Back-projection analysis of the 2020 Cuba earthquake

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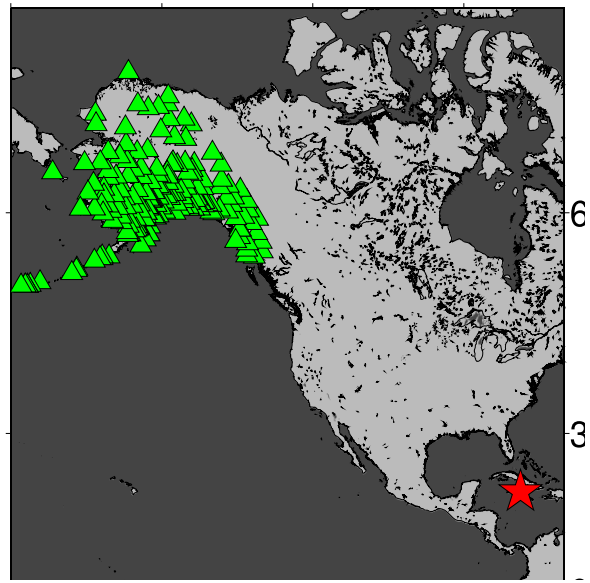
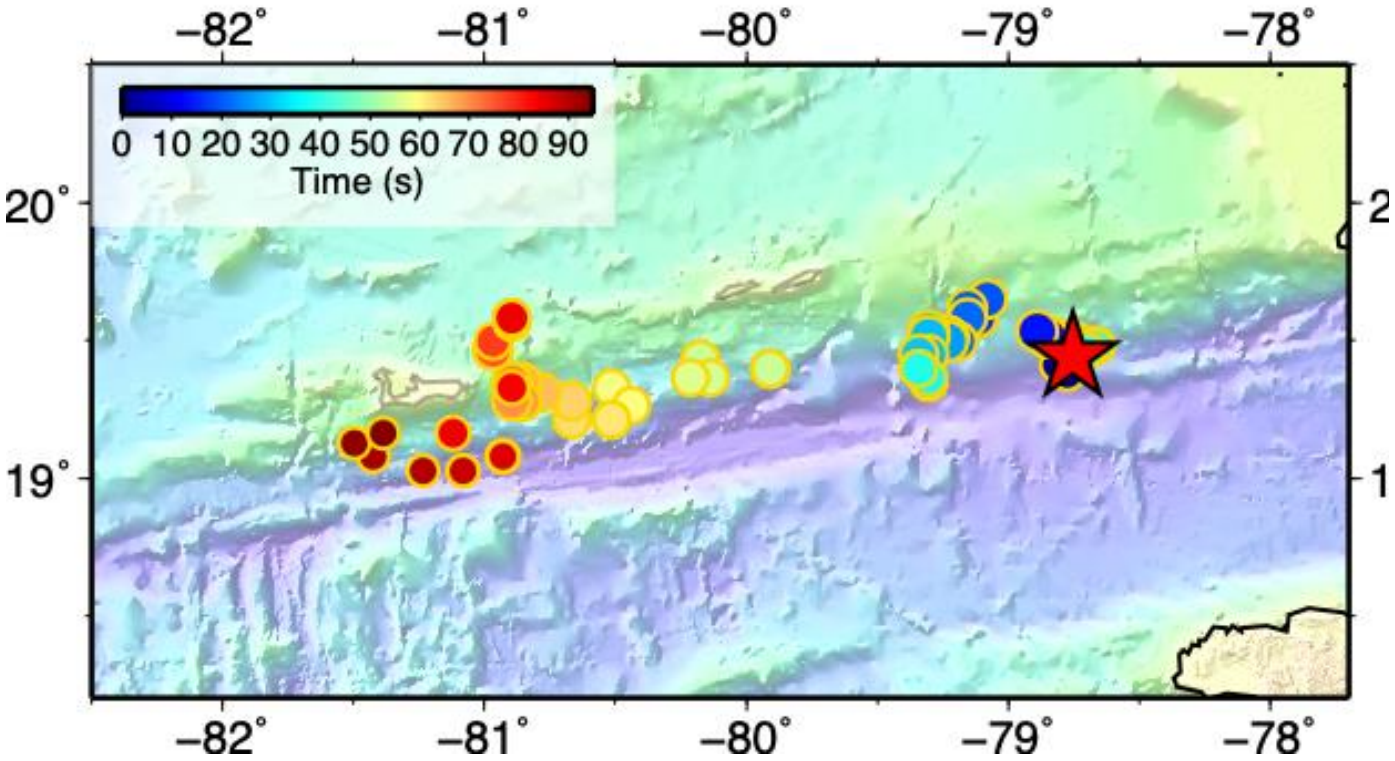
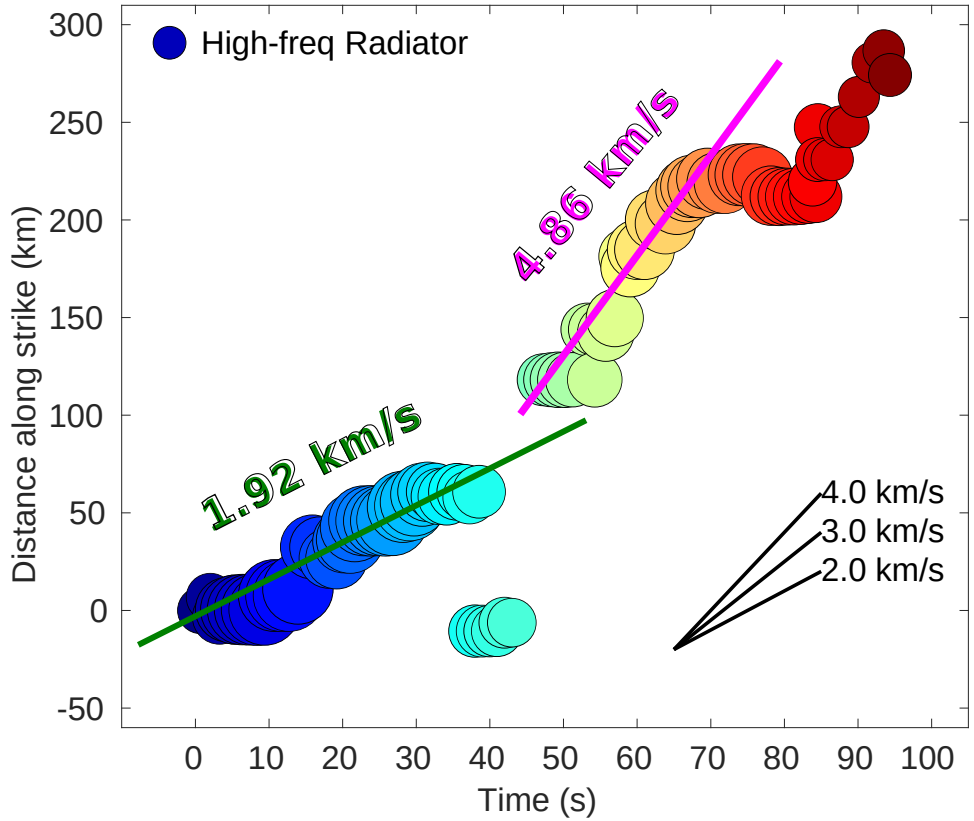
(modified by J. P. Ampuero, Geoazur)

