Exploring complex normal faulting systems through physics-based dynamic rupture modeling

5 min talk !

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ANR EQTIME Project

May 10, 2022

Outline

Motivation

Settings

Who am I?

Hugo S. Sánchez-Reyes :

- 2019 – PhD. Earth Sciences, Université de Grenoble Alpes, France
- 2020 – Postdoc at Université Grenoble de Alpes, France
- 2021 – Postdoc at the Institut de Radioprotection et Sûreté Nucleaire (IRSN)
- 2022 – Researcher at Institute of Research for Development (IRD, ISTerre)

☞ Ah, by the way ... **I am visually impaired!** 👓

Motivation

Seismic Hazard in Central Italy

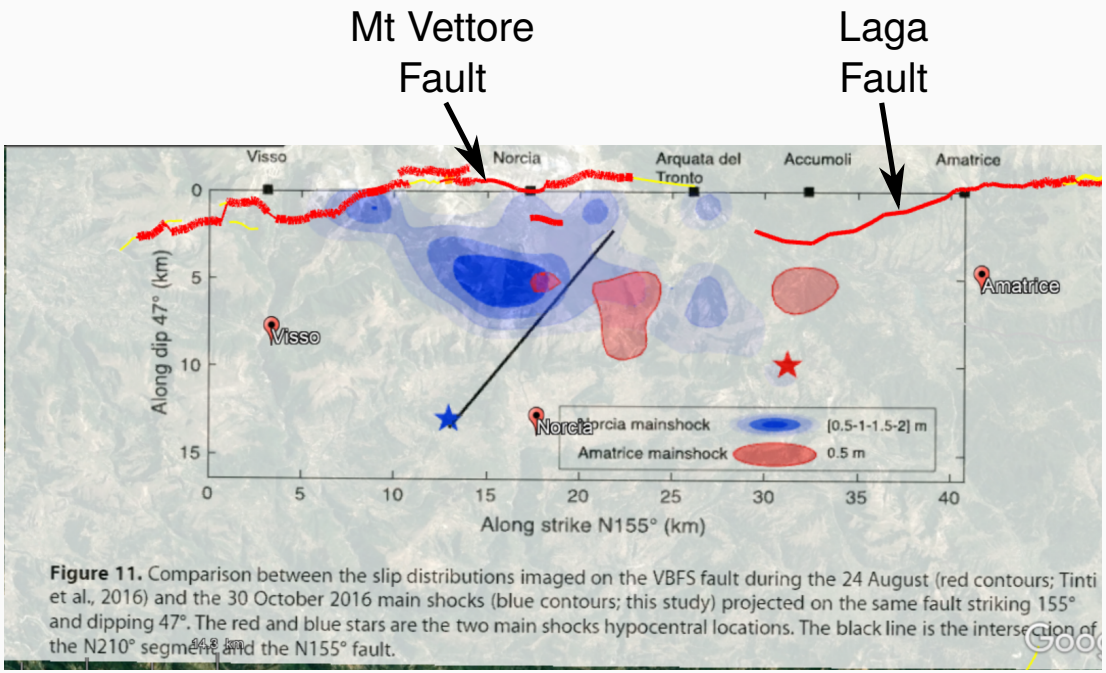
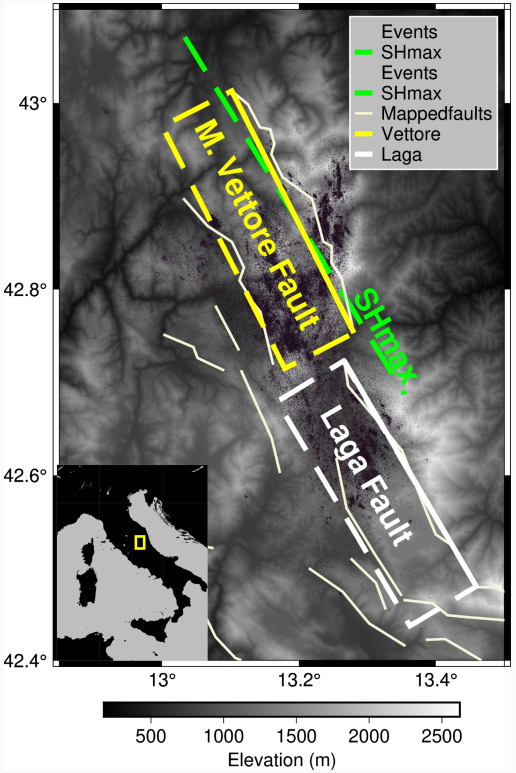


