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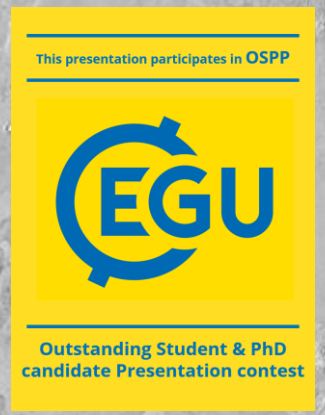
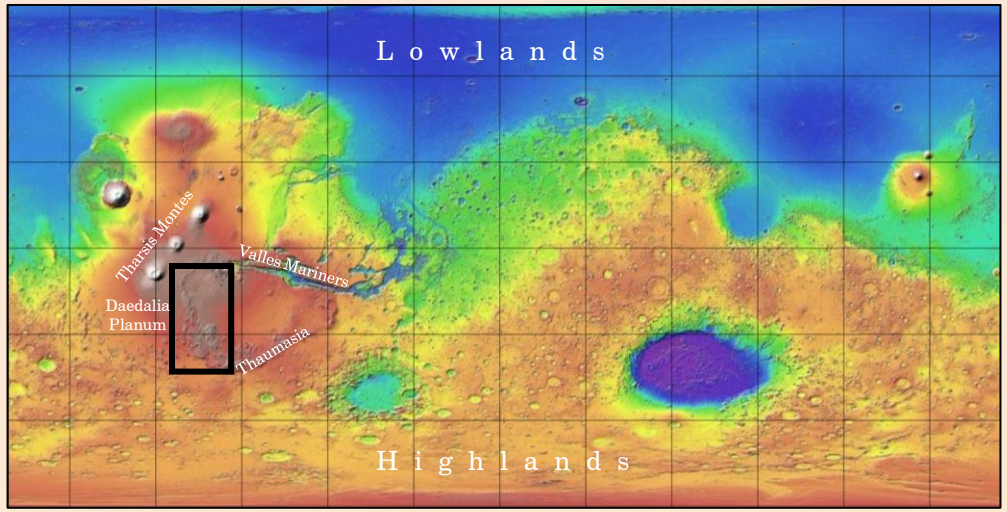
Modelling the extensional tectonic setting of the Claritas Fossae, Mars

Balbi E.[1,2] (evandro.balbi@edu.unige.it), Cianfarra P. [1], Ferretti G. [1], Crispini L. [1], Tosi S. [2]

