

AdriaArray: Status and Challenges

Meier, T. (CAU Kiel), Kolinsky, P. (CAS Prague)

6th AdriaArray Workshop 2025, San Servolo (Venice), Italy
11 – 14 March 2025

Organizing committee:

C. Piromallo, P. Kolinsky, G. Georgieva, T. Meier

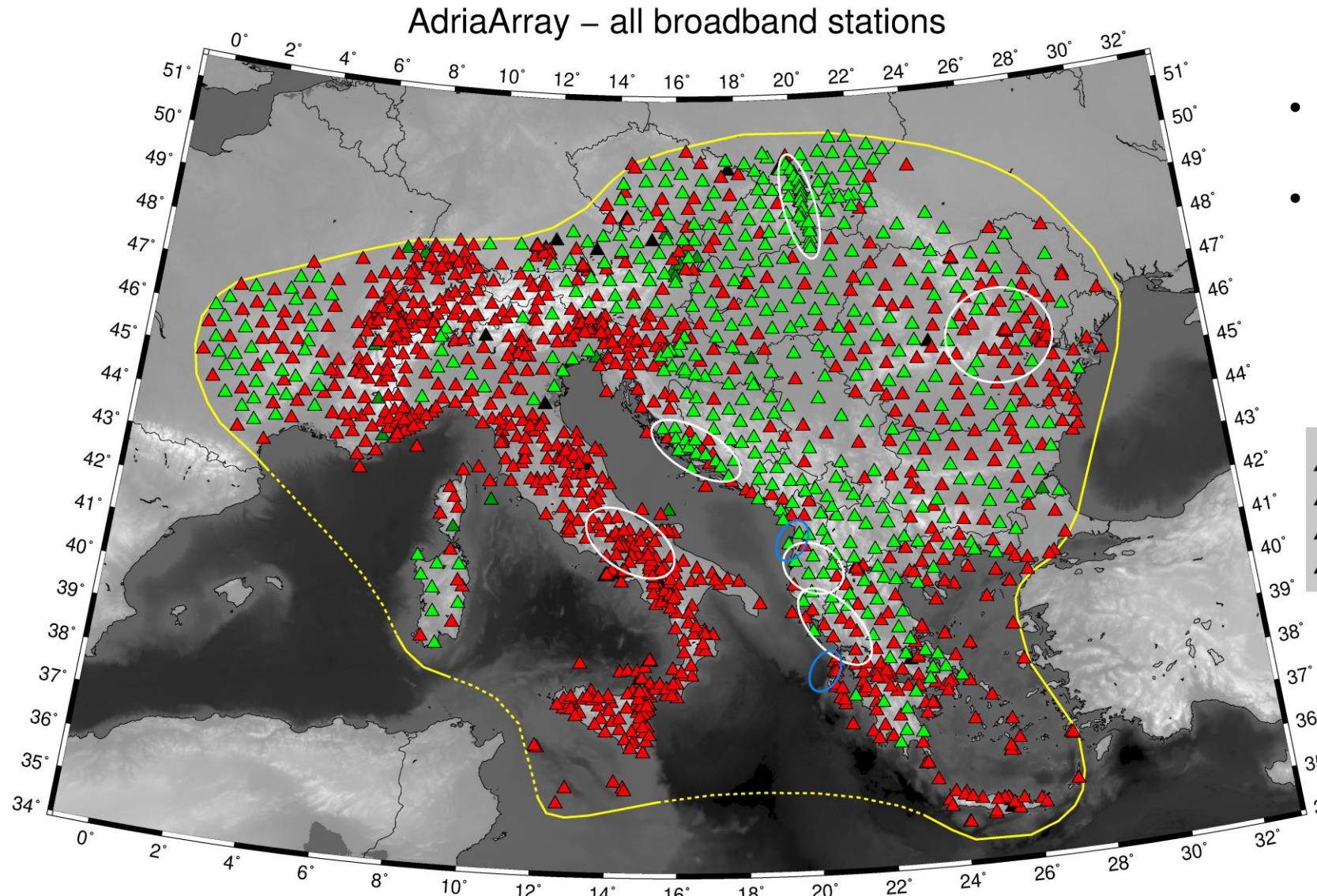


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DI GEOFISICA E VULCANOLOGIA

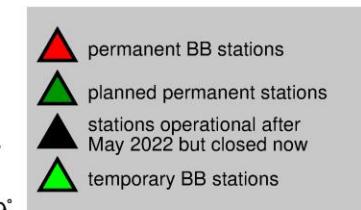
Orfeus



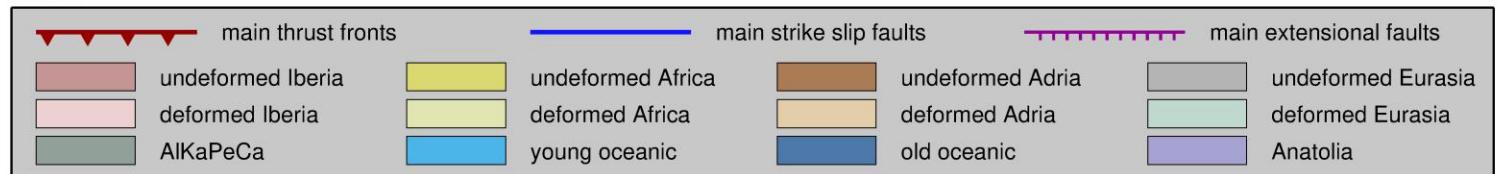
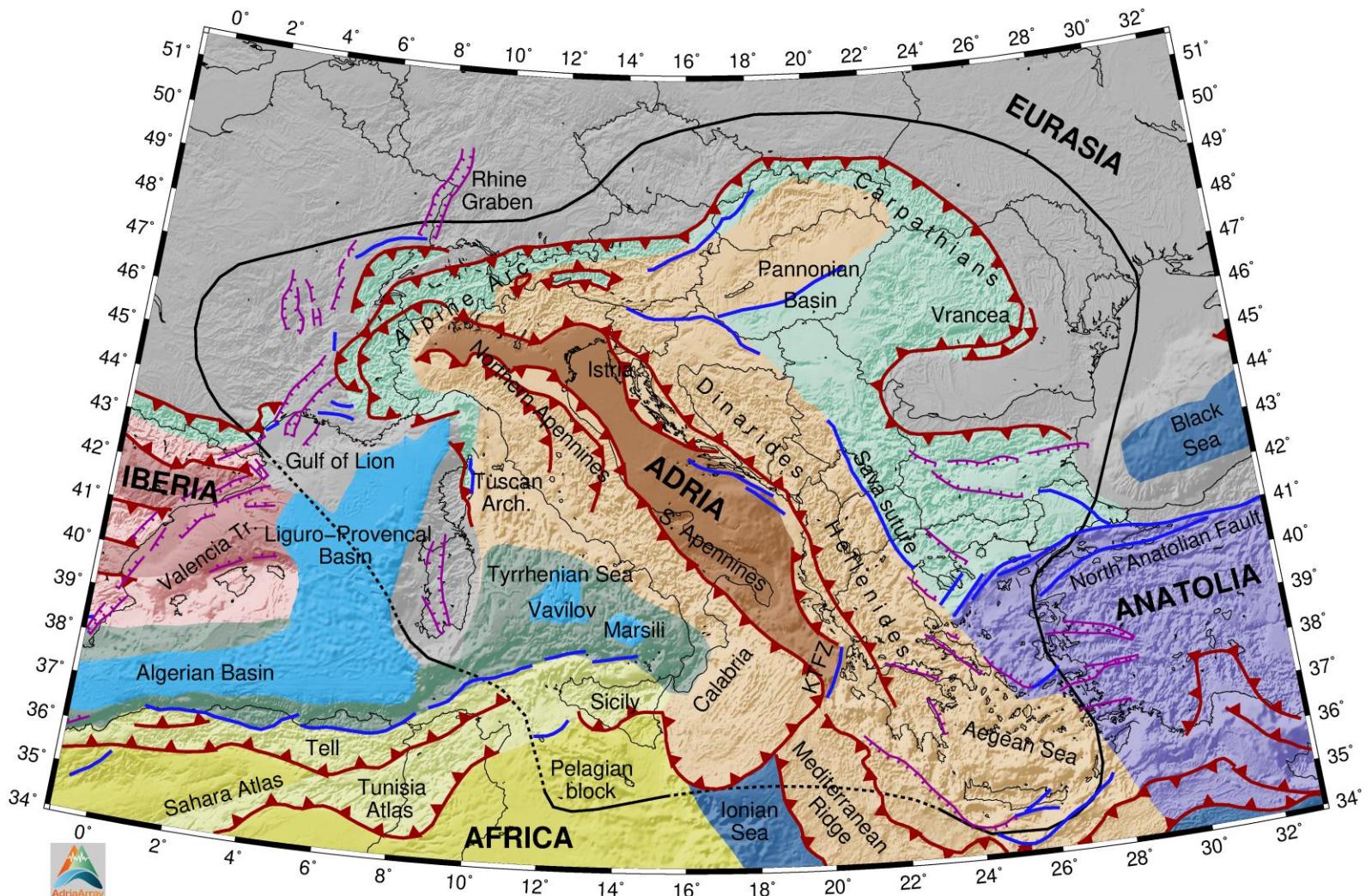
AdriaArray