Figure 11. Comparison between the slip distributions imaged on the VBFS fault during the 24 August (red contours; Tinti et al., 2016) and the 30 October 2016 main shocks (blue contours; this study) projected on the same fault striking 155° and dipping 47°. The red and blue stars are the two main shocks hypocentral locations. The black line is the intersection of the N210° segment and the N155° fault.



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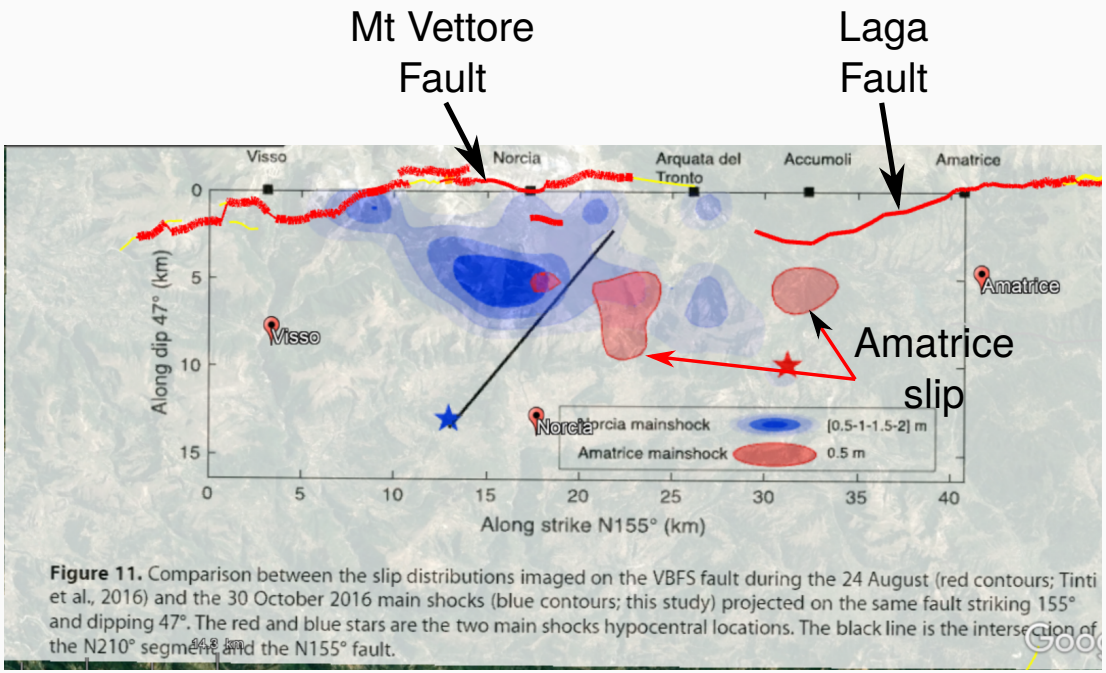
Seismic Hazard in Central Italy



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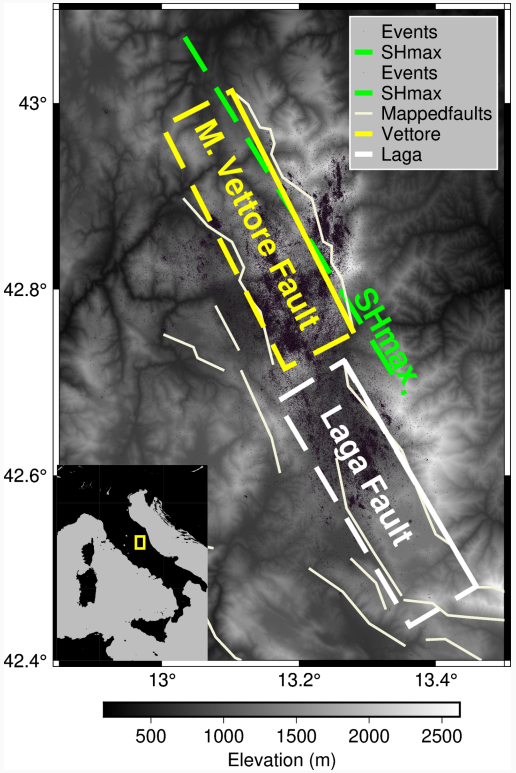