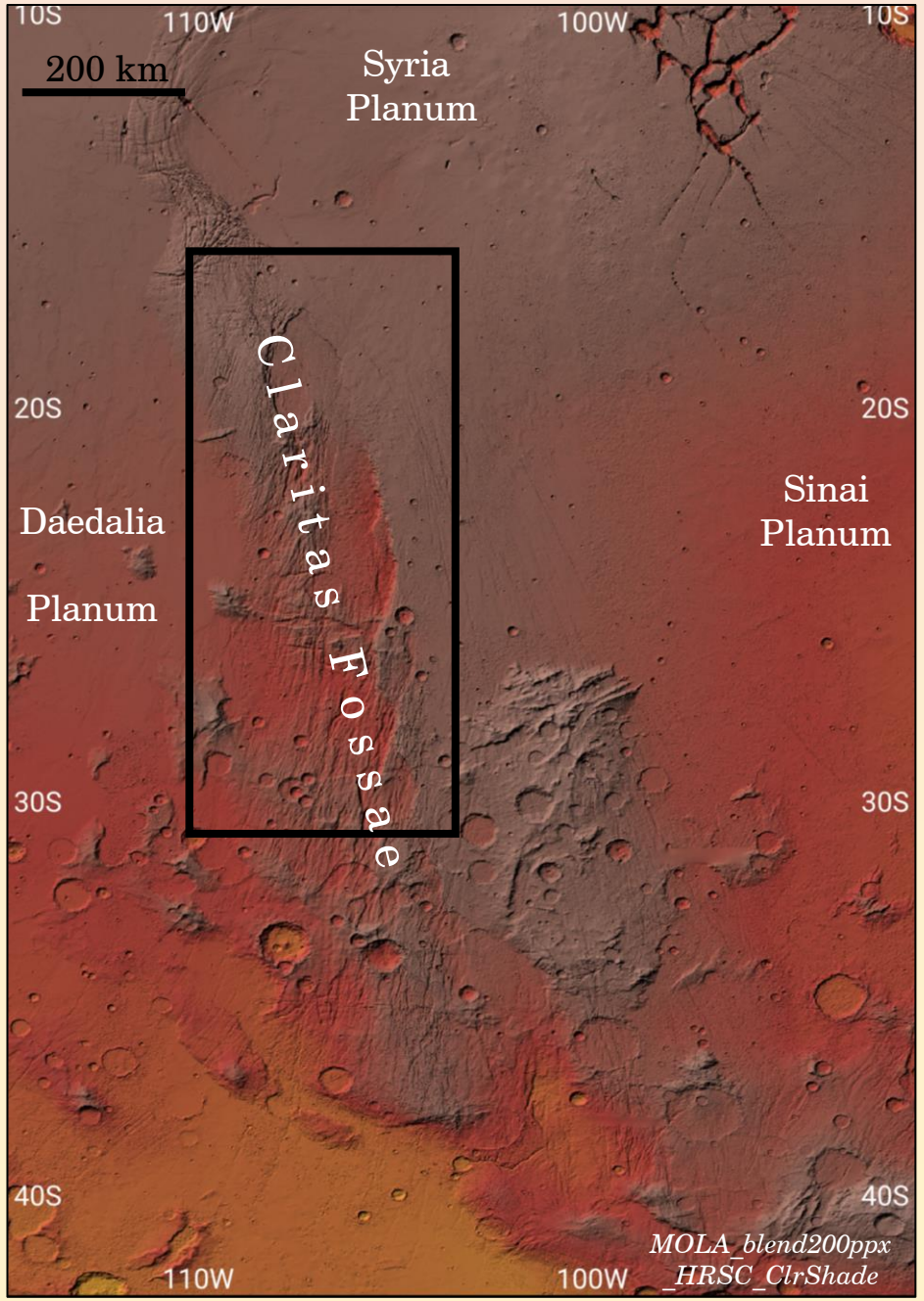
1 – Università degli Studi di Genova, Dipartimento di Scienze della Terra dell'Ambiente e della Vita (DISTAV), 16132 Genova, Italy
2 – Università degli Studi di Genova, Dipartimento di Fisica (DIFI), 16146 Genova, Italy

