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Observations of Inner-core Shear Waves with AlpArray

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ALP ARRAY

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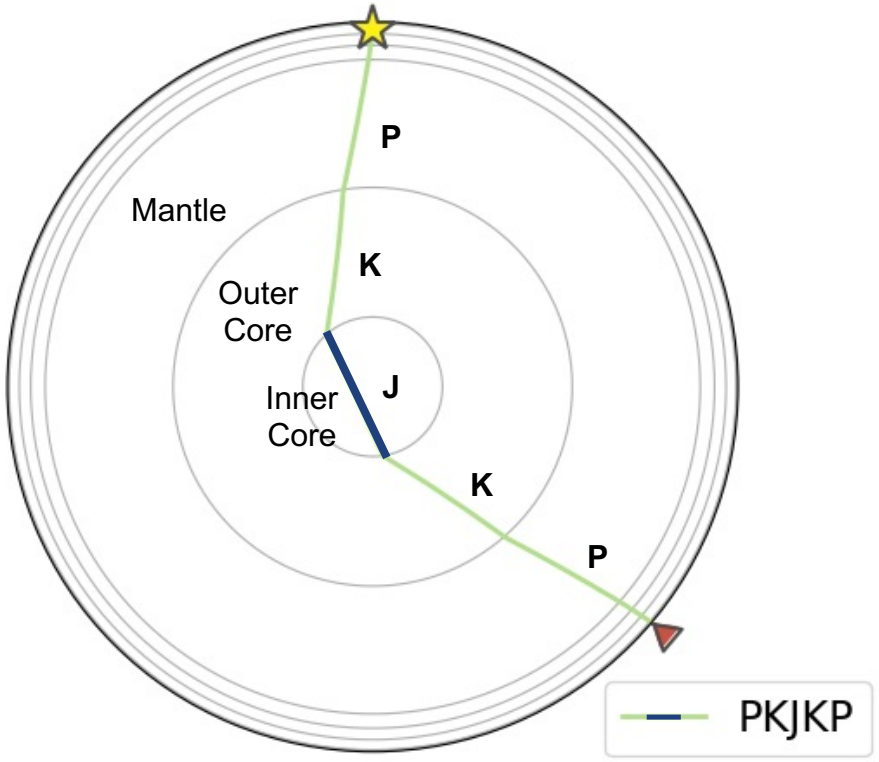
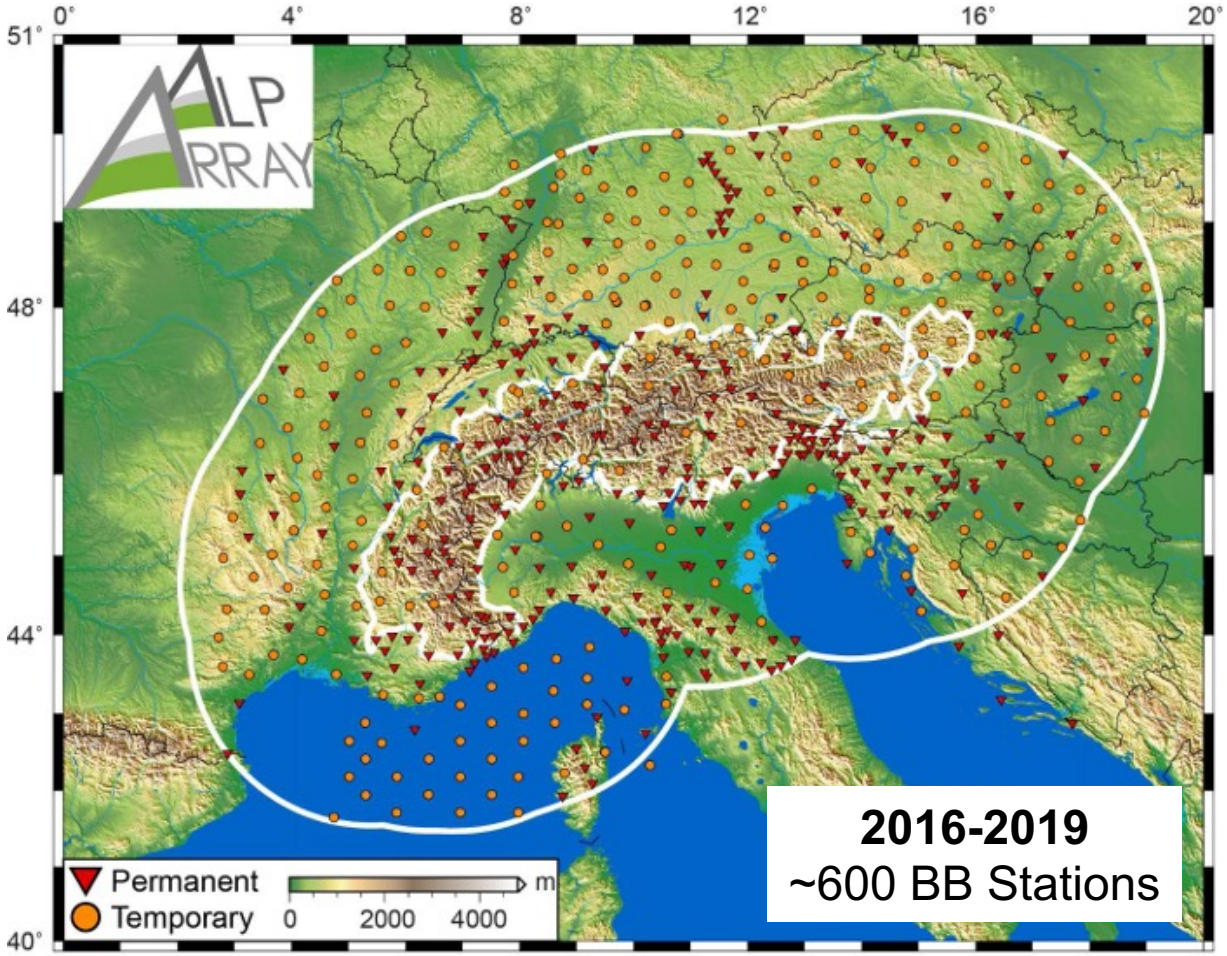
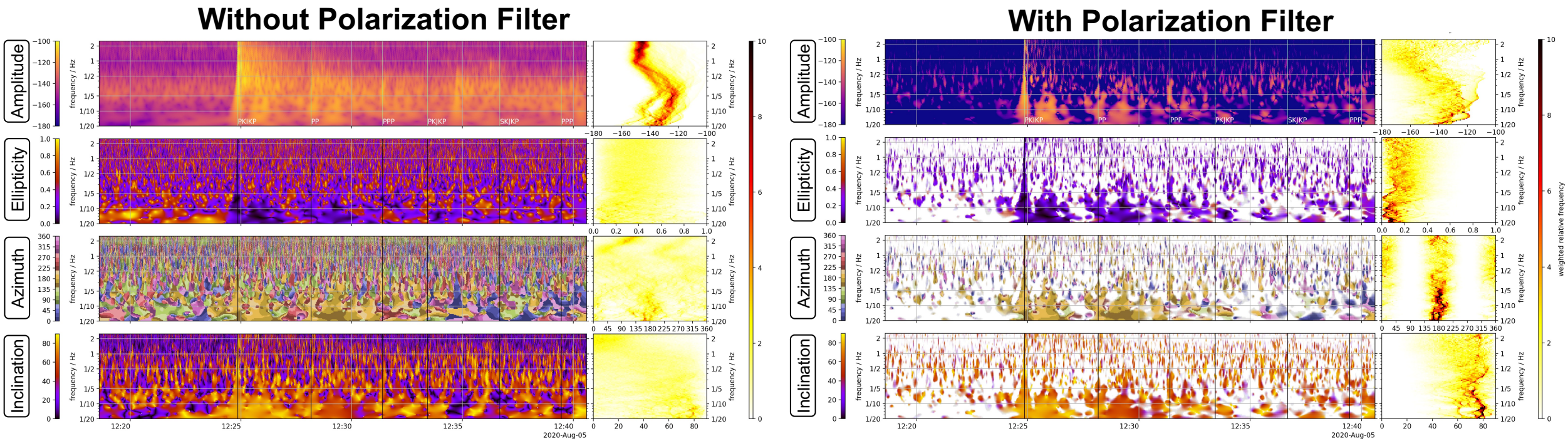
Introduction: Inner-core Shear Waves (J)





