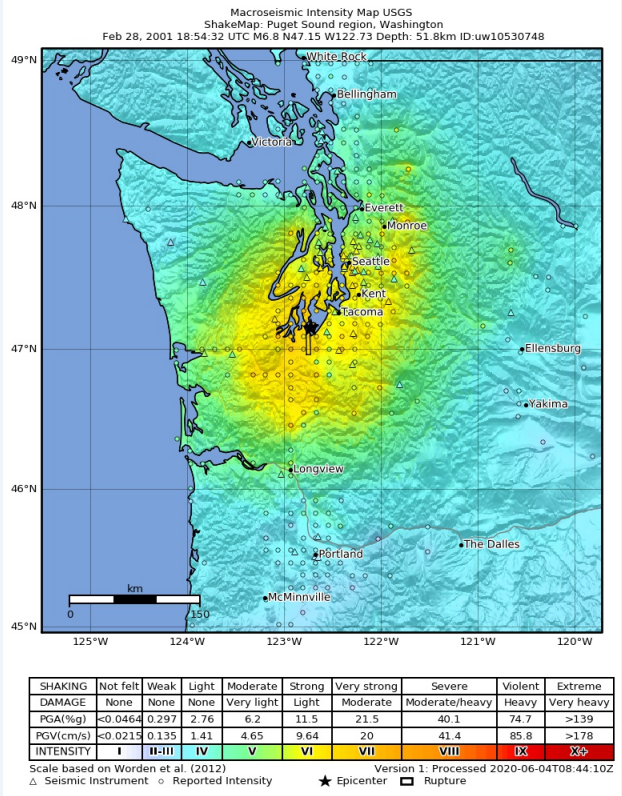
Similar Magnitude, Different Consequences

Six U.S. earthquake case studies: source, shaking, exposure and disruption



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Historical evidence. Better questions. Useful records.

An earthquake has one source, but many consequences. These six cases from 2001 to 2020 pair preferred USGS event records with historical impact summaries and ShakeMaps. They show how a field journal becomes more useful when magnitude, depth, ground failure and infrastructure disruption remain distinct.

What the records reveal

SCOPE AND METHOD

This is an illustrative selection from the United States and Puerto Rico, not a ranking by loss, magnitude or casualties. Instrumental values and UTC times come from the USGS ComCat snapshot retrieved November 11, 2026. Magnitude types are retained exactly as supplied; md and mw are not silently homogenized. Maps are archived USGS ShakeMap products combining measurements, reported intensities and modeling, and may retain earlier event parameters. Impacts are selected reported historical effects, not PAGER forecasts. No comparable economic-loss ranking is claimed. Coordinates mark epicenters, not rupture boundaries or damage centroids.

A COMPARISON WORTH MAKING

Anchorage and Ridgecrest both have preferred magnitude 7.1, but their catalog depths are 46.7 km and 8 km. That is a useful reason to investigate their different shaking and disruption patterns, not proof that depth alone explains them. Virginia at 5.8 also illustrates why a broad felt area is a different measure from magnitude. Compare source parameters and documented outcomes side by side.

IMAGES AND UNCERTAINTY

Photographs and satellite views are historical agency imagery. Charts are drawn from cited observations or estimates, with units and dates preserved. A picture shows a place and moment; it does not prove an entire event boundary, impact or cause. This is a historical reference, not a live warning service.

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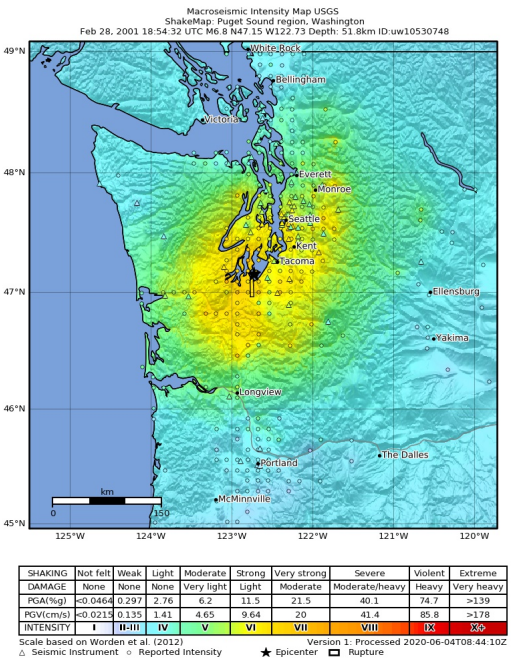
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Nisqually: Deep Shaking, Surface Damage

