

THE 2026-04-13 M5.7 LAKE LAHONTAN, NV EARTHQUAKE: COSEISMIC DAMAGE, AFTERSHOCKS AND AFTERSLIP

Christie D. Rowe¹, Hannah Martin¹, Maggie Duncan², Daniel T. Trugman¹, Rich D. Koehler³, Harriet Z. Yin⁴, Katherine A. Guns⁴, Catherine E. Hanagan⁴, Ian Pierce⁵, William C. Hammond⁶, & Evan Hartshorn²

¹Nevada Seismological Laboratory, University of Nevada, Reno
²Desert Research Institute, Reno, NV
³Center for Neotectonics Studies, Nevada Bureau of Mines and Geology, University of Nevada, Reno
⁴US Geological Survey Earthquake Science Center, Golden, Colorado
⁵Pacific Gas & Electric, Oakland, California
⁶Nevada Geodetic Laboratory, Nevada Bureau of Mines and Geology, University of Nevada, Reno



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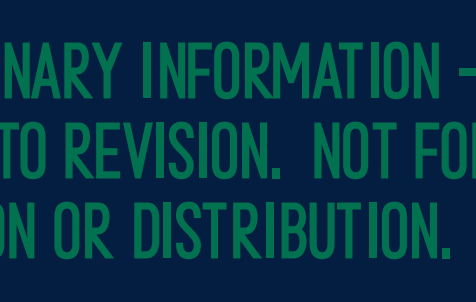
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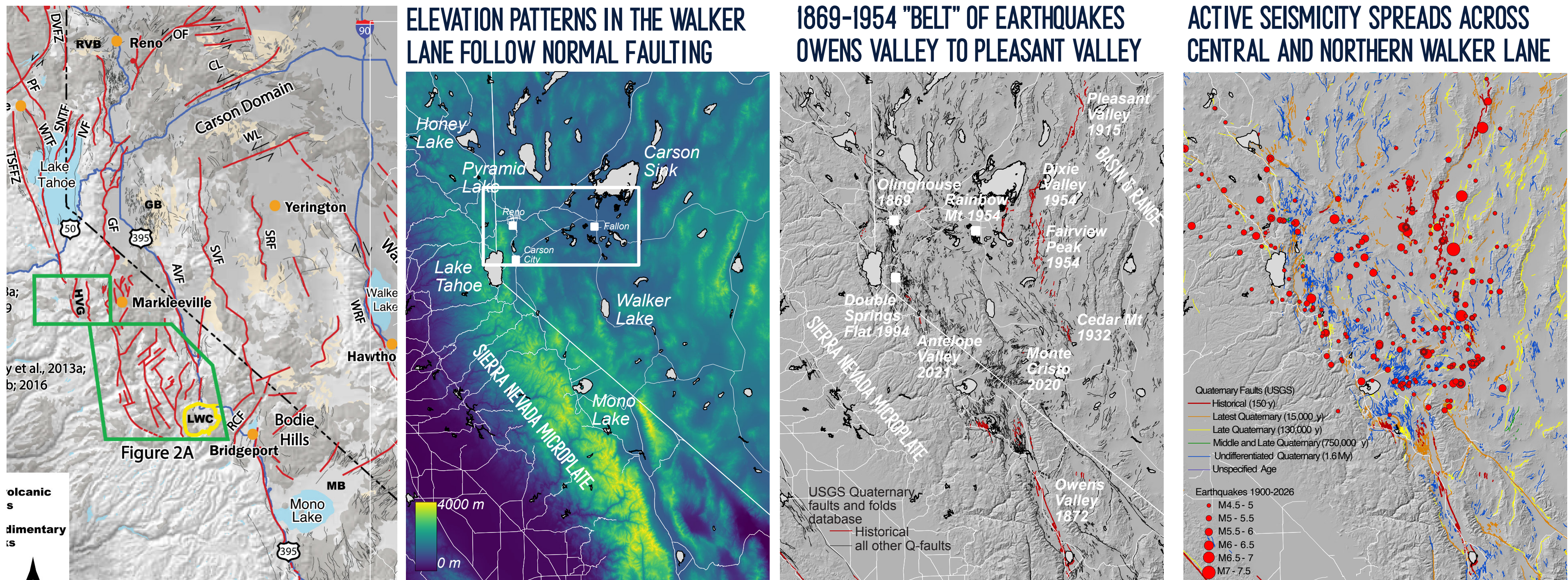
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KEY POINTS