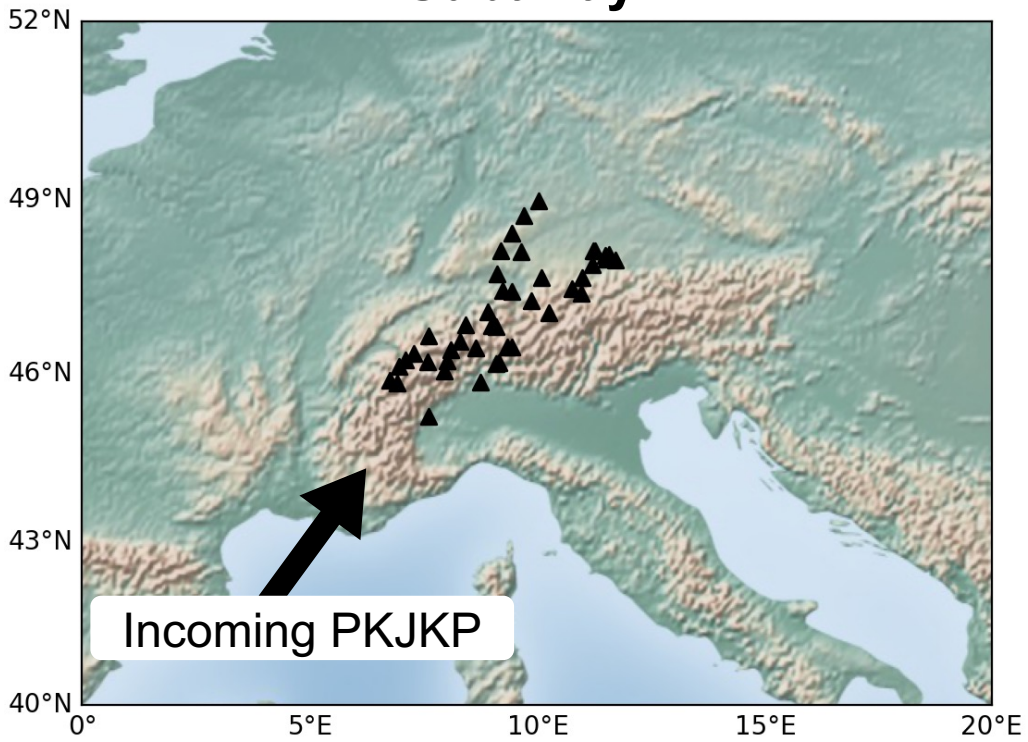
- Provide direct constraints on the inner core's shear properties
- Difficult to observe due to its small amplitude