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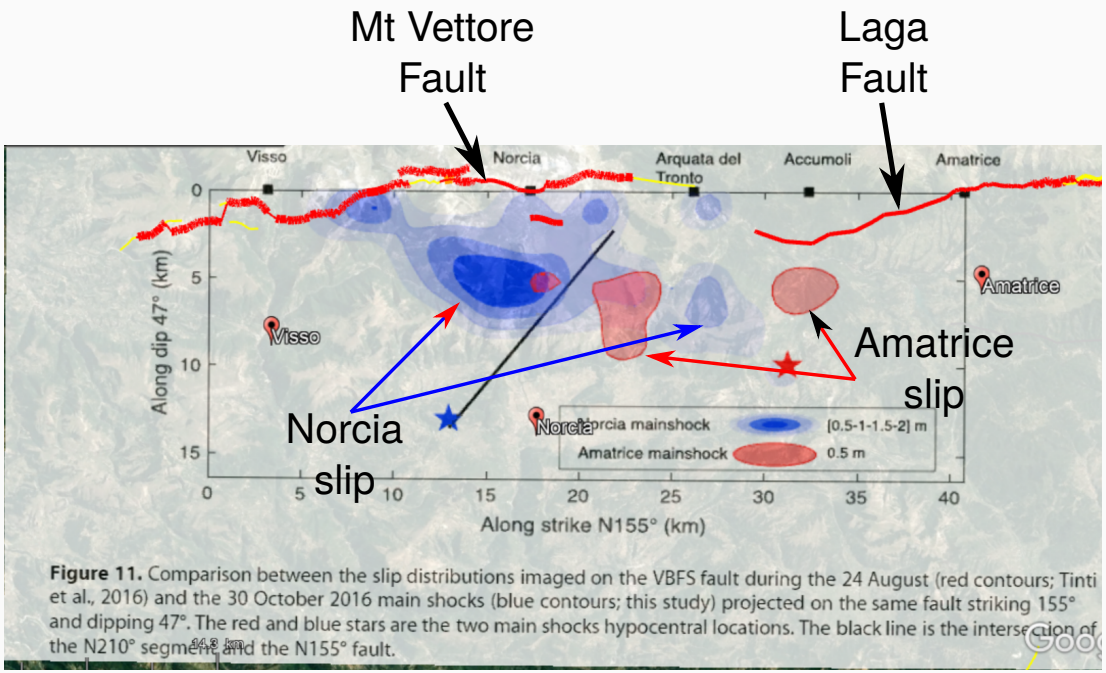

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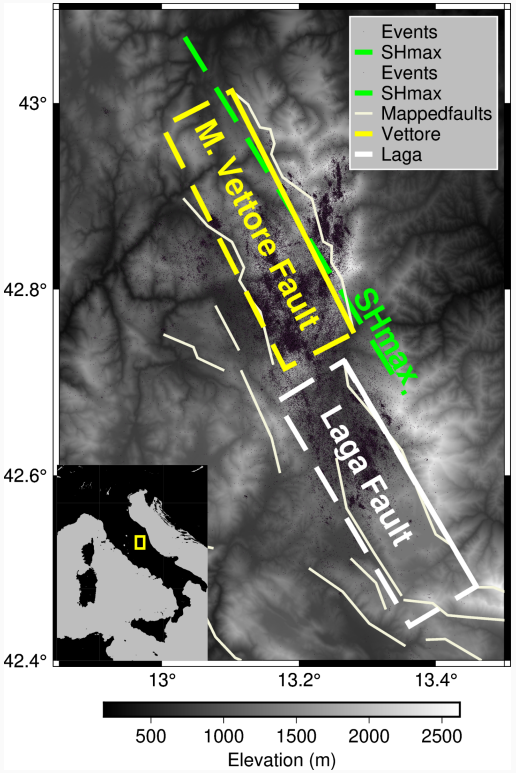

