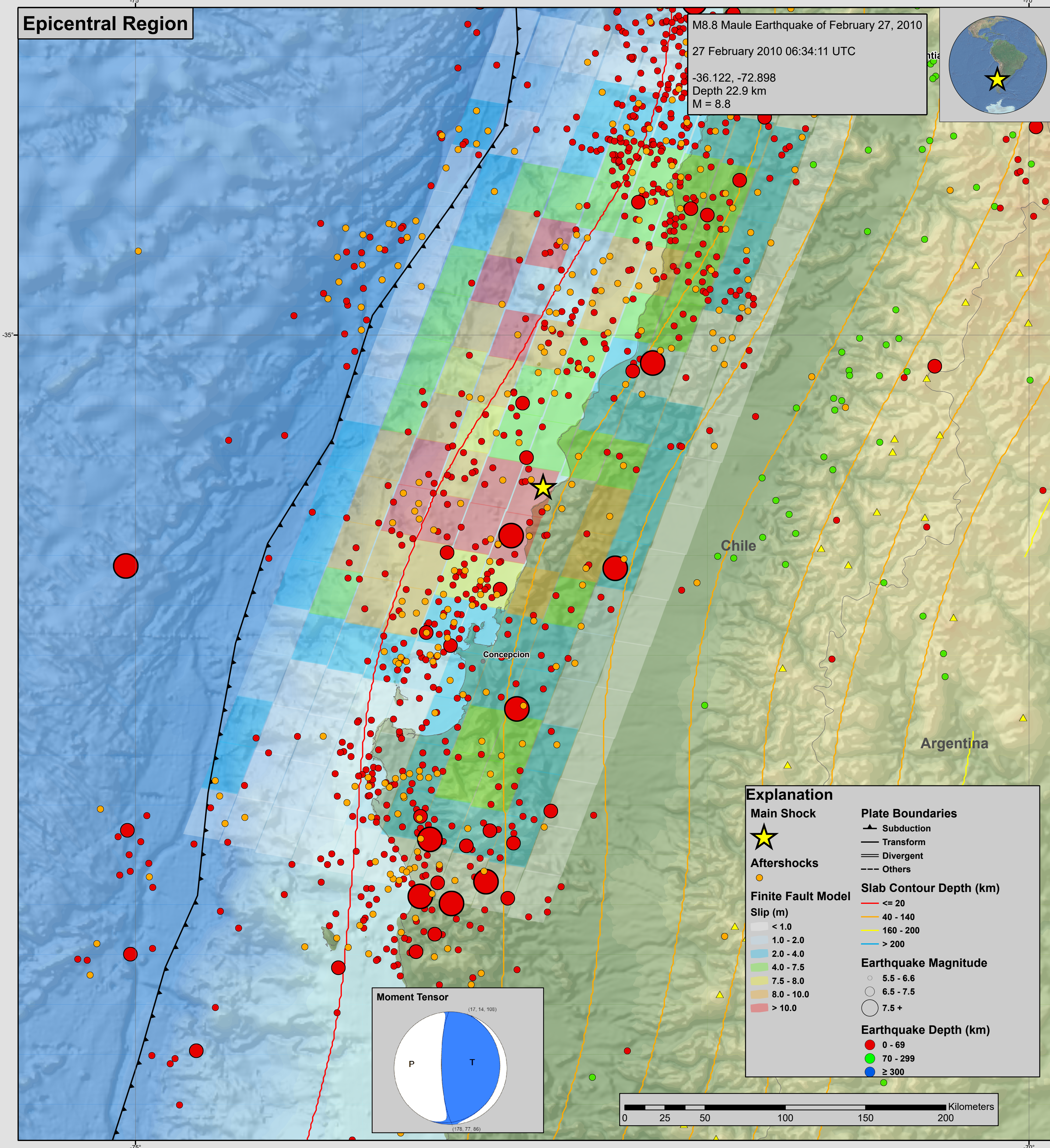




DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Earth Physical Data Center
IASPEI, Centennial Catalog (1900 - 1999) and
extensions (Engdahl and Villaseñor, 2002)
EHB catalog (Engdahl et al., 1998)
HDF (unpublished earthquake catalog, Engdahl, 2003)
DeMets, C., Gordon, R.G., Argus, D.F., 2010.
Geologically current plate motions, Geophys. J. Int. 181, 1-80.

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)
Ji, C., D.J. Wald, and D.V. Helmberger, Source description
of the 1999 Hector Mine, California earthquake, Part I: Wavelet
domain inversion theory and resolution analysis, Bull. Seism.
Soc. Am., Vol 92, No. 4, pp. 1192-1207, 2002.
DeMets, C., Gordon, R.G., Argus, D.F., 2010.
Geologically current plate motions, Geophys. J. Int. 181, 1-80.