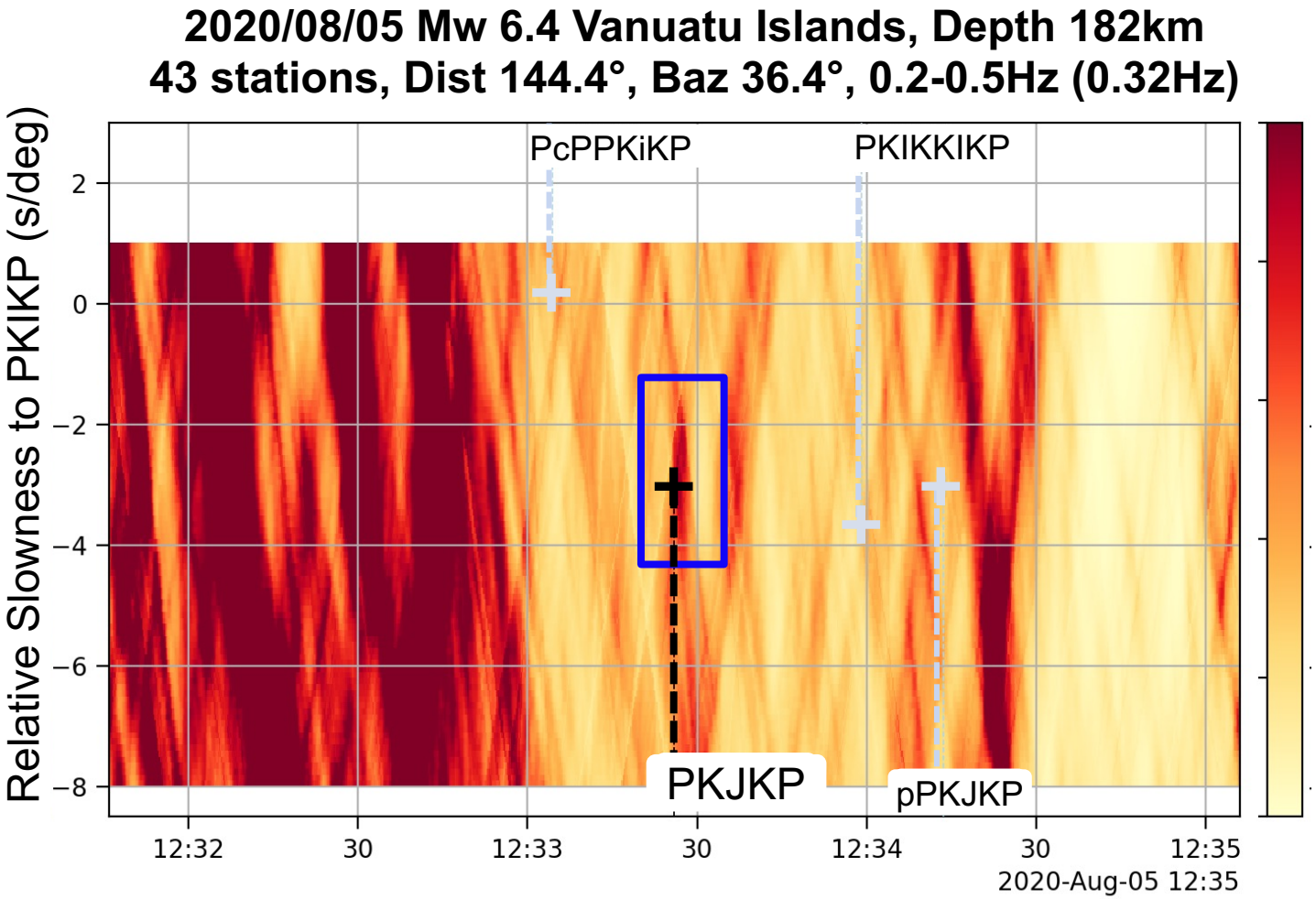
Method: Polarization Filtering + Array Analysis



