

Geologic Effects of the March 2020 M 5.7 Magna, Utah Earthquake

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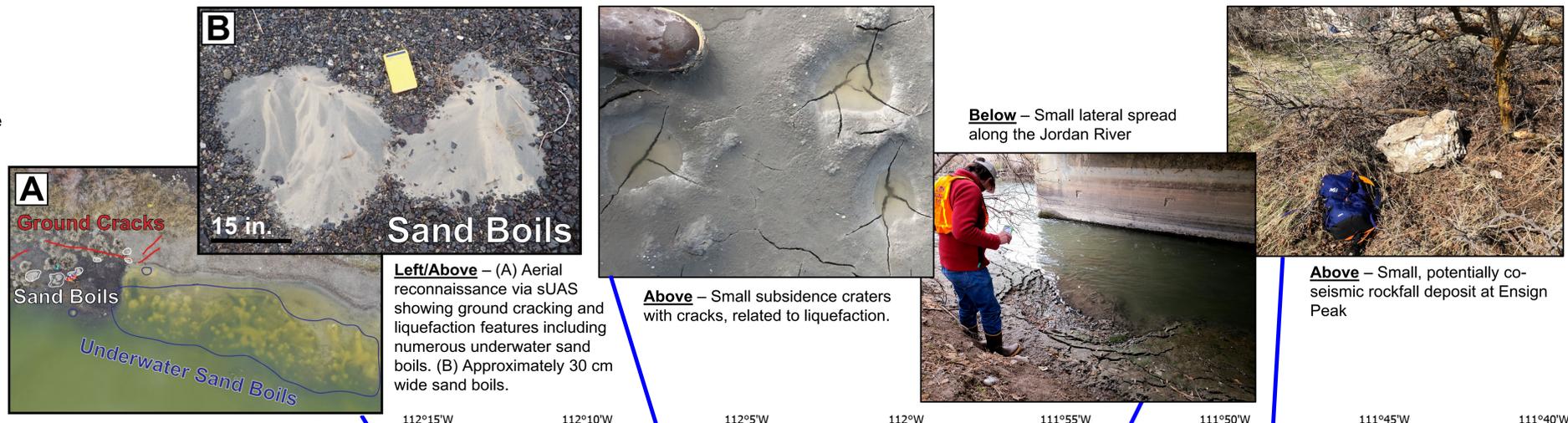
Geologic Hazards Program, Utah Geological Survey

Abstract

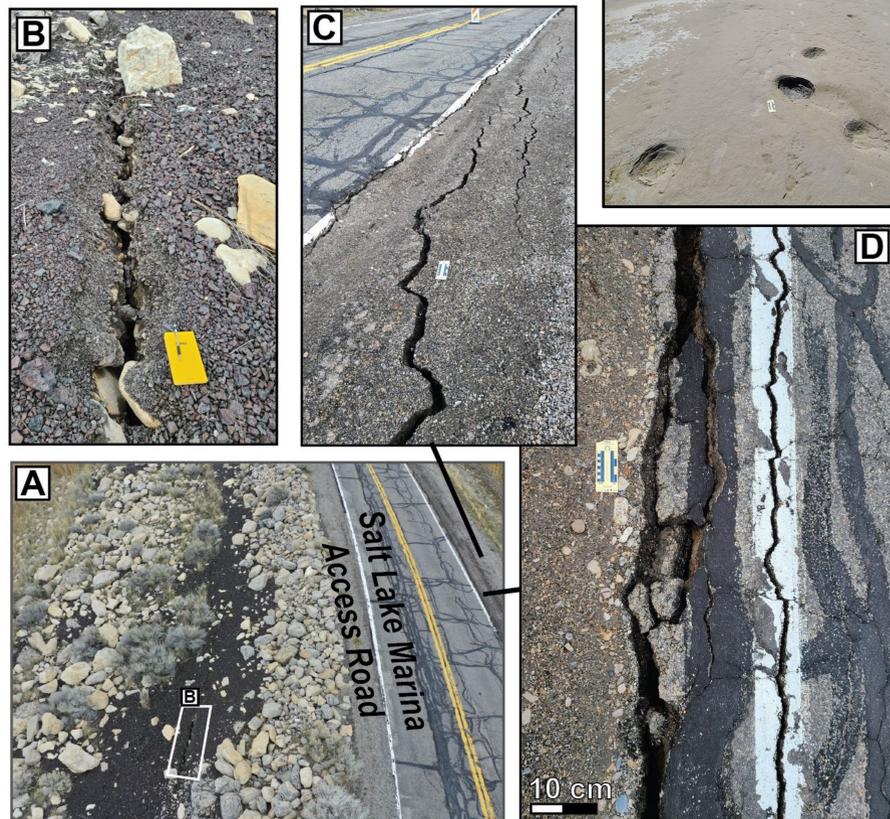
The March 18, 2020 M 5.7 Magna, Utah, earthquake was the most widely felt earthquake in an Intermountain West urban area in recent history. This normal-faulting earthquake occurred in the northwest part of Salt Lake Valley, home to over 1.2 million people or about one-third of Utah's population. Immediately following the earthquake, the Utah Geological Survey (UGS) organized reconnaissance teams to collect perishable field data on the geologic effects from the earthquake and created an online digital clearinghouse (see QR code below). Locations investigated included the general epicenter area, the Jordan River, the southeastern shore of Great Salt Lake, and the foothills of the Wasatch Range and Oquirrh Mountains. The observed geologic effects from the Magna earthquake include liquefaction-induced sand boils and lateral spreading, tension cracks, localized subsidence, syneresis cracking, and some possible small rockfalls. The most intense liquefaction was close to the shore of Great Salt Lake and near the epicenter. The clearinghouse was established to collect, archive, preserve, and distribute valuable data on the earthquake. We present the results of this reconnaissance work and add to the observations accompanying seismicological data for modern earthquakes in the western United States.