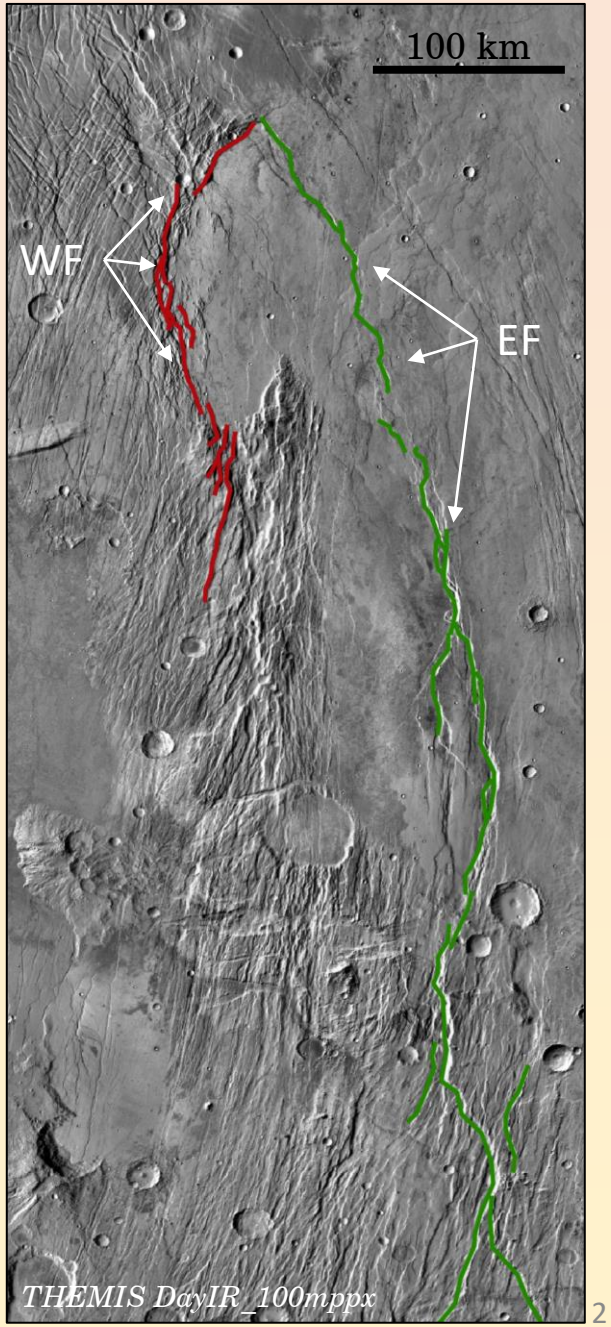




- System of scarps, troughs and depressions located to the south of the Tharsis Volcanic Province

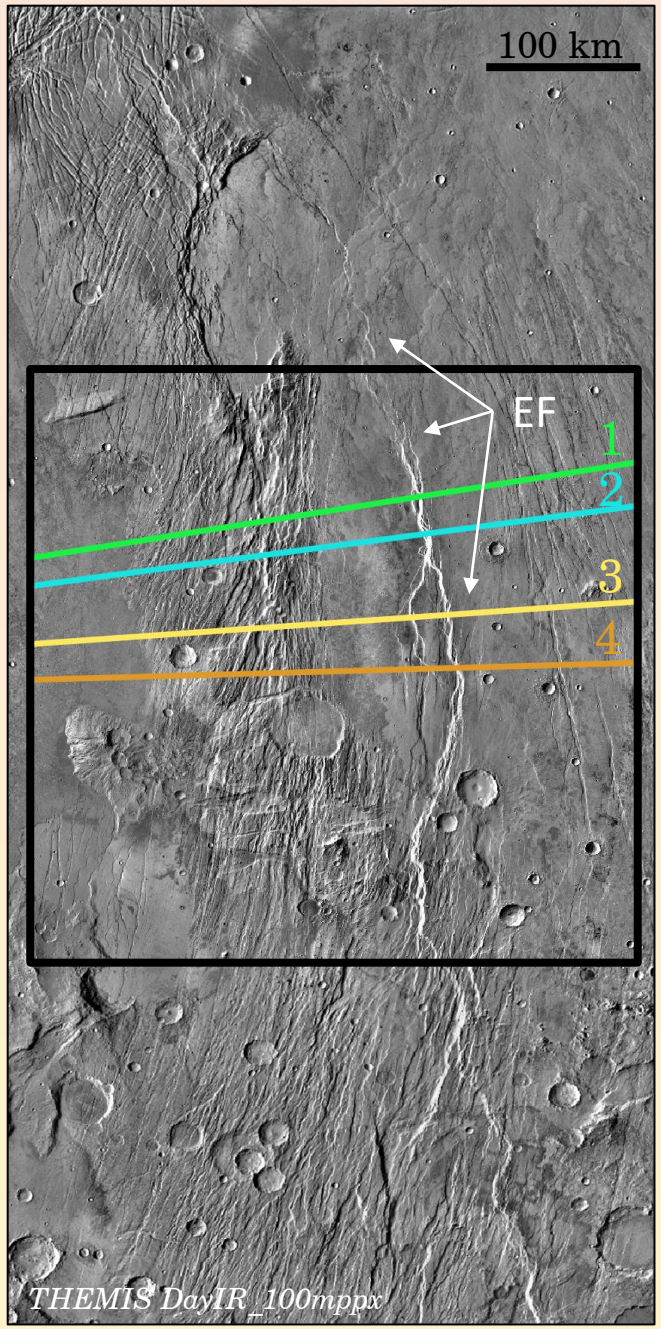
- The steep morphologies of the two main scarps, suggest a strong tectonic control:
  - Western Fault (WF)
  - Eastern Fault (EF)

