

3 November 2002 Denali, Alaska Earthquake

For additional info and photos, go to:

http://www.aeic.alaska.edu/M7.9_quake_2002/M7.9_quake.html

The Alaska Earthquake Information Center located a major earthquake that occurred on Sunday, November 3rd at 1:12 PM AKST in the central region of Alaska. This earthquake had a preliminary magnitude of 7.9 and was located at a depth of about 3 miles (5 km). The magnitude and location may change slightly as additional data are received and processed. This earthquake was felt throughout the state. Reports of light damage have been received from Cantwell.

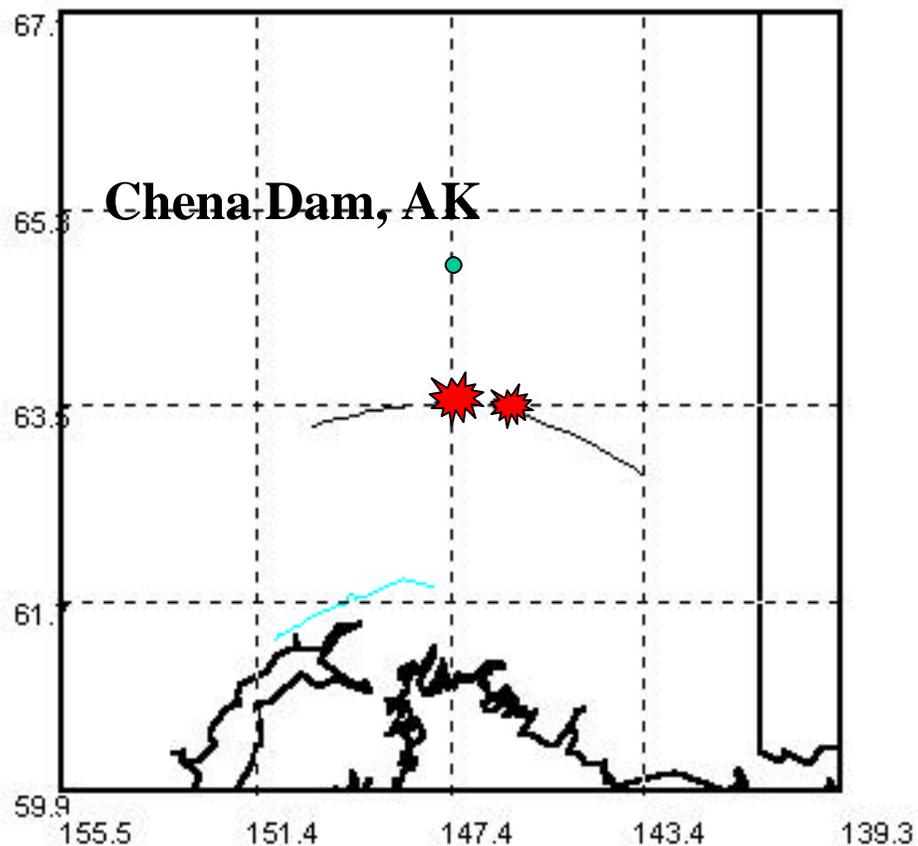
M 7.9 earthquake on November 3, 2002

The largest earthquake known to occur in the world this year struck central Alaska on Sunday, November 3. It was preceded by a magnitude 6.7 foreshock in the early morning of October 23, 2002. This earlier earthquake and its zone of associated aftershocks were located slightly to the west of the 7.9 quake. The epicenter of the Nov. 3 temblor was located approximately 75 miles (135 km) south of Fairbanks and 176 miles (283 km) north of Anchorage. It struck at 1:12 PM local time, causing countless landslides and road closures, but minimal structural damage and amazingly few injuries and no deaths. The earthquake resulted from slip on the Denali fault - an arcuate strike-slip fault that stretches over 700 km across the State of Alaska and extends southeastward into Canada. The first motion focal mechanism (University of Alaska, Fairbanks), and teleseismic bodywaves analyzed by Kickuchi and Yamanaka indicate that the event began as a northeast striking reverse fault, and evolved into a 300 km right-lateral strike-slip rupture. Aftershock locations and surface slip observations indicate that the rupture was predominately unilateral in the eastward direction. The geologists followed the earthquake rupture by helicopter through valleys, across streams, and along glaciers. Near Mentasta Lake, a village that experienced some of the worst damage in the quake, they discovered that the surface scar turned from the Denali fault to the adjacent Totschunda fault, which trends toward more southeasterly down toward the Canadian border. Overall, the geologists found that measurable scarps indicate that the north side of the Denali fault moved to the east and vertically up relative to the south. Maximum offsets on the Denali fault were 22 feet at the Tok Highway cutoff, a road that goes from Tok to Glenallen and intersects with the Alaska Highway, and were 6.5 feet on the Totschunda fault. The largest offsets were in the region between the Richardson Highway and the Tok Cutoff Highway. This earthquake is one of the largest ever recorded on U.S. soil and the largest seismic event ever recorded on the Denali fault system.

This event has been felt strongly throughout the state. The earthquake caused significant structural damage in the villages of Slana and Mentasta, and knocked things off the shelf in Tok, Paxon, Cantwell and Denali Park. There was some

minor structural damage in Fairbanks. There was severe road damage on the Richardson Hwy, and the Trans-Alaska Pipeline has been shut down since the event (with damage to support structures but not to the pipe, and no leaks).

M= 7.9 and 6.7 Earthquakes on Denali Fault ~140 km from Chena Dam, AK



Data within 400 Km range from Long = 147.40 . Lat = 63.50

<http://geoscience.wes.army.mil>