- **1068** permanent stations, ca. **100** former non-EIDA stations
- **440** temporary BB stations from **23** mobile pools

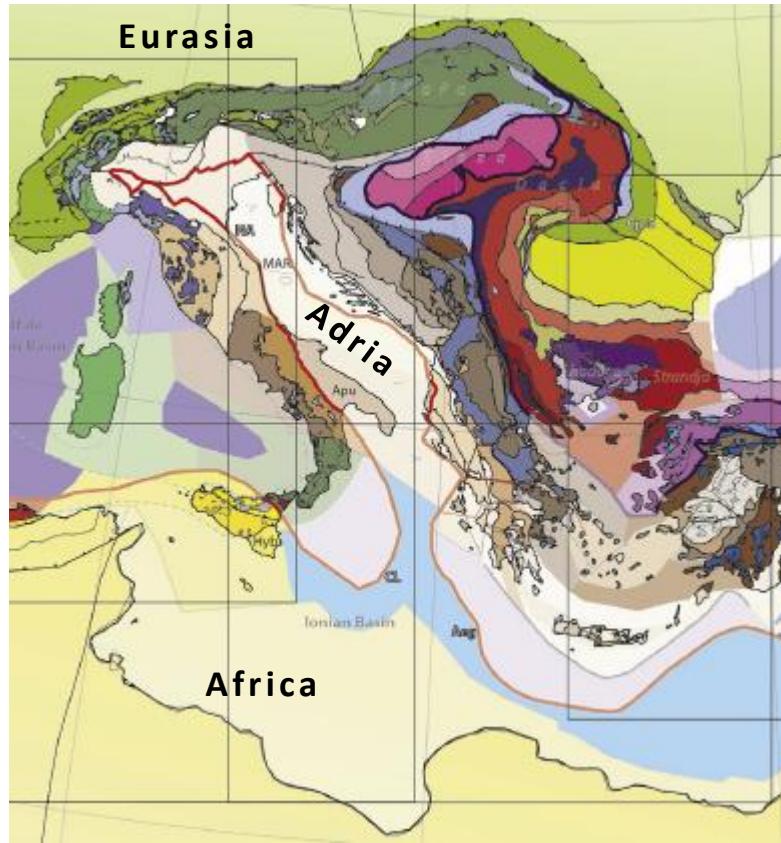


Tectonics

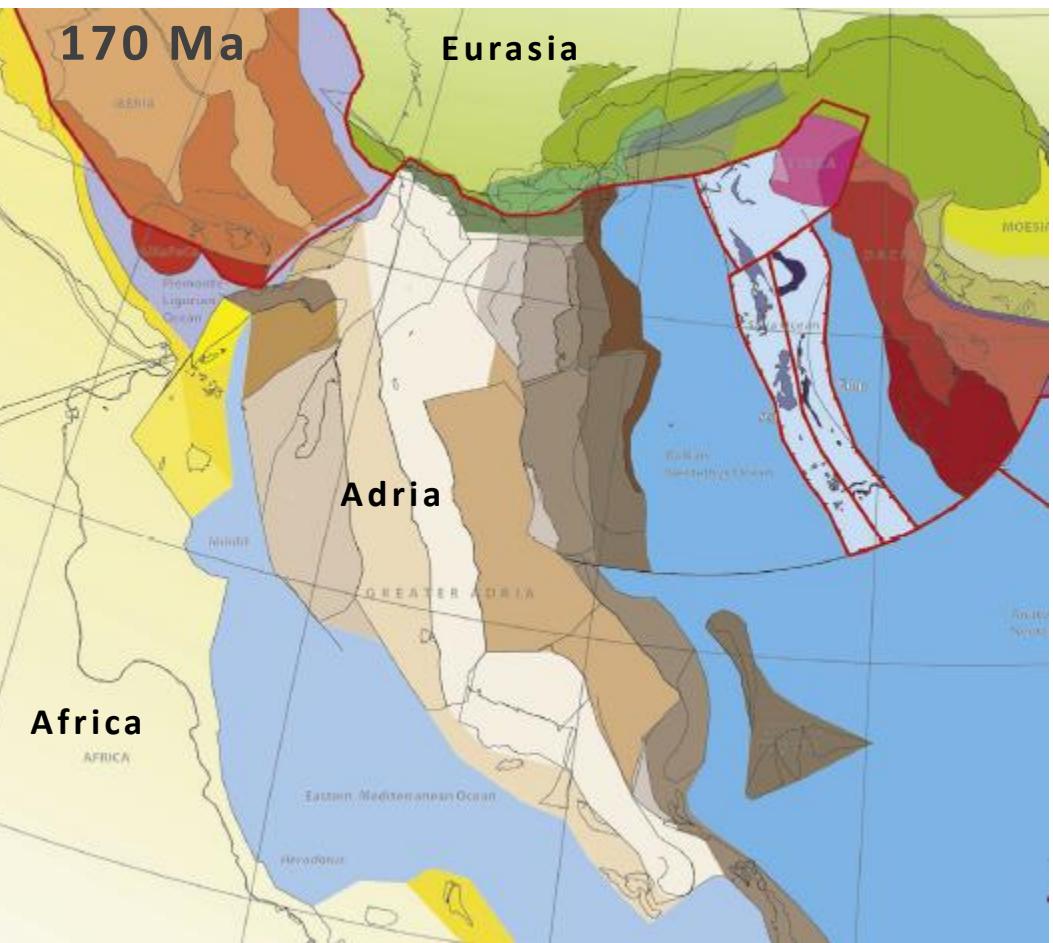


Adria: tectonic reconstruction

0 Ma

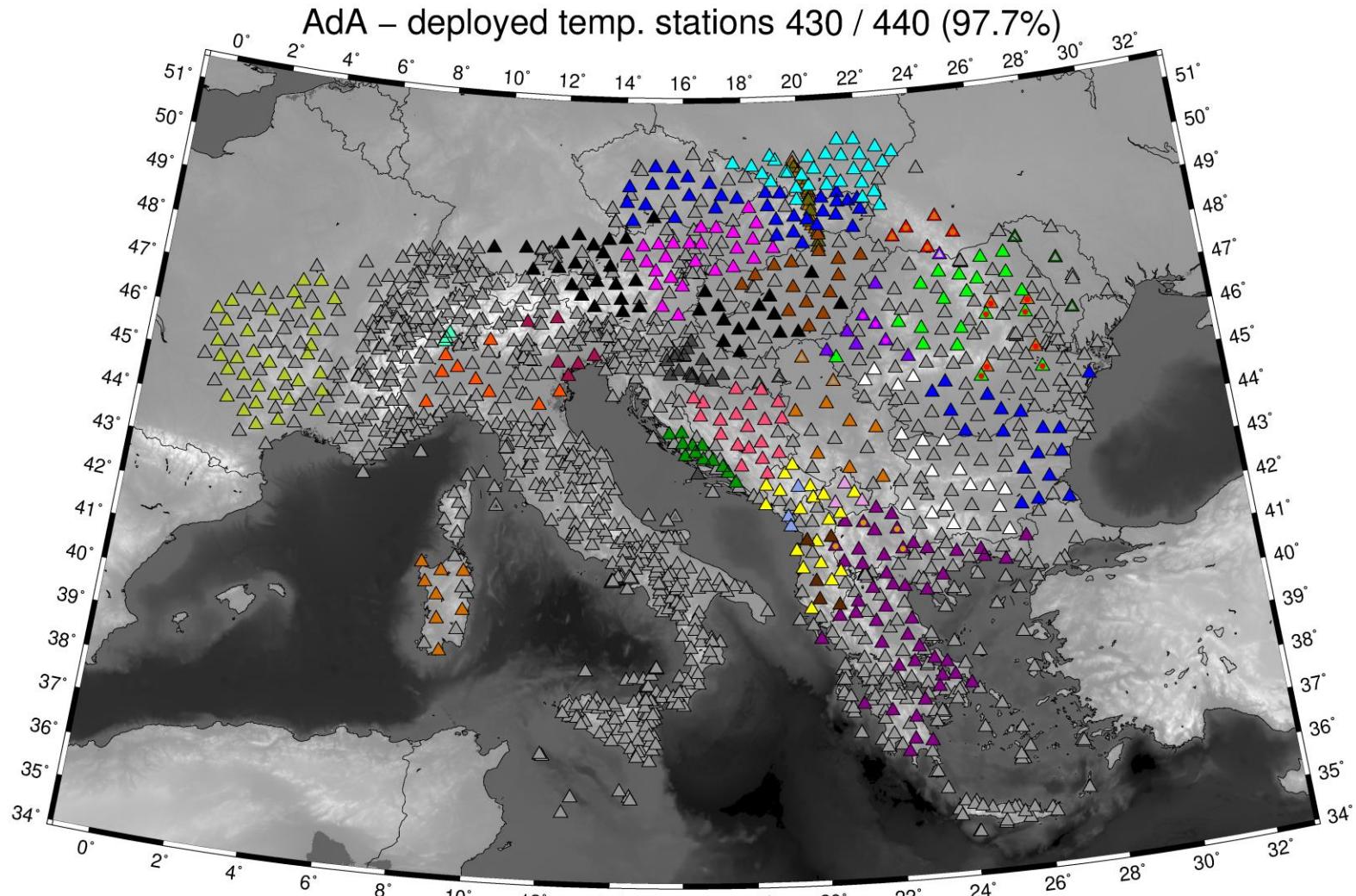


size of Adria reduced by ca. 70 %

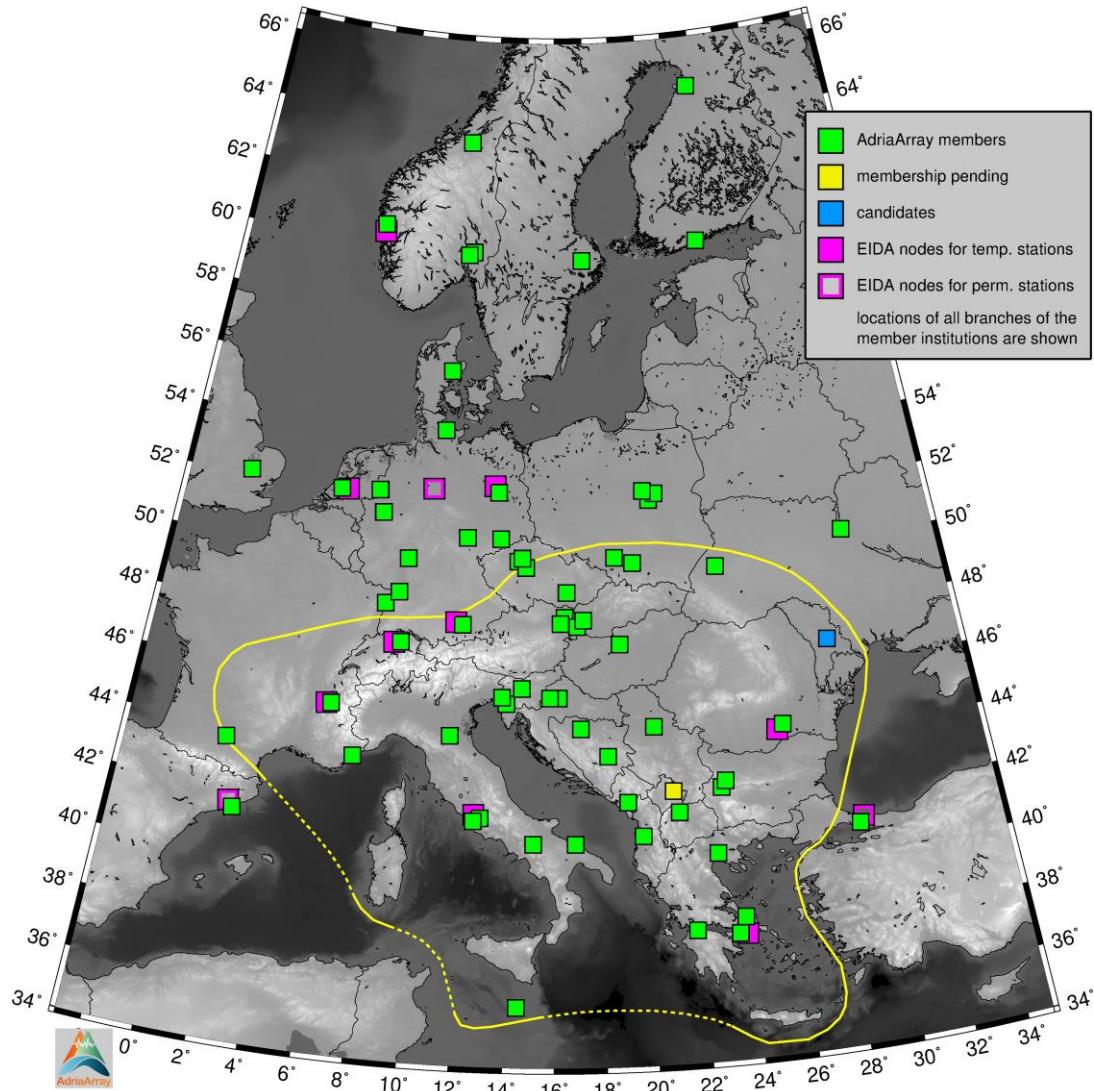


van Hinsbergen et al. (2020)

AdriaArray - status



AdriaArray - status



**AdriaArray Seismology Group
(founded in 2022)**

64 member institutions

442 participants

30 countries

12 EIDA nodes (Athens, Barcelona, Bergen, BGR, ETH Zurich, GFZ, INGV, Kandili, Munich, NIEP, ODC, RESIF)

- proposed 2018: AlpArray Science Meeting Zürich
- Preparation from 2019 – 2022
- AdriaArray Seismology Group founded in 2022
- Deployment of stations 2022 – 2025/2026?
- AdriaArray Workshops:
 - Thessaloniki 2019
 - Online Workshops (EPOS/ORFEUS): 2020, 2021
 - AdriaArray/EPOS/ORFEUS Workshop Potsdam 2022
 - Dubrovnik 2023
 - Sofia 2024
- AdriaArray Workshop **Venice** March 11-14, 2025
 - **Review status of AdriaArray**
 - **Discussion of open research questions, model repositories**
 - **Consolidate Collaborative Research Groups and cooperations**

6th AdriaArray Workshop



Tuesday, March 11	program overview
08:30 – 9:00	Registration
09:00 - 10:30	Session 1: Welcome & Adriatic geodynamics: progress and frontiers
	Coffee break
11:00 - 12:30	Session 2: Adriatic geodynamics: progress and frontiers – continued
	Light lunch (served)
14:00 - 15:30	Session 3: Physical structure and evolution of the lithosphere in the Adriatic region: what we can and cannot resolve with seismic imaging
	Coffee break
16:00 - 17:00	Poster advertisement
17:00 – 18:00	Poster session A (Sala E Palazzina Grecale)
18:00 – 19:00	Poster session B (Sala E Palazzina Grecale)

6th AdriaArray Workshop



Posters:

- Announcement: 1 slide – 1 minute (Auditorium, Tue 16:00)
- Session A (Sala E Palazzina Grecale, Tue 17:00)
- Session B (Sala E Palazzina Grecale, Tue 18:00)