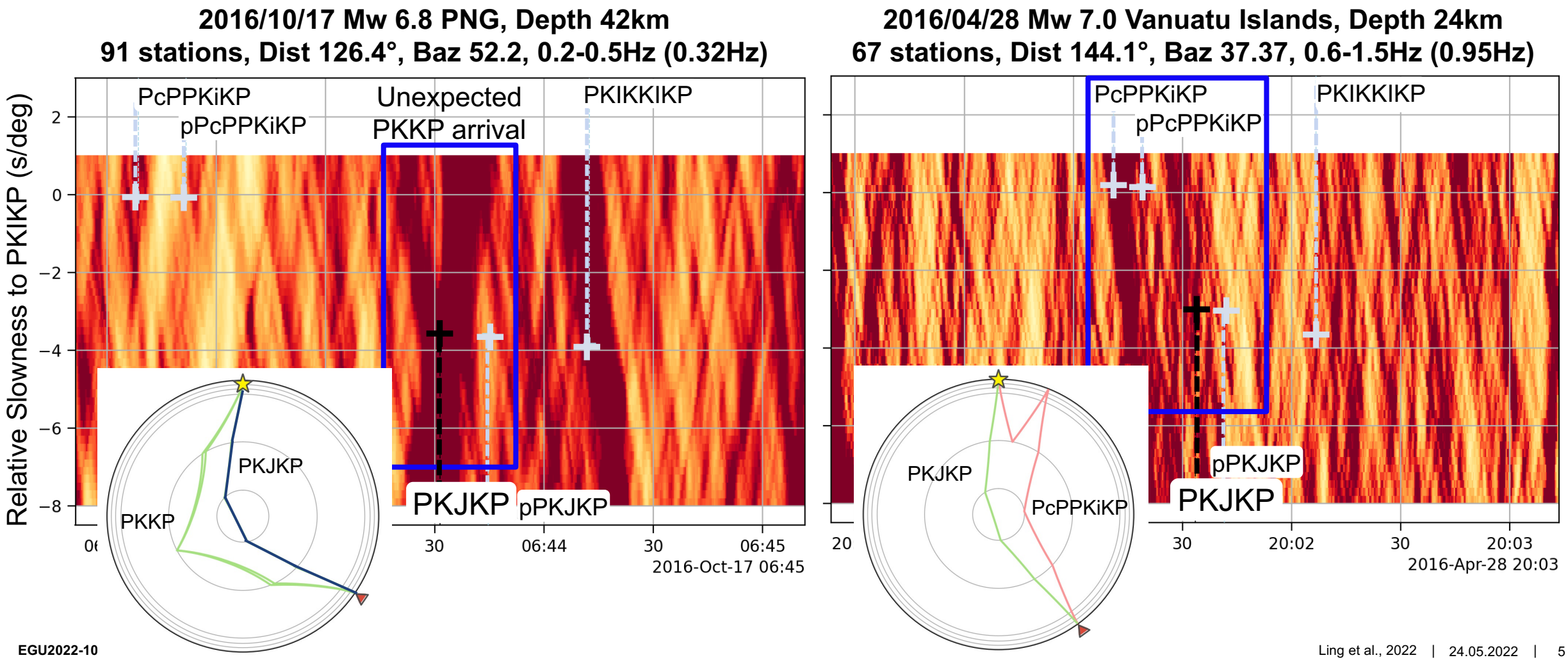
Goal: Apply this new approach on AlpArray data to search for J phases systematically and determine their observability.

