Tectonic activity assessment using morphometric indices - Tokaj Mountain (Hungary)

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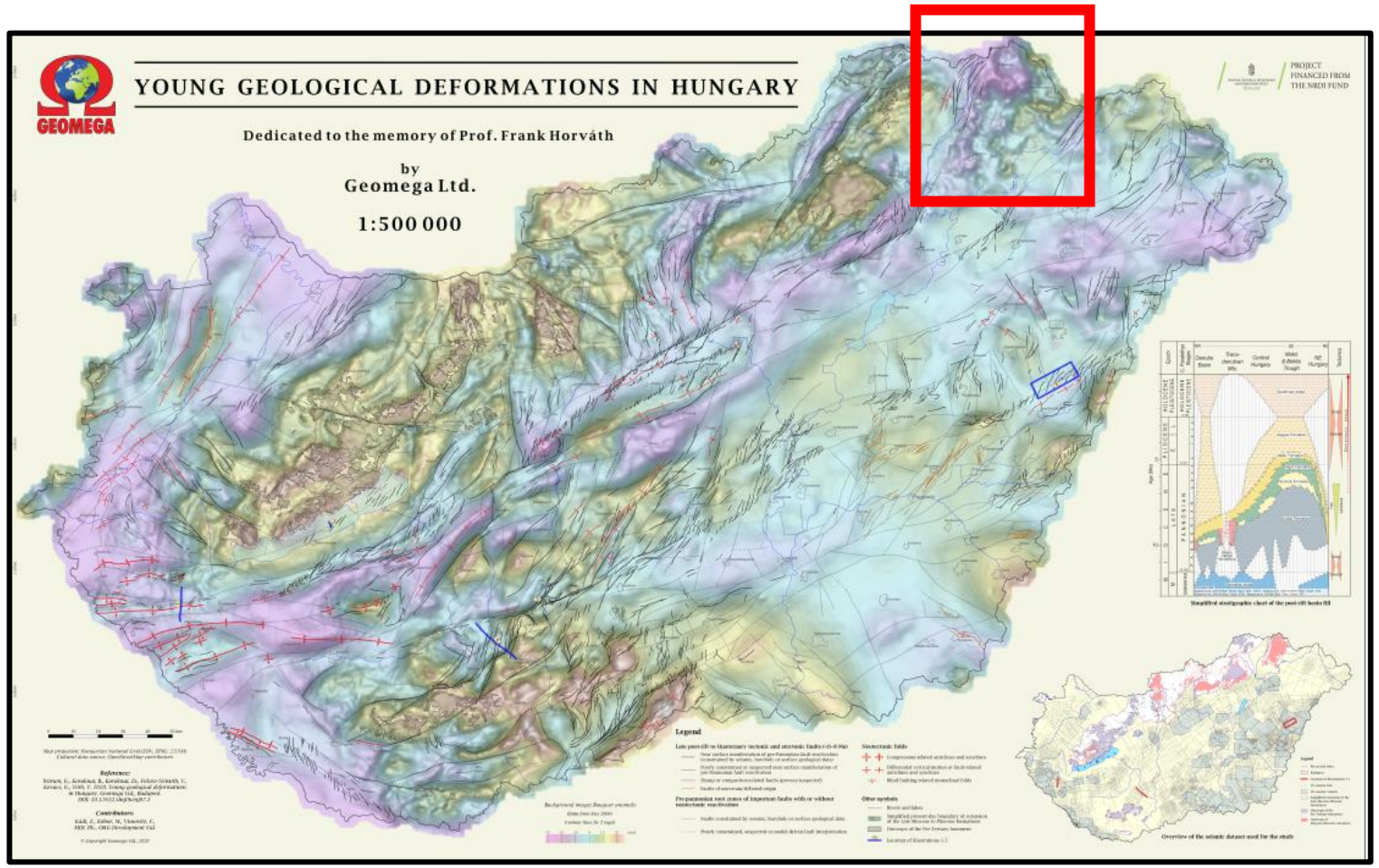
The present study aims to examine the link between the actual morphology of the Tokaj Hills and the major tectonic factors affecting the region.

Is there a tectonic effect on the formation of the surface of the Tokaj Hills?