6th AdriaArray Workshop

Wednesday, March 12					
09:00 - 10:30	Session 4: Physical structure and evolution of the lithosphere in the Adriatic region: what we can and cannot resolve with seismic imaging – continued				
	Coffee break				
11:00 - 12:30	Session 5: Physical structure and evolution of the lithosphere in the Adriatic region: what we can and cannot resolve with seismic imaging – continued and Seismicity and seismic sources in the AdriaArray region				
	Light lunch (served)				
14:00 - 15:30	Break-out session 1: Seismicity and seismic sources (Auditorium)	Break-out session 2: Slabs in the Adriatic region: what do we know? (Room 6)			
	Coffee break				
16:00 - 17:30	Break-out session 3: The western margin of the Adriatic Plate: concepts and experiments				
17:30 – 19:00	Break-out session 4: The eastern margin of the Adriatic Plate: concepts and experiments				

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Thursday, March 13		
09:00 - 10:15	Session 6: Seismicity and seismic sources in the AdriaArray region – continued	
	Coffee break	
11:00 - 12:30	Break-out session 5: AdriaArray: Data access and data quality	
	Light lunch (served)	
14:00 - 15:30	Break-out session 6: Receiver functions	
	Coffee break	
16:00 - 17:30	Break-out session 7: Ambient noise and surface wave tomography	
18:00 – 19:00	AdriaArray Steering Committee Meeting (Auditorium)	Early Career Scientist Networking Evening (Room 6)

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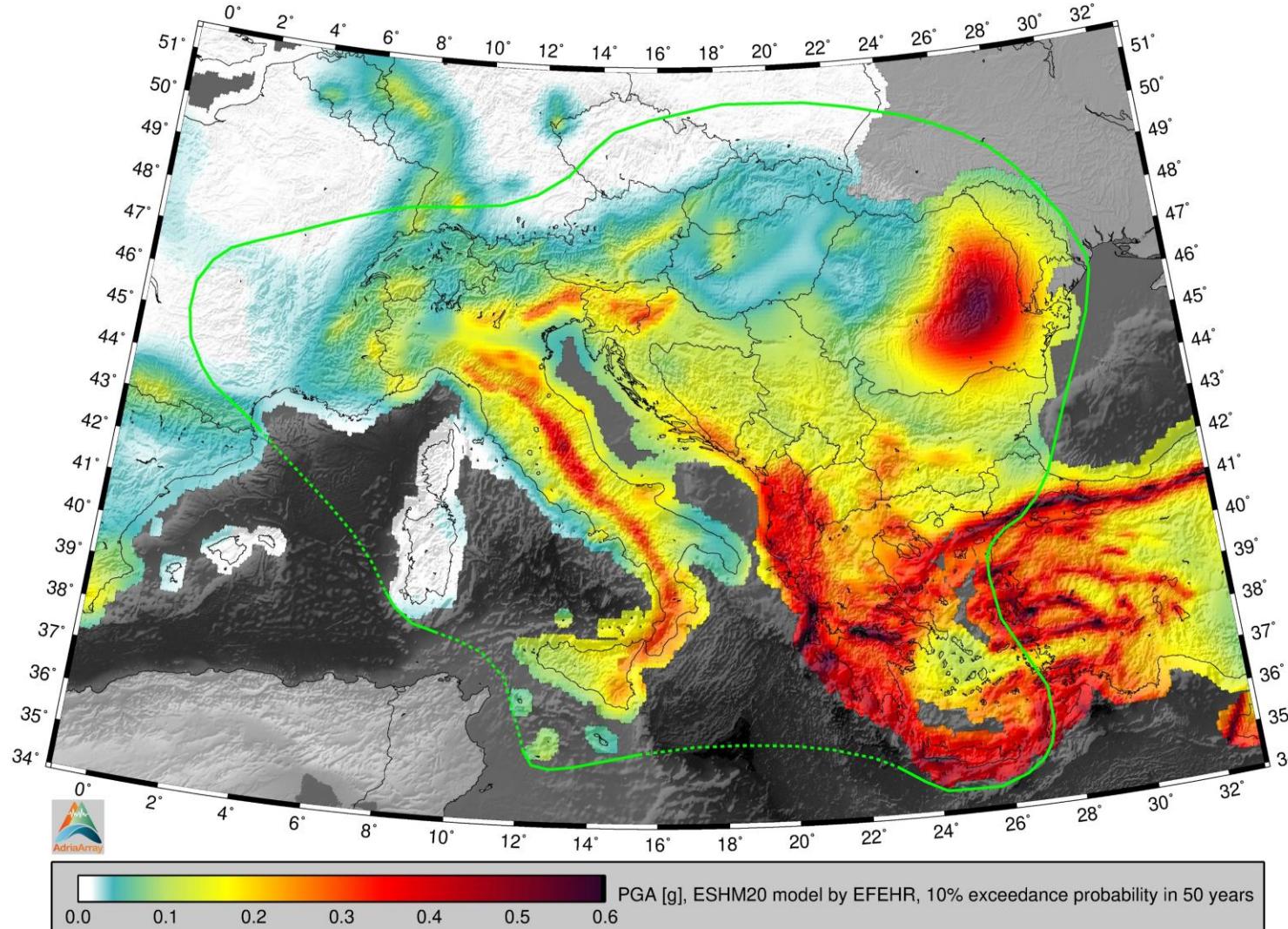
Early Career Scientist Networking Evening (room6, Thu 18:00):

- Convener: Eckel, F., Roisenberg, H., Soni, T.

Steering Committee meeting (Auditorium, Thu 18:00):

- Data availability, data quality
- End of the temporary station deployment
- Web page
- Model repositories
- Status of CRGs, new members
- ORFEUS webinar, AdA webinars?
- Next meetings

Seismicity

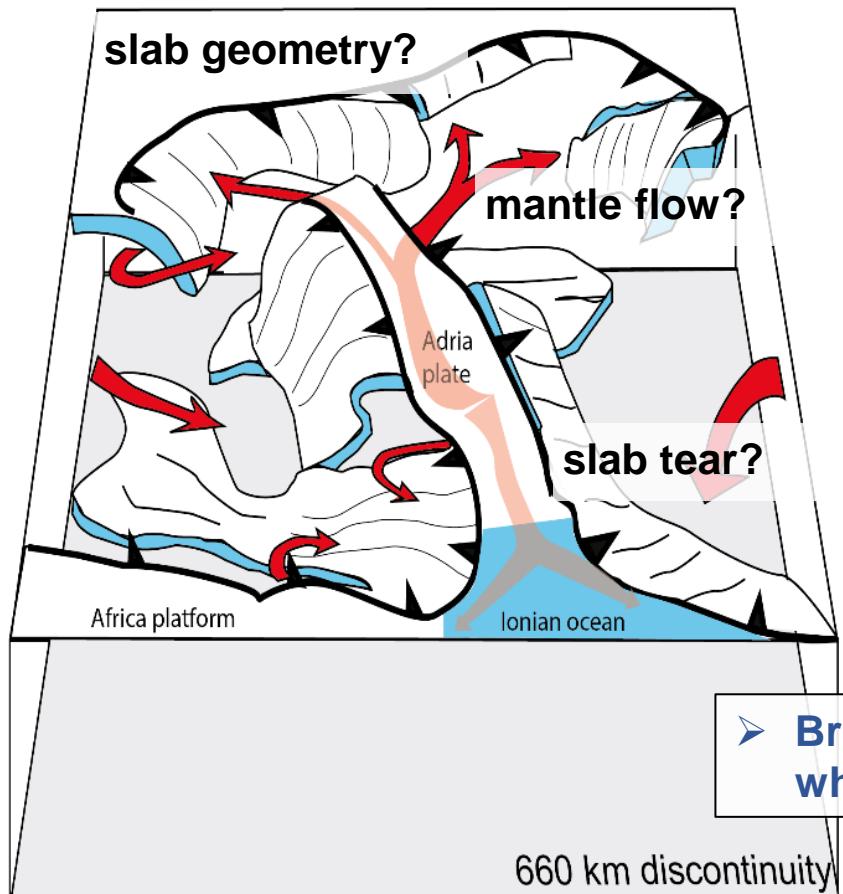


1. How can we **harmonize earthquake catalogs** and integrate national datasets into a regional framework?
2. What are the **best practices** for ensuring high-quality, **standardized earthquake and source parameters solutions**?
3. How can we enhance collaboration to **efficiently process large volumes of data**, ensuring reliable results and smooth integration into the AdriaArray initiative?

