erc e-Mars Laboratoire de Géologie de Lyon Terre Planètes Environnement UNIVERSITÉ DE LYON

M2020
First Landing Site Workshop

Exceptional rock diversity exposed in Coprates Chasma

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1) Why Coprates Chasma is a key location ?
2) Orbital observations around the landing ellipse
3) Engineering contrains of the landing site

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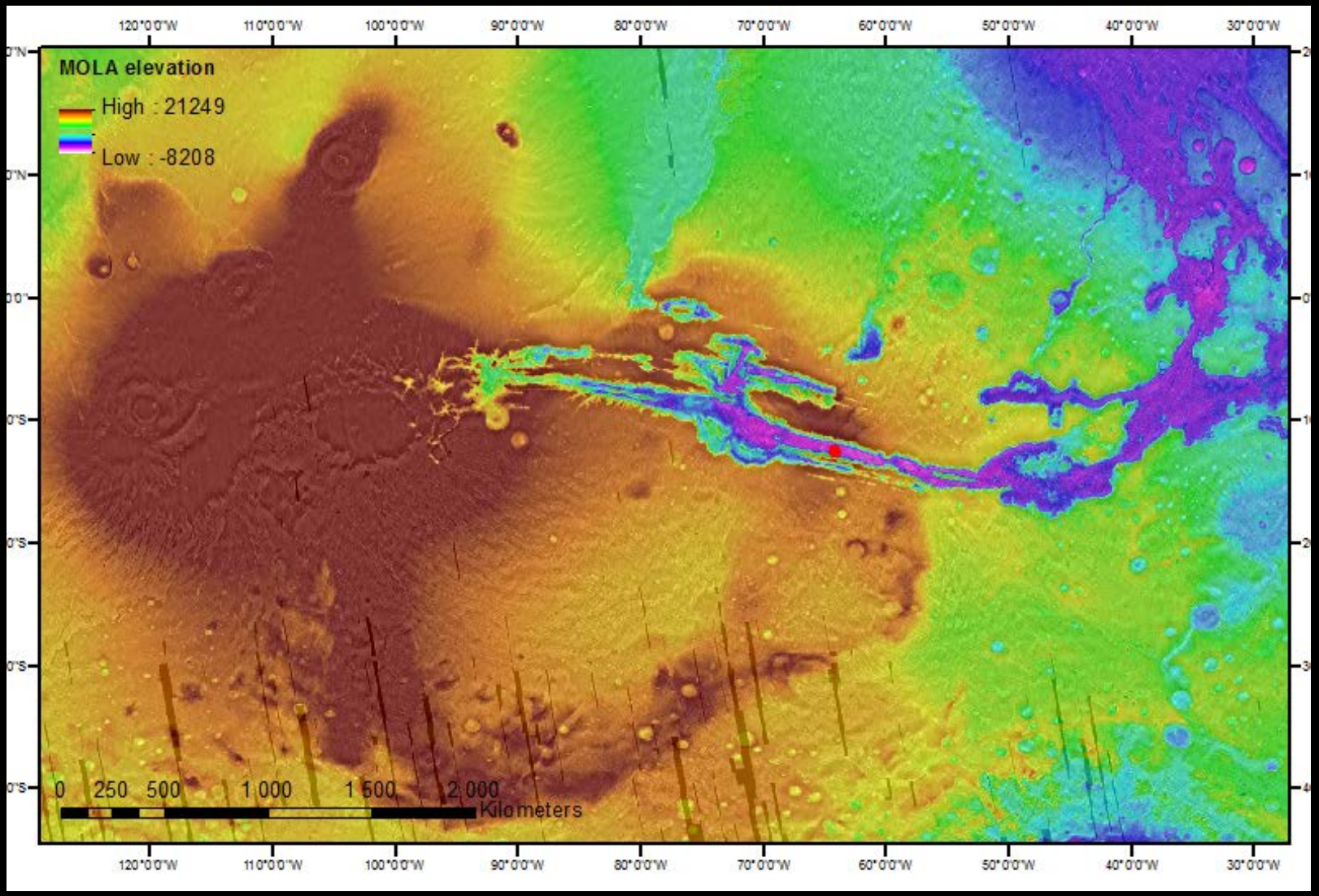
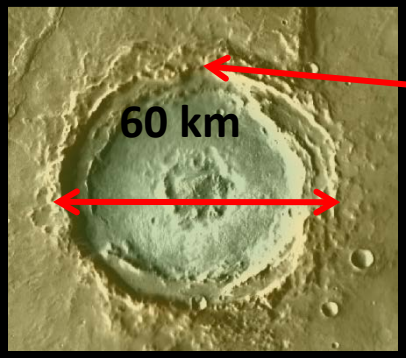
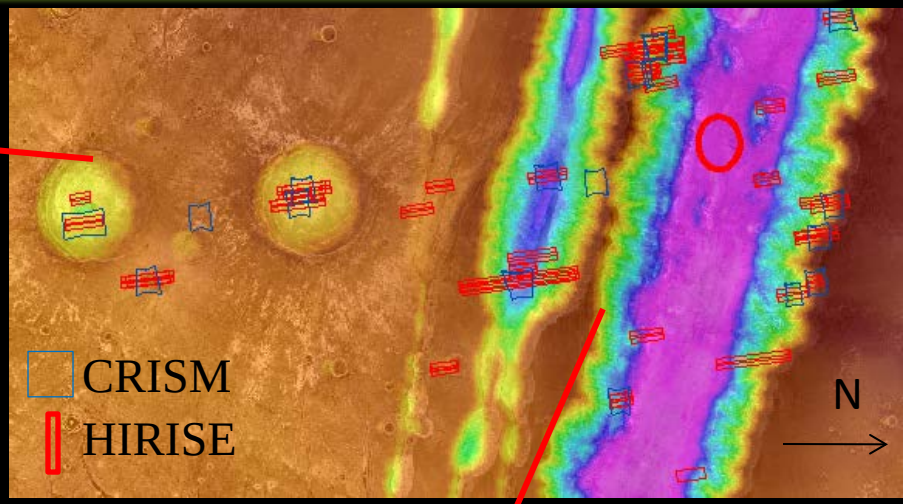
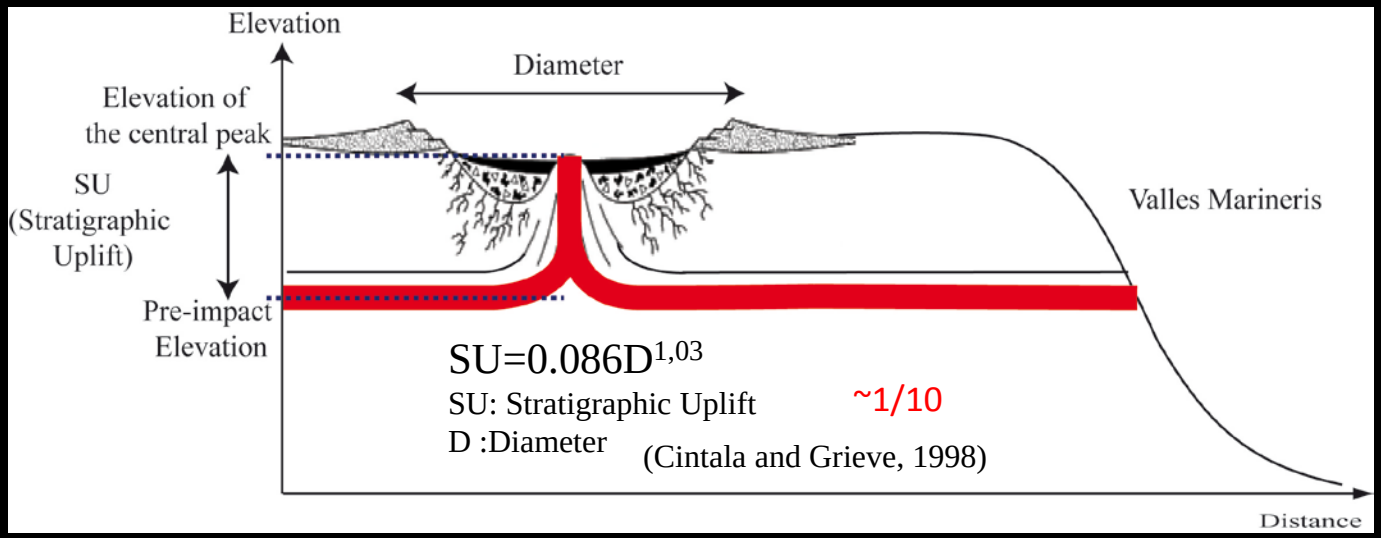
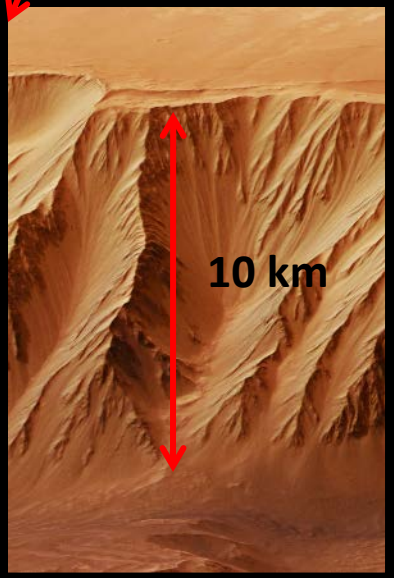