0.5-2 Hz back-projection using the Alaska array and the **beamforming method**

→ Rupture starts subshear, transitions to supershear

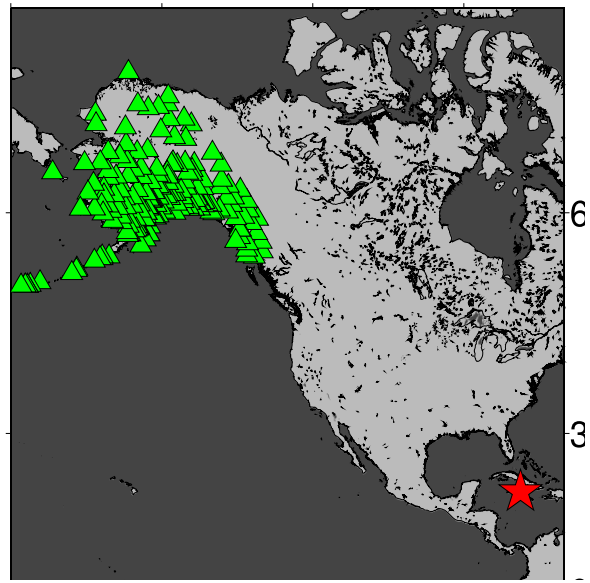


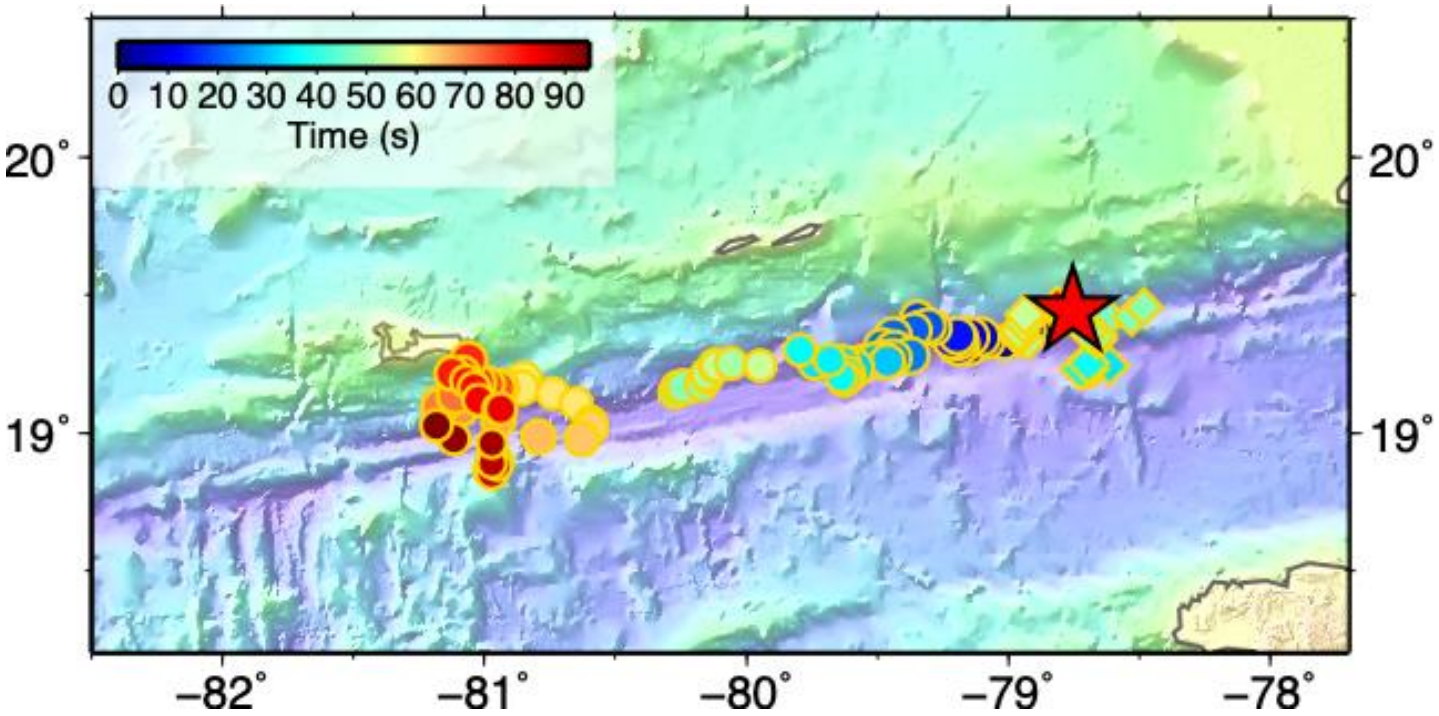


