# Comments about MSL Landing sites:

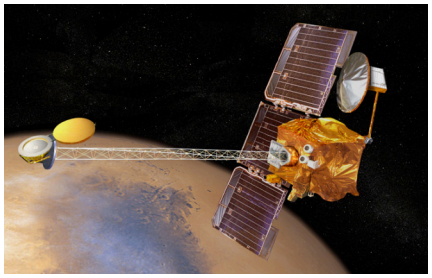
## *Samara Vallis, Eos Chasma, Aeolis Region and*

## *Shalbatana Vallis* regions

*Igor Mitrofanov for DAN/MSL Science Team*

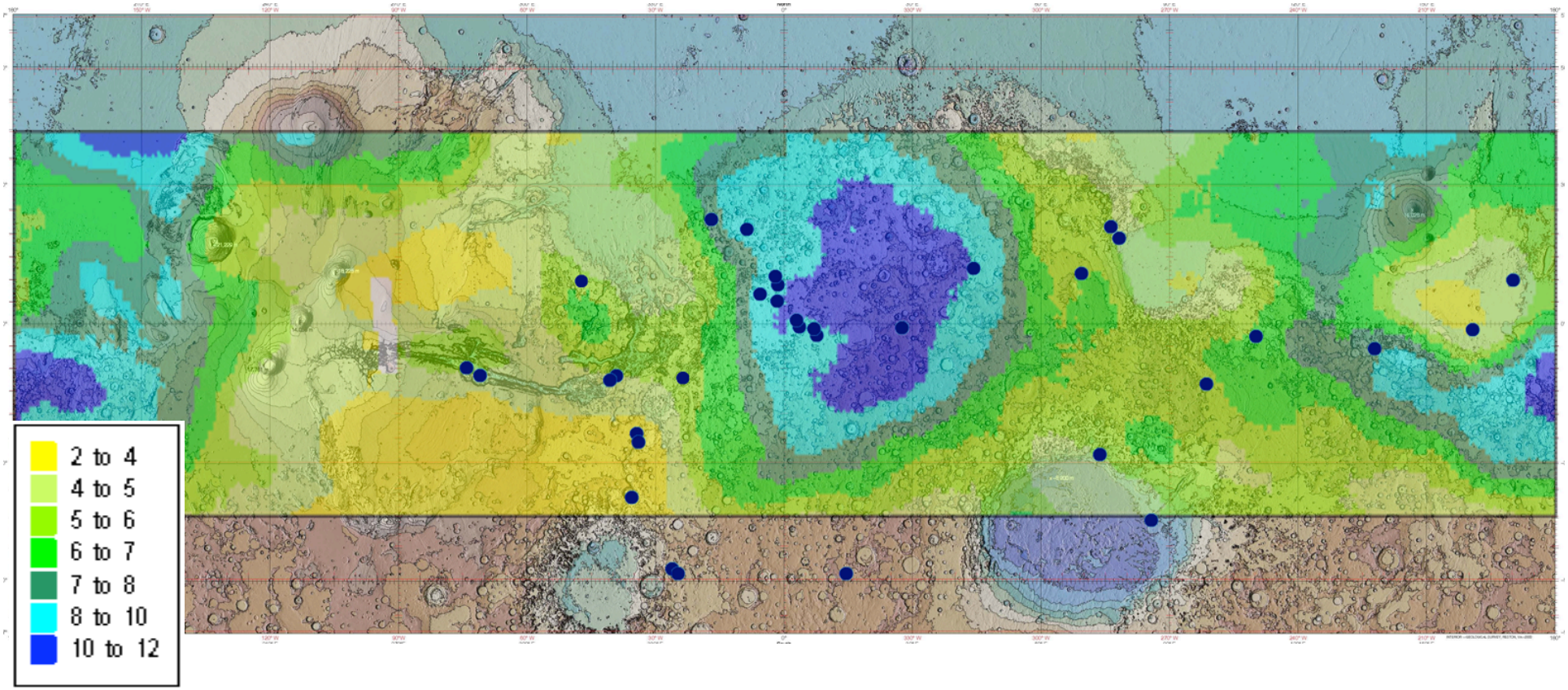
*MSL Landing Site selection Workshop #2*
*Pasadena, October 23-25, 2007*

# Introductory Remarks: Following the Water



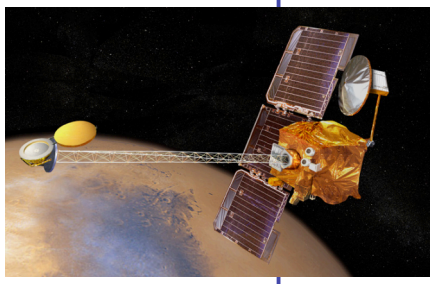
Map of the HEND water equivalent (%) based on 2-layer soil model with 2% of water amount in upper 5-cm layer.

● - **landing sites proposed on the first MSL Workshop**



| MSL LS | HEND water equivalent (%) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

1. E. Meridiani
2. Meridiani Crater
3. Becquerel Crater
4. SW Arabia Terra
5. W. Arabia
6. N Meridiani
7. W. Meridiani
8. Meridiani Bench
9. Marwth Vallis
10. Gale Crater
11. Iani Chaos
12. W Candor East
13. Melas Chasma
14. NE Syrtis Major
15. Margaritifer basin
16. Elysium/Avernus Colles
17. Nili Fossae Crater
18. Terby Crater
19. Xanthe/HypanisVallis
20. Hellas/Dao Vallis
21. E. Melas Chasma
22. Eos Chasma
23. Athabasca Vallis
24. Nilo Syrtis
25. Juventae Chasma
26. Isidis Basin Escarp
27. SML Crater
28. NW Slope Valleys
29. Nili Fossae Trough
30. Holden Crater Fan
31. Eberswalde Crater
32. Gullies/Hale Crater
33. Argyre



**Introductory Remarks: How we consider our new sites -**

**(1) We want to follow the water, as the most promising sites of habitability**

**(2) We want to correlate the *evidence* for water in present with the *signatures of water* in the past**

**(3) We want to continue studies of our candidates using all new observational data and new concepts and paradigms**

**(4) We will support our studies by engineering analysis**

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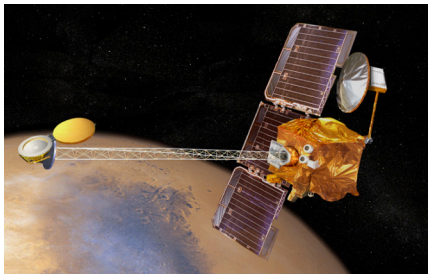
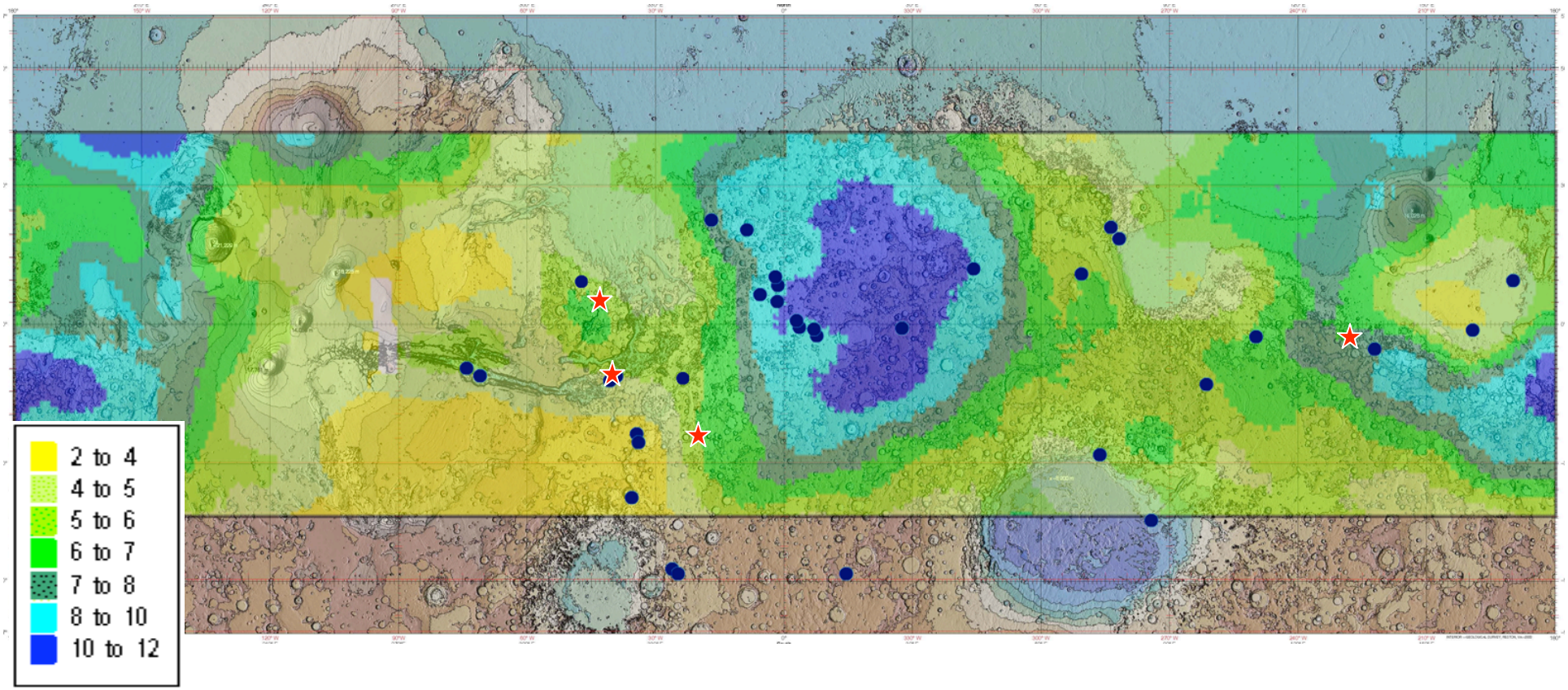


Map of the HEND water equivalent (%) based on 2-layer soil model with 2% of water amount in upper 5-cm layer.