- At 18:29 local time on 4/13/2026, Monday evening, a **M5.7** earthquake occurred about 66 km / 41 miles east of Reno, between the towns of Fallon and Silver Springs.
- The earthquake occurred on a **previously unmapped fault** between two known "lineaments" in the central Walker Lane, where ENE-WSW striking sinistral faults are significant.
- The earthquake was shallow (Moment tensor depth = 5 km) and **ruptured the surface**.
- The surface rupture caused parallel and oblique crack arrays in Pleistocene lacustrine deposits, local liquefaction and fluid escape features on active clay pan.
- Afterslip occurred on the mainshock plane and extended to the SW beyond the aftershock patch.
- Over four months, Lake Lahontan earthquake has **3x the aftershock productivity** of the 12/8/2024 M5.7 Parker Butte earthquake, 15 km south with similar sense.

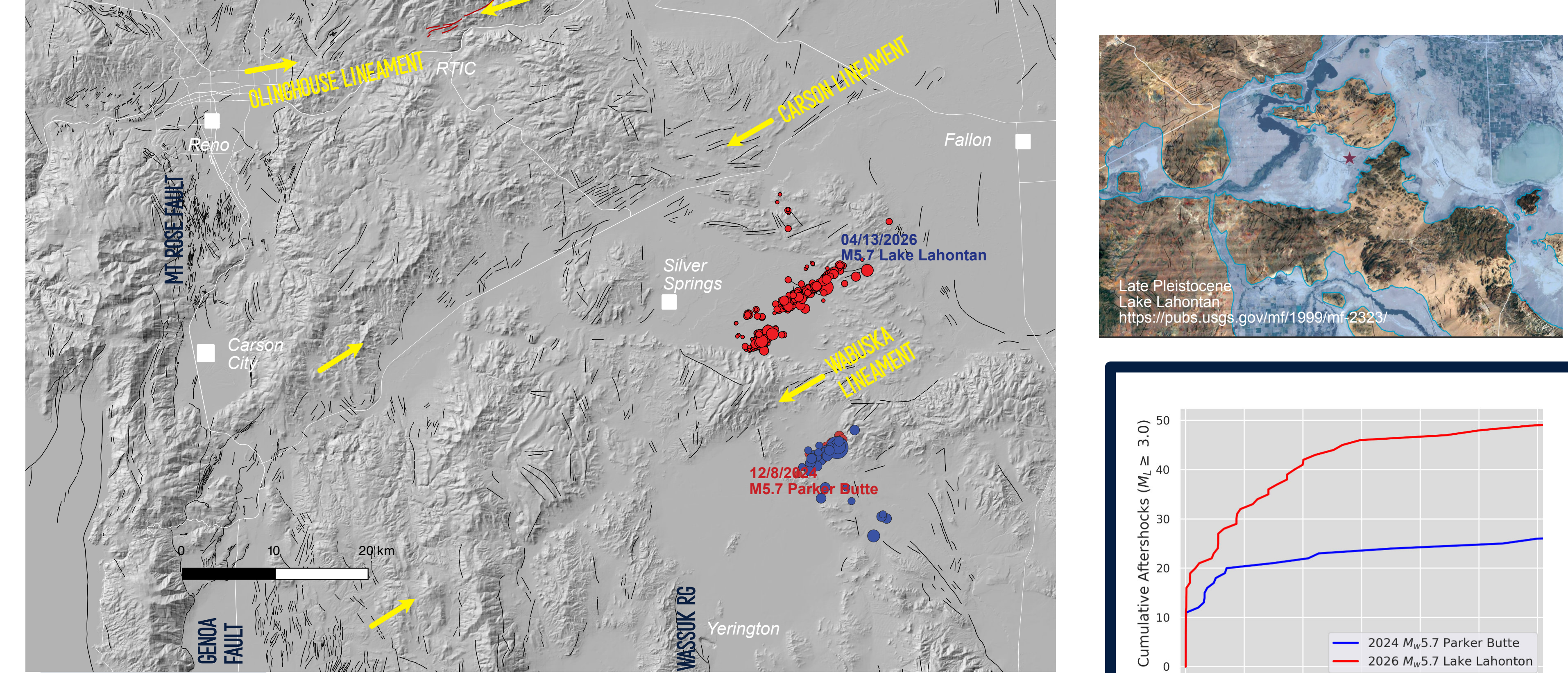
TECTONICS



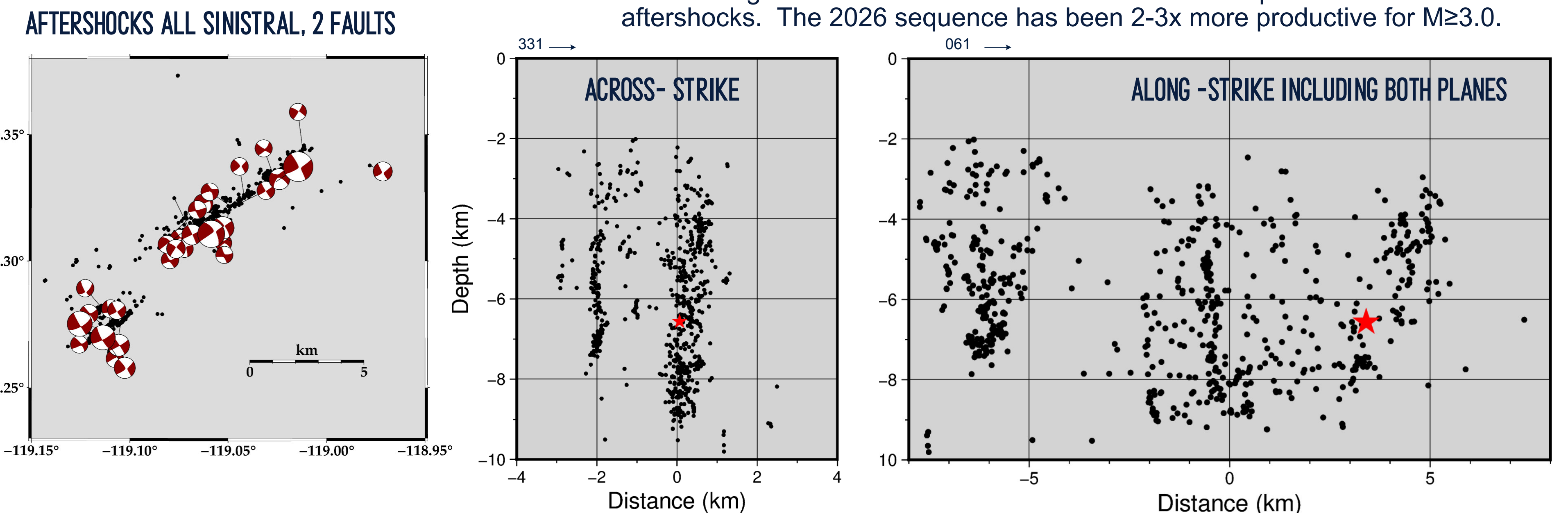
The Walker Lane is a belt of strike-slip and normal faults 100-150 km wide on the eastern edge of the Sierra Nevada microplate. Collectively, these accommodate about 25% of Pacific-North America plate motion and extension between the Sierra Nevada microplate and the Basin & Range. Moderate earthquakes occur frequently, and orthogonal earthquake pairs are common, but paleoseismic data is incomplete. Linkages and local triggering affect earthquake patterns.