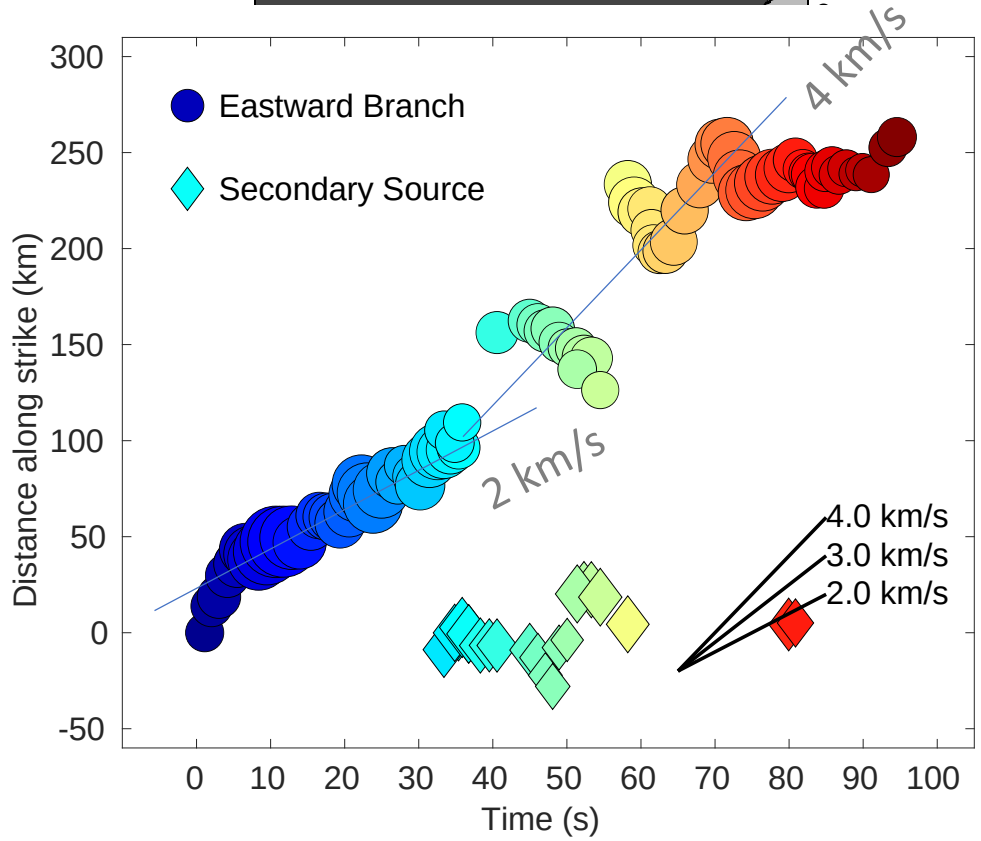


0.5-2 Hz back-projection using the Alaska array and the **MUSIC method**

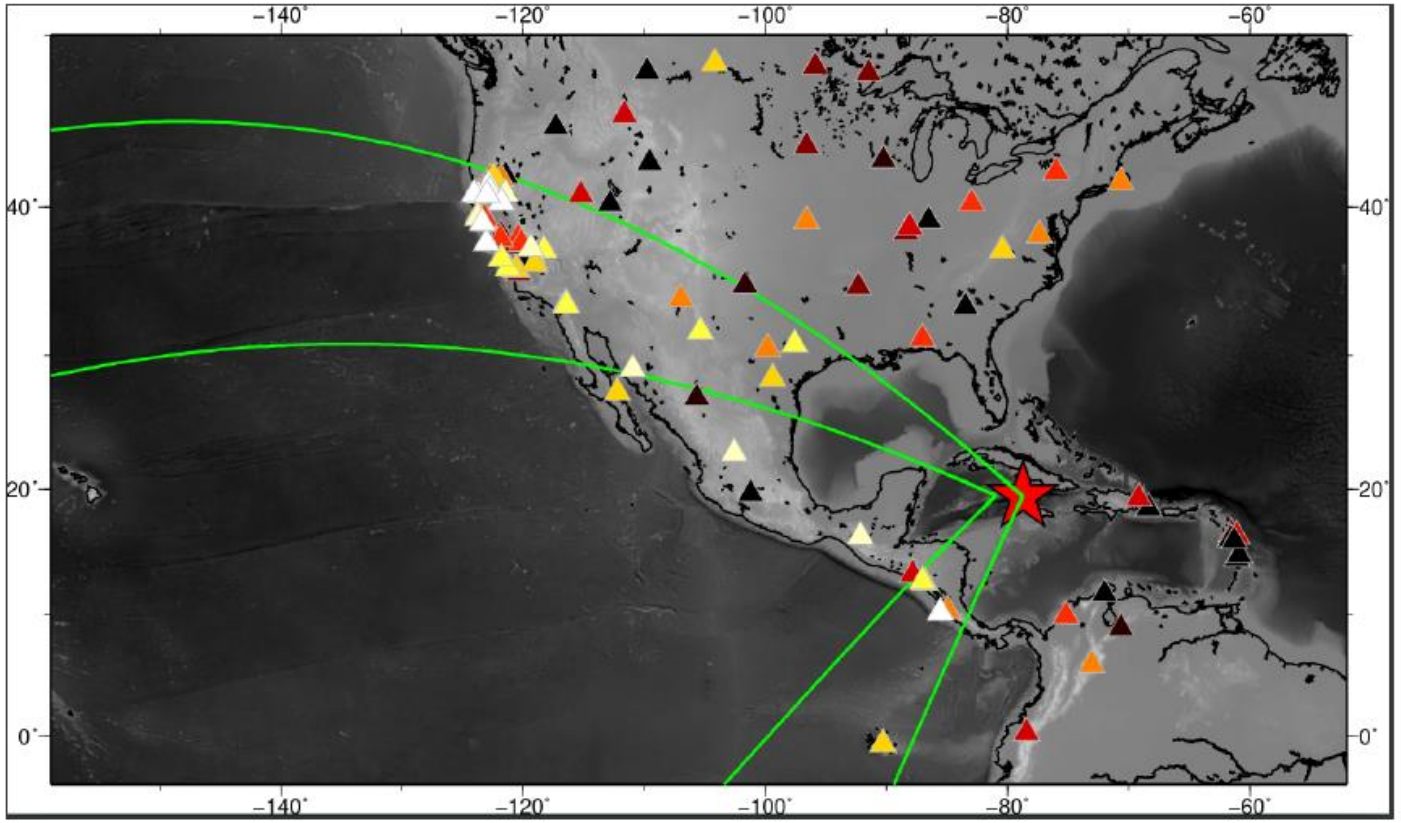
→ Rupture starts subshear, transitions to supershear