Quantin et al., Icarus, 2012









Murchie et al., 2009
Flahaut et al., Icarus, 2012

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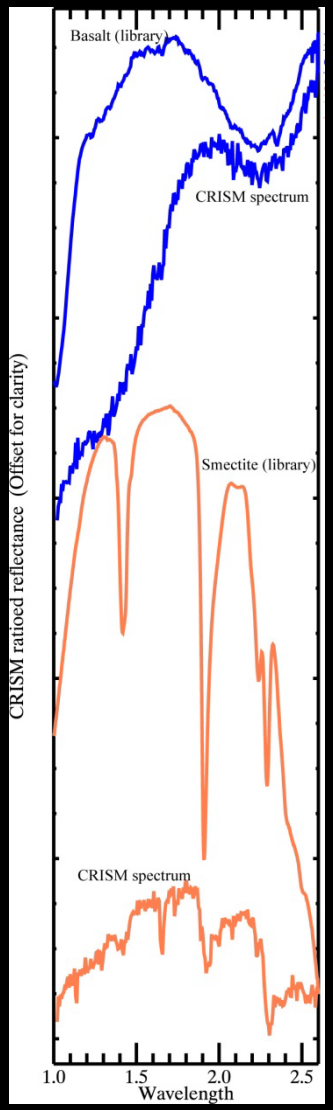