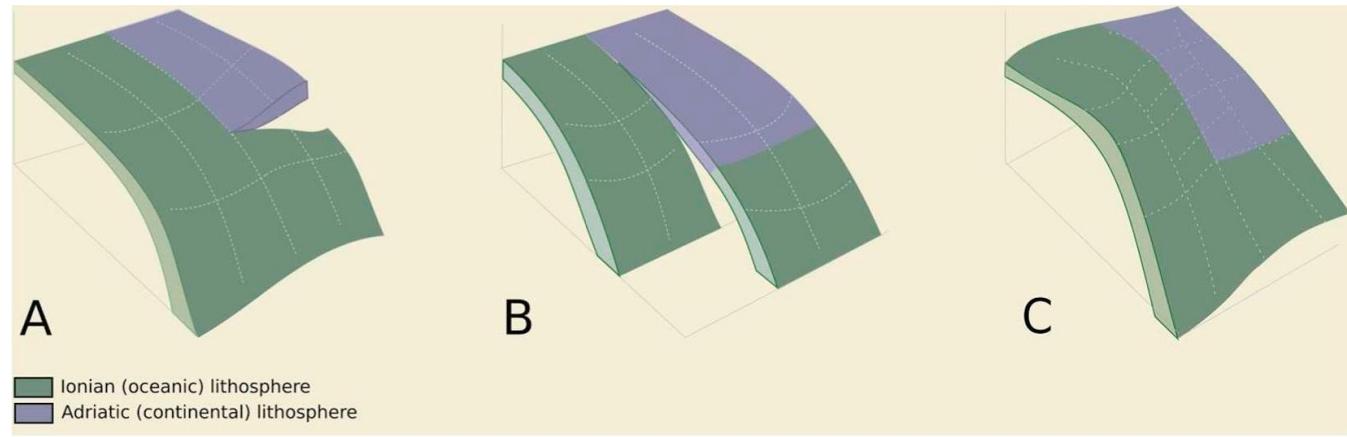
➤ **Break-out session 1: Seismicity and source parameter (Auditorium, Wed 14:00)**

Geodynamic drivers?

From cartoons to testable models?



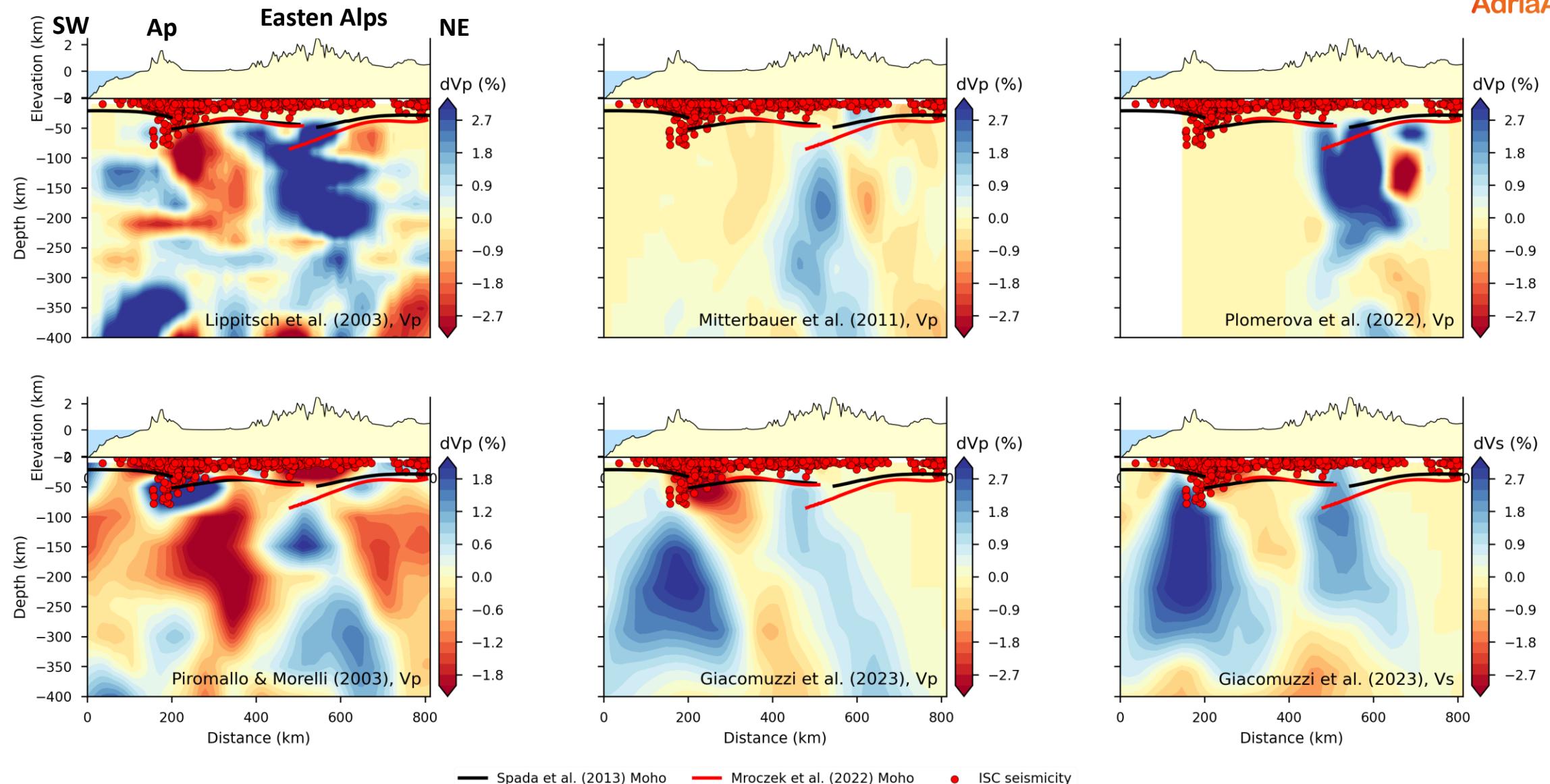
different slab hypotheses: Kefalonia Transform Fault



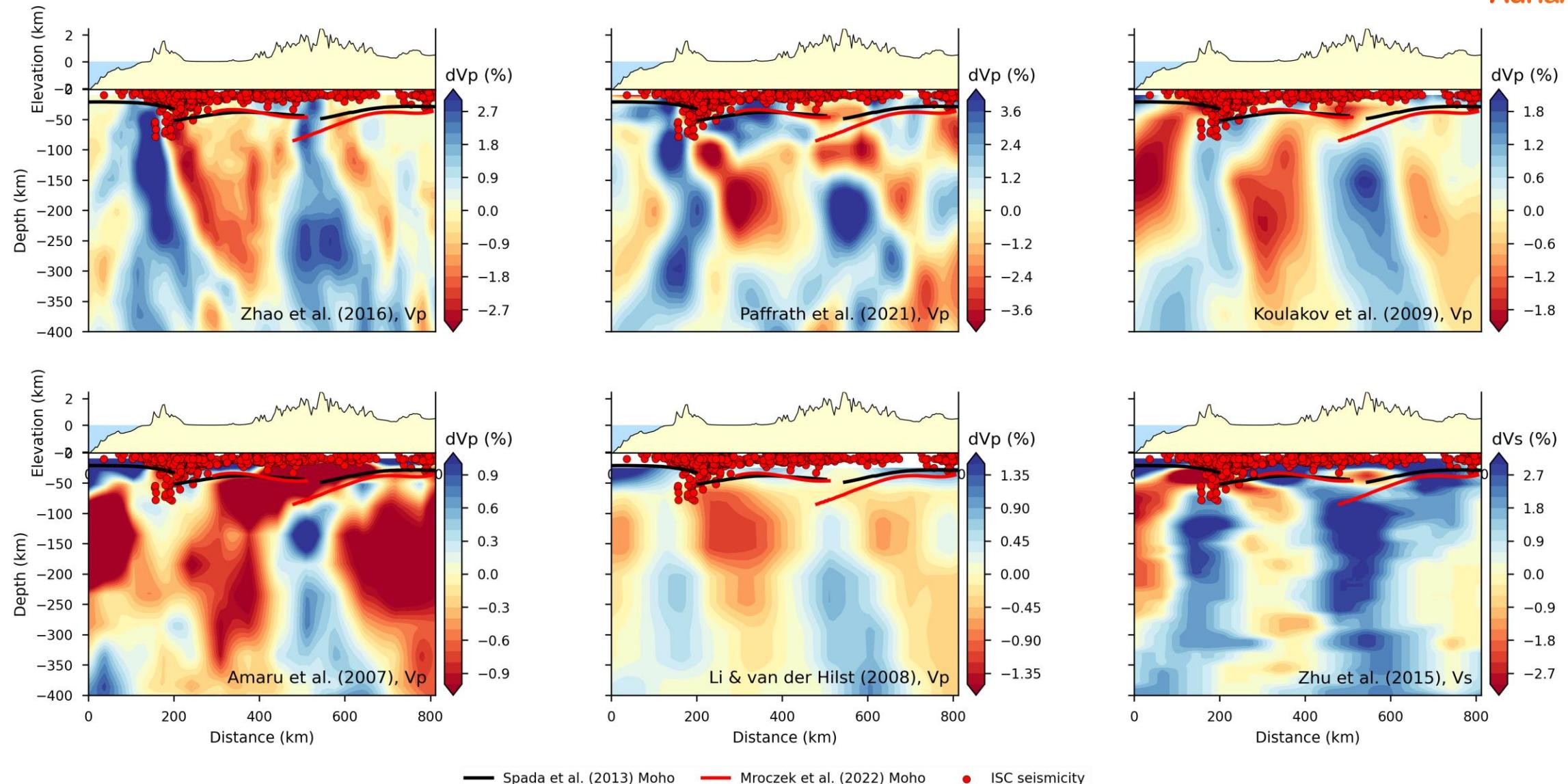
Özbakir et al. (2020)