Search for independent evidence of supershear rupture using the surface-wave coherence method of Vallée & Dunham (2012)



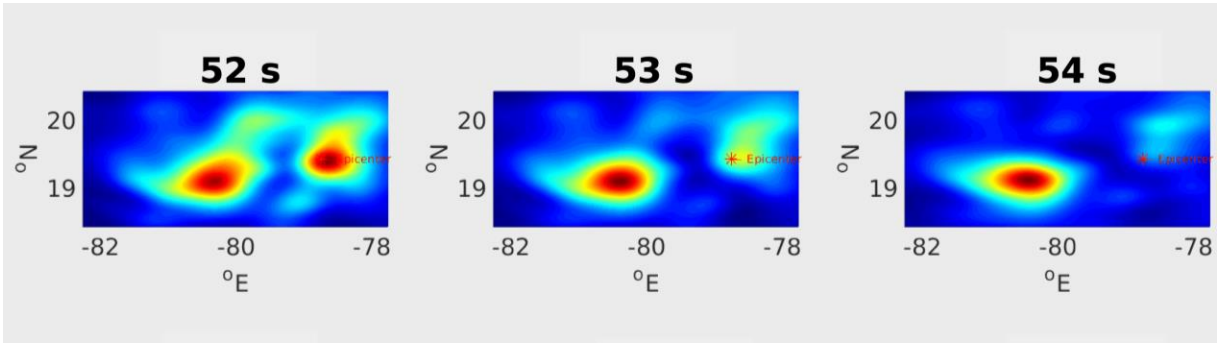
The upper figure shows the evidence of a far-field Rayleigh-wave Mach cone. The locations of the broadband stations are indicated by triangles. Their color indicates the correlation coefficients between 15 to 25 s Rayleigh wave displacement seismograms of the Cuba earthquake and its aftershock. White color means higher coherence.

For a supershear rupture, higher coherence is expected within the Mach cones (green)

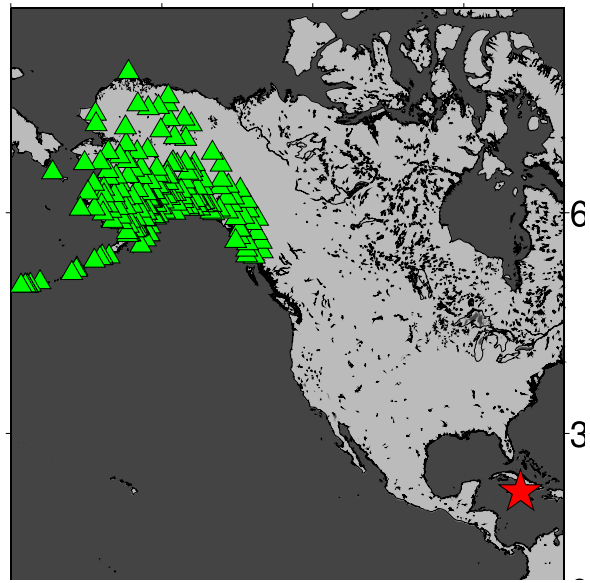
0.5-2 Hz back-projection using the Alaska array and the **MUSIC method**

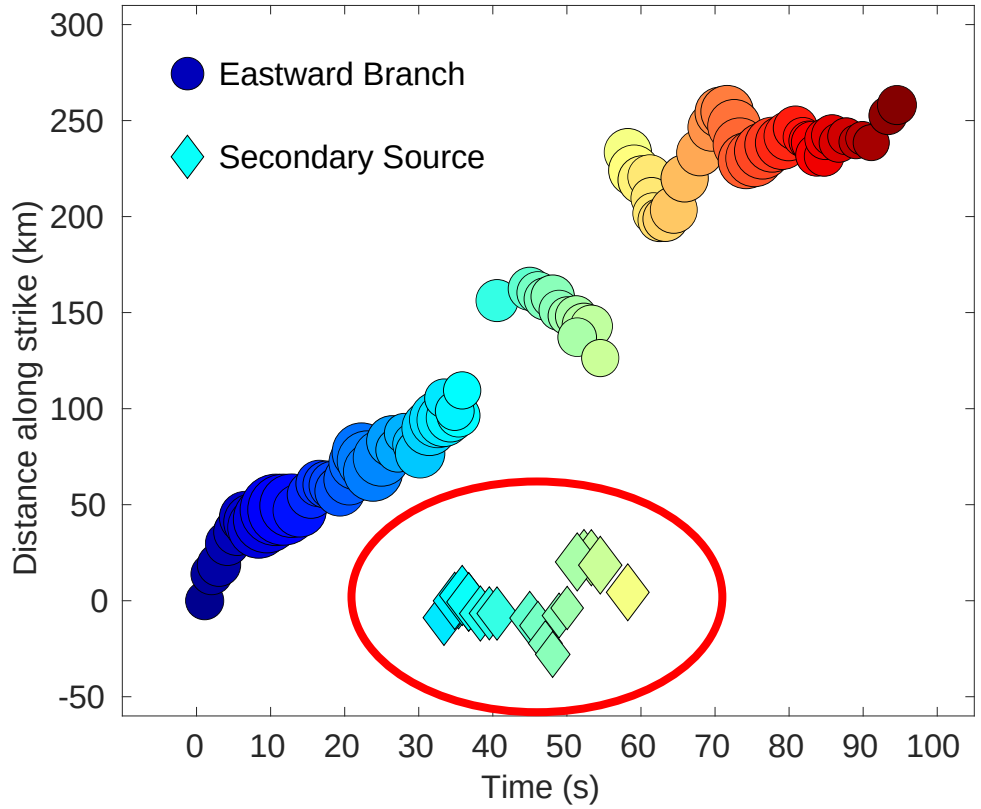
→ Rupture starts subshear, transitions to supershear