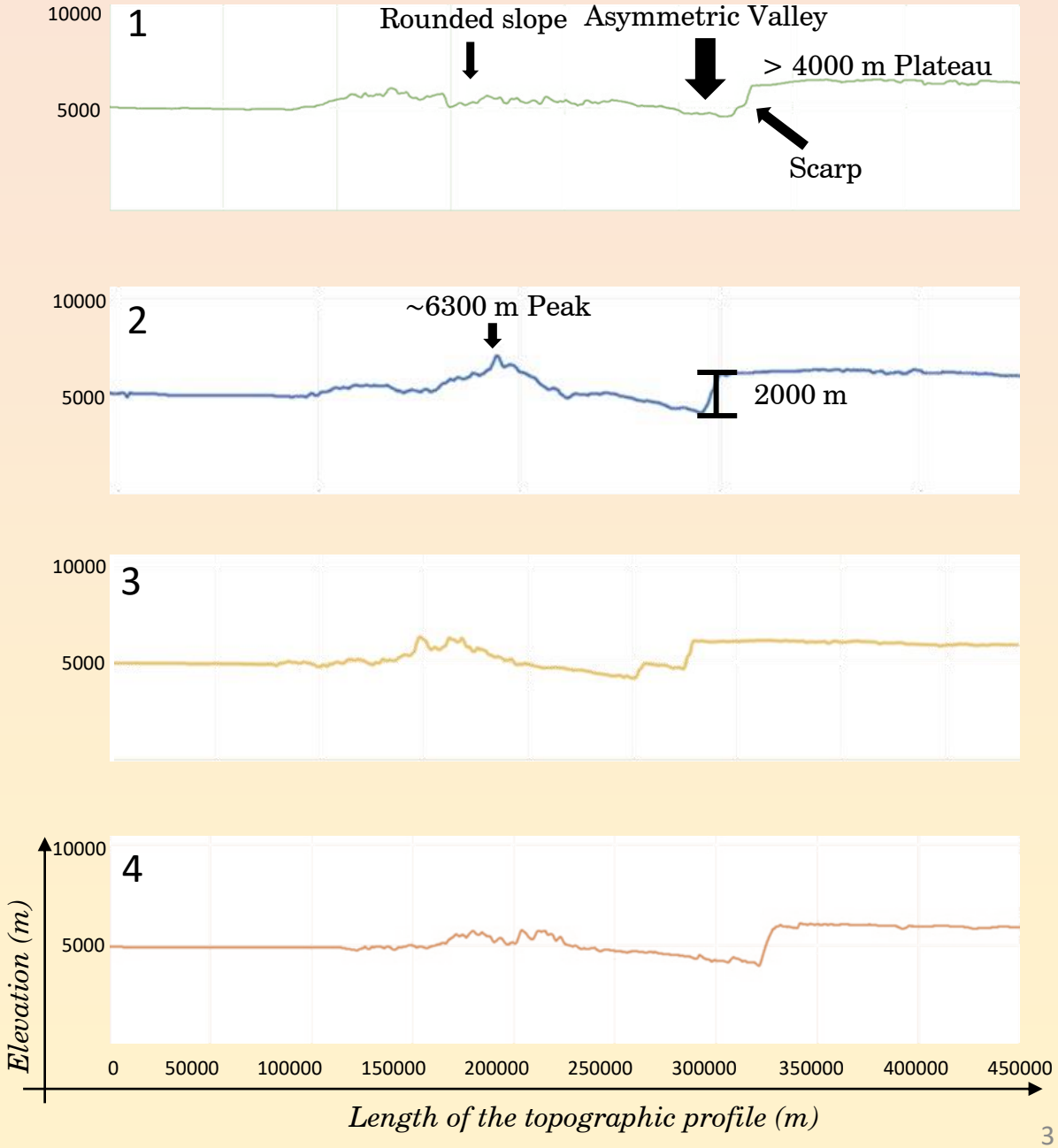




Balbi Evandro (evandro.balbi@edu.unige.it)

- Erosional processes on Mars have very low rates and negligible effects in shaping the regional physiography (Klimczak et al., 2018)
- We consider the regional scale topography of the Martian surface as a reference layer reflecting the crustal tectonic processes
- HCA replicates superficial morphologies with the movement of two crustal blocks separated by a fault with given geometry