LOCAL FAULTS AND RECENT EVENTS

Three left-lateral "lineaments" define the Central Walker Lane between Yerington and Reno, and the region is bounded on the west by normal faults with some dextral oblique component of the Sierra range front (Mt Rose Fault and Genoa Fault). The 2024 and 2026 earthquake sequences occurred on parallel ~060°/90 sinistral faults lacking geomorphic expression, between the known range-front structures. The high stand map of Pleistocene Lake Lahontan (right) helps explain why the faults were not known.



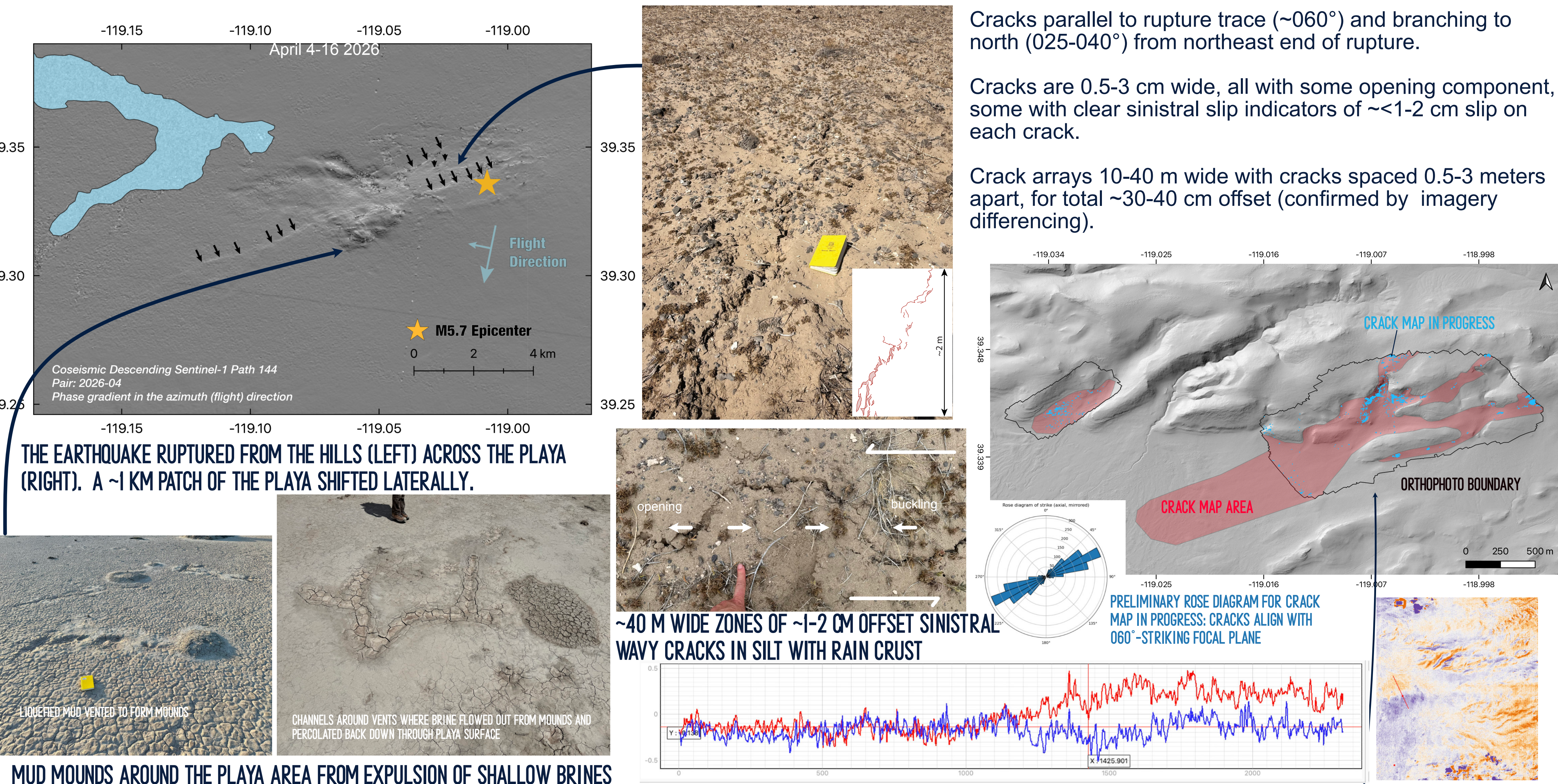
AFTERSHOCKS



Relocated aftershocks (up to 4 Aug, 2026) define the mainshock plane, with most large aftershocks within 3 weeks of the mainshock, mostly around 3-9 km depth. Around day 6 (April 19 2026), a second parallel fault plane became active, with aftershocks between 4-7 km. All aftershocks large enough to calculate a moment tensor (~M>3) were sinistral. Both active fault strands are vertical.