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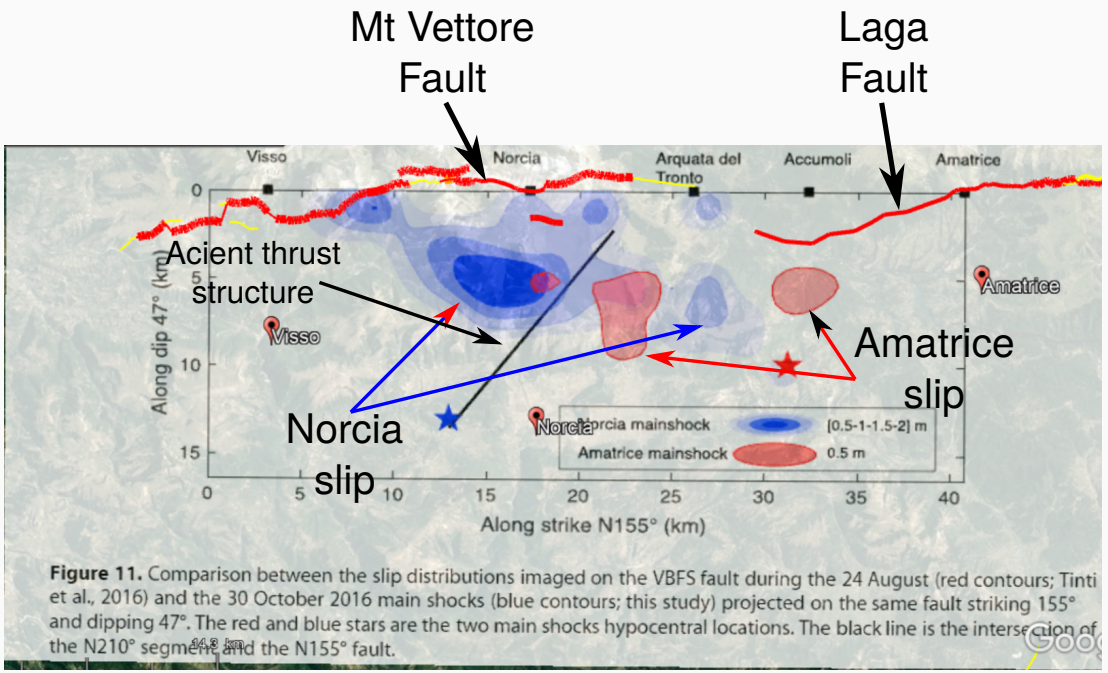

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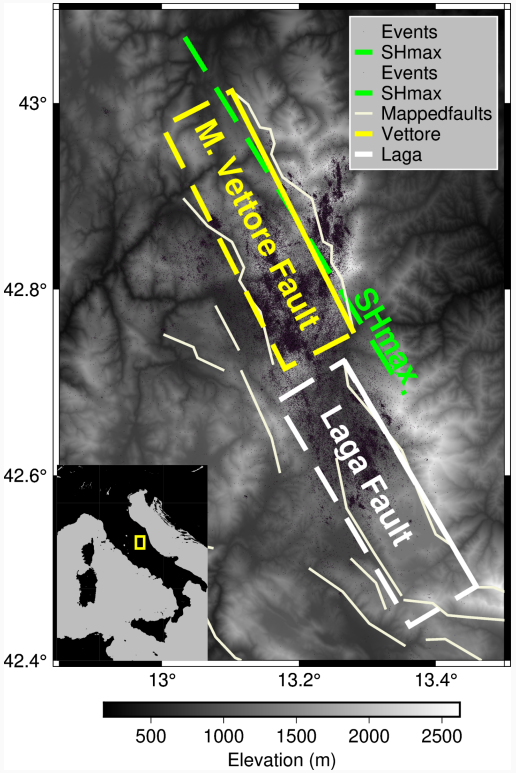