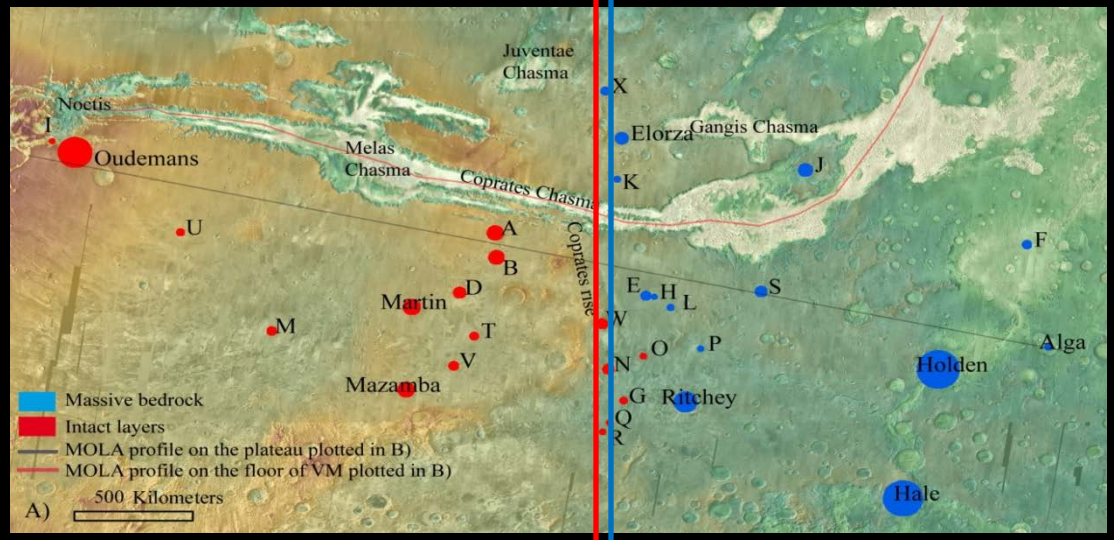

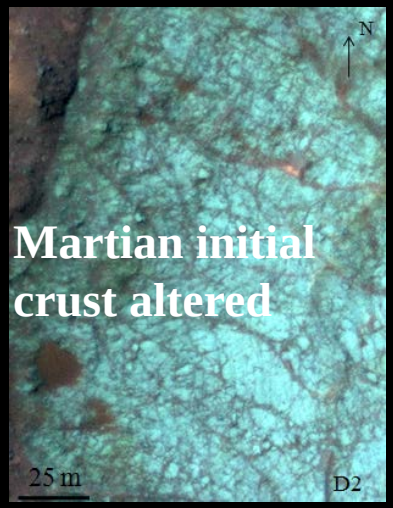

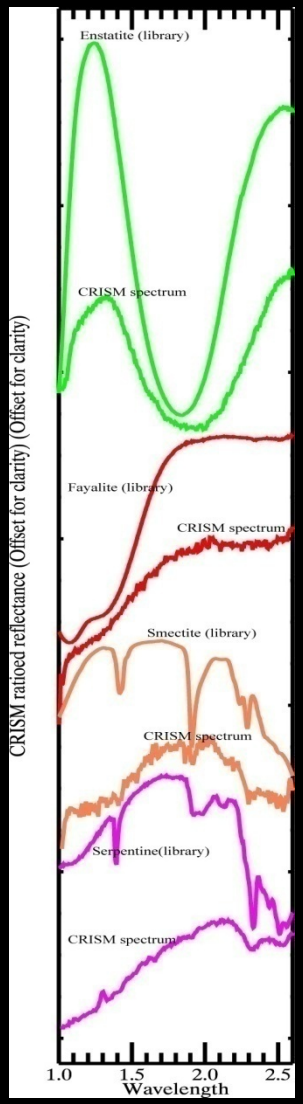

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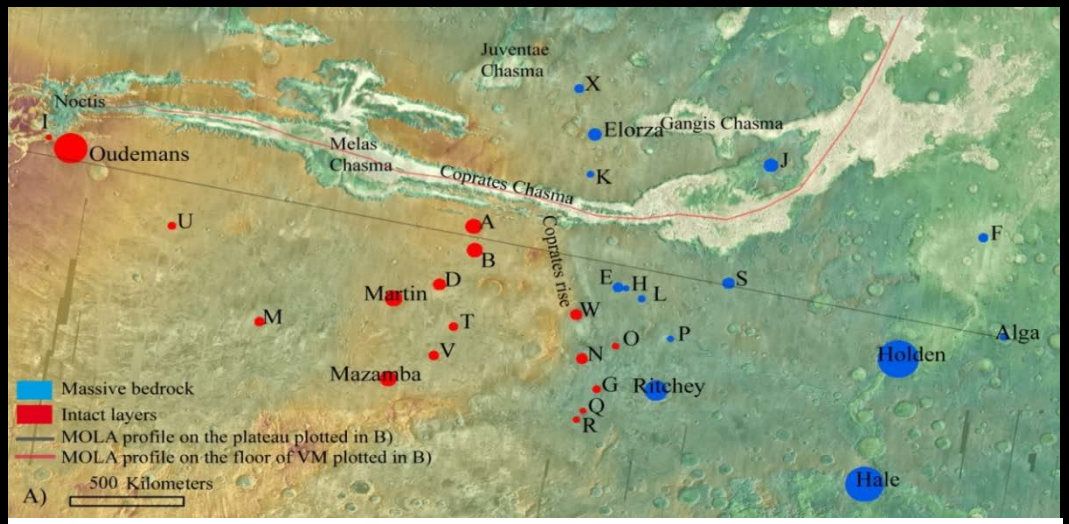
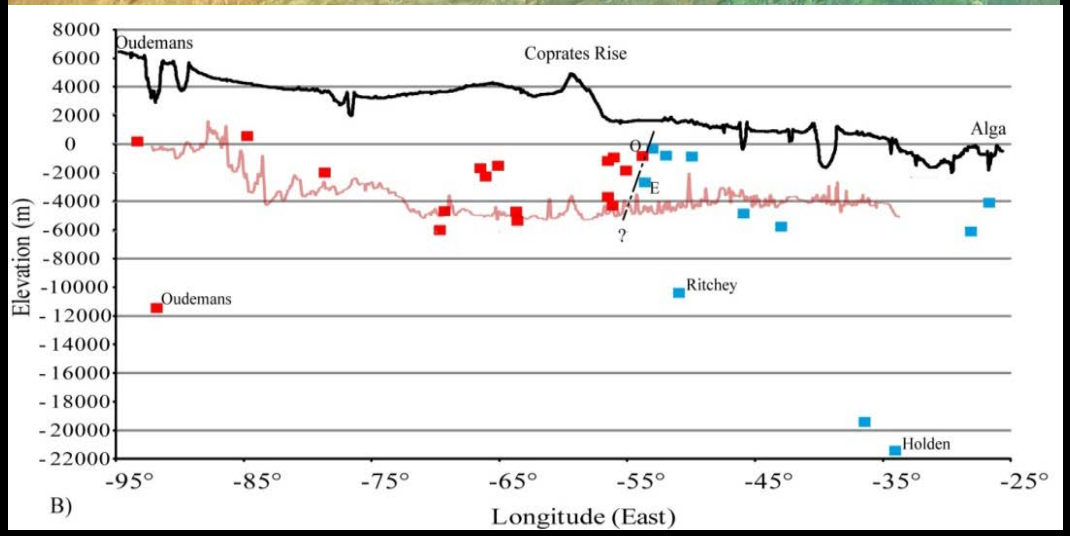
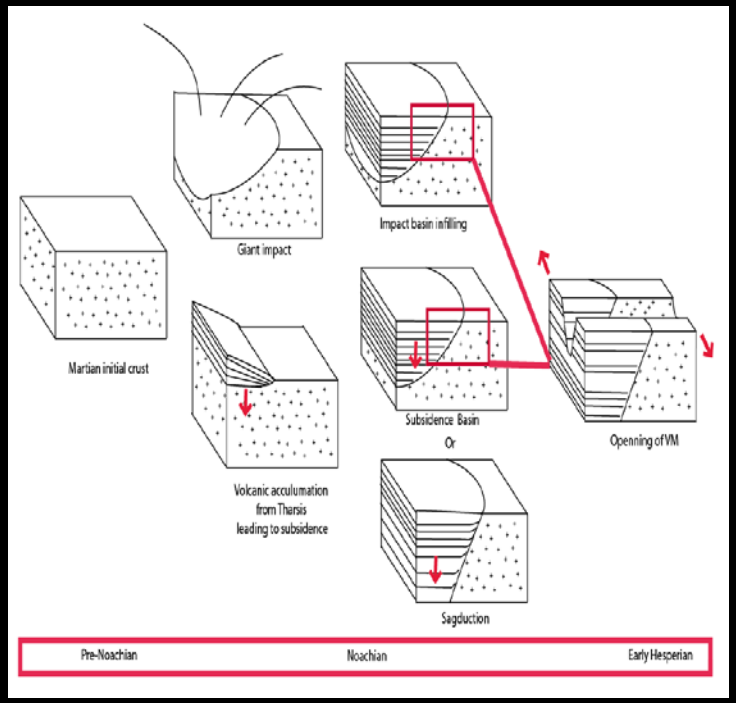
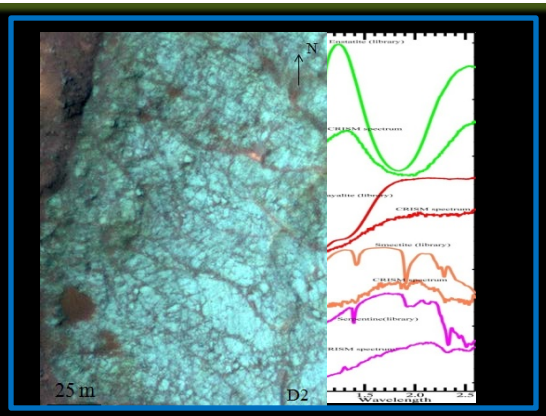