CO-SEISMIC DEFORMATION FROM INSAR IS CORRELATED TO FIELD OBSERVATIONS

Insar interferograms show different patterns of coseismic (top) and post-seismic (below) surface deformation. The coseismic time interval showed multi-stranded surface rupture, with a zone of broad translation of the playa surface. Postseismic slip continued on the mainshock fault for weeks, extending the fault along strike.



MUD MOUNDS AROUND THE PLAYA AREA FROM EXPULSION OF SHALLOW BRINES

GEOLOGY CONTROLS RUPTURE EXPRESSION

Insar- derived displacement features cross active dune and clay pan, old lake beds, regolith between rocky volcanic outcrops.

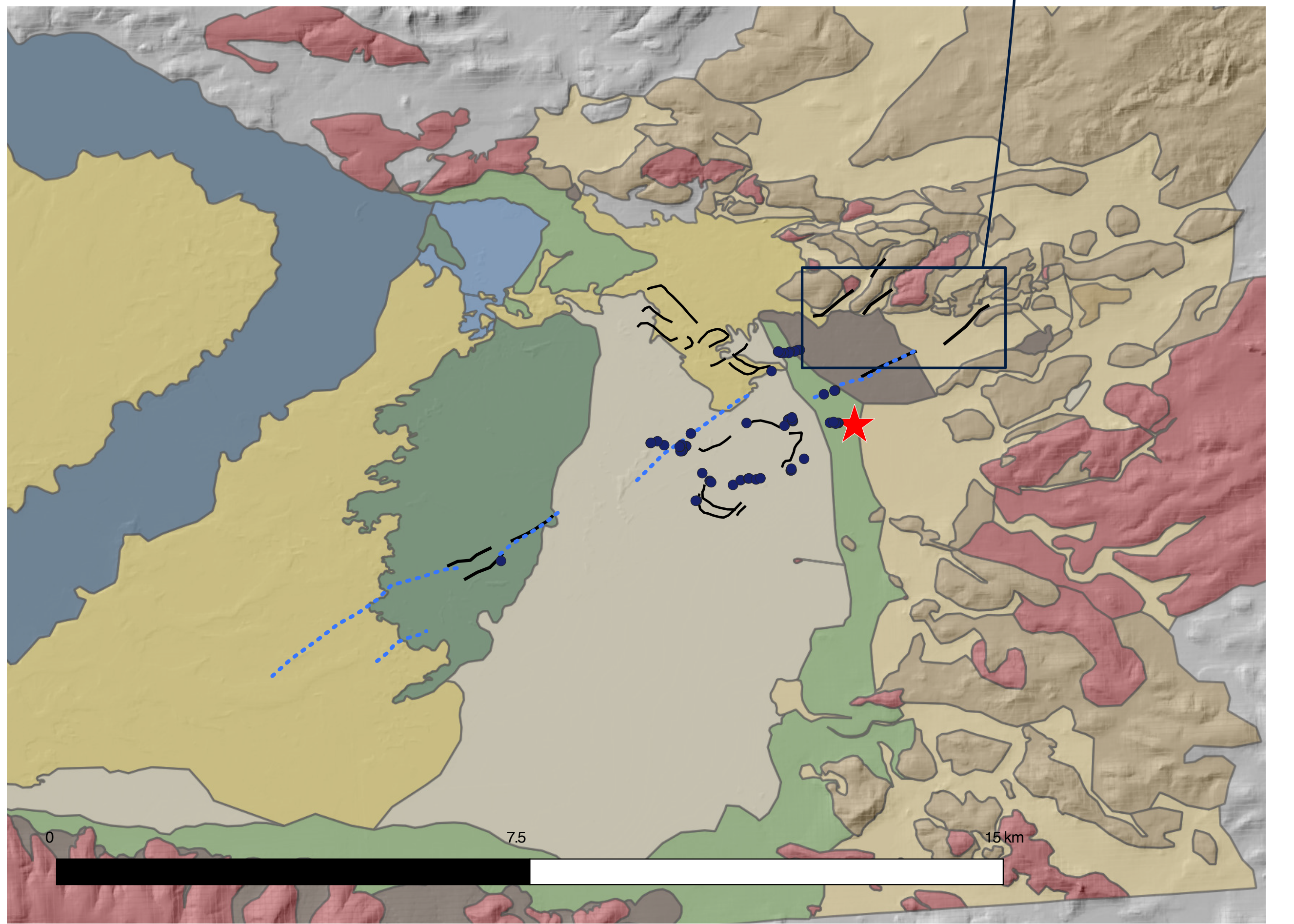
Fine silt with rain crust is ideal for forming and preserving rupture cracks (opening and sinistral modes). Rain crust silts occur on old lake sediments and in active alluvium in the hills.