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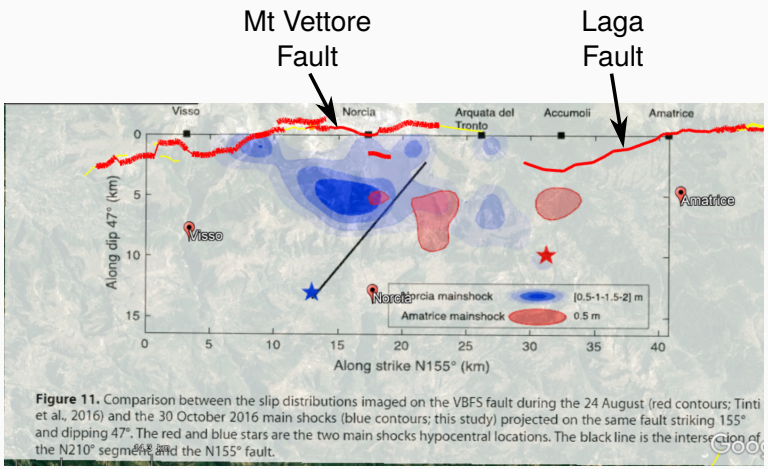

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Rupture jump across step-overs

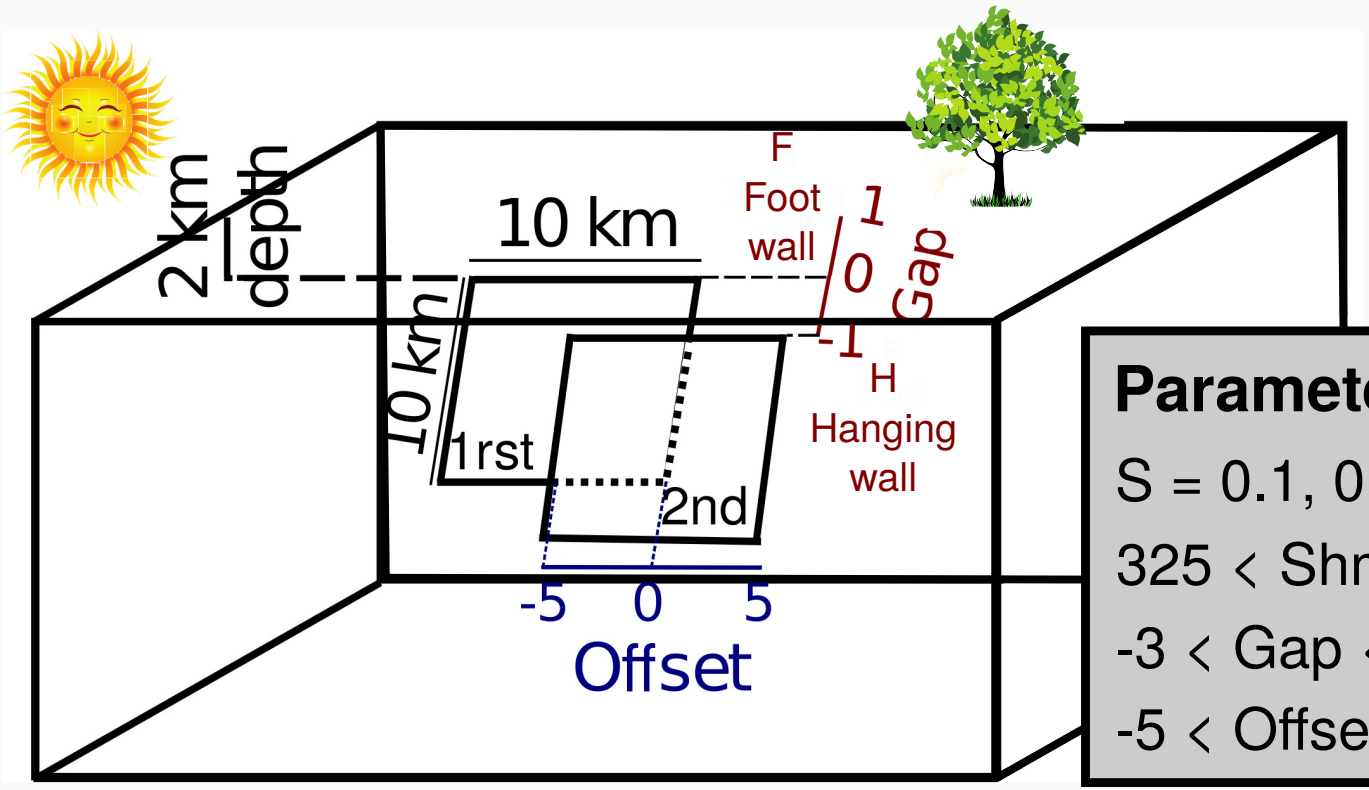
- Potential larger magnitudes?
- Conditions promoting this?
  - Geometry
  - Stress conditions
- To enhance SHA!