● - **landing sites proposed on the first MSL Workshop**

★ - **landing sites proposed in this talk**



# MSL LS

HEND water equivalent (%)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
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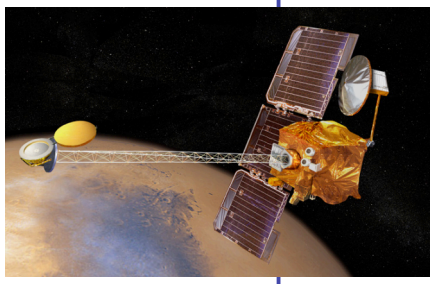
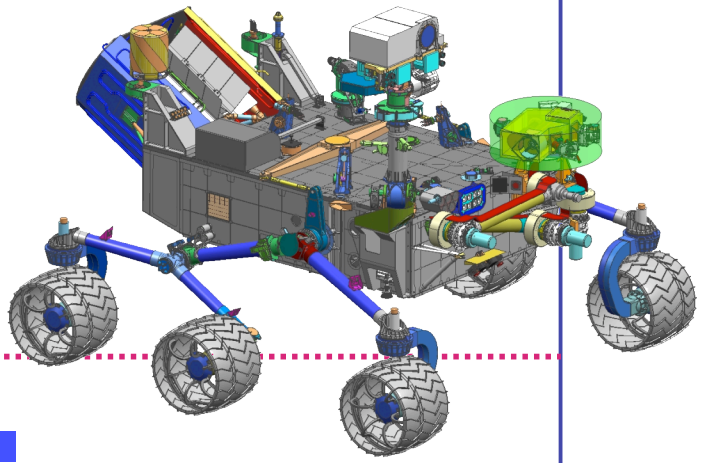
33. Argyre

34. Samara Vallis Basin
35. Eos Chasma Alluvial
36. Aeolis fan-delta
37. Shalbatana V. region



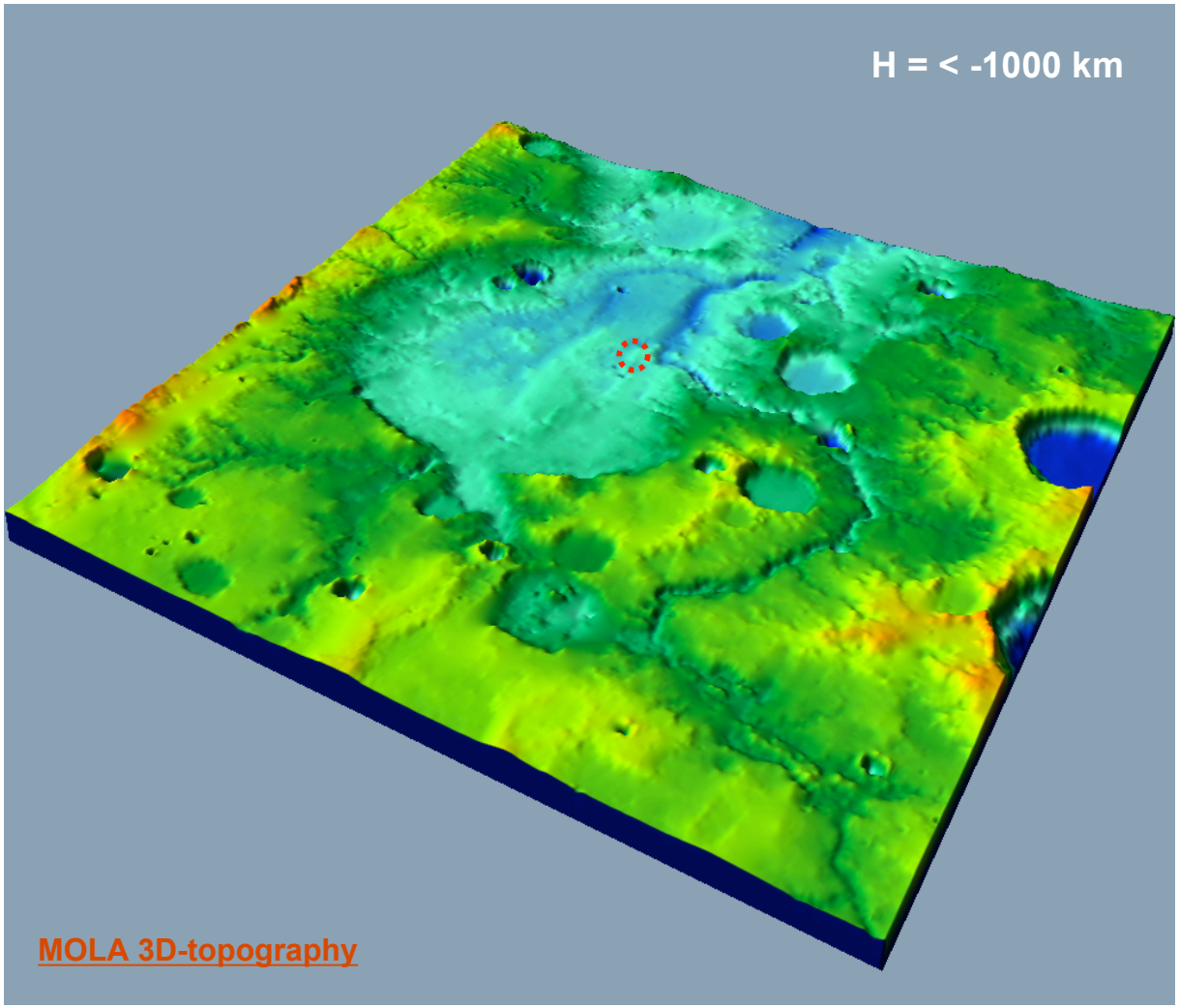


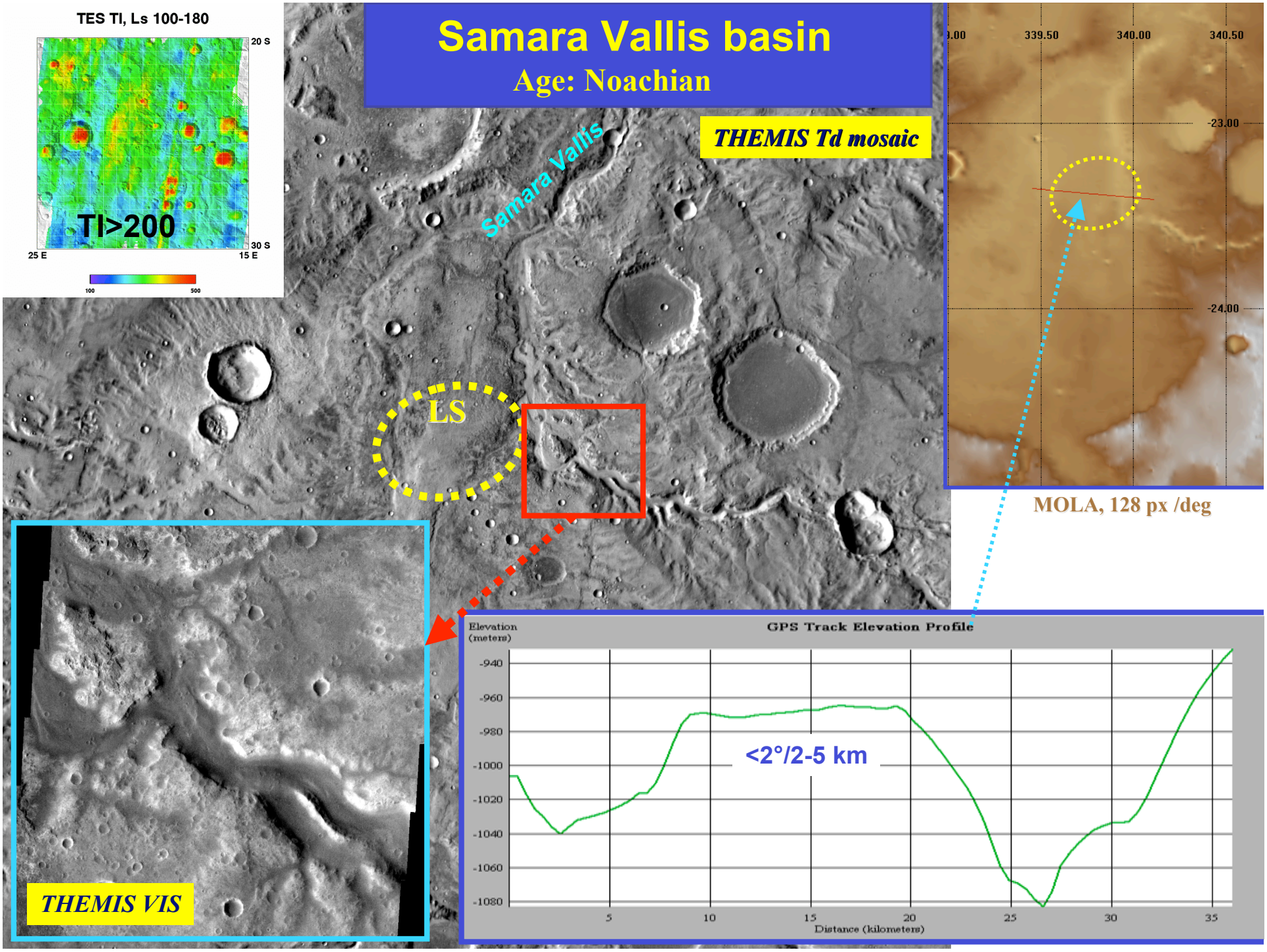
**Site from Ruslan Kuzmin and DAN Science Team:**