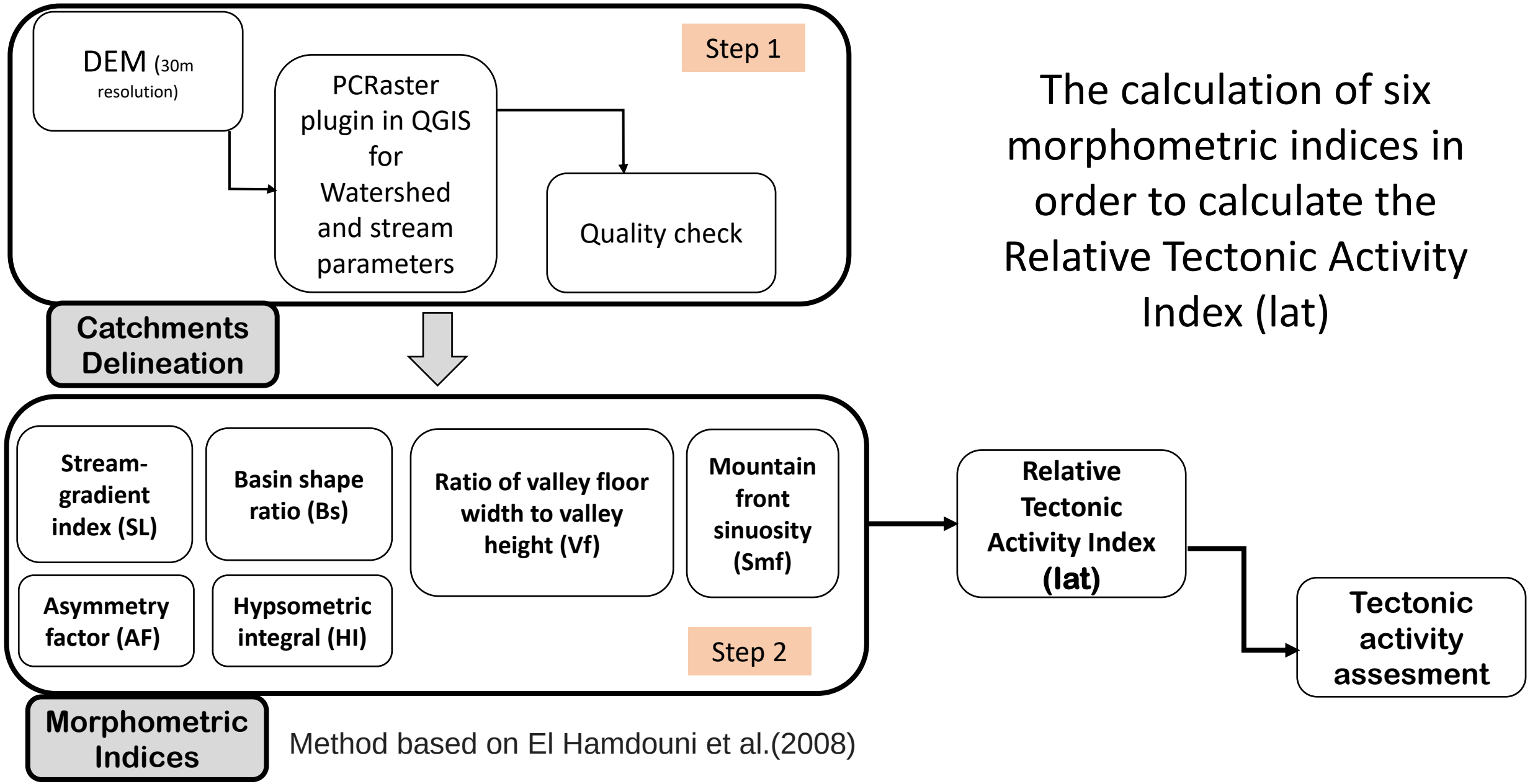


Geological Deformation map in HUNGARY – Location of Tokaj mountain

- The Geological history of the region: very complex area due to the multiphase nature of the tectonism.
- The surface is composed of late Miocene volcanic rocks -> no dipping beds, and syntectonic sedimentology!
- Tectonic data scarcity: very few outcrops of tectonised formations

- Indirect method: Morphometric indices to evaluate the relative tectonic activity.