→ Delayed re-nucleation near the hypocenter

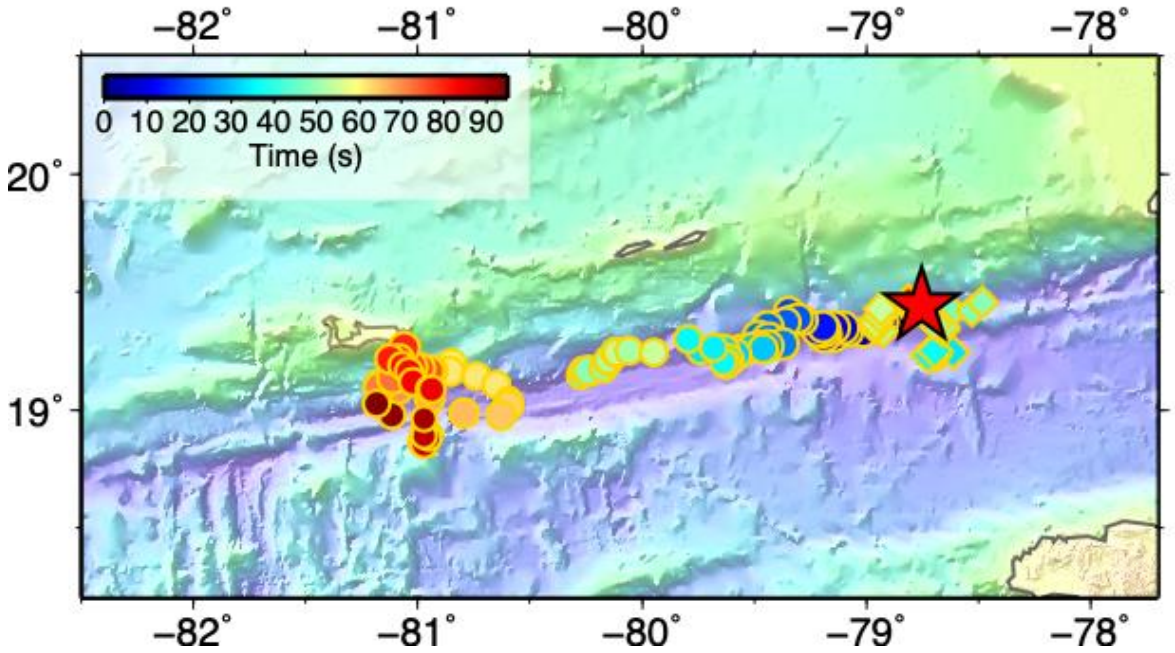


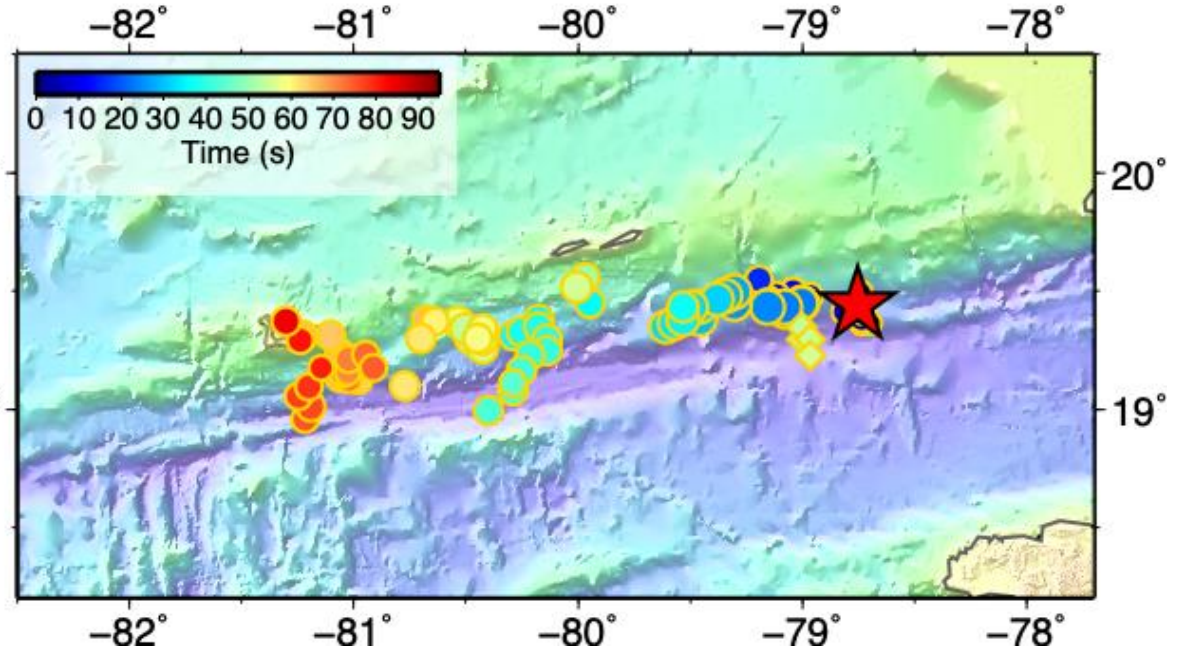
Back-projection snapshots showing the simultaneous sources