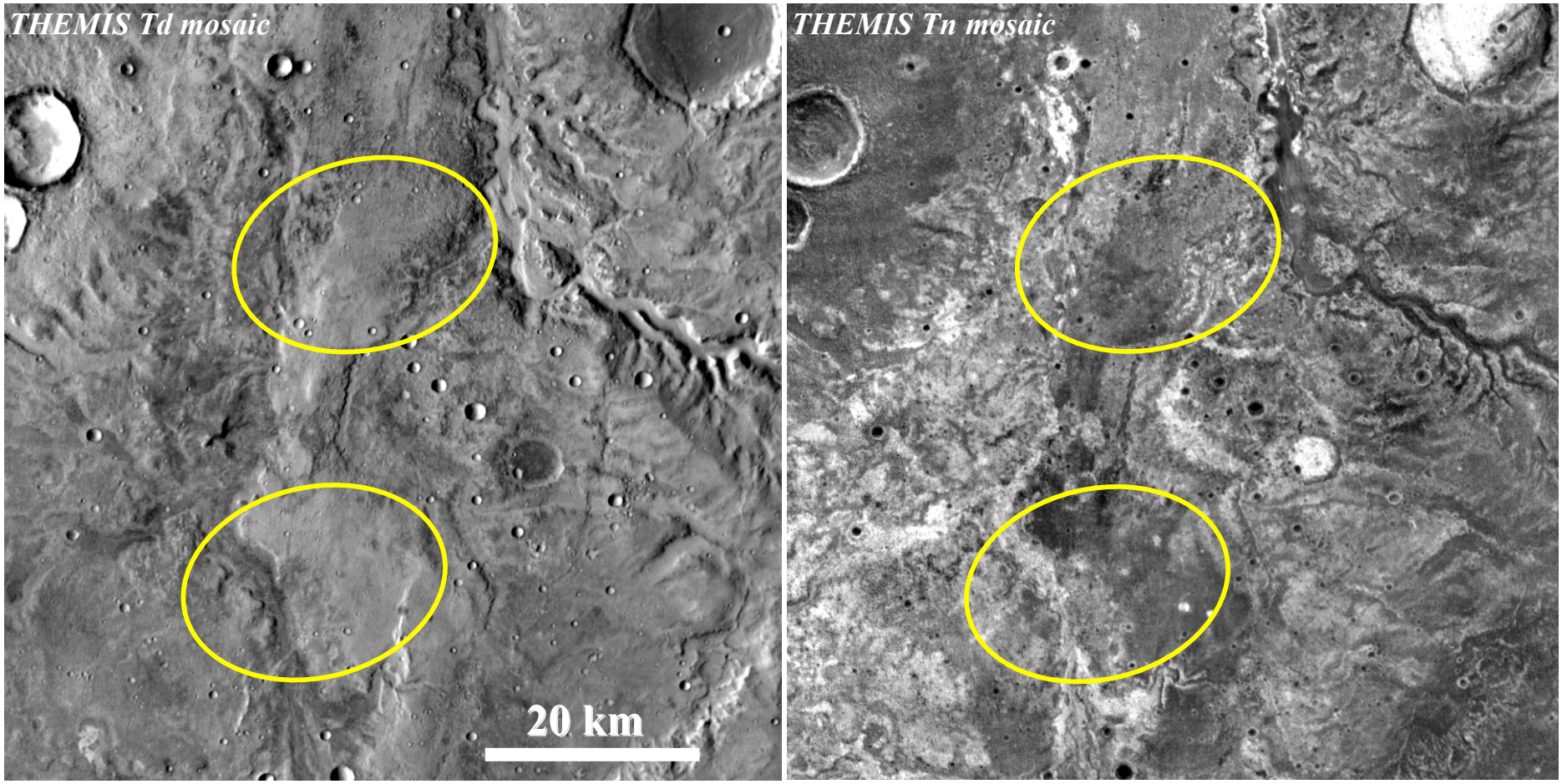
***Samara Vallis***

***(as Fluvio-Lacustrine Basin)***

# *Crater Moroz-Samara Vallis (as Fluvio-Lacustrine Basin)*




TES TI, Ls 100-180
20 S
30 S
25 E
15 E
TI>200
100
500
Samara Vallis basin
Age: Noachian
THEMIS Td mosaic
Samara Vallis
LS
339.50
340.00
340.50
-23.00
-24.00
MOLA, 128 px /deg
THEMIS VIS
GPS Track Elevation Profile
Elevation (meters)
-940
-960
-980
-1000
-1020
-1040
-1060
-1080
<2°/2-5 km
5
10
15
20
25
30
35
Distance (kilometers)



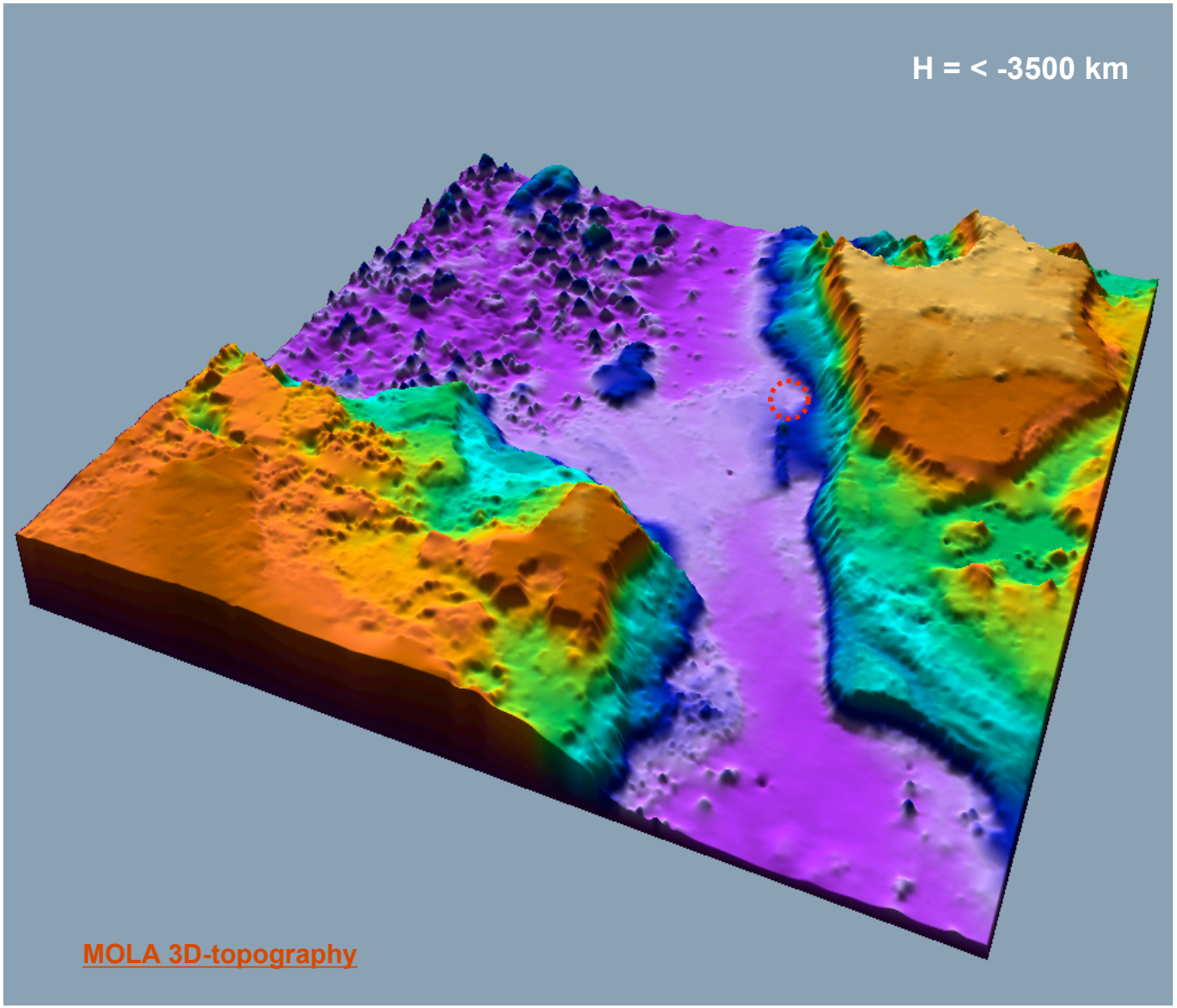

**Comparison of the THEMIS $T_{day}$ and $T_{night}$ images show that two potential MSL LS locations within Samara Vallis's Basin are characterized by diversity of a fluvio-lacustrine lithological facies.**