[Scan or Click for UGS's Digital Clearinghouse for the March 2020 M5.7 Magna EQ](#)

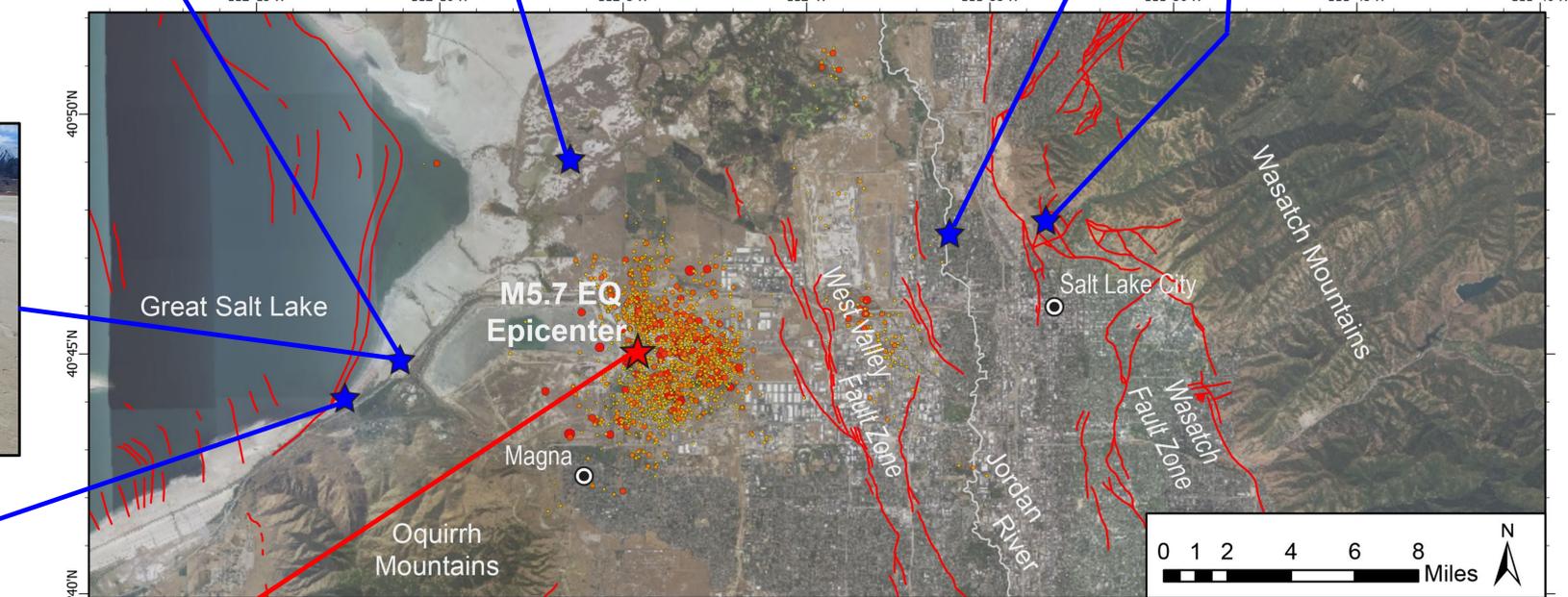


Below – Potential ground shaking related collapse features on salt flats

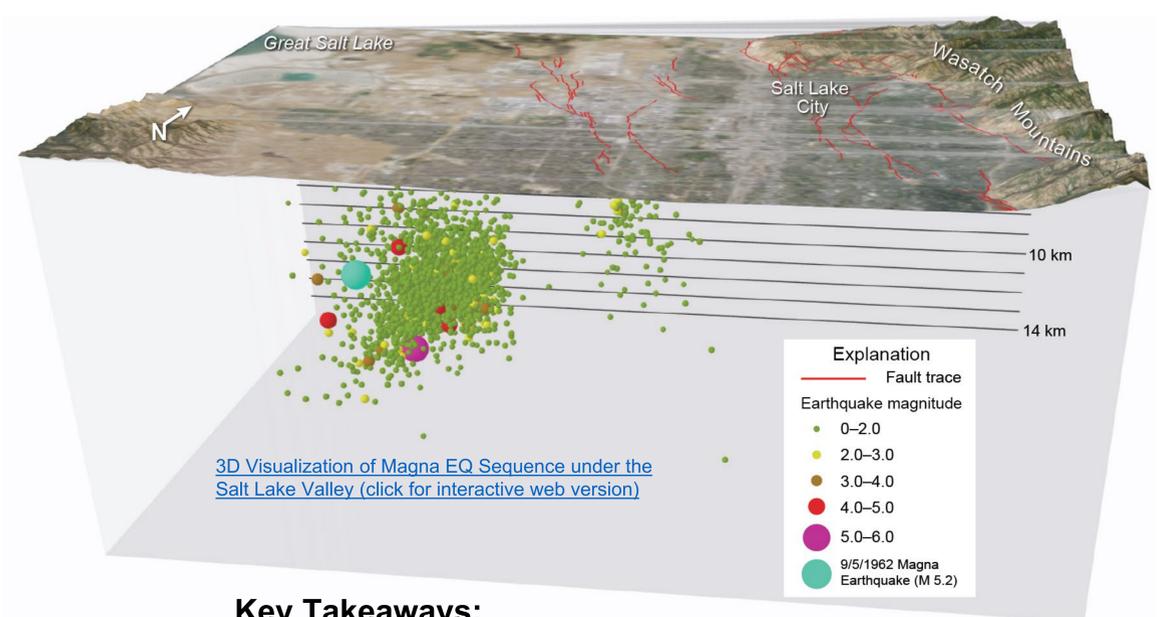


Above – Great Salt Lake Marina and State Park access road tension cracking: (A) sUAS photo of the road with an ~20ft crack at the base of the roadbed material. (B) Close up of the base roadbed crack showing some separation and measuring up to 1 foot deep. (C) Cracks at the asphalt and fill shoulder showing extensive lateral continuity along the road, as well as separation.

Right – Ground shaking related cracking and features observed in the epicentral area: (A) Linear ground cracks, potentially related to ground shaking and rapid groundwater withdrawal. (B) Potential syneresis cracking, showing a radial pattern. (C) Settled pebbles from ground shaking in saturated soils.



March 18, 2020 M5.7 Magna Earthquake – Geologic Effects Location Map



Key Takeaways:

- Largest EQ on the Wasatch front in modern history, and the largest EQ in UT since the 1992 M5.8 St. George, UT EQ.
- Minimal geologic effects due to moderate magnitude
- No deaths, and moderate infrastructure damage
- “Wakeup Call” for the region’s population to what the effects of a large magnitude EQ (>M6.5) would have on the Wasatch Front.