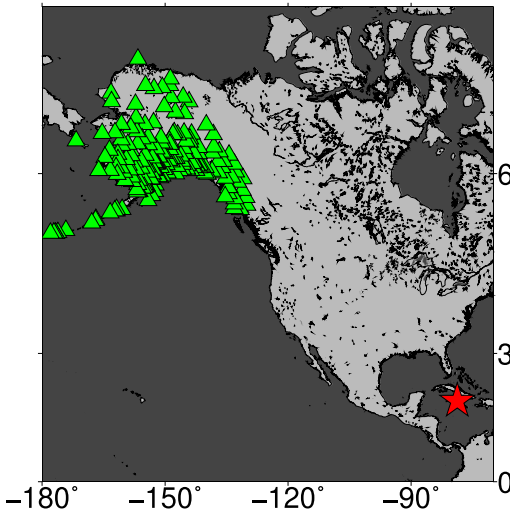


Comparison of results of Alaska and European arrays, [0.5-2 Hz], MUSIC BP

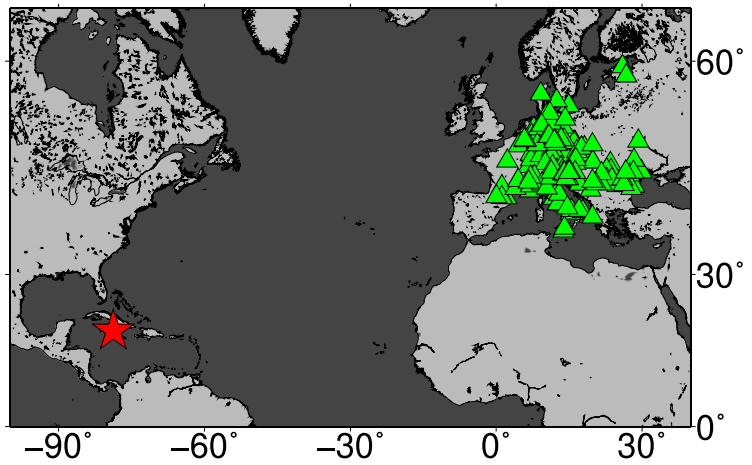




AK



EU



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