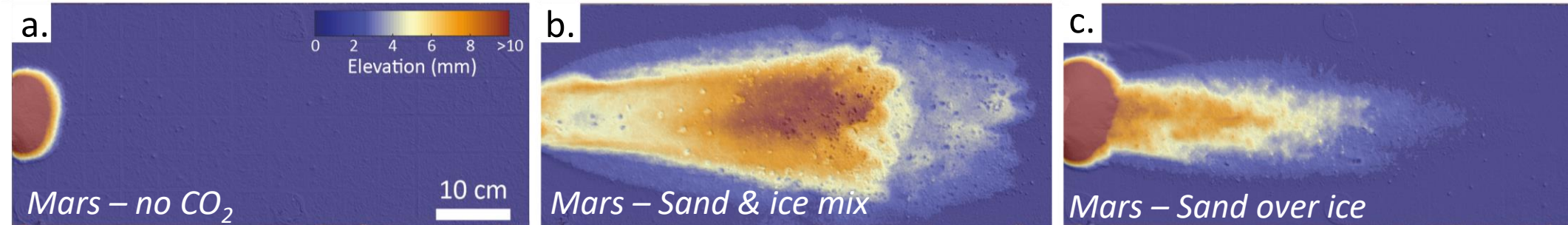


Results & Conclusions

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Roelofs et al. in prep.

- Sublimating CO₂ ice can **mobilize and transport** sediment under Martian atmosphere
- **Morphologies** resemble real-life examples → levees & lobes
- The low **Martian pressure is key** → large gas fluxes during sublimation

To be continued
More analyses
Larger experiments
• Aarhus Mars Chamber
Modelling