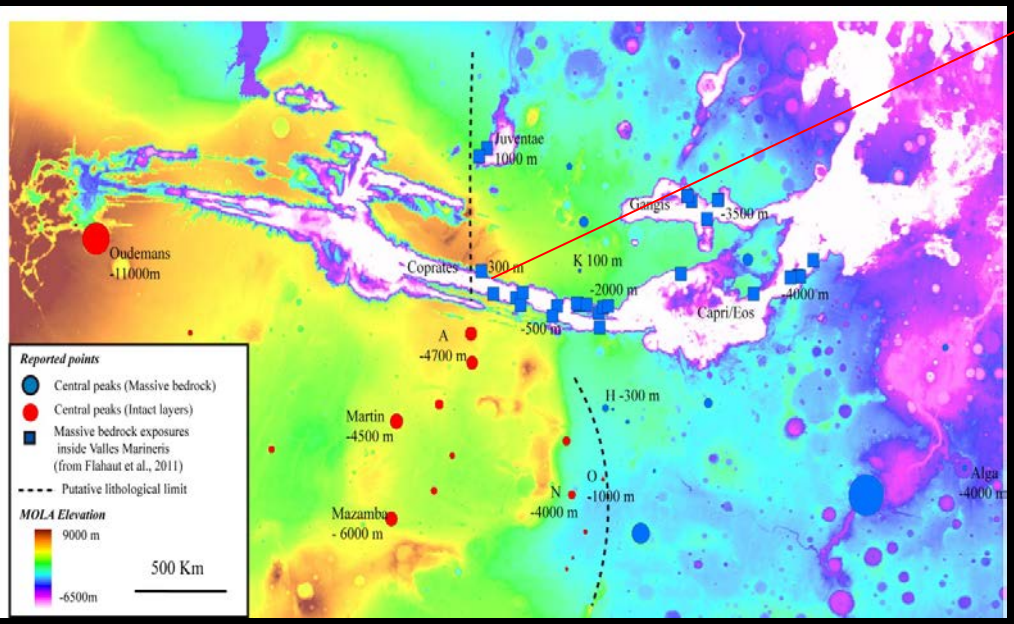


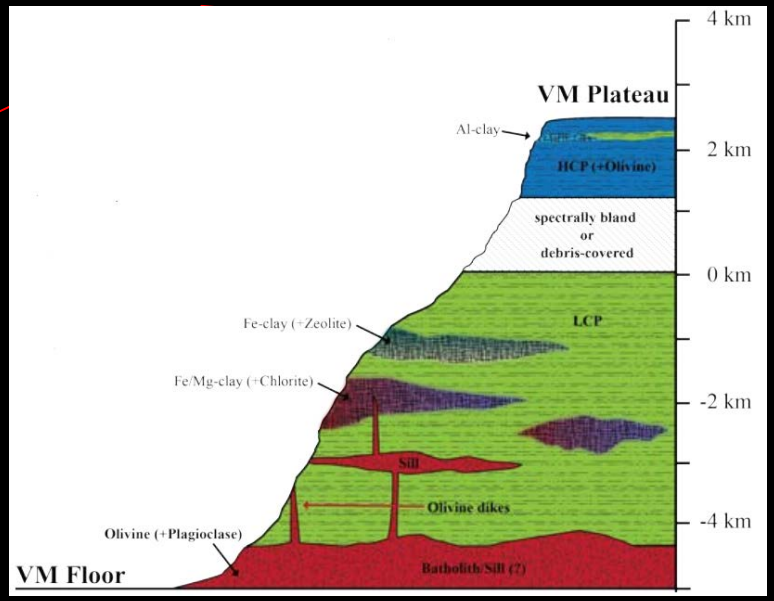


Comparison with the cross section exposed in the Walls of Coprates Chasma



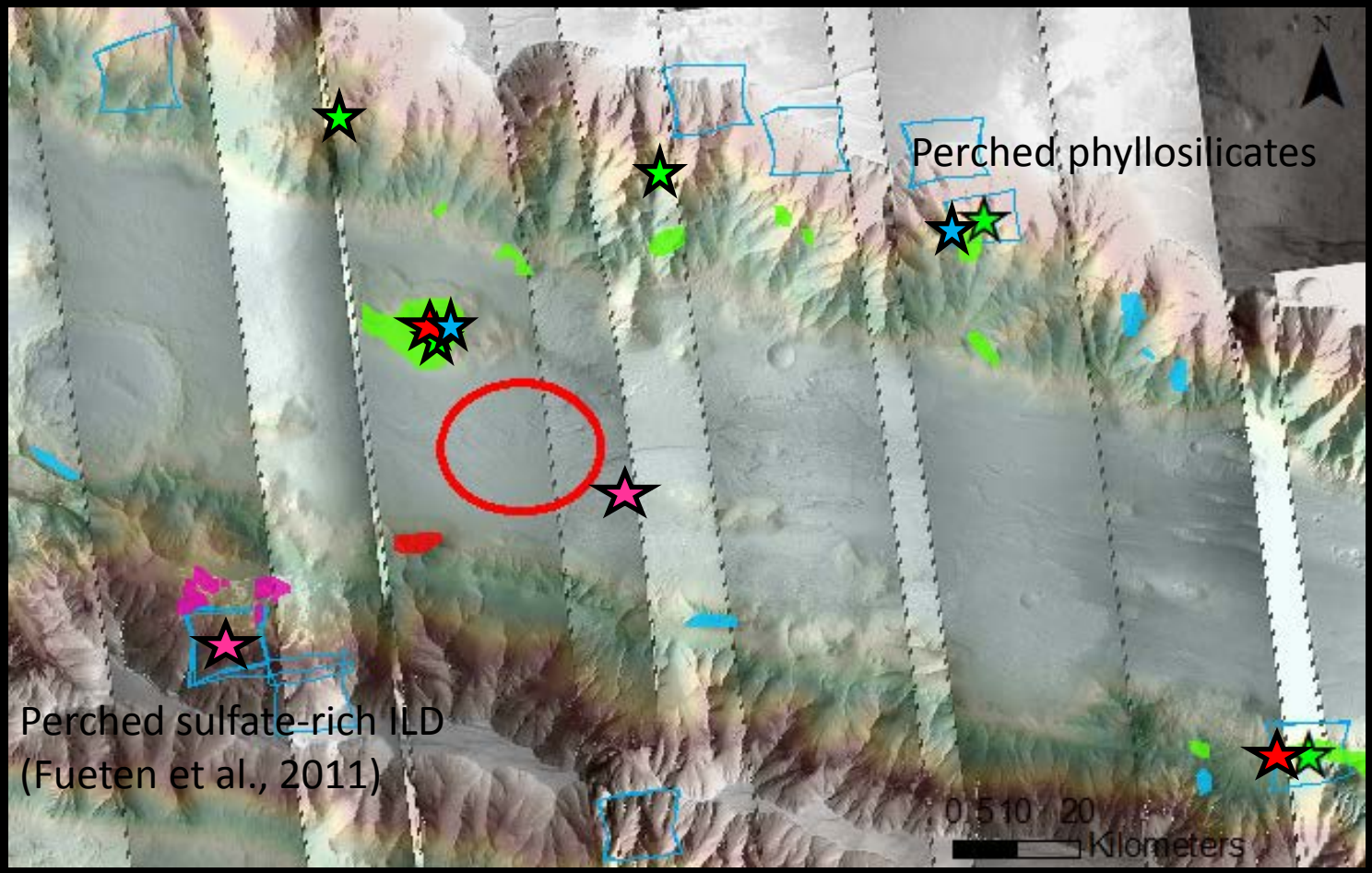
Evidence for hydrothermally altered stratigraphy : Saponite, Chlorite, Zéolite…





Flahaut et al., 2012, Murchie et al., 2009 , Viviano-Beck and Murchie, 2014

Overall mineralogical context



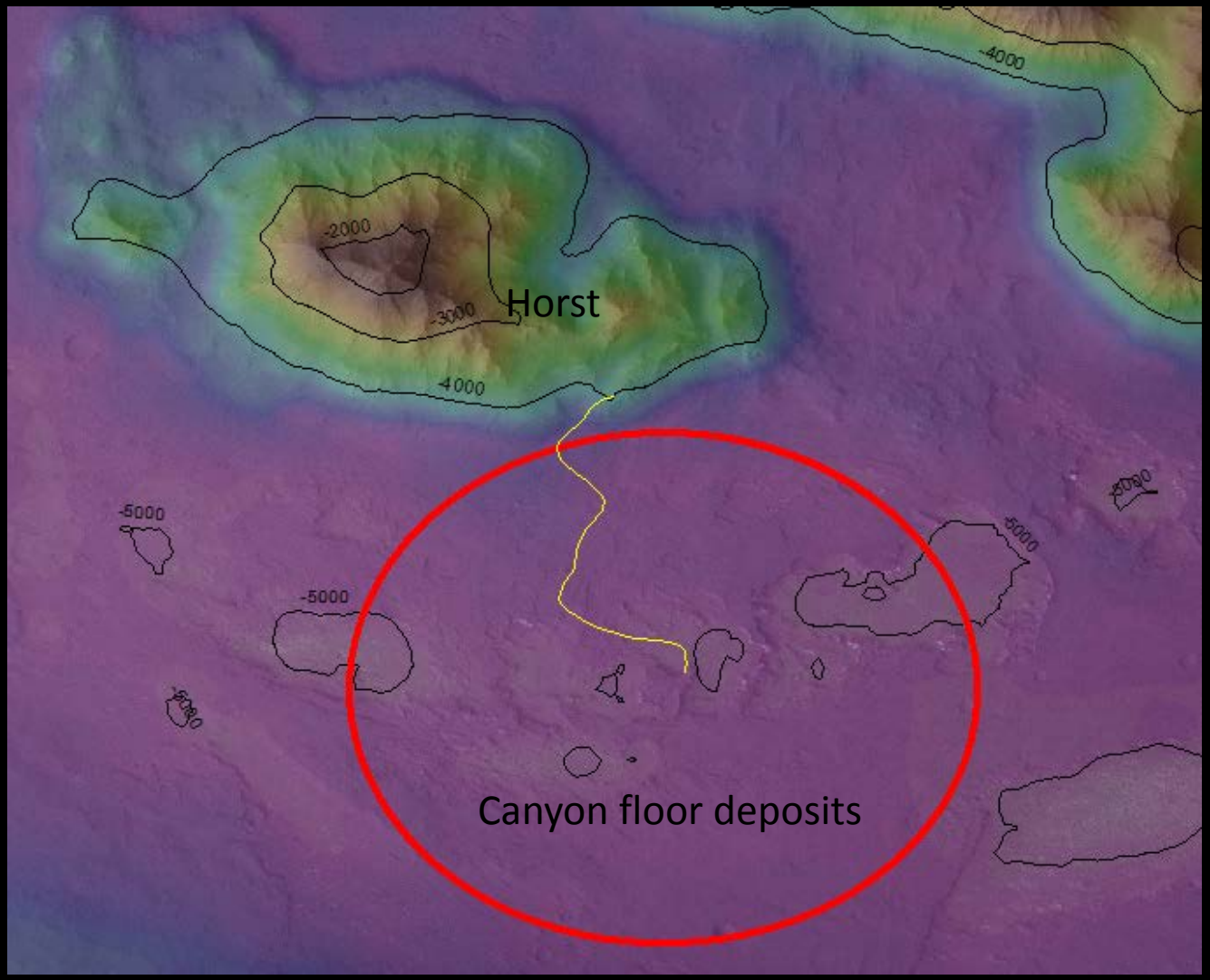
Landing Ellipse
(25*20km)

Mineralogy from
CRISM multispectral data

- Low Calcium Pyroxenes
- Olivine
- Phyllosilicates
- Sulfates

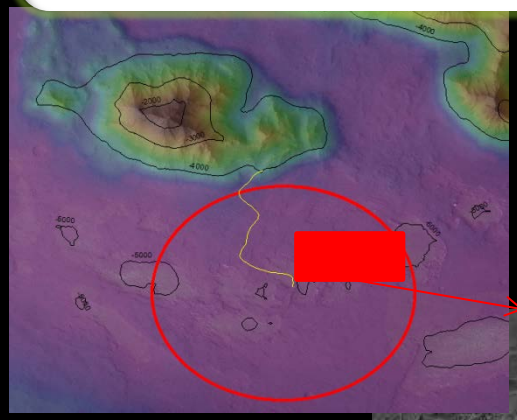
Detection from CRISM hyperspectral data
Flahaut et al., 2012

- LCP
- Olivine
- Phyllosilicates
- Sulfates



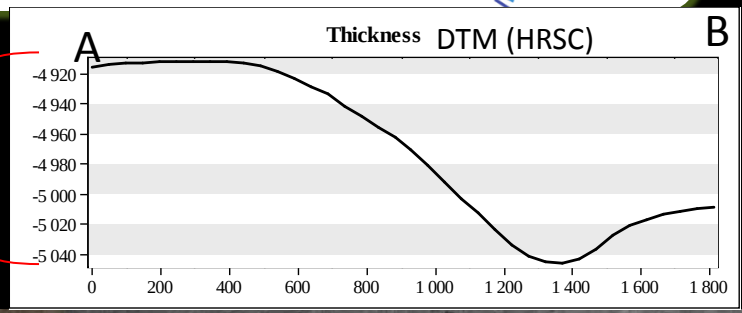
Scientific objectives : Land on the canyon floor deposits and go to sample the horst.