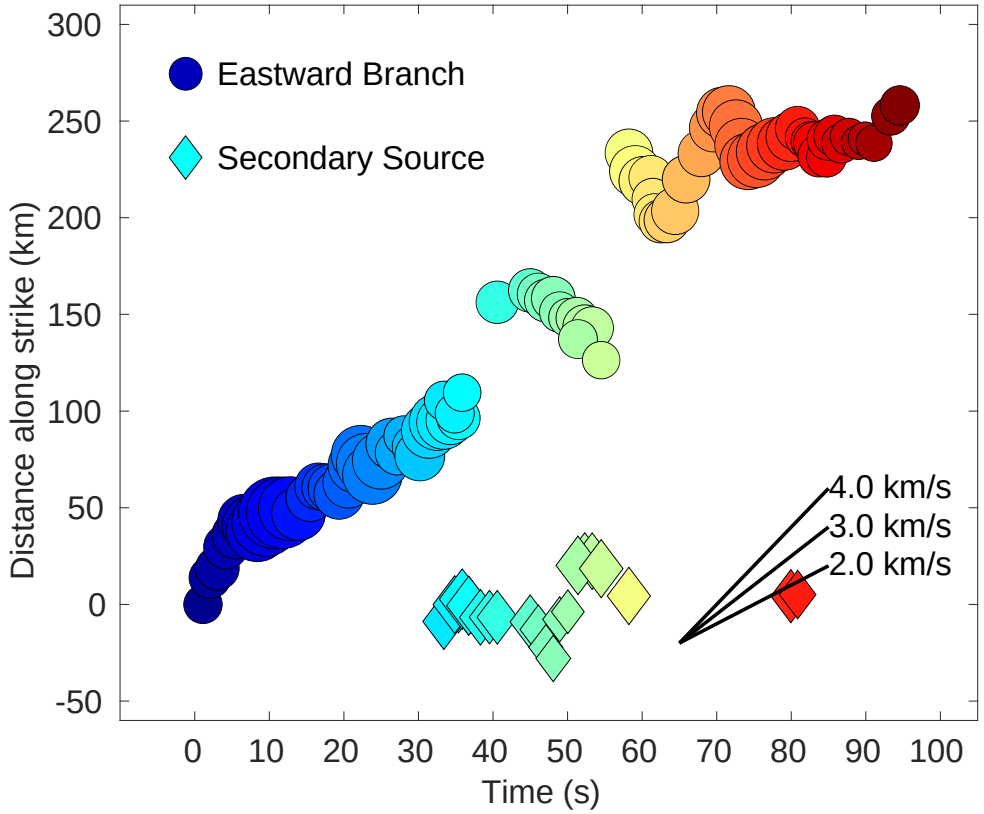

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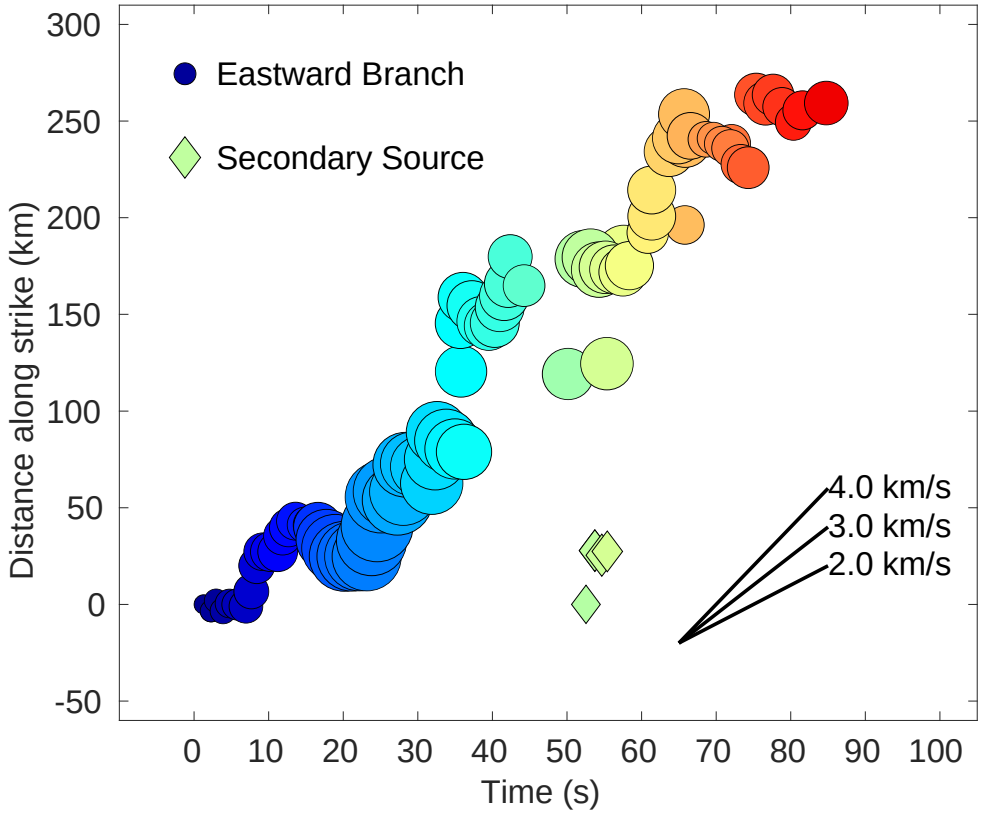

Confirms supershear

Initial speed and transition point are less clear