**Site from Ruslan Kuzmin and DAN Science Team:**

***Eos Chasma***

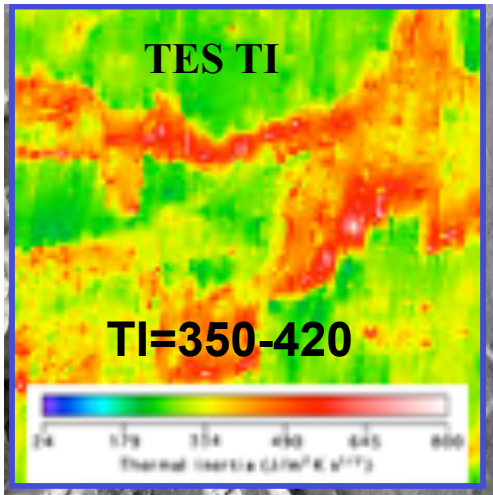
***(as Alluvial Fans)***

# *Eos Chasma (Alluvial Fans)*



# Alluvial fans in Eos Chasma

## Age: Late Hesperian-early Amazonian

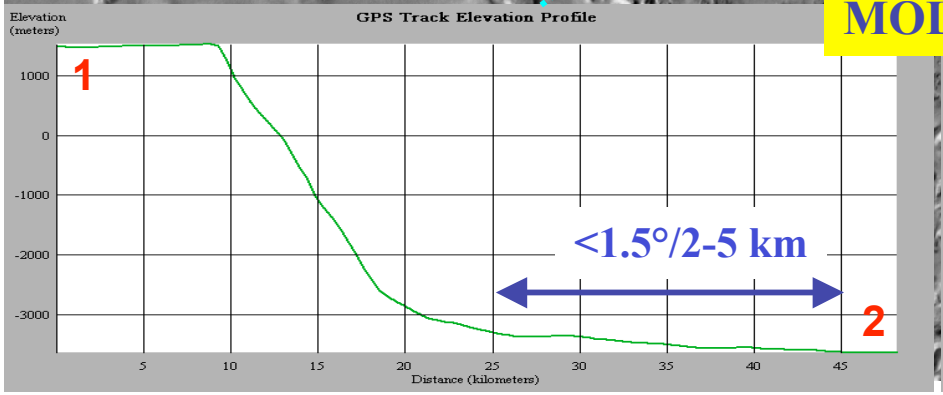


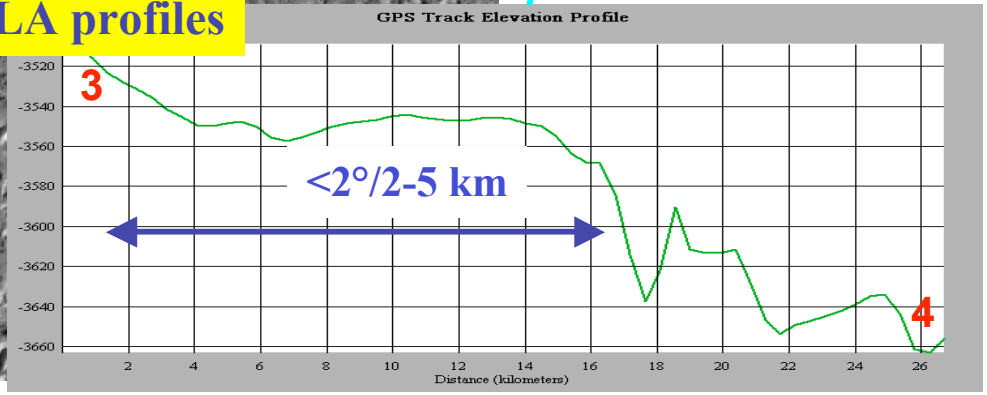


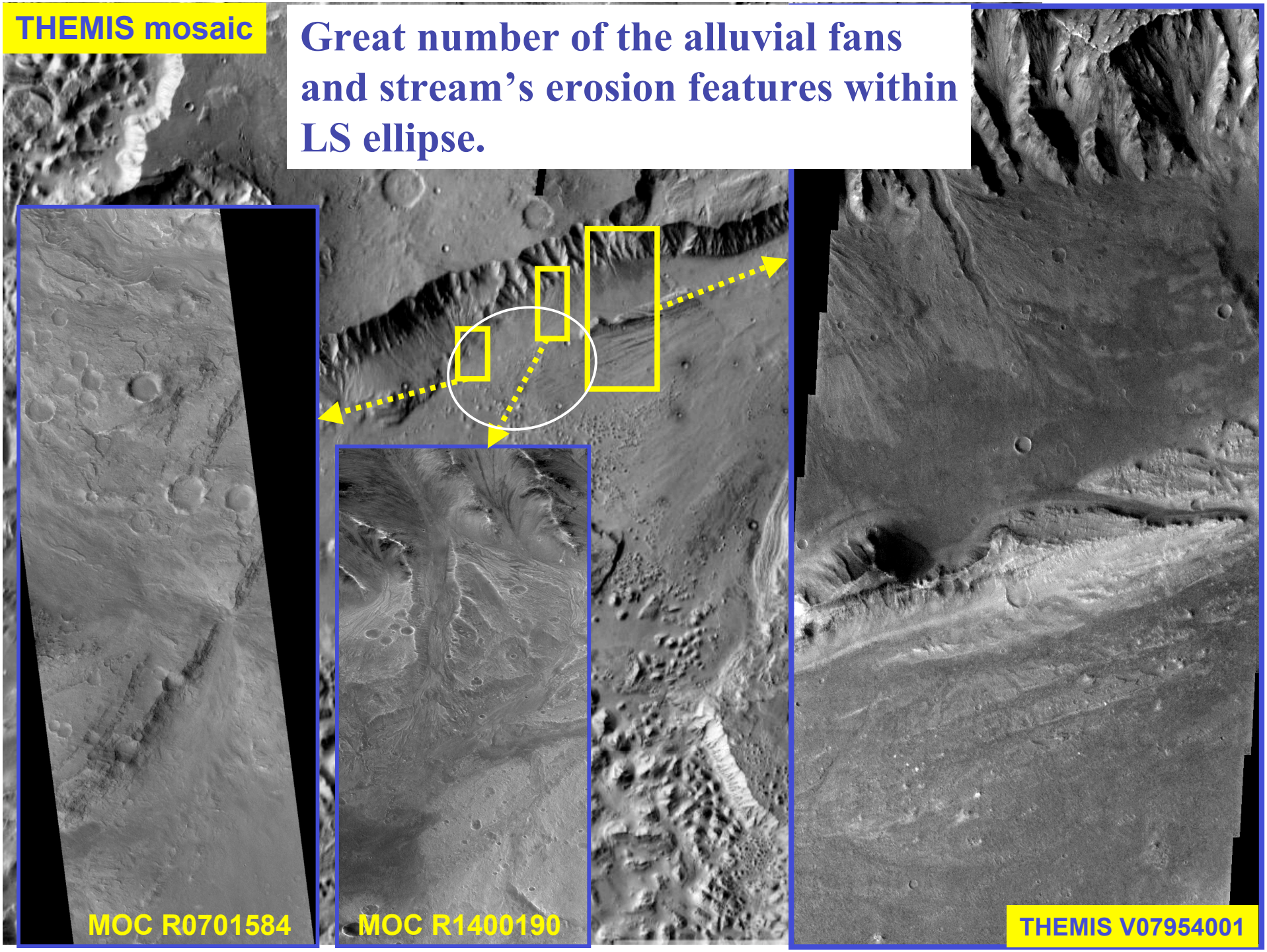


MOLA, 128 px /deg

## MOLA profiles



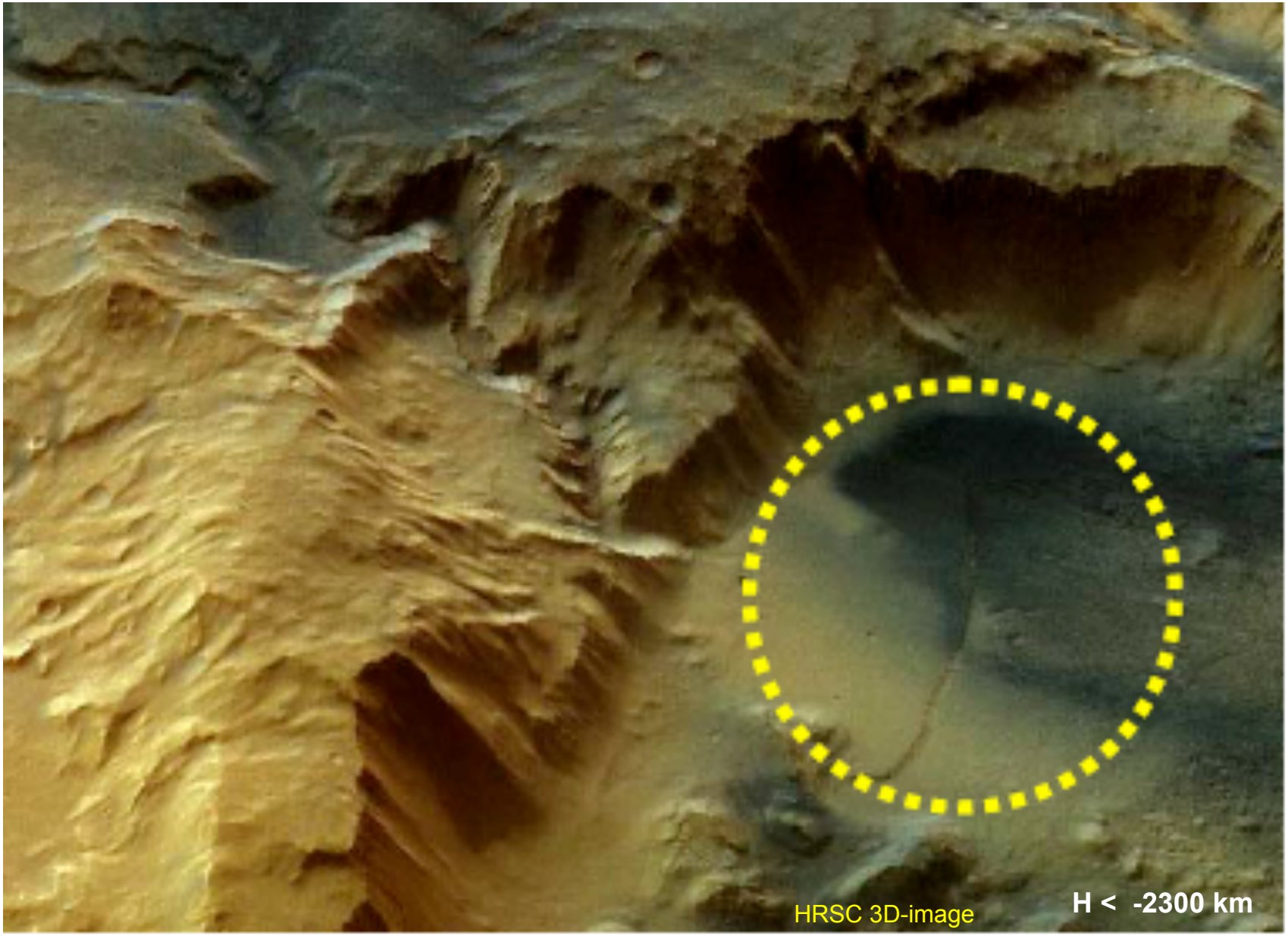

THEMIS mosaic
Great number of the alluvial fans and stream's erosion features within LS ellipse.
MOC R0701584
MOC R1400190
THEMIS V07954001