2001-02-28 18:54:32 UTC | Puget Sound, Washington



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Preferred magnitude

6.8 (md)

Hypocentral depth

51.798 km

Epicenter

47.1490, -122.7267

USGS event ID

uw10530748

WHAT HAPPENED

The February 2001 earthquake affected the Seattle-Tacoma-Olympia area. USGS describes roughly 400 injuries, liquefaction in Olympia and south Seattle, and landslides near Tacoma and Renton. These are reported historical impacts, not a loss estimate produced by the colored map. The preferred catalog places the hypocenter about 52 km deep.

WHAT THE DATA REVEALS

Record depth alongside magnitude, then track where ground failure and building damage actually occurred. A deep source does not eliminate the importance of local soil conditions and exposure.

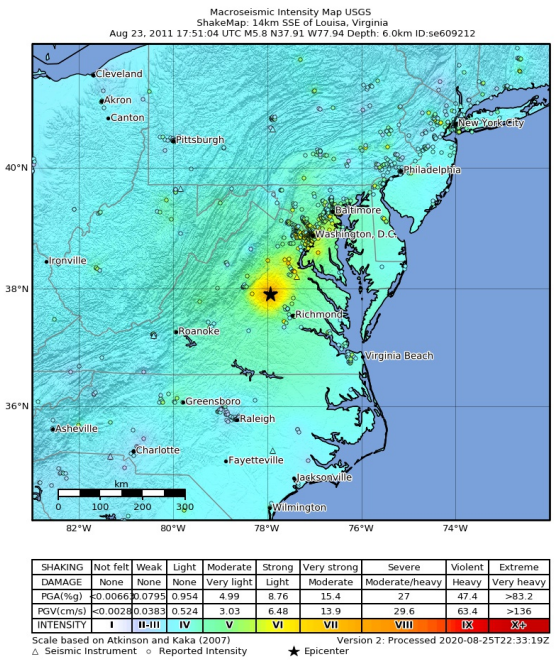
READ WITH CARE

The catalog labels its preferred 6.8 magnitude as md. Do not relabel it Mw. Historical intensity descriptions and the later ShakeMap are different products; neither is a building-by-building inspection.

Source 1 > **Source 2 >** **Visual / data >**

Virginia: A Moderate Magnitude, A Broad Felt Area

2011-08-23 17:51:04 UTC | Near Mineral, Virginia



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Preferred magnitude

5.8 (mw)

Hypocentral depth

6 km

Epicenter

37.9097, -77.9363

USGS event ID

se609212

WHAT HAPPENED

The shallow August 2011 earthquake caused substantial damage around Louisa County, with lighter damage extending toward southern Maryland and Washington, DC. USGS reports that shaking was felt across much of the eastern United States and parts of southeastern Canada. Its tectonic summary identifies reverse faulting in the Central Virginia Seismic Zone.

WHAT THE DATA REVEALS

Use the felt-area footprint as a separate field from magnitude. This case invites comparison with western events, where similar magnitudes can produce a different geographic pattern of reports.