Investigate the physical conditons promoting rupture jumps across step overs regarding normal fault systems

Previous studies focused on strike-slip fault systems: **?????**, and more ...

Settings

Geometry and parameters explored



Parameters:

S = 0.1, 0.2, 0.3, ...

325 < Shmax < 350

-3 < Gap < 3 km

-5 < Offset < 5 km

(www.seissol.org; e.g., **??**)

Preliminary exploration: 3 different cases

For these cases: Gap = 1 km, Offset = 1 km

Only 1 fault segment breaks

S: 0.6

Rupture is arrested after jumping

S: 0.4

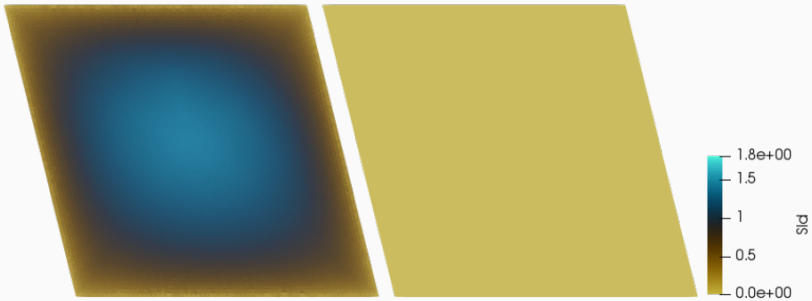
Both segments break

S: 0.2

Preliminary exploration: 3 different cases

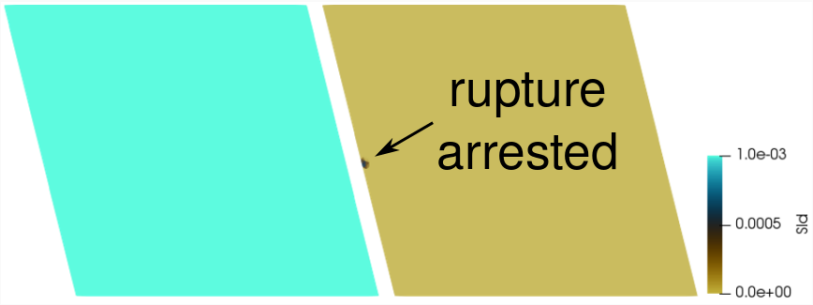
For these cases: Gap = 1 km, Offset = 1 km

Only 1 fault segment breaks



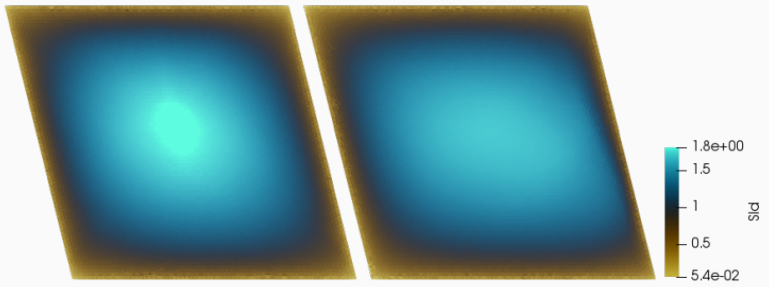
S: **0.6**

Rupture is arrested after jumping



S: **0.4**

Both segments break



S: **0.2**

References

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