Clay pans don't show cracks, but they do preserve evidence of shallow groundwater / briny mud expulsion - interpreted as liquefaction due to shaking

Dunes and vegetated areas with aeolian sediment must have jiggled and settled during shaking but preserve no surface evidence.

No surface deformation observed on afterslip-only traces (see below)

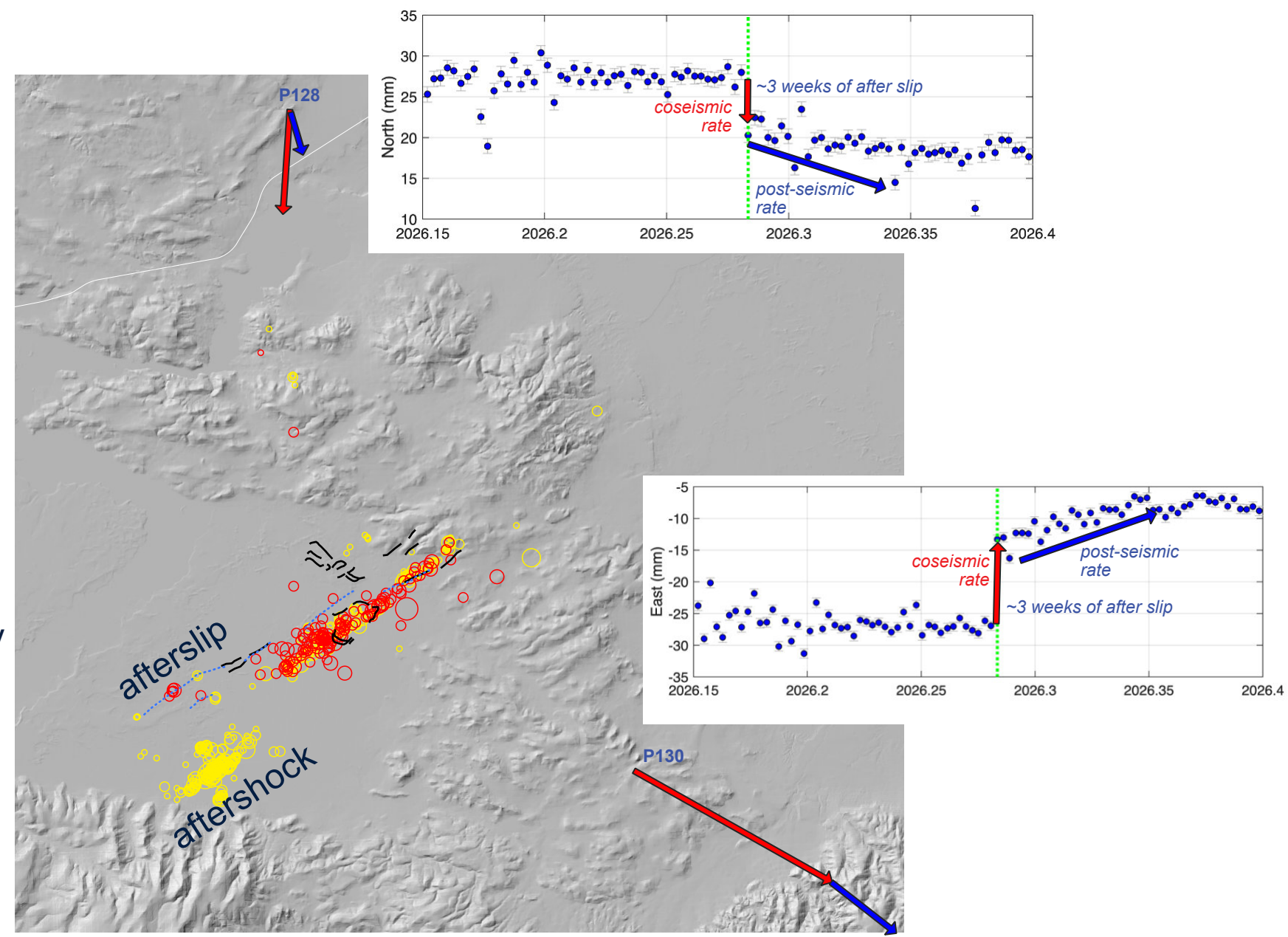
- Carson River, active channel
- Carson River, abandoned oxbow
- Active clay pan
- Active sand dunes
- Lake floor silts with dunes
- Shoreline deposits, highstand or younger
- Pre-Lake Lahontan alluvial fans
- Tertiary volcanic rocks
- Active alluvium and mobile volcanic regolith
- Coseismic Insar lineaments
- Postseismic Insar lineaments
- Epicenter M5.7
- Field observation of liquefaction features



AFTERSLIP

SLIP CONTINUED WEEKS AFTER THE EARTHQUAKE, FROM THE EPICENTER SOUTHWESTWARD AND CONTINUED BEYOND THE ORIGINAL RUPTURE TRACE, BUT AFTERSHOCKS HAPPENED ON A DIFFERENT FAULT PLANE

- Earthquakes April 13-20
- Earthquakes April 21-June 5
- Coseismic displacement at Nevada Geodetic Laboratory stations nearby.
- Postseismic displacement.
- Coseismic insar deformation features
- Postseismic insar deformation features



ONGOING WORK

Crack mapping is continuing on high resolution orthophotos -- surface cracks are mostly gone (filled with windblown sediment).

This implies no permanent geologic record of a surface-rupturing M5.7 would be expected after a few months

Mud mounds on the playa - some fresh, but some are old. Have there been previous seismic liquefaction events on this playa? (e.g 1869 letters from Eliza Buckland living nearby recorded the earthquake "rocked her bed like a cradle"....)

No surface features record post-seismic creep, which extended beyond aftershock area... Invisible contribution to strain across the Central Walker Lane. How does this affect earthquake hazard?

THANK YOU!! PG&E, SCEC, AND NBMG CARTOGRAPHY DEPARTMENT! MADUGO AND PIERCE FAMILIES! PEOPLE OF SILVER SPRINGS, FALLON, FALLAN NAVAL AIR STATION, AND FORT CHURCHILL STATE PARK!