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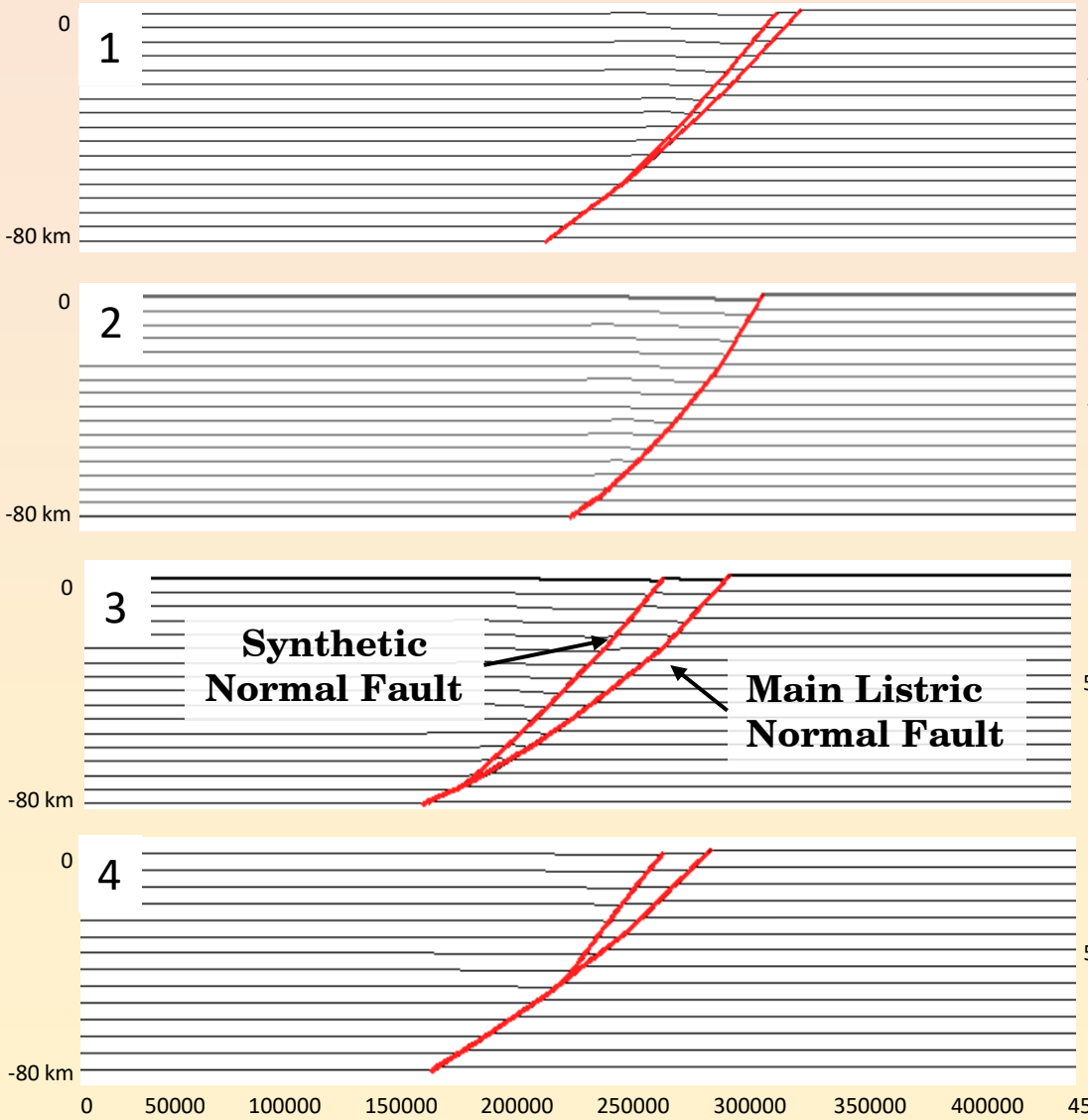
