

The Nenana Mountain Magnitude 6.7 earthquake of October 23, 2002

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On October 23, 2002 around 3:30 am AST, people of interior Alaska were awakened to strong shaking caused by a magnitude 6.7 earthquake in the central region of Alaska. The epicenter was located on the Denali Fault at 63.5 N latitude, -147.9 W longitude and depth of 4.2 km. The quake was 28 mi (44 km) northeast of the Denali Park entrance and 91 mi (146 km) south of Fairbanks. Damage from this quake was limited to a small area around the epicenter, and consisted of mainly road damage and a few items falling off shelves in Cantwell. The focal mechanism shows right-lateral motion on a vertical east-west plane. This quake could be either a foreshock or the trigger to the magnitude 7.9 earthquake, that occurred on November 3, 2002 at 1:12 AST, at the eastern end of the magnitude 6.7 rupture zone.

The largest aftershocks attributed to this earthquake were two magnitude 3.8 events; the first occurred 3 hours after the main event, 41.2 km east and the second occurred 3 days, 4.4 km west of the main shock. Over 1100 aftershocks ranging from 0.2 to 3.8 ml have been located since the 6.7 main shock, until the M 7.9 earthquake. The aftershock sequence has a magnitude of completeness of 0.8, a b-value of 0.8 and an a-value of 3.8. Aftershocks have been relocated with a double difference algorithm, as well as waveform cross to minimize the scatter. The rupture zone, as defined by the aftershocks, is 40 km along fault trace. The majority of the aftershocks are located between 0 and 10 km deep. The relocated aftershocks define a WNW-ENE striking plane slightly dipping to the north.