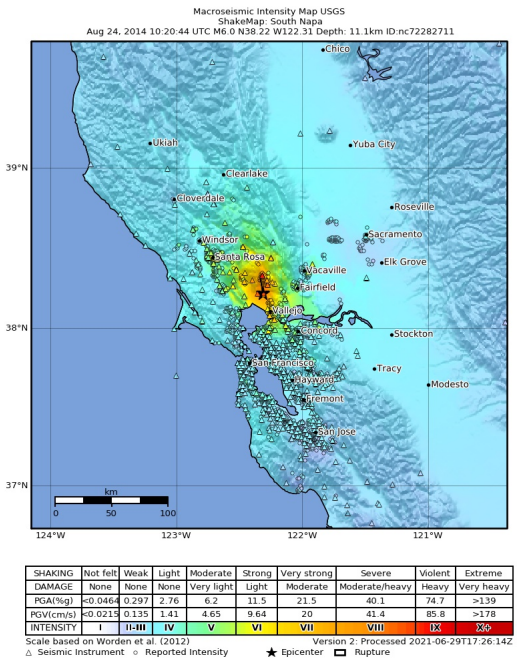
READ WITH CARE

Felt reports depend on where people are and whether they respond. The ShakeMap combines evidence and modeling; its colored boundary is not a line beyond which shaking or damage was impossible.

Source 1 > **Source 2 >** **Visual / data >**

South Napa: Damage Close to a Shallow Rupture

2014-08-24 10:20:44 UTC | Napa and Solano counties, California



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Preferred magnitude

6.02 (mw)

Hypocentral depth

11.12 km

Epicenter

38.2152, -122.3123

USGS event ID

nc72282711

WHAT HAPPENED

The August 2014 earthquake damaged buildings in Napa and Solano counties and disrupted electricity, water and gas services. The USGS historical impact summary documents surface faulting, fires and injuries. This case combines an instrumental event record with reports about infrastructure and buildings; these evidence types answer different questions.

WHAT THE DATA REVEALS

Track surface rupture, utility disruption and building observations separately. A single damage field hides whether the problem was ground displacement, shaking, fire or a service outage.

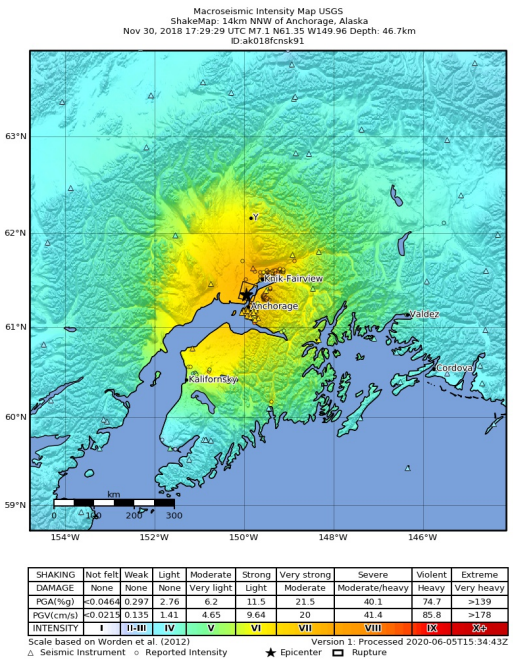
READ WITH CARE

The current preferred magnitude is 6.02 mw; older maps and common event names round it to 6.0. Damage reports are a historical summary, not a complete inventory or a current assessment of those structures.

Source 1 > **Source 2 >** **Visual / data >**

Anchorage: Infrastructure Matters

2018-11-30 17:29:29 UTC | Near Anchorage, Alaska



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Preferred magnitude

7.1 (mw)

Hypocentral depth

46.7 km

Epicenter

61.3464, -149.9552

USGS event ID

ak018fcnsk91

WHAT HAPPENED

The November 2018 earthquake occurred within the subducting Pacific plate beneath Alaska. USGS reports damaged buildings, roads and bridges, water-main breaks, gas leaks, power outages and a rockslide on the Seward Highway. The preferred catalog now gives magnitude 7.1 and a depth of 46.7 km.

WHAT THE DATA REVEALS

Compare the kinds of disruption, not just magnitude. A road closure, water interruption and damaged school each affect recovery differently and benefit from their own dated status and source.