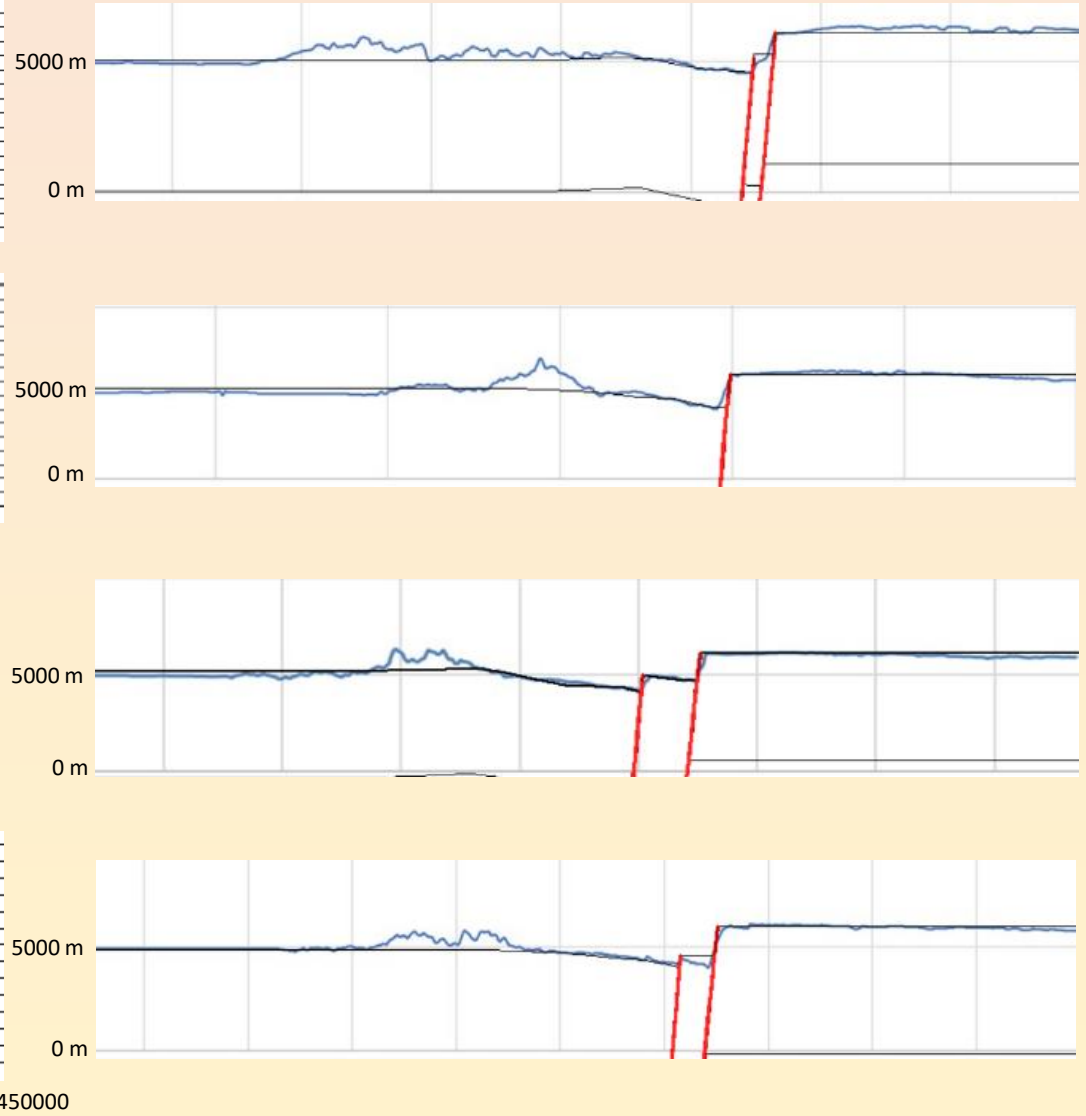
Full trajectory of the modelled, crustal normal fault