➤ **Break-out session 2: Slabs in the Adriatic region:
what do we know? (room 6, Wed 14:00)**

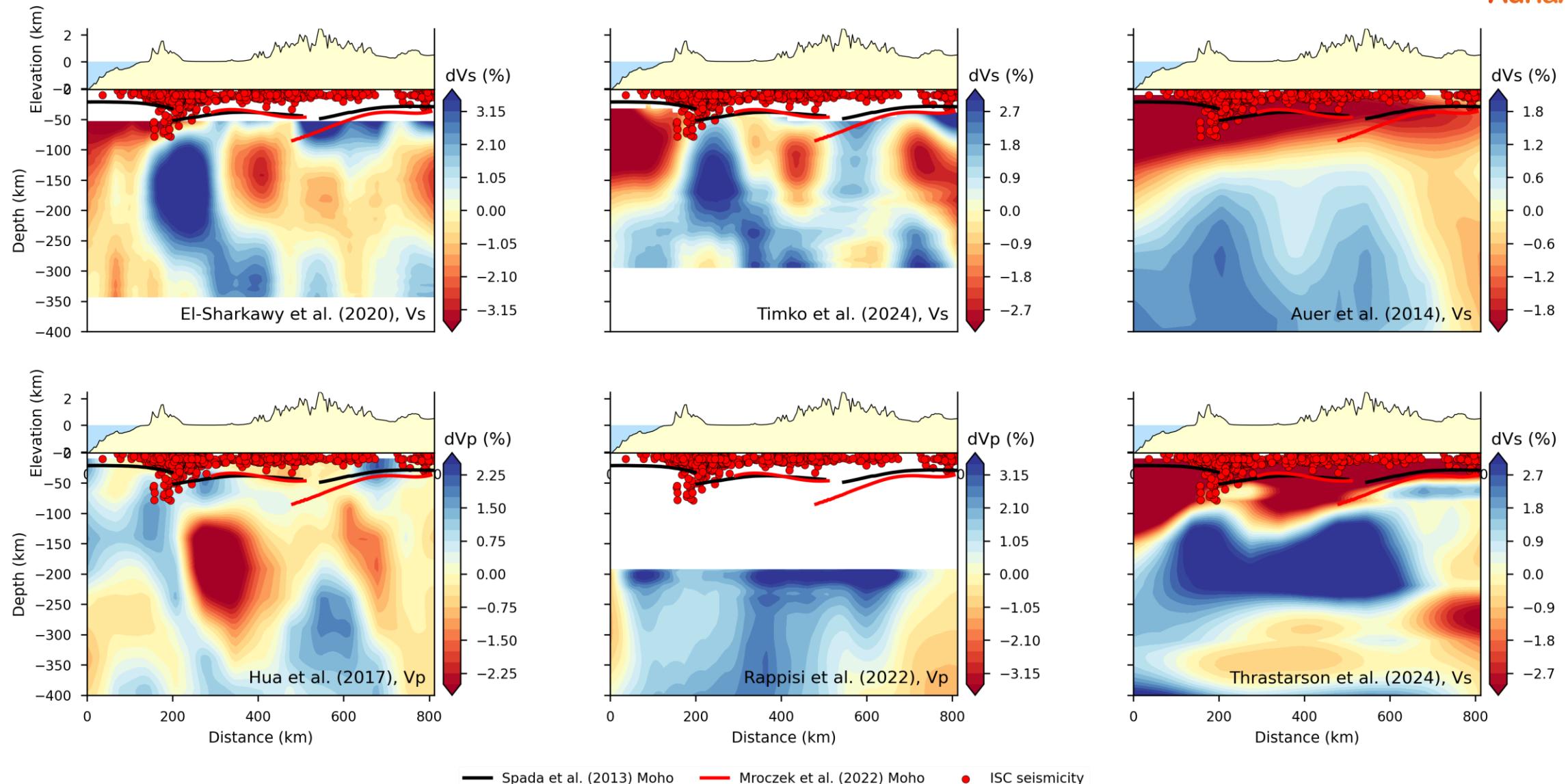
Seismic tomography – comparison of models



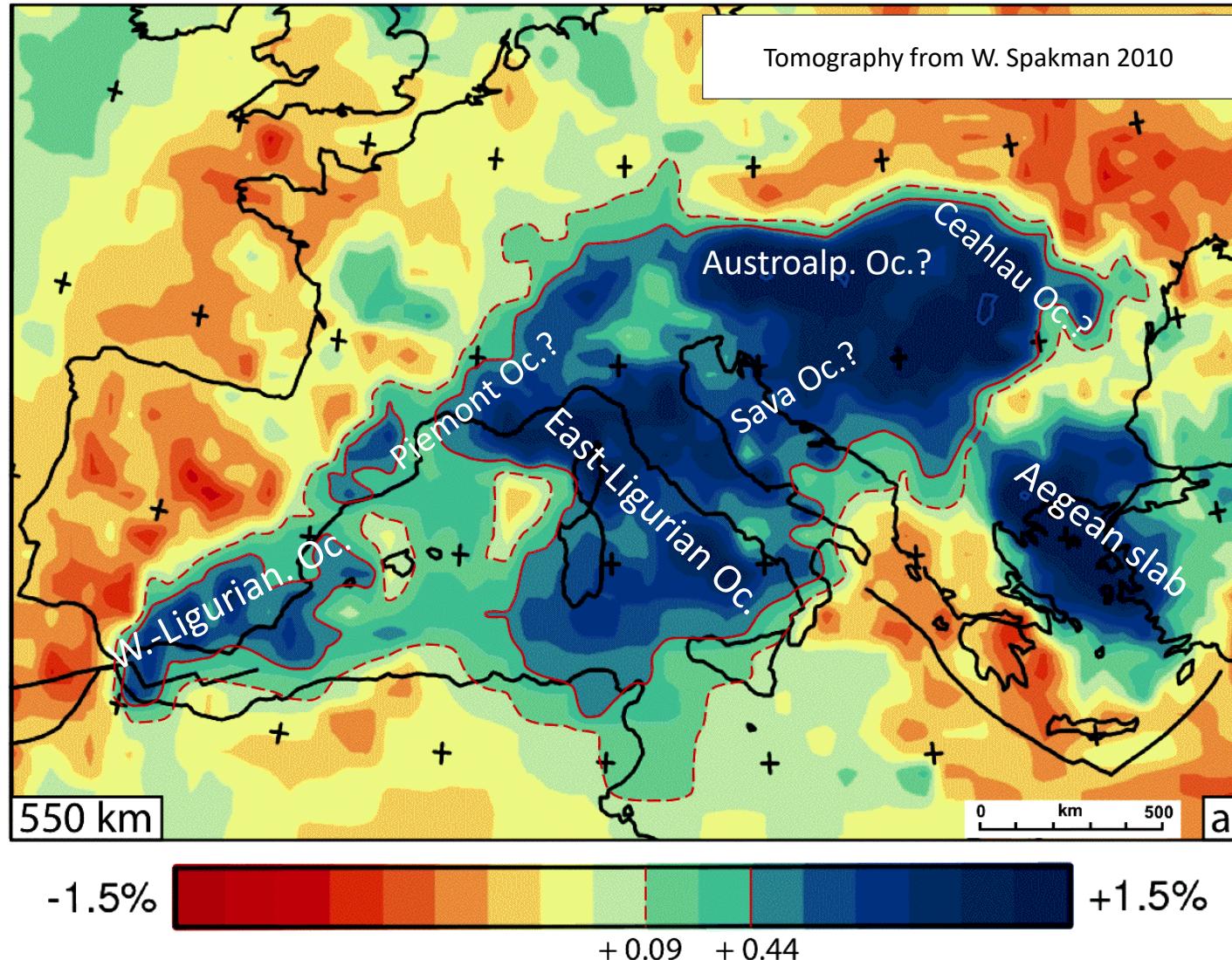
Seismic tomography – comparison of models