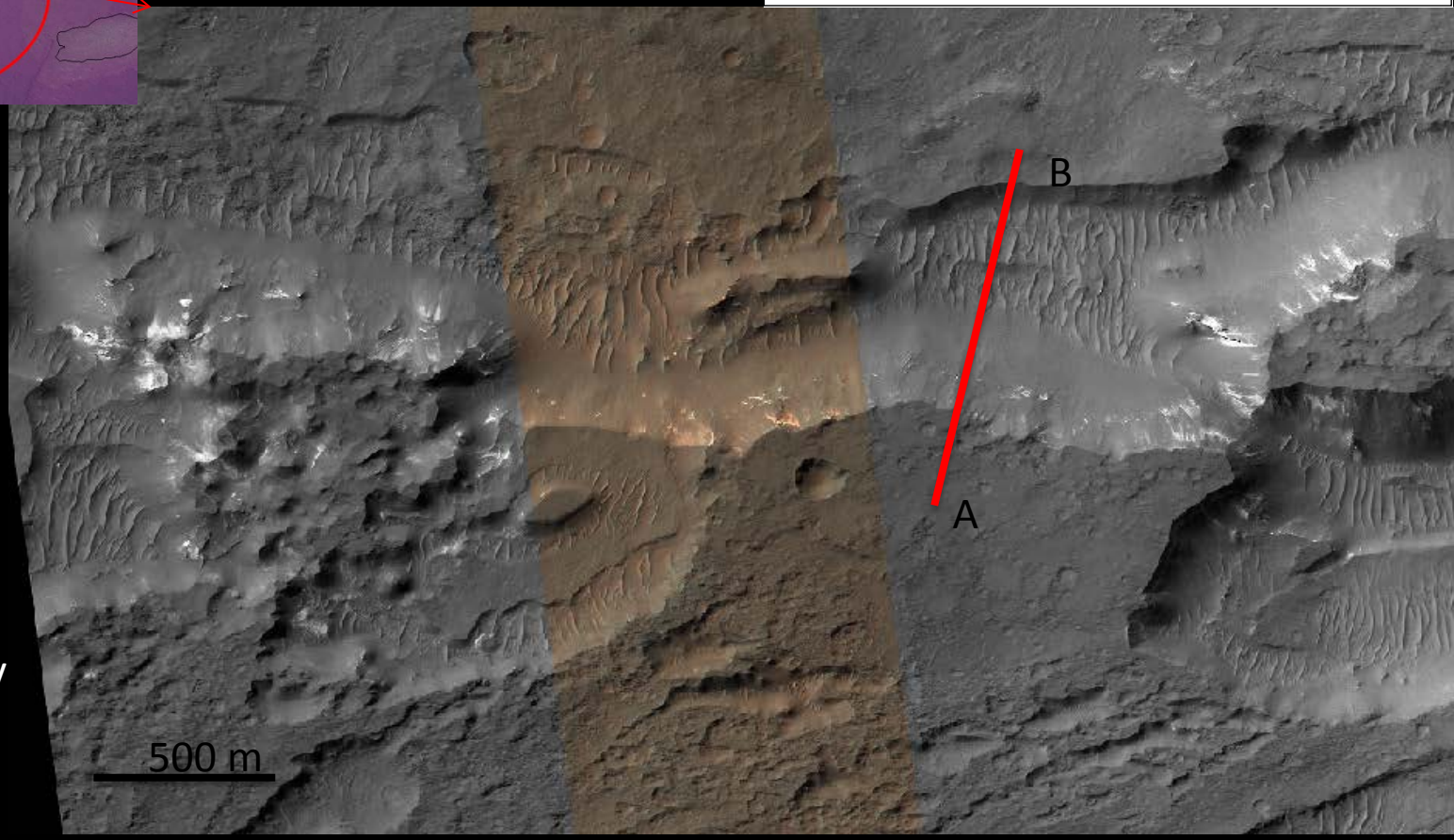
Possible route



Floor deposits

~100 m

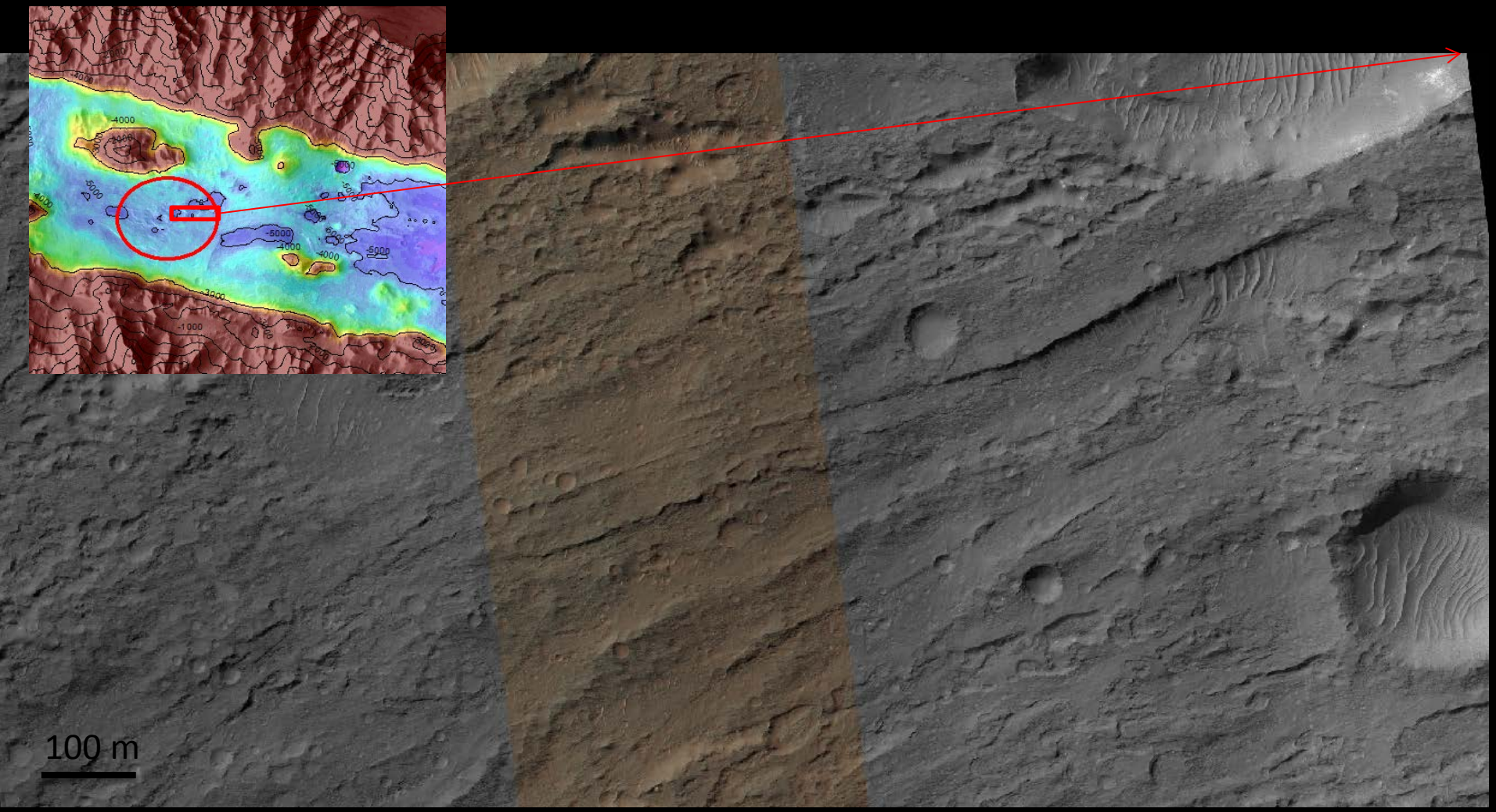




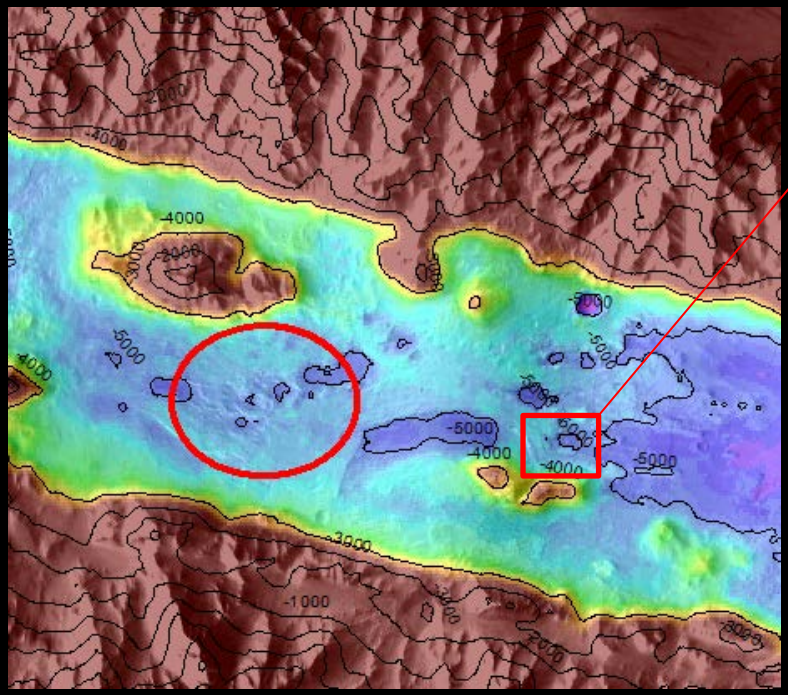
Light toned units exposed on the flancks of the floor deposit