Observations: Vespagrams of Polarization-filtered Data

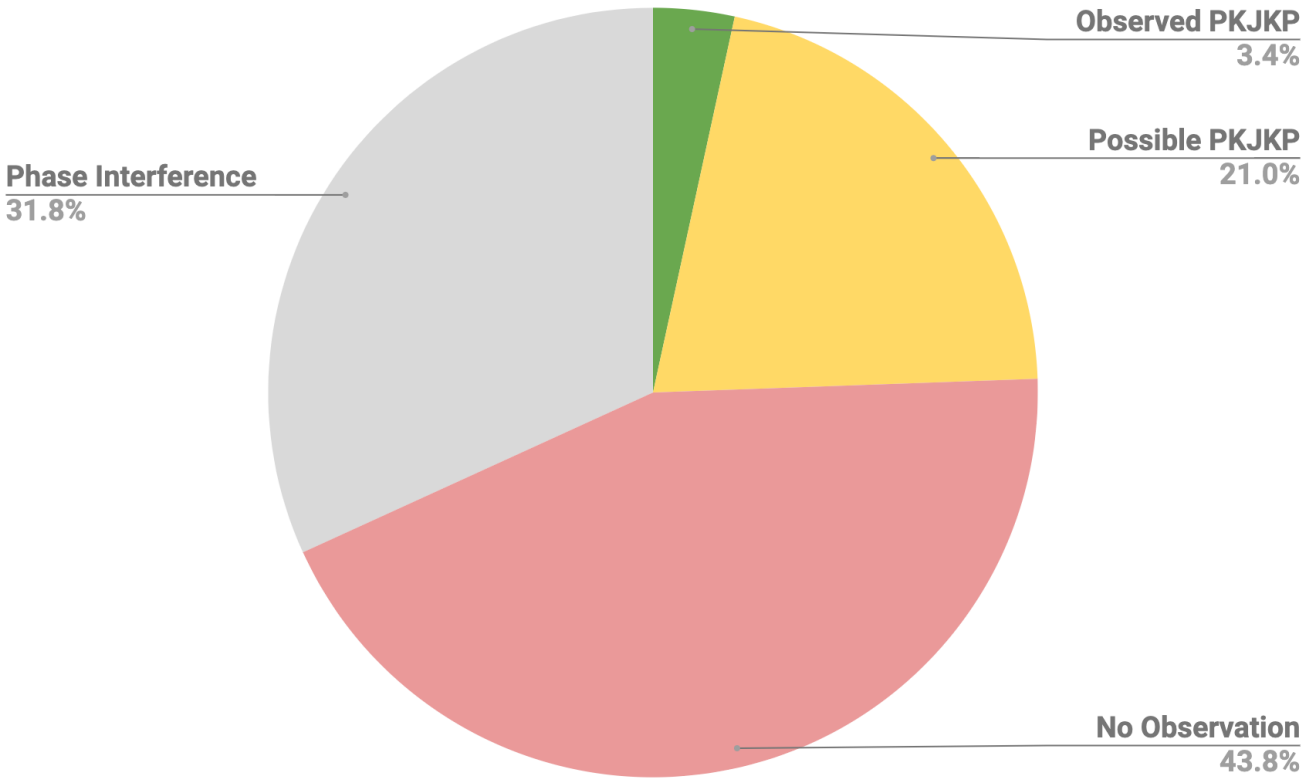




Unobservable: Interference of Other Phases



Overview of PKJKP Candidates



Event selection:

- Year: 1999-2021
- Epicentral distance: 120-150° from the center of the Alps
- Mag: 6 ≤ M ≤ 8
- Depth: ≥ 20km
- Total: 401

After eliminating events with bad SNR and aftershocks:

- Usable: 176 (~44%)

Summary and Outlook

- PKJKP observed in <4% of events. No clear correlation of detections with depth, magnitude or location.
- The observed signals are generally found above 0.2 Hz (requires significantly higher inner core Q_β than seen from normal modes).
- Low number of observations = random artifacts?
- Next: test for artifacts using weakly perturbed 1D synthetics.

Thank you for your attention!