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MACROSEISMIC SURVEY OF THE M7.9, 2002 DENALI FAULT EARTHQUAKE

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TECHNICAL ABSTRACT:

The macroseismic survey of the M_W 7.9, November 3, 2002 Denali Fault earthquake, conducted by the Geophysical Institute of the University of Alaska Fairbanks in late 2003, provided important data in addition to the US Geological Survey Community Internet Intensity dataset. The intensities of the ground shaking were obtained at more than 99 near-field locations. The largest values, VIII and IX, were obtained at 58 survey locations, mostly in the communities of Slana, Mentasta Lake, Northway and Paxson, and along the sections of the Tok-Cutoff and Richardson Highways adjacent to the fault crossings. The isoseismal map, produced using the combined dataset, portrays the spatial distribution of intensities from IV to VIII/IX. The mean isoseismal radii for intensities VIII, VII, VI, V, and IV are 38, 64, 109, 185, and 315 km, respectively. The average decimal intensity in the near-field zone (less than 30 km from the fault rupture) is 8.5 ± 0.7 . There is a good correlation between the intensities and horizontal peak ground accelerations observed at strong-motion sites, with a correlation coefficient of 0.84. Larger concentration of the intensity IX locations in the eastern segment of the earthquake zone indicate that the ground shaking amplitudes were higher than the eastern section, which is consistent with the results of the slip distribution studies.

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NON -TECHNICAL SUMMARY

In this project we aimed to obtain seismic intensities in the small communities around the 2002 M7.9 Denali Fault earthquake rupture zone in Alaska, in addition to the dataset collected by the US Geological Survey (USGS) through the Internet. Such data were obtained at more than 99 near-field locations. The isoseismal map, produced on the basis of these and the USGS data, portrays the spatial distribution of intensities from IV to IX. The results of the project allow us to better understand the characteristics of the ground motion generated by strong crustal earthquakes.