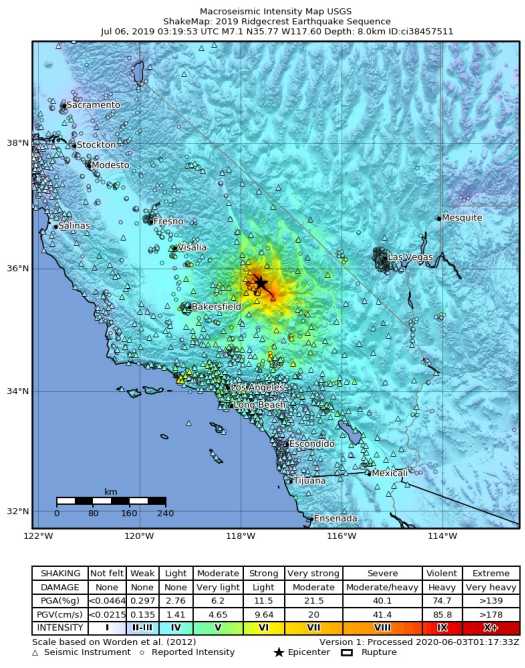
READ WITH CARE

The original tectonic summary used an earlier 7.0 magnitude and approximately 40 km depth. This record uses the preferred catalog snapshot instead. The ShakeMap does not establish the condition or safety of any individual road or building.

Source 1 > **Source 2 >** **Visual / data >**

Ridgecrest: One Event Within a Sequence

2019-07-06 03:19:53 UTC | Ridgecrest-Trona region, California



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Preferred magnitude

7.1 (mw)

Hypocentral depth

8 km

Epicenter

35.7695, -117.5993

USGS event ID

ci38457511

WHAT HAPPENED

The magnitude 7.1 earthquake occurred on July 6 UTC, which was July 5 locally in California. It followed a magnitude 6.4 event approximately 34 hours earlier. USGS describes shallow strike-slip faulting and reports damaged homes, fires from broken gas lines, utility interruptions and additional road cracks and landslides.

WHAT THE DATA REVEALS

An event identifier and time zone prevent a sequence from becoming a confusing pile of similarly dated records. Link observations to the specific shock when evidence permits; otherwise label them as sequence-wide.

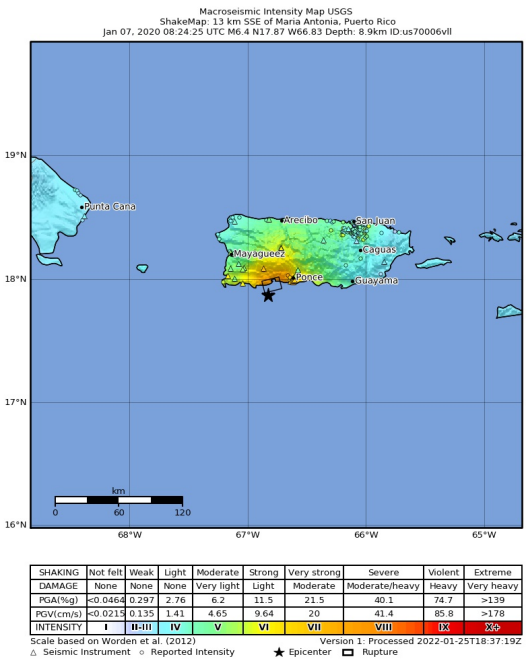
READ WITH CARE

This record is the magnitude 7.1 event, not the combined cost or impact of the entire sequence. A plotted epicenter is a location reference; the rupture extended across a much larger fault area.

Source 1 > **Source 2 >** **Visual / data >**

Puerto Rico: A Shallow Offshore Source

2020-01-07 08:24:27 UTC | Southwestern Puerto Rico



USGS ShakeMap intensity illustration for this event. Estimated spatial shaking, not an observed damage map. The archived map can retain an earlier magnitude or source revision. Credit: USGS ShakeMap / Atlas

Preferred magnitude

6.4 (mw)

Hypocentral depth

6 km

Epicenter

17.9578, -66.8113

USGS event ID

pr2020007007

WHAT HAPPENED

The January 7, 2020 earthquake occurred offshore of southwestern Puerto Rico during an active sequence. USGS describes shallow oblique normal faulting, damage and landslides in the southwest, and widespread power and water outages. The preferred event record has magnitude 6.4 and a depth of 6 km.

WHAT THE DATA REVEALS

Keep the offshore source location separate from the onshore impact locations. A Dattle can connect shaking observations, blocked routes and utility recovery without treating the epicenter as the center of every consequence.