(No Vertical exaggeration)



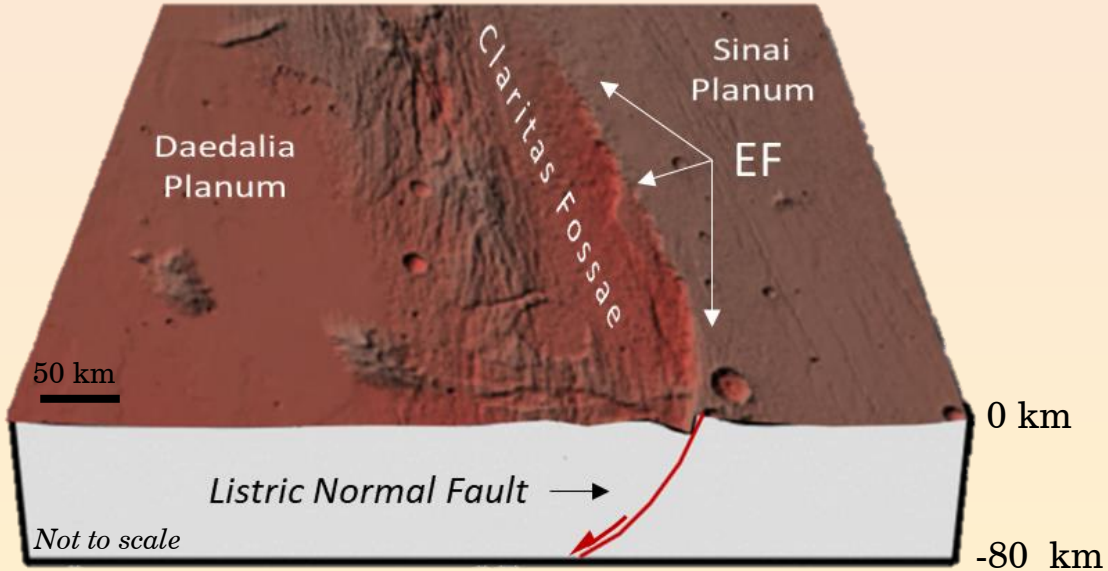
Fit between the modelled normal fault and the topography

(Vertical exaggeration 10:1)



Fault	Throw
Main	1200
Synthetic	500
Main	2000
Synthetic	-
Main	1500
Synthetic	500
Main	2000
Synthetic	200

- The Claritas Fossae is configured within an extensional tectonic regime
- Listric normal fault with crustal relevance are associated to the formation of a fracture corridor that increases the secondary permeability of the rocks



- The Claritas Fossae can thus represent a preferential path for fluid interaction between the inner planet and the atmosphere
- Understanding the tectonic processes on rocky bodies can led to a better comprehension also of terrestrial exoplanets

Thank you for your attention!

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