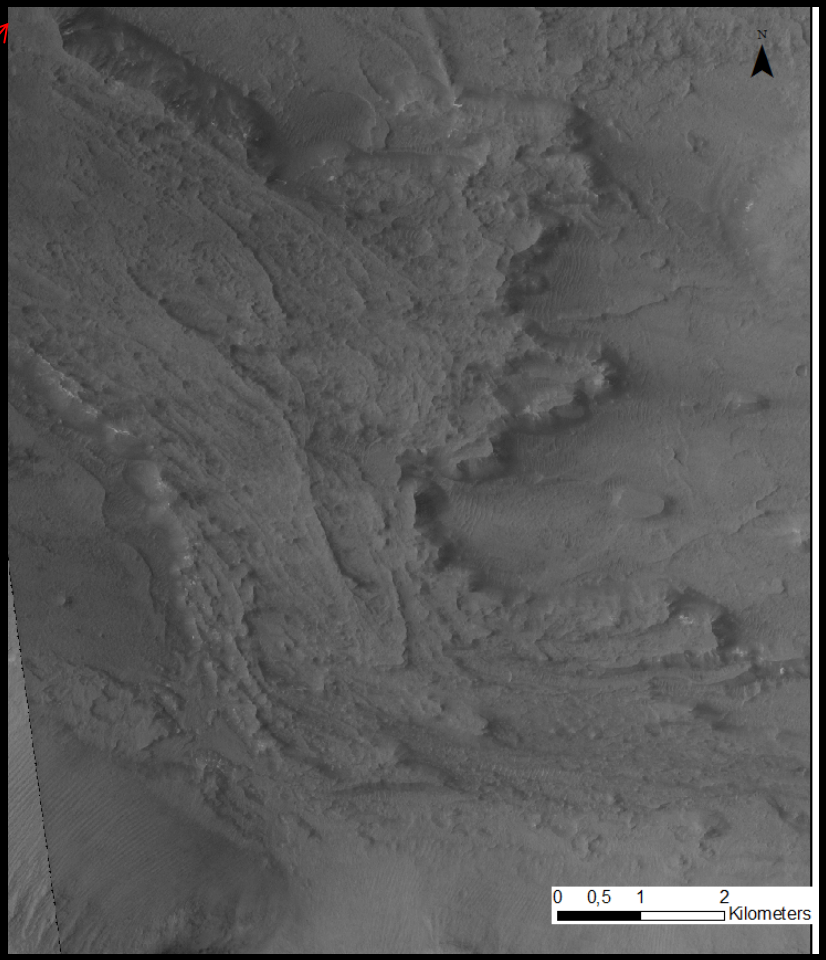
Flat capping,highly impacted and streamlined