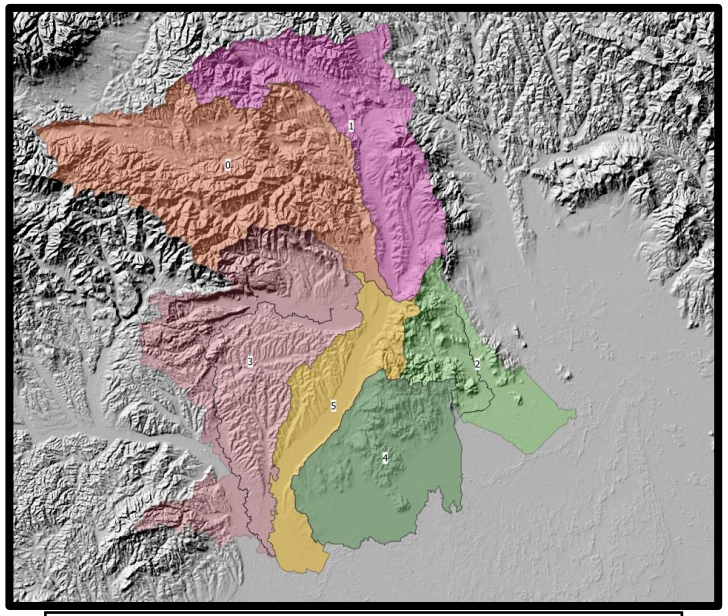
Workflow and Data processing



The calculation of six morphometric indices in order to calculate the Relative Tectonic Activity Index (lat)

Method based on El Hamdouni et al.(2008)

Results



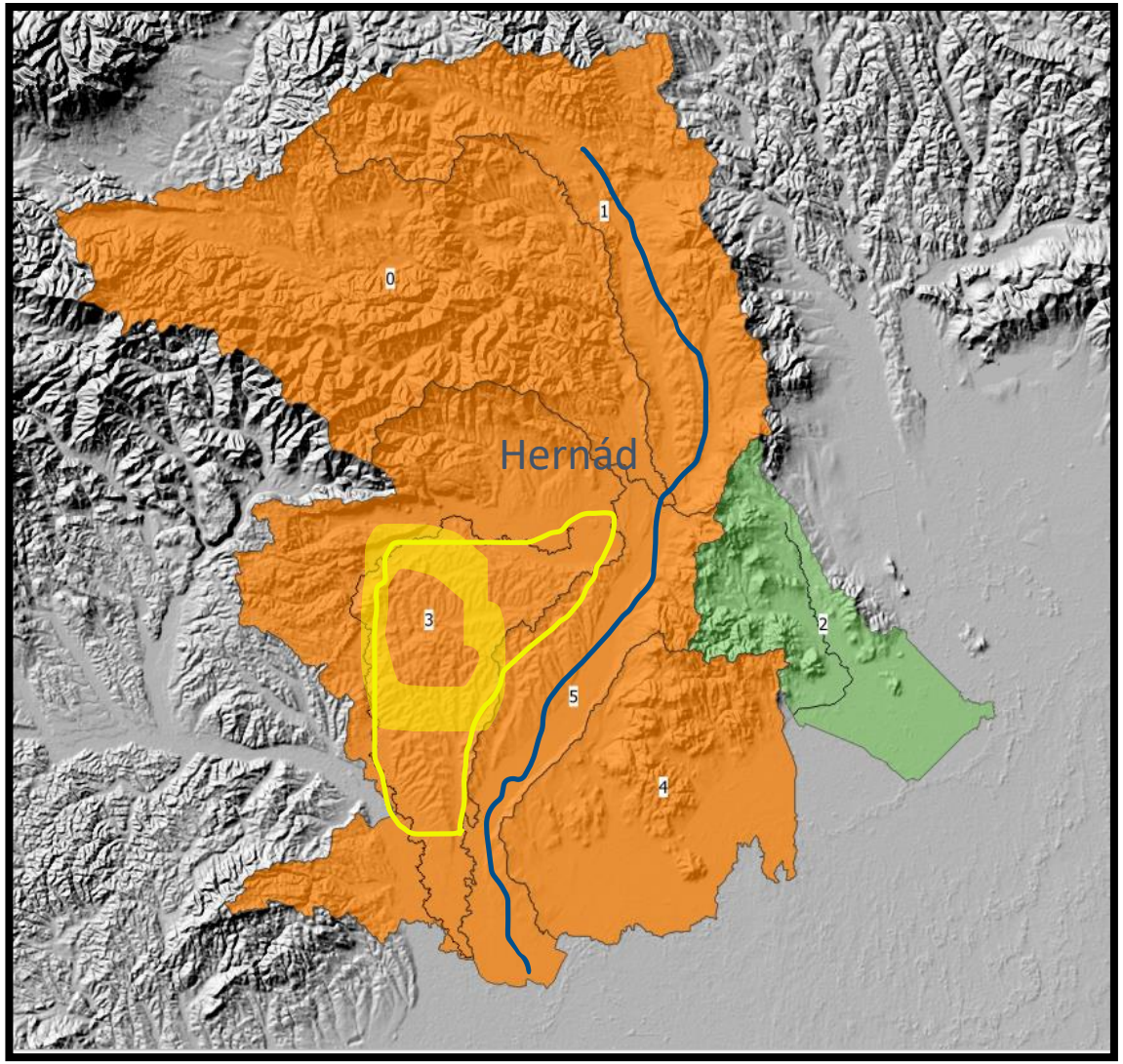
Watersheds delineation in Tokaj

Area ID.	Class	lat
0	3	moderate
1	3	moderate
2	4	low active tectonics
3	3	moderate
4	3	moderate
5	3	moderate