READ WITH CARE

The contemporaneous tectonic summary contains preliminary sequence counts; they are not final totals. This collection does not aggregate sequence losses or treat a mapped intensity estimate as a confirmed damage report.

Source 1 > **Source 2 >** **Visual / data >**

From examples to observations

A USEFUL RECORD KEEPS ITS EVIDENCE

Keep the time, place, measurement method, unit, source and uncertainty with every observation. Separate what you saw from an estimate or interpretation. Repeat observations consistently, and retain the original evidence when updating a record.

SUGGESTED DATTLE FIELDS

- Event ID and source revision date
- UTC and local event times with time zone
- Latitude, longitude and hypocentral depth
- Magnitude value and magnitude type
- Observation location and source
- Shaking intensity product and uncertainty
- Ground failure, structure and utility effects separately
- Photograph date, viewpoint and credit
- Status updates with dates; unknown values remain unknown

AI AS AN ACCELERATOR

Use this prompt to draft a collection structure, then review it. AI can organize the questions and fields; it cannot supply missing observations or replace source verification.

> Create a Dattle for earthquake case studies. Include event ID, UTC time, local time zone, latitude, longitude, depth in km, magnitude and magnitude type, ShakeMap source, reported effects, observation location, date of observation, photograph credit and source links. Keep modeled shaking separate from observed damage. Do not generate missing measurements or loss estimates.

Explore Dattle at dattle.com. Availability, features and plan limits are described on the website.

Sources and image credits

Primary references checked November 11, 2026. Records and estimates can be revised. Every case page links to its evidence; full addresses are retained here for reuse.

01. USGS event page, preferred catalog and impact products
https://earthquake.usgs.gov/earthquakes/eventpage/uw10530748

02. USGS downloadable event detail (GeoJSON)
https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/uw10530748.geojson

03. Visual / source data for Nisqually: Deep Shaking, Surface Damage
https://earthquake.usgs.gov/product/shakemap/uw10530748/atlas/1594176057488/download/intensity.jpg

04. USGS event page, preferred catalog and impact products
https://earthquake.usgs.gov/earthquakes/eventpage/se609212

05. USGS downloadable event detail (GeoJSON)
https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/se609212.geojson

06. Visual / source data for Virginia: A Moderate Magnitude, A Broad Felt Area
https://earthquake.usgs.gov/product/shakemap/se609212/atlas/1598395112836/download/intensity.jpg

07. USGS event page, preferred catalog and impact products
https://earthquake.usgs.gov/earthquakes/eventpage/nc72282711

08. USGS downloadable event detail (GeoJSON)
https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/nc72282711.geojson

09. Visual / source data for South Napa: Damage Close to a Shallow Rupture
https://earthquake.usgs.gov/product/shakemap/nc72282711/atlas/1624995941193/download/intensity.jpg

10. USGS event page, preferred catalog and impact products
https://earthquake.usgs.gov/earthquakes/eventpage/ak018fcnsk91

11. USGS downloadable event detail (GeoJSON)
https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/ak018fcnsk91.geojson

12. Visual / source data for Anchorage: Infrastructure Matters
https://earthquake.usgs.gov/product/shakemap/ak018fcnsk91/atlas/1594328884249/download/intensity.jpg

13. USGS event page, preferred catalog and impact products
https://earthquake.usgs.gov/earthquakes/eventpage/ci38457511

14. USGS downloadable event detail (GeoJSON)
https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/ci38457511.geojson

15. Visual / source data for Ridgecrest: One Event Within a Sequence
https://earthquake.usgs.gov/product/shakemap/ci38457511/atlas/1594160054783/download/intensity.jpg

16. USGS event page, preferred catalog and impact products
https://earthquake.usgs.gov/earthquakes/eventpage/pr2020007007

17. USGS downloadable event detail (GeoJSON)
https://earthquake.usgs.gov/earthquakes/feed/v1.0/detail/pr2020007007.geojson

18. Visual / source data for Puerto Rico: A Shallow Offshore Source
https://earthquake.usgs.gov/product/shakemap/us70006vll/atlas/1646888284178/download/intensity.jpg