Top of the floor deposits : streamlined, impacted surface



Top of the floor deposits





Divergent Finger-like terminations

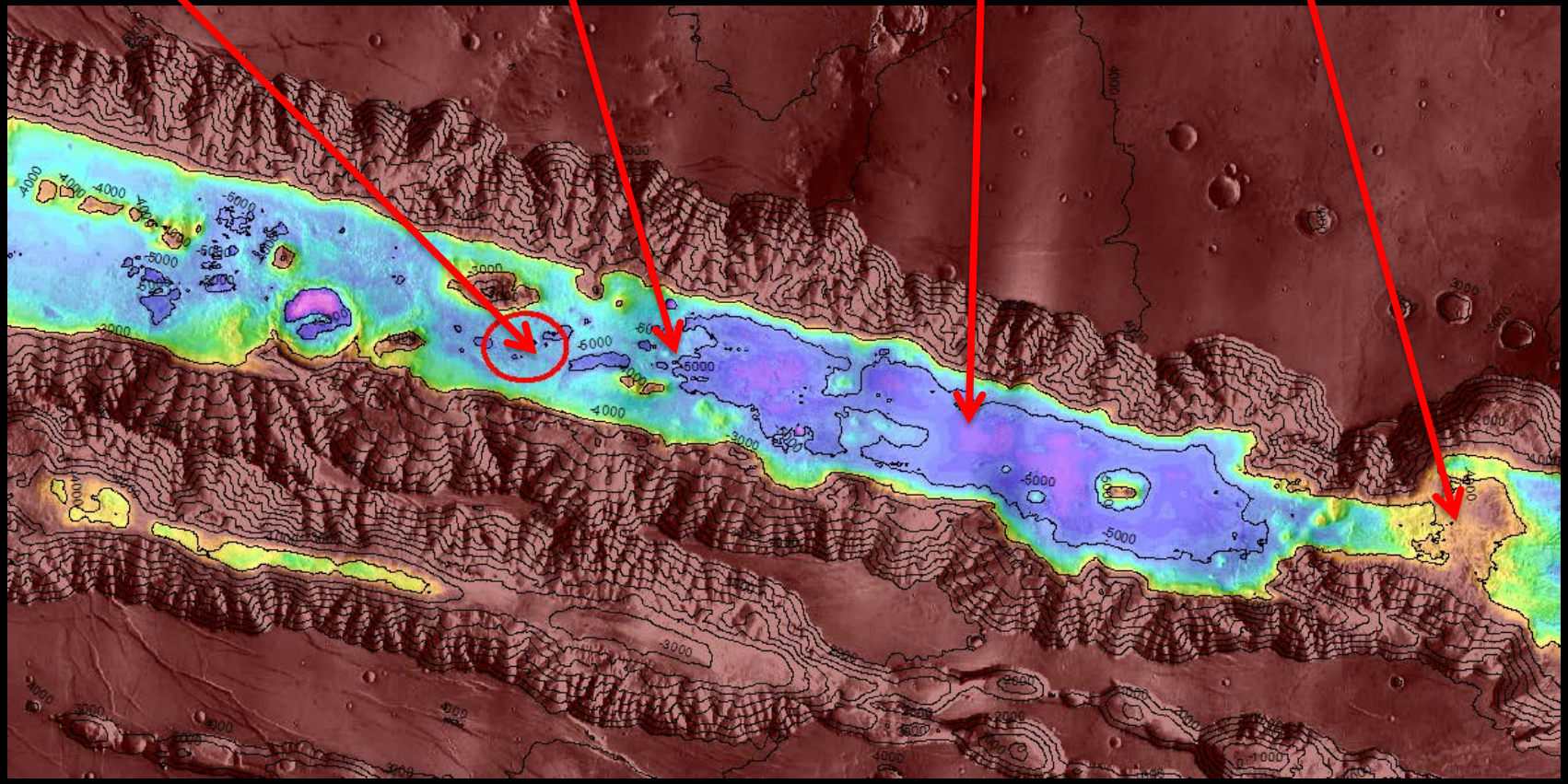
Top of the floor deposits

Steamlined floor

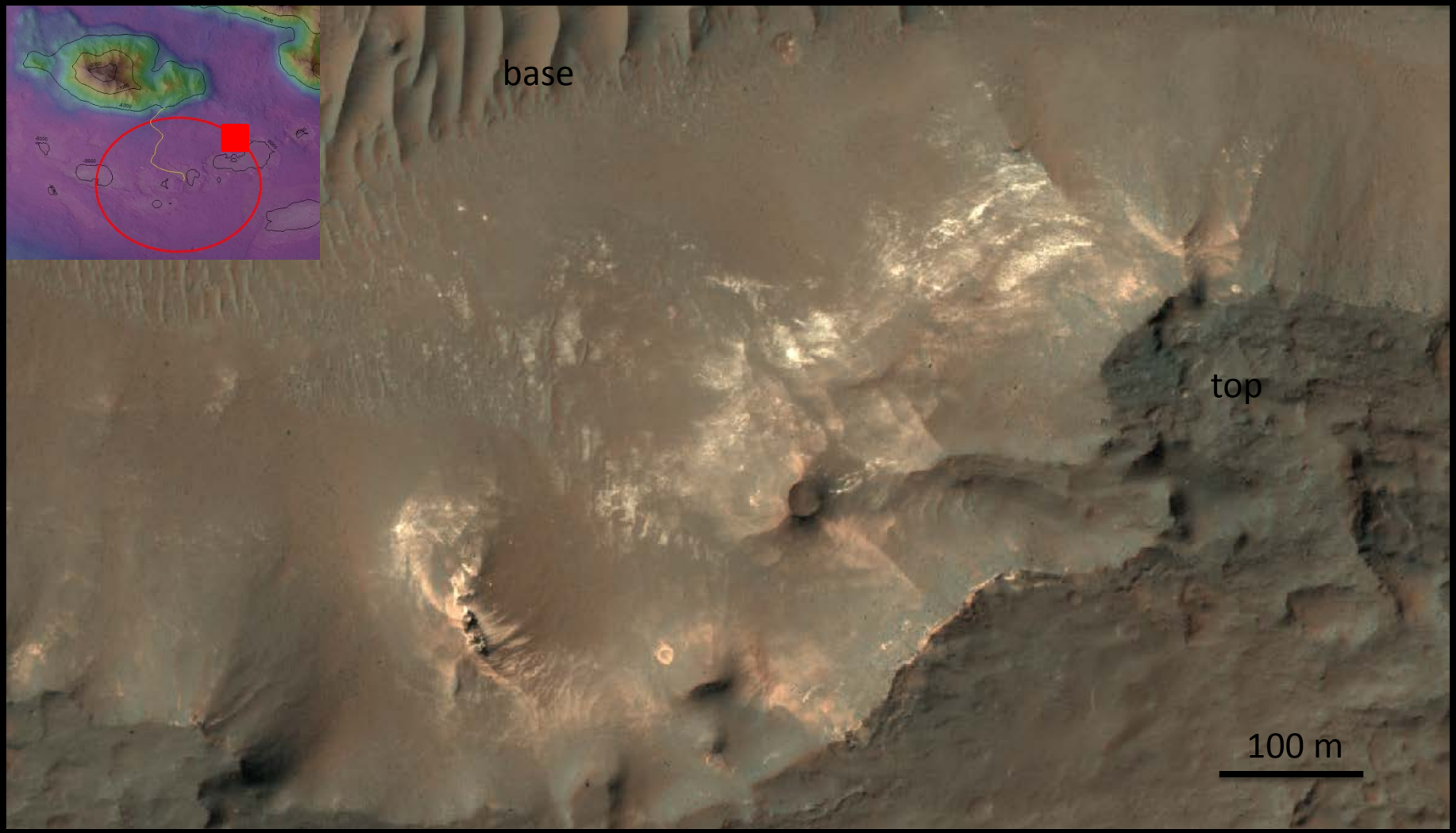
Divergent Finger-like terminations

Enclosed depression

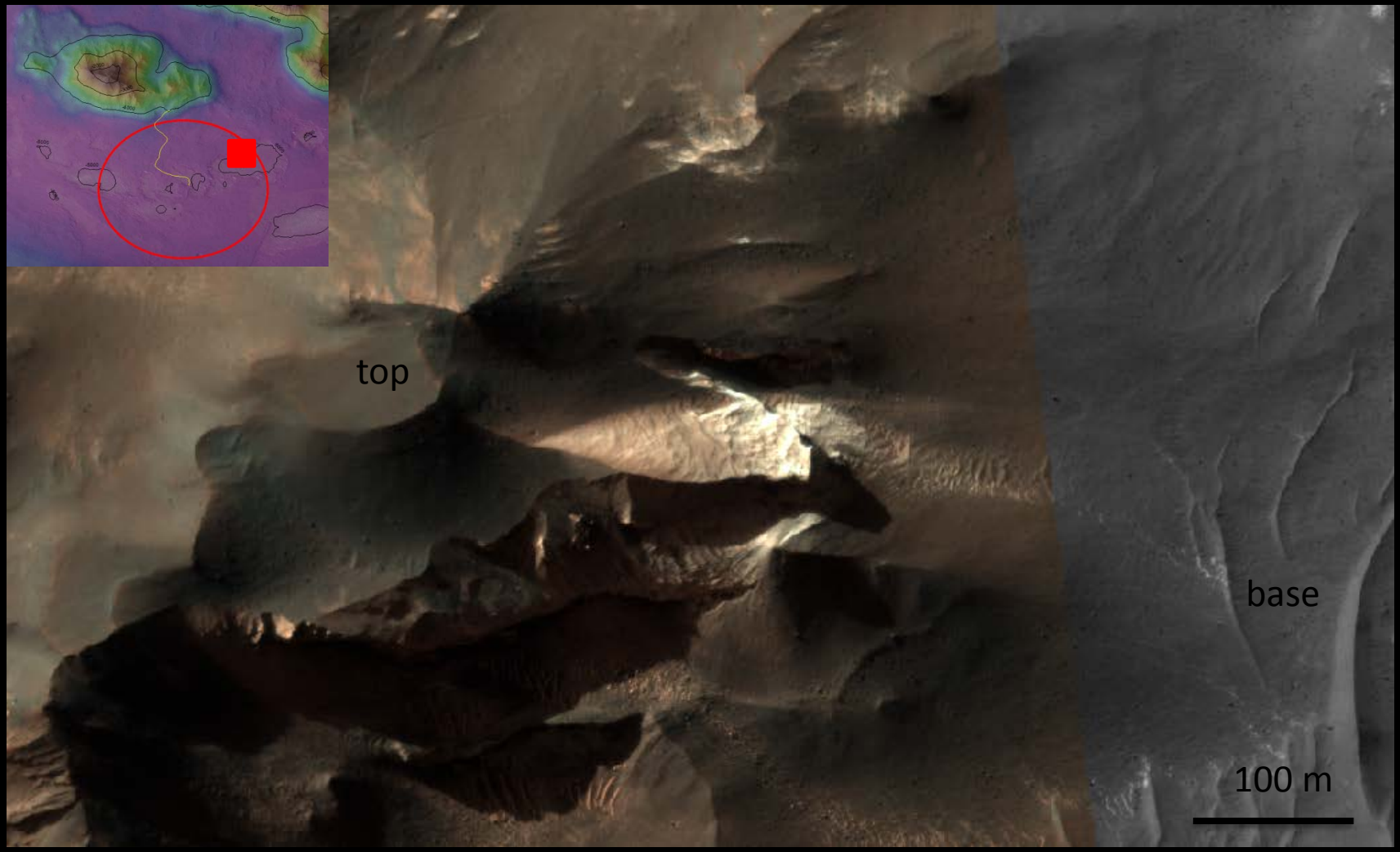
Landslide-Dam



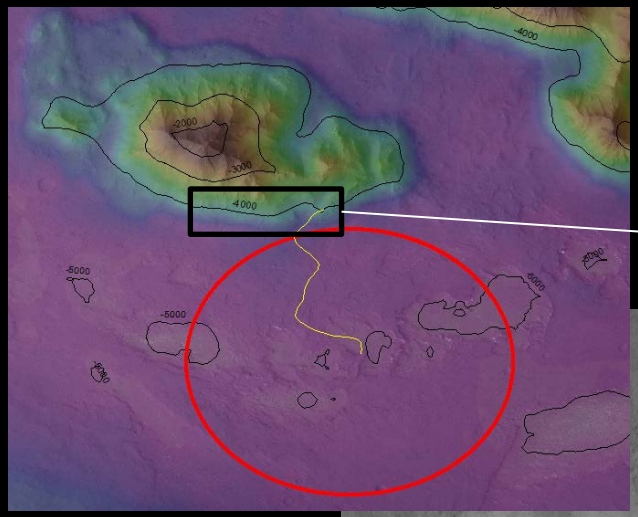
Stratigraphy of the floor deposits : fresh light toned outcrops (100 m)