Seismic tomography – comparison of models



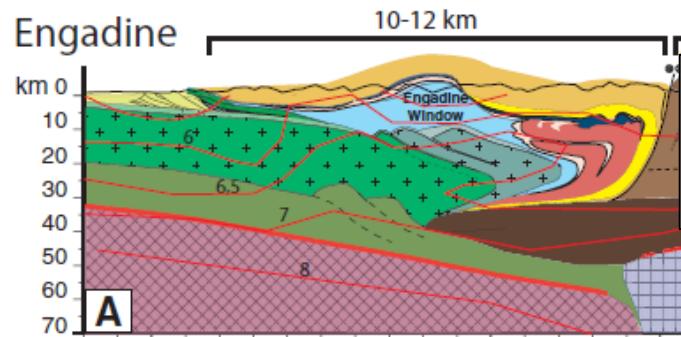
Properties of the mantle transition zone



- characterize MTZ heterogeneities
- constrain changes in mineralogical composition, thermal state, and water content
- relation to subduction history, magmatism and volcanism
- controls on the depth of mantle convection

Properties of the crust: conceptional models

Indentation (Central Alps) ➤ Break-out session 2: Slabs in the Adriatic region: what do we know? (room 6, Wed 14:00) **Subduction channel (Western Alps)**



Rosenberg, Kissling (2013)

➤ Break-out session 2: Slabs in the Adriatic region: what do we know? (room 6, Wed 14:00)

➤ Break-out session 3: The western margin of the Adriatic region: experiments and concepts (Auditorium, Wed 16:00)

➤ Break-out session 4: The easter margin of the Adriatic region: experiments and concepts (Auditorium, Wed 17:30)

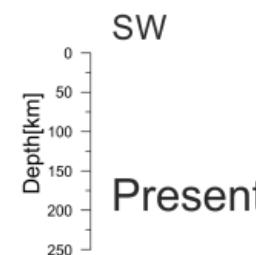
➤ Break-out session 6: Receiver functions (Auditorium, Thu 14:00)

➤ Break-out session 7: Ambient noise and surface wave tomography (Auditorium, Thu 16:00)

Indentation (Central Alps) ➤ Break-out session 2: Slabs in the Adriatic region: what do we know? (room 6, Wed 14:00) Subduction channel (Western Alps)

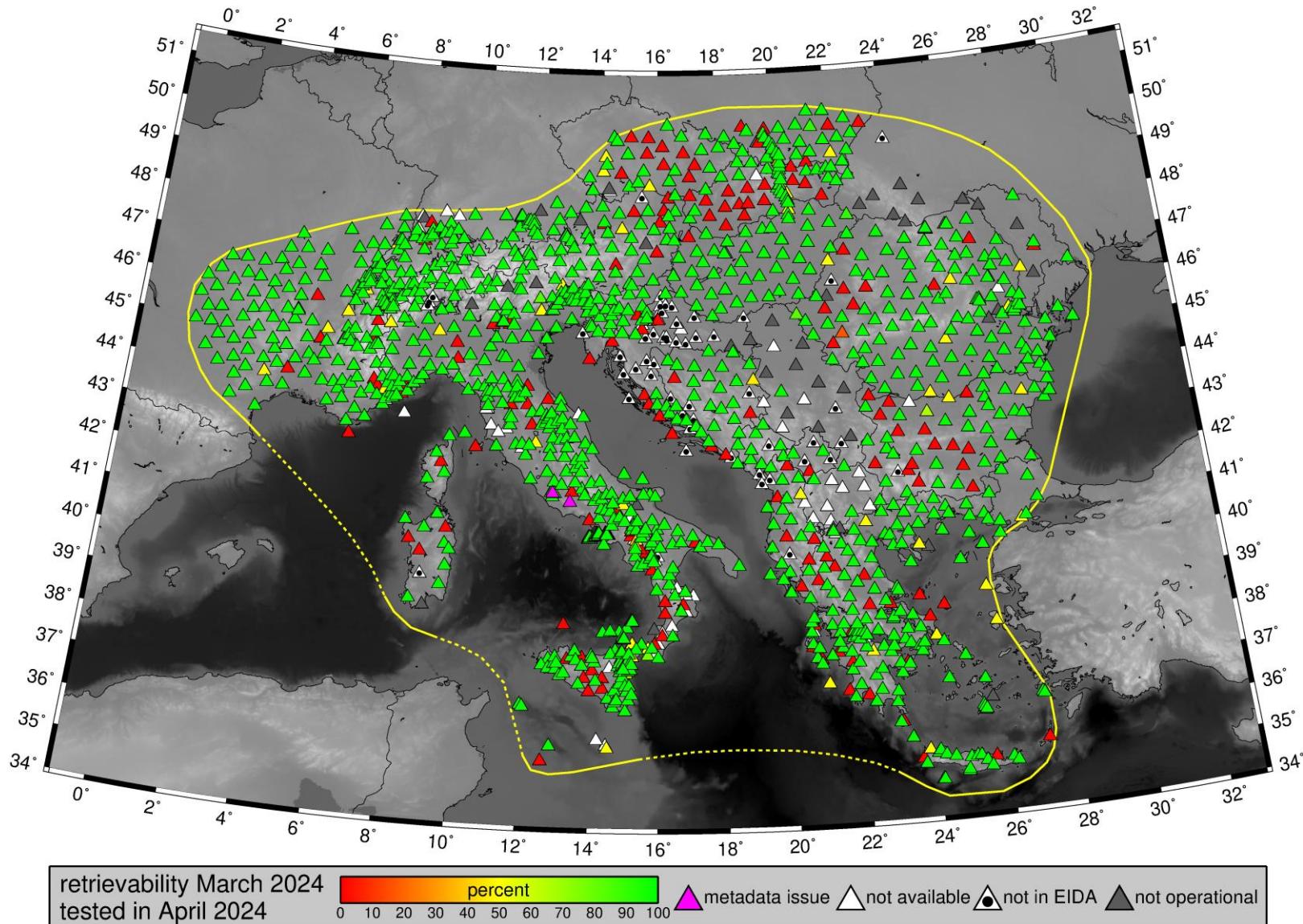


Paul et al. (2022)



Bocchini et al. (2018)