**Site from Ruslan Kuzmin and DAN Science Team:**

***Aeolis Region***

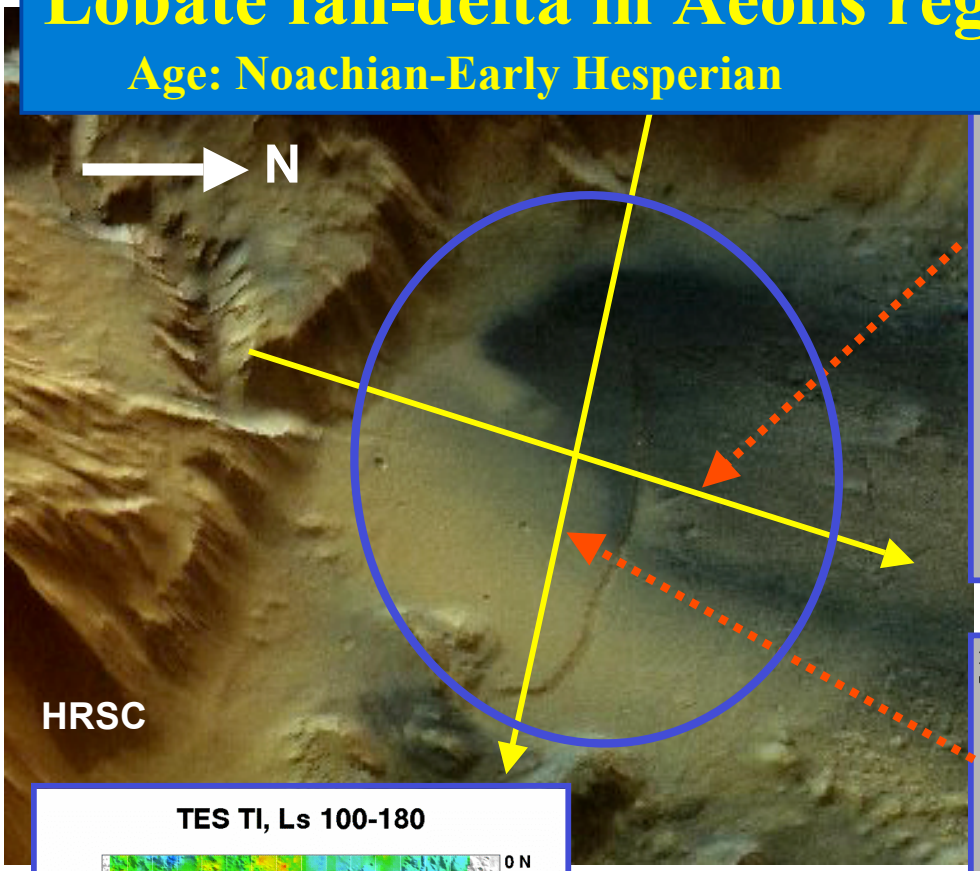
***(as Lobate Fan-Delta)***

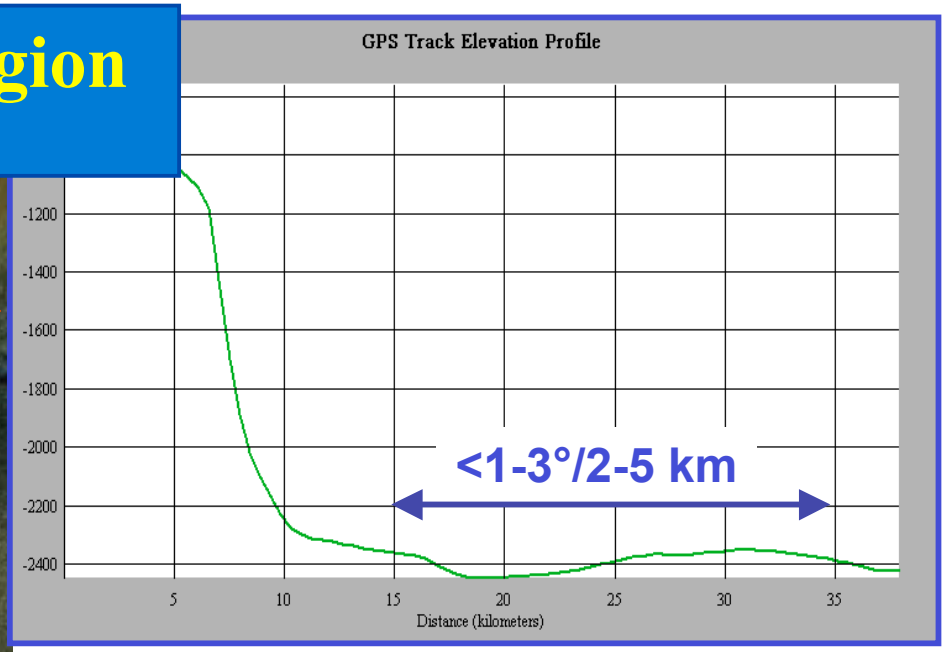
## Aeolis region

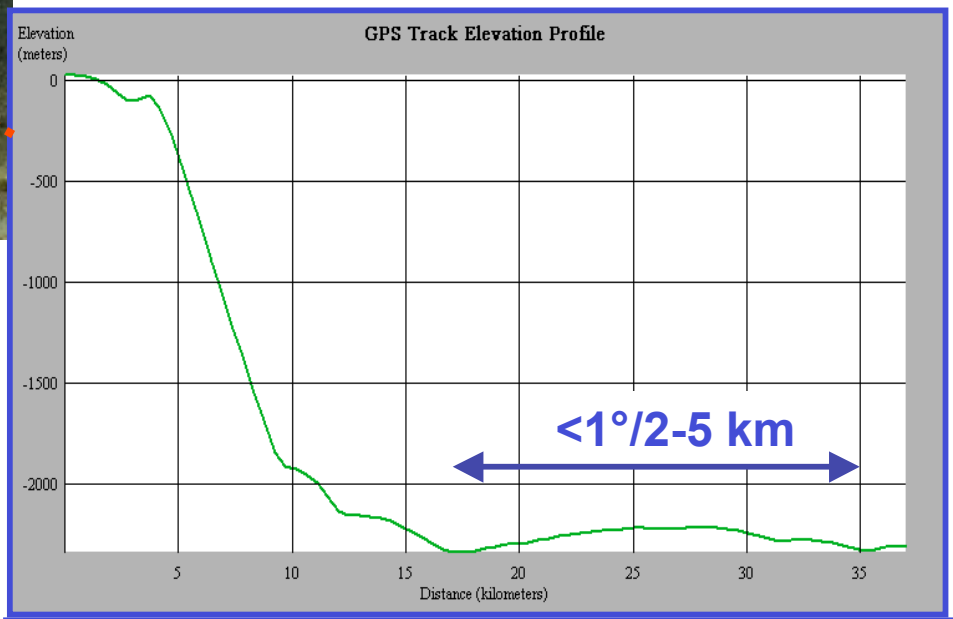


# Lobate fan-delta in Aeolis region

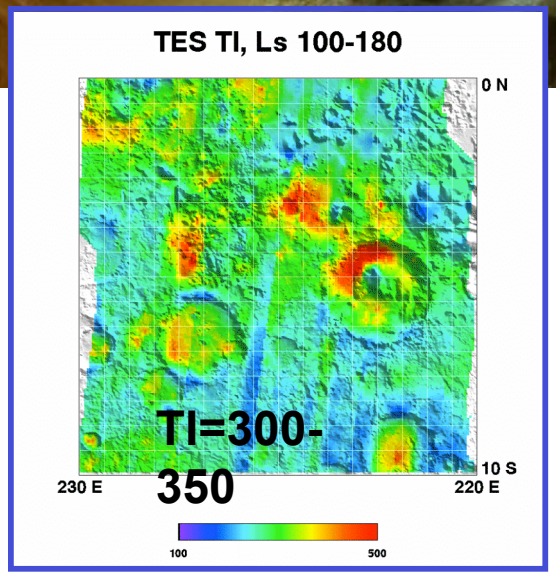
## Age: Noachian-Early Hesperian

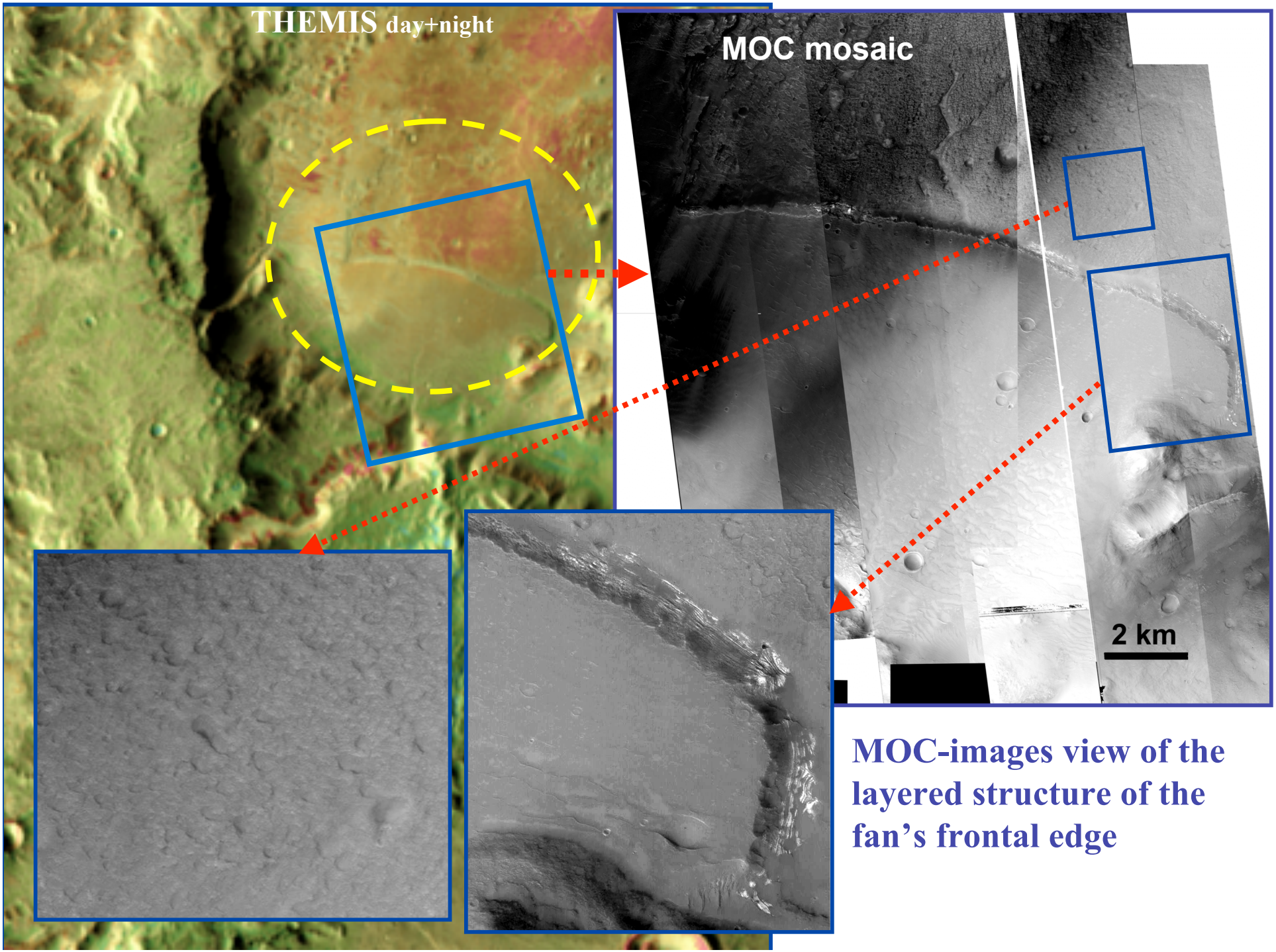


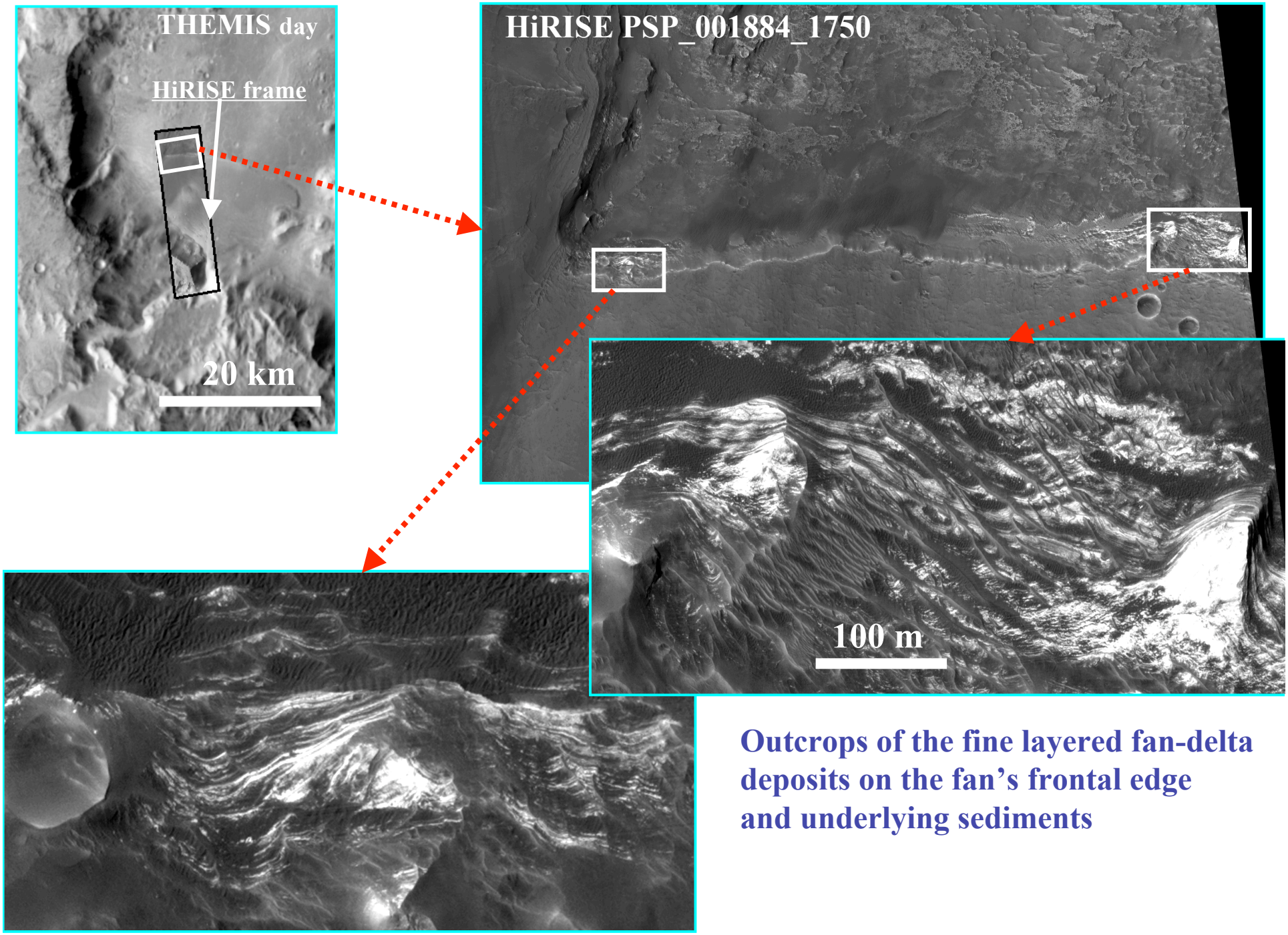




MOLA profiles along and across of the fan






**MOC-images view of the layered structure of the fan's frontal edge**



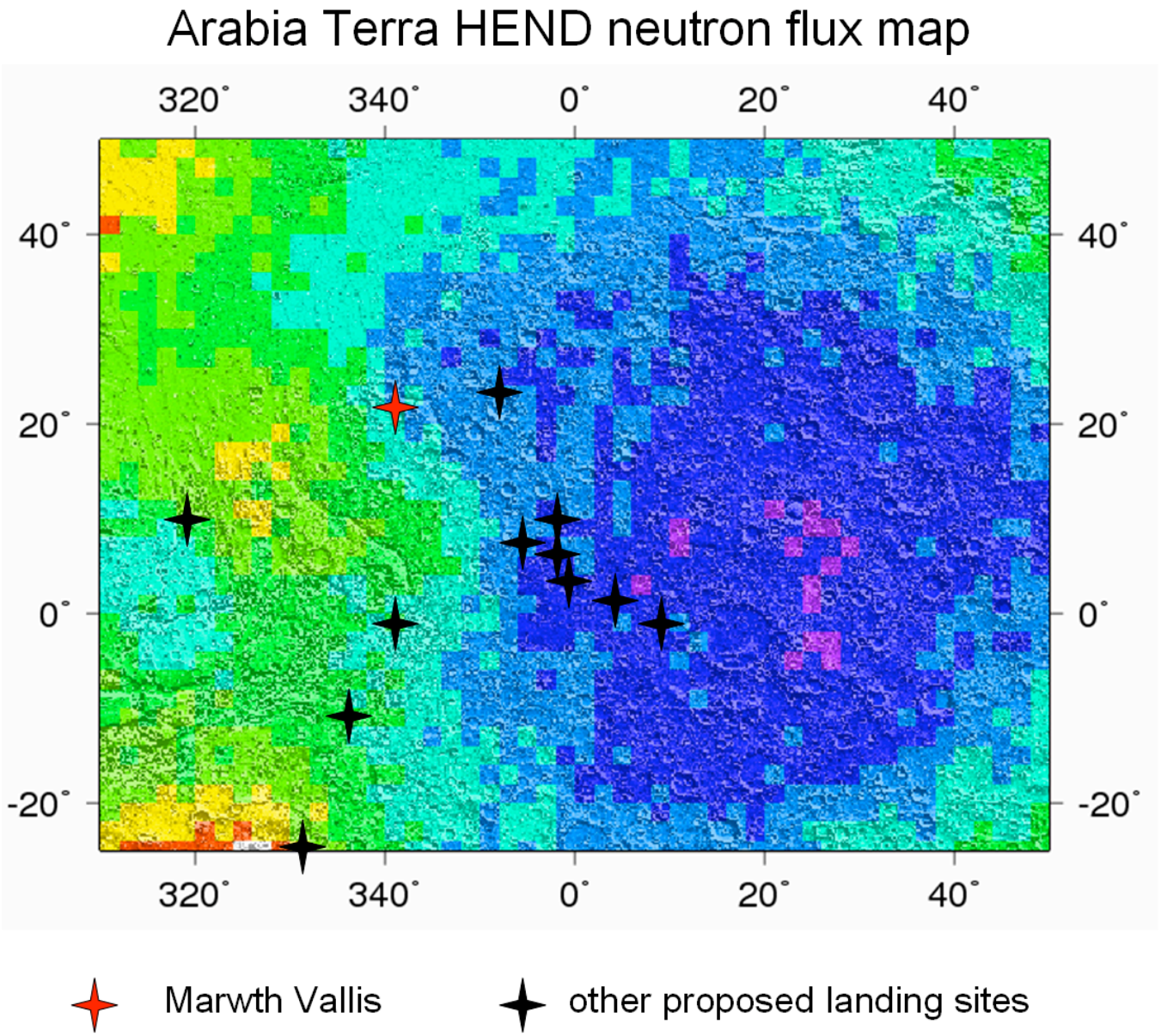