	Bs	SL	HI	VF	smf	AF	lat
Area ID	class	class	class	class	class	class	
0	1	3	3	3	3	2	2.5
1	1	3	3	3	3	2	2.5
2	3	3	3	3	3	3	3
3	1	1	2	3	3	2	2
4	2	3	2	3	3	1	2.3
5	1	3	2	3	3	3	2.5

West of Hernád

East of Hernád



Watershed differenciation – Tectonic assesment

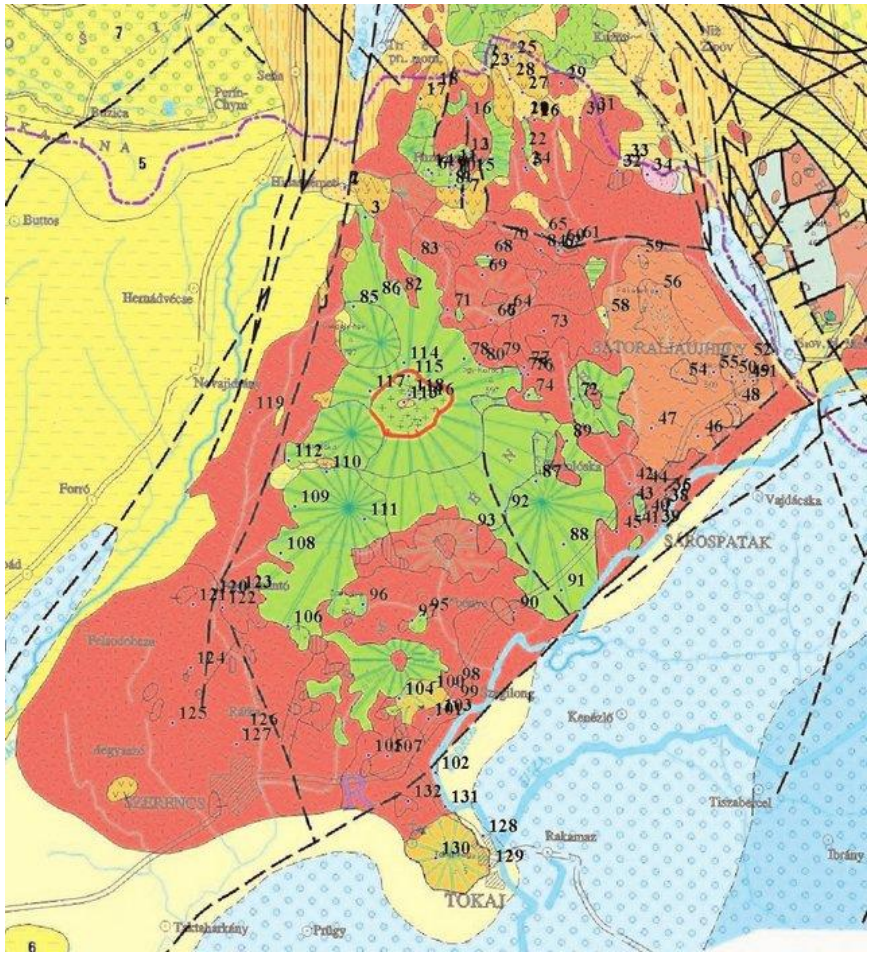
Conclusion

- Except on the eastern side of the mountain (flat area), where activity is low, the evaluation demonstrates little relative tectonic activity

- On the surrounding areas of the Hernád drainage basin, there was a substantial morphological contrast, as well as a modest variation in activity between the western and eastern banks of the lower Hernád River.

- The model could be reinforced with more morphotectonic confluences (i.e. refined delineation of watersheds, GPS data, InSAR data)

Reference:
El Hamdouni et al (2008). Assessment of relative active tectonics, southwest border of the Sierra Nevada (southern Spain), Geomorphology, 96(1-2), 150-173.



Geological map of the Tokaj volcanic complex (Szalay et al. 2007)

Thank you for your attention!

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