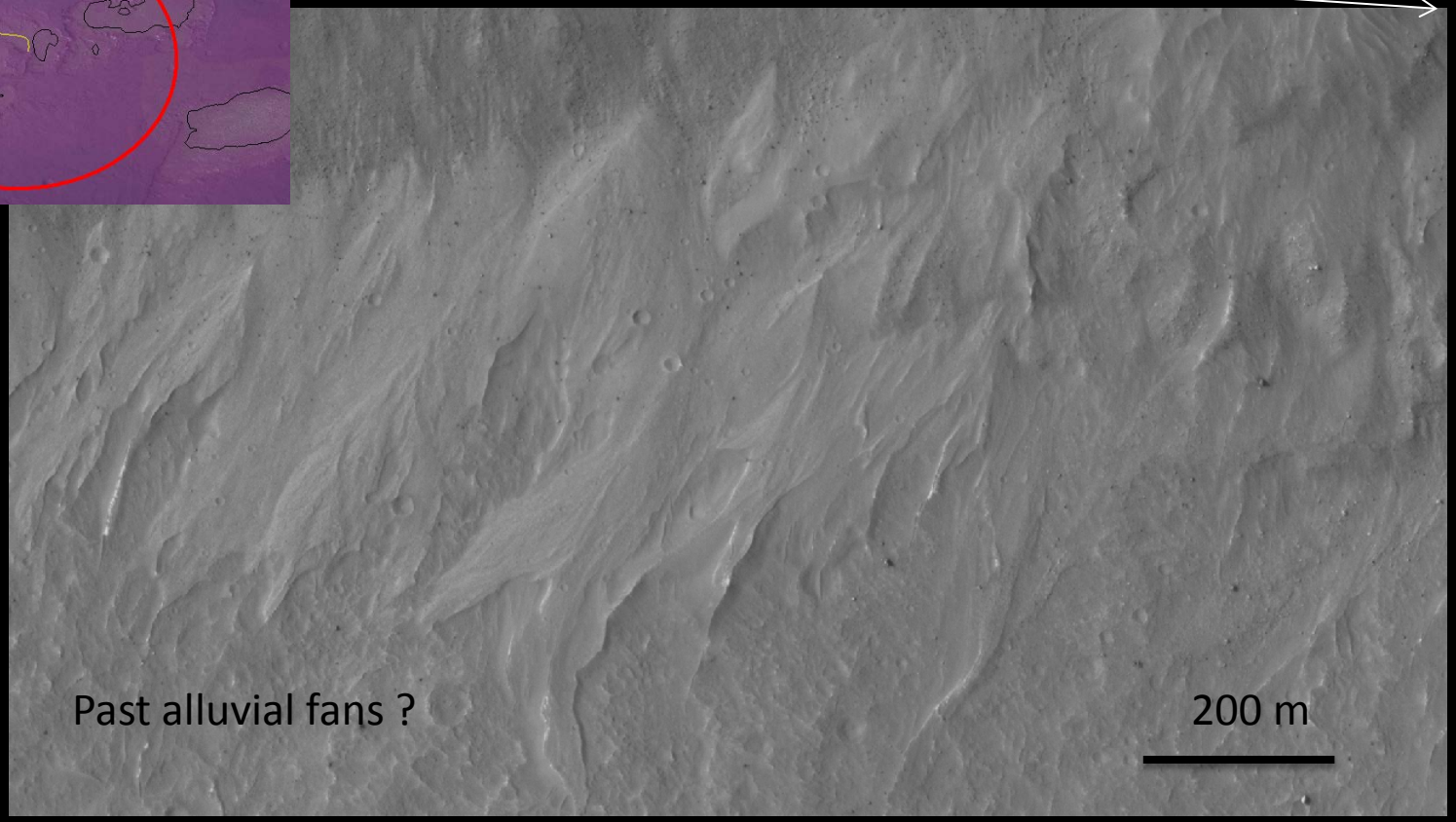


Stratigraphy of the floor deposits : fresh massive light toned outcrops (100 m)

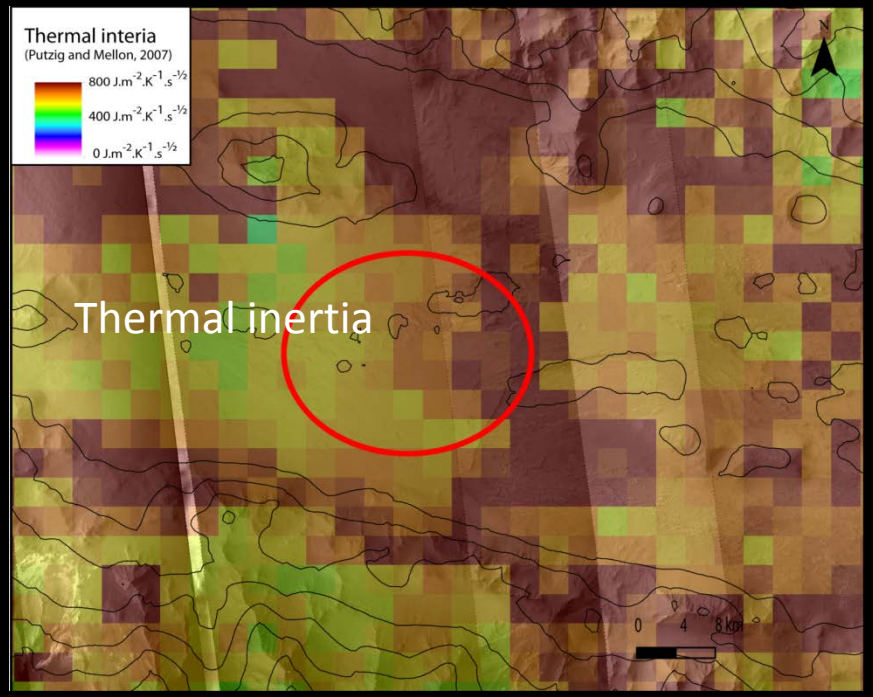


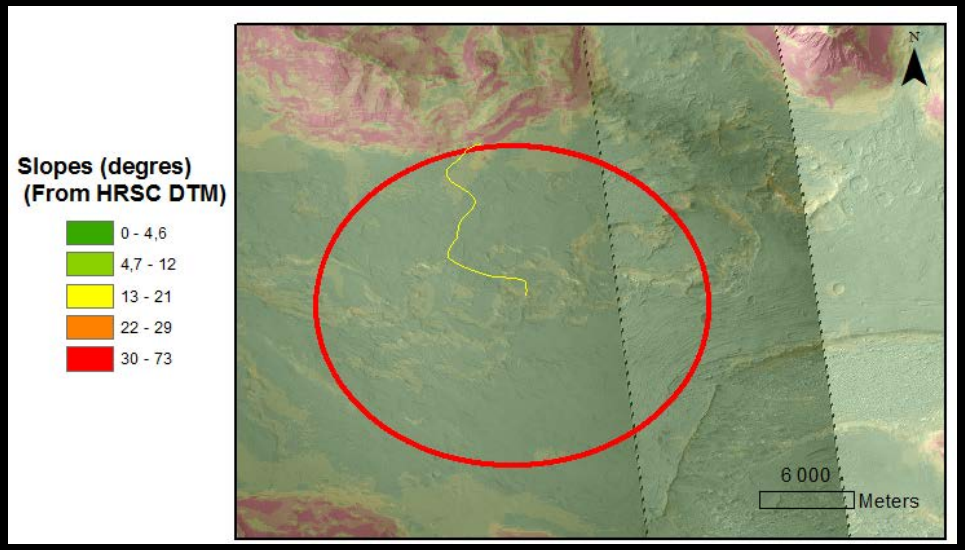
Horst morphologies : basal part of the horst





Engineering contrains

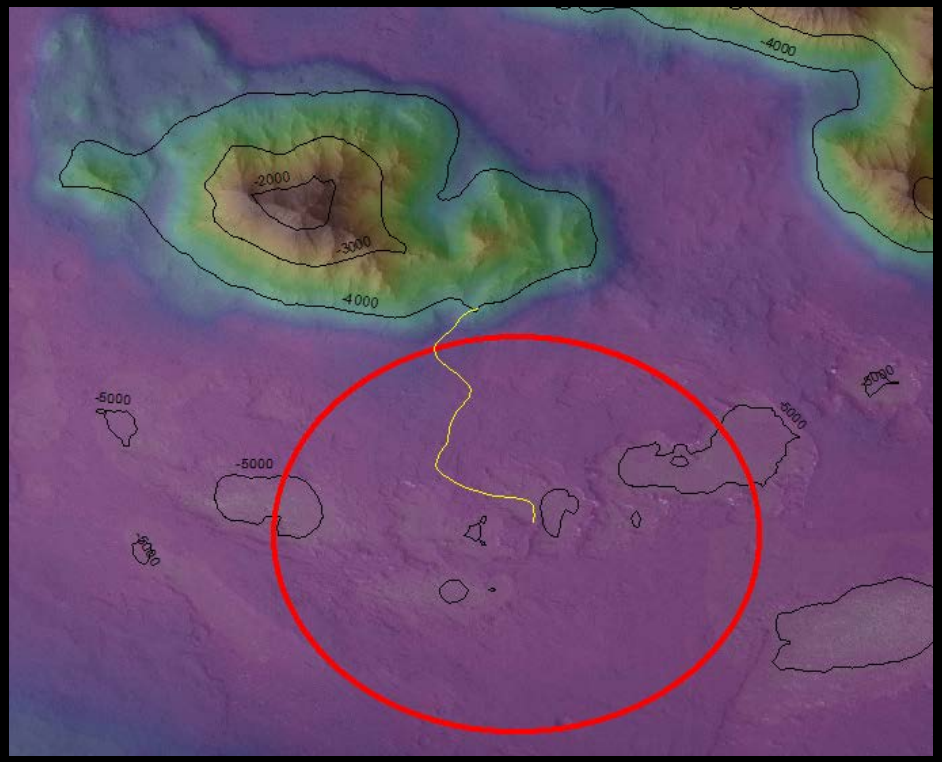




Slope

Conclusions

Why landing in Coprates Chasma ?



Science summary

-Primitive Martian crust

- hydrothermal alteration of the martian crust (suitable for life emergence ?)

-Tharsis volcanism

-Tectonics (VM opening)

-Sulfates rich floor deposit recently exhumed (conservation)

-Water flow morphologies

NOACHIAN

HESPERIAN