**Outcrops of the fine layered fan-delta deposits on the fan's frontal edge and underlying sediments**

**Site from Nikita Demidov, Alberto Behar, Igor Mitrofanov and DAN Science Team:**

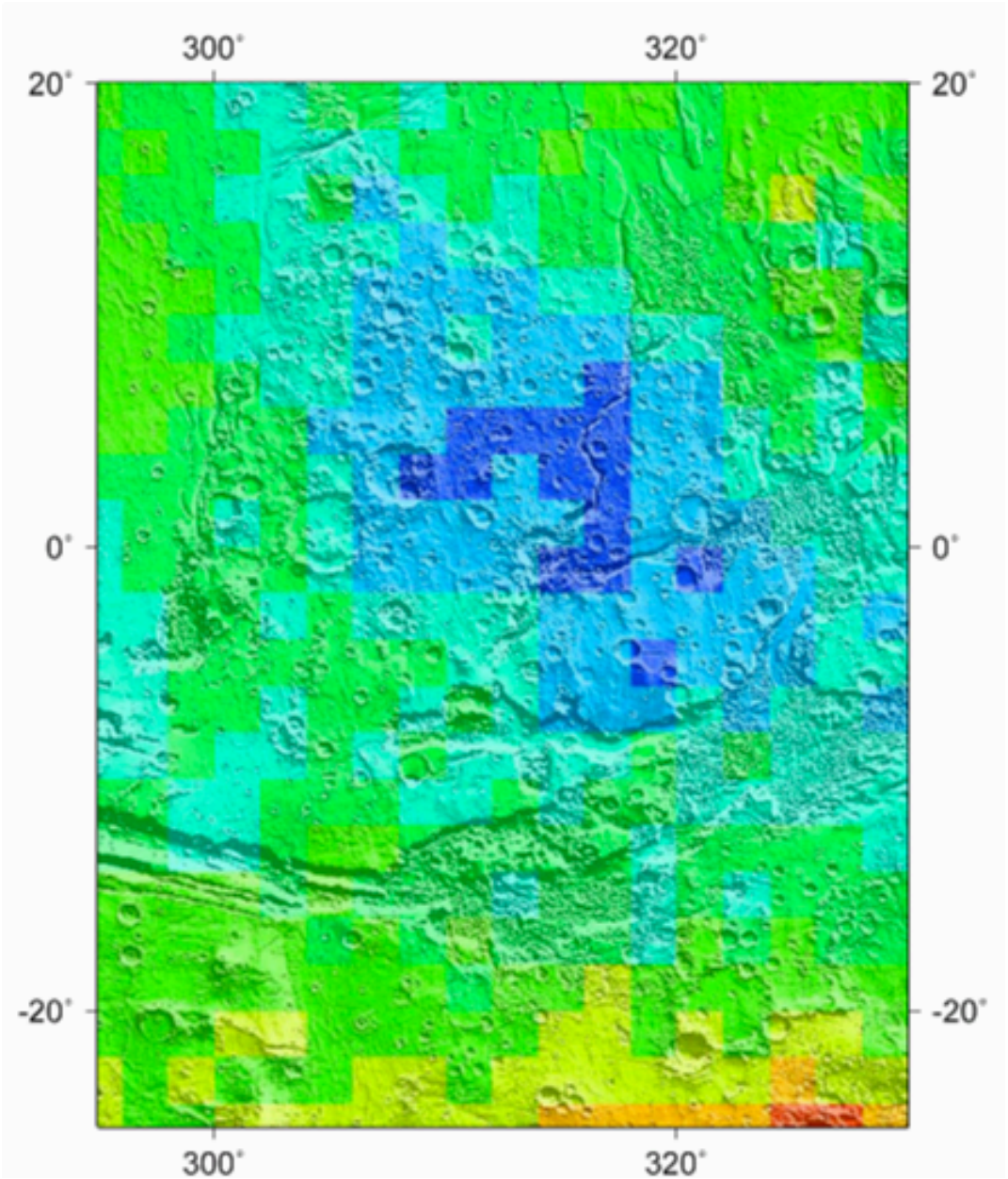
***Shalbatana Vallis Regions***

***(as current water site + Phillosilicate site)***

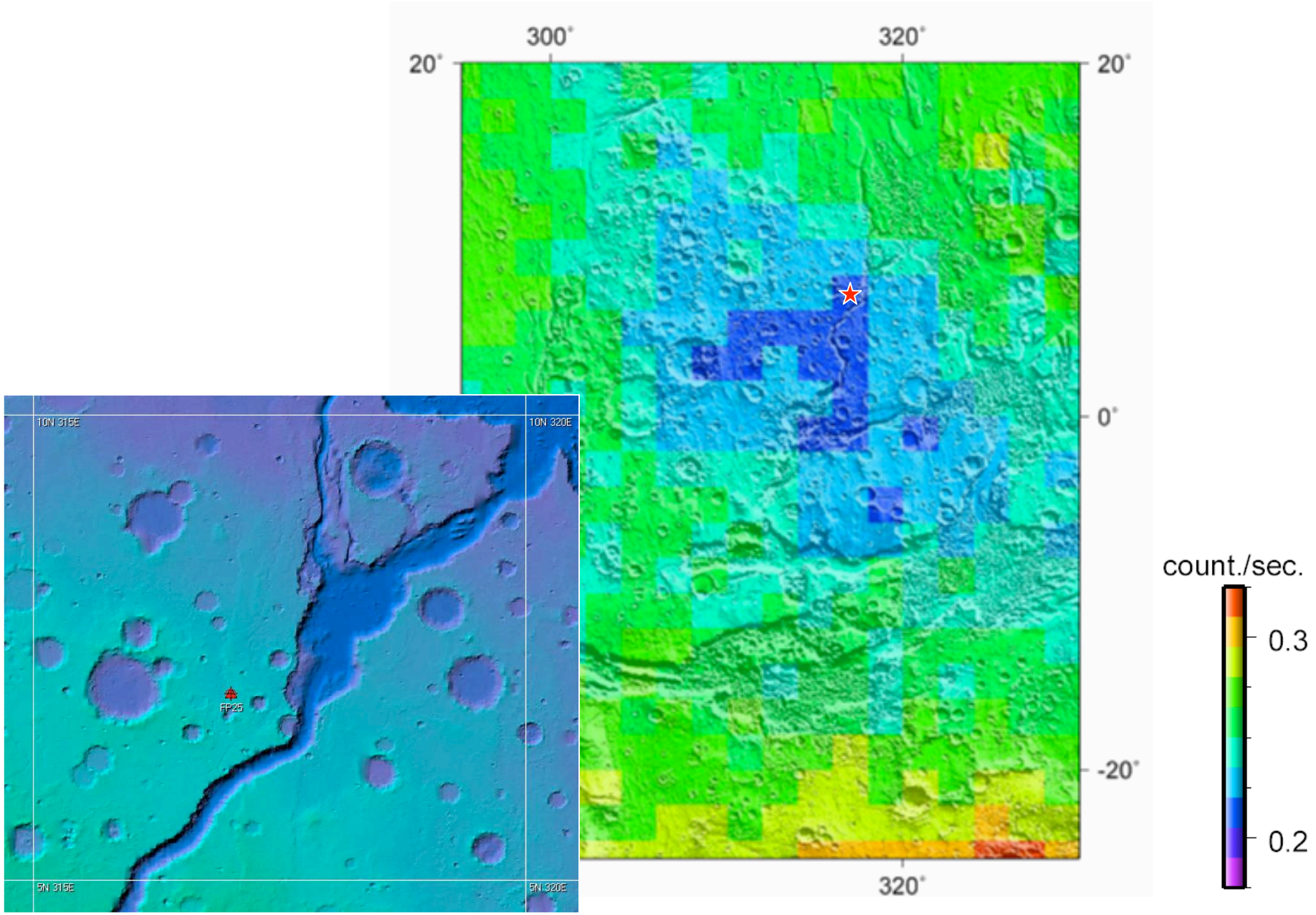
## *Arrabia Terra - is it region for current water site + Phillosilicate site?*



## *Shalbatana Vallis Regions* ***(as current water site + Phillosilicate site)***



## *Shalbatana Vallis Regions* *(as current water site + Phillosilicate site)*



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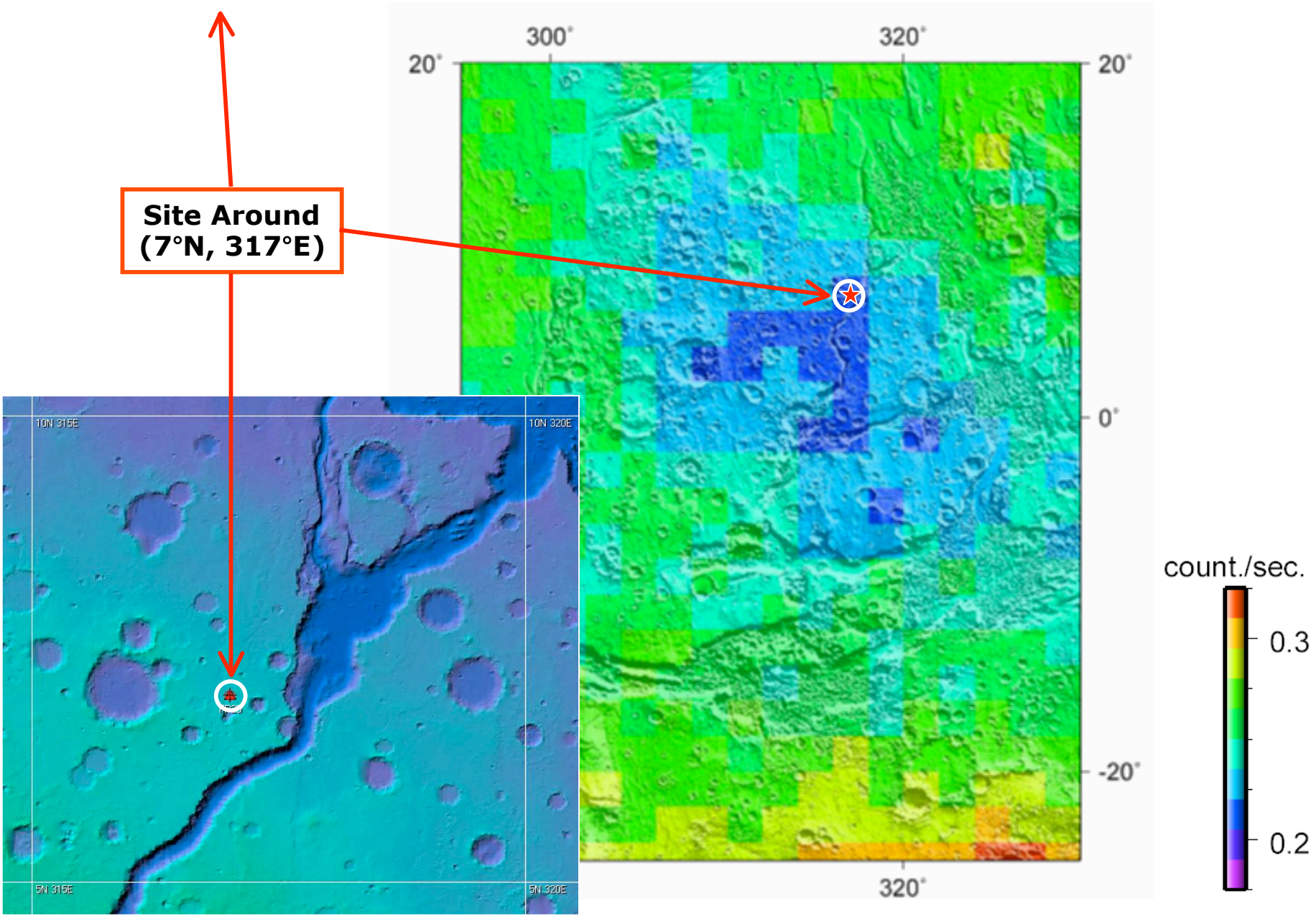

**All four proposed landing sites satisfy the main engineering constraints,**

**… and more work is in progress**

| Region | Latitude | Elevation (km) | TES TI | Rocks (%) | Slope/2-5 km |
|---|---|---|---|---|---|
| Samara Vallis | - 24° | < -1 | >200 | 5-10 | <2° |
| Eos Chasma | - 13.4° | < -3 | 350 -420 | 10-18 | 1-2° |
| Aeolis fan-delta | - 5° | < -2.3 | 300 -350 | 7-12 | <2° |
| Shalbatana Vallis | + 7° | | | | |

## Concluding Remarks:

**(1) We believe that signatures of current water could be equally important for LS selection, as well as the signatures of past water activity**

**(2) We, as HEND/Odyssey + DAN/MSL team, want to be in the dialogue with the colleagues of Mars science community for optimal selection of MSL LS =**

**= that is why we present our candidates today**

**(3) Our candidates are not so much developed presently, as it would be necessary for successful participation in the current "five-the–best" selection process =**

**= but we will work much more within the next few months for addressing all known selection requirements, both scientific and engineering**

**= we need the mechanism to keep the opportunity for our candidates for consideration in future for potential selection**