AdriaArray - status

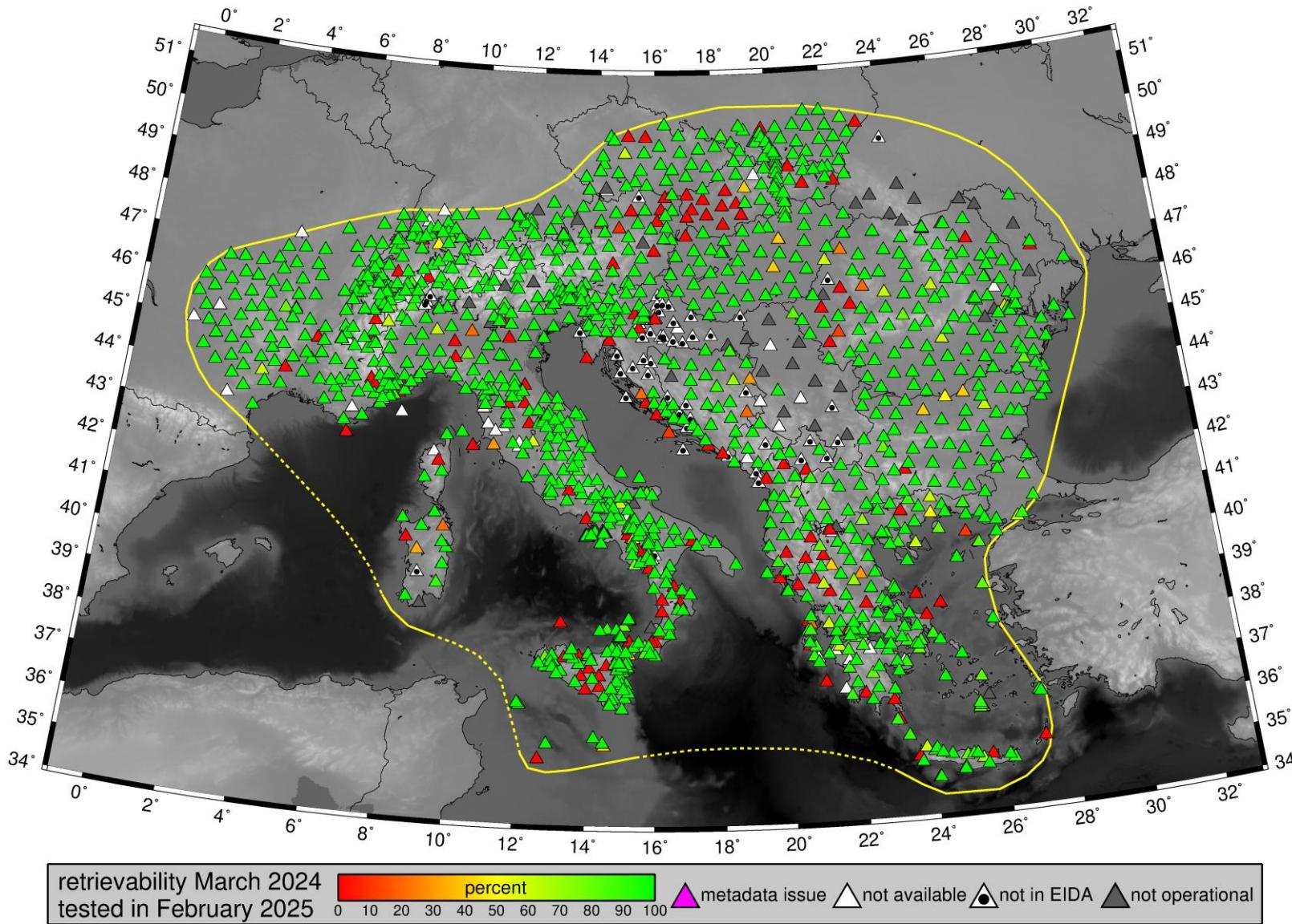


Data quality control:

- Availability
- Signal-to-noise ratio
- Metadata?

Together with ORFEUS UAG

AdriaArray - status



Data quality control:

- Availability
- Signal-to-noise ratio
- Metadata?

Together with ORFEUS UAG

Backfilling of data?

Albania, Austria, Croatian Seismological Service, Kosovo, Montenegro

➤ **Break-out session 5:
AdriaArray: data access and data quality (Auditorium, Thu 11:00)**

Projects:

- Bulgaria, Czech Republic, Croatia, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Norway, Poland, Romania, Slovakia, Slovenia, Sweden, EPOS, ORFEUS
- Pending: COST, Germany (DFG Priority Program)

Special Issue Annales of Geophysics 2025: **Recent large-scale temporary passive seismic experiments in Europe: deployment and data quality**

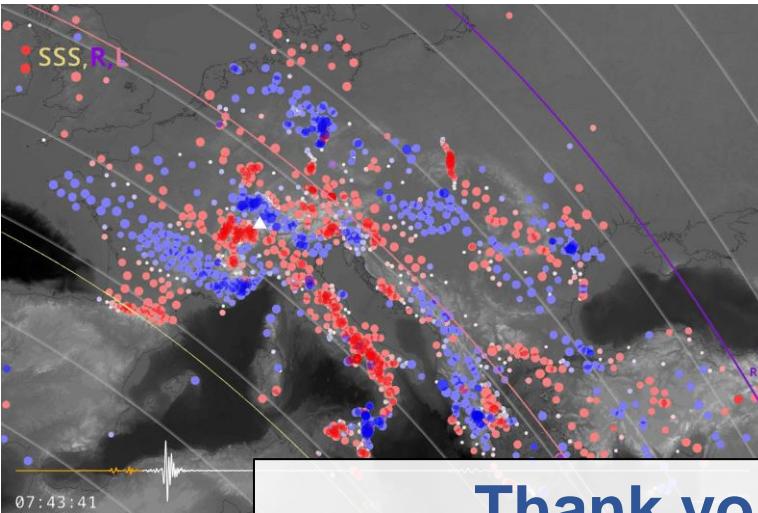
- 20 submissions including general paper presenting AdriaArray (Kolinsky et al., 2025)

Concluding Plenary Discussion (Auditorium, Fri 9:00)

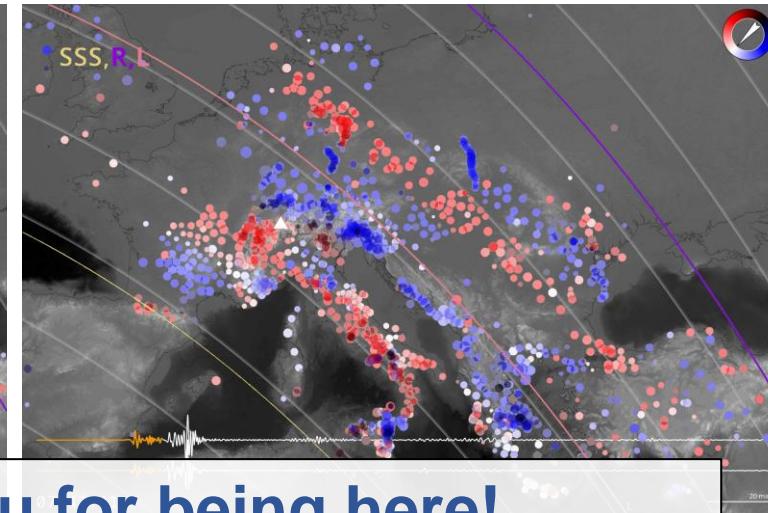
- Report of break-out sessions (1 slide)
- Report of SC meeting (1 slide)
- Report Early Career Scientists (1 slide)
- Report Special issue (1 slide)
- Data availability & data quality
- Station book, CRG ‘Engineering Seismology’
- Web page (names, etc.)
- Next activities and meetings

P- and S-wave, Japan 01.01.2024 Mw 7.5

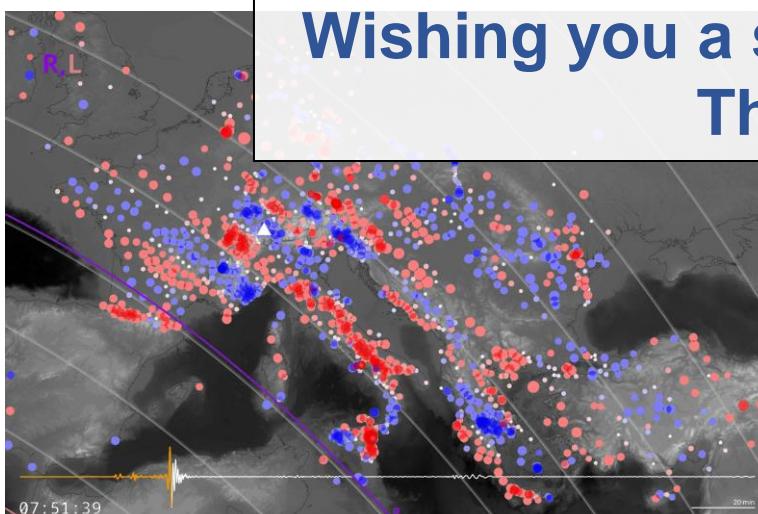
vertical component



horizontal components



Love (red – blue)



Rayleigh (black – white)

J. Stamp, F. Eckel