BASE MAP
NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center
NOAA GEBCO and GLOBE Elevation Models

REFERENCES

Bird, P., 2003, An updated digital model of plate
boundaries: Geochim. Geophys. Geosyst., v. 4,
no. 3, pp. 1027-80.
Engdahl, E.R., and Villaseñor, A., 2002, Global
Seismicity: 1900-1999, chap. 41 of Lee, W.H.K.,
and others, eds., International Earthquake and
Engineering Seismology, Part A: New York, N.Y.,
Elsevier Academic Press, 832 p.
Engdahl, E.R., Van der Hilst, R.D., and Buland, R.P.,
1998, Global teleseismic earthquake relocation with
improved travel times and procedures for depth
determination, Bull. Seism. Soc. Amer., v. 88, p. 722-743.

DISCLAIMER

Base map data, such as place names and political
boundaries, are the best available but may not be
current or may contain inaccuracies and therefore
should not be regarded as having official significance.

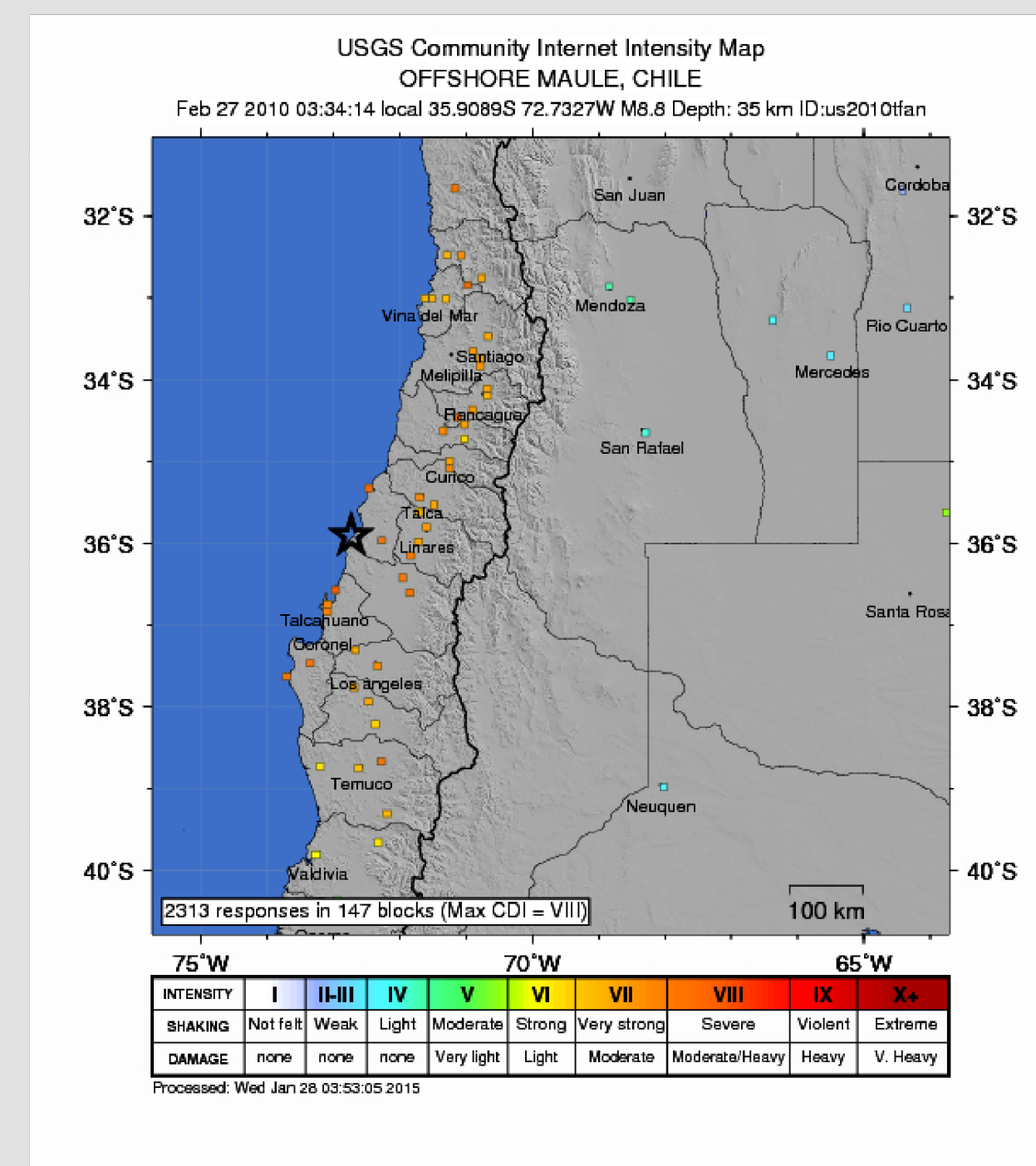
Map updated by U.S. Geological Survey National
Earthquake Information Center
6 November 2017
<http://earthquake.usgs.gov/>
Map not approved for release by Director USGS

Tectonic Summary

This earthquake occurred at the boundary between the Nazca and South American tectonic plates. The two plates are converging at a rate of 80 mm per year. The earthquake occurred as thrust-faulting on the interface between the two plates, with the Nazca plate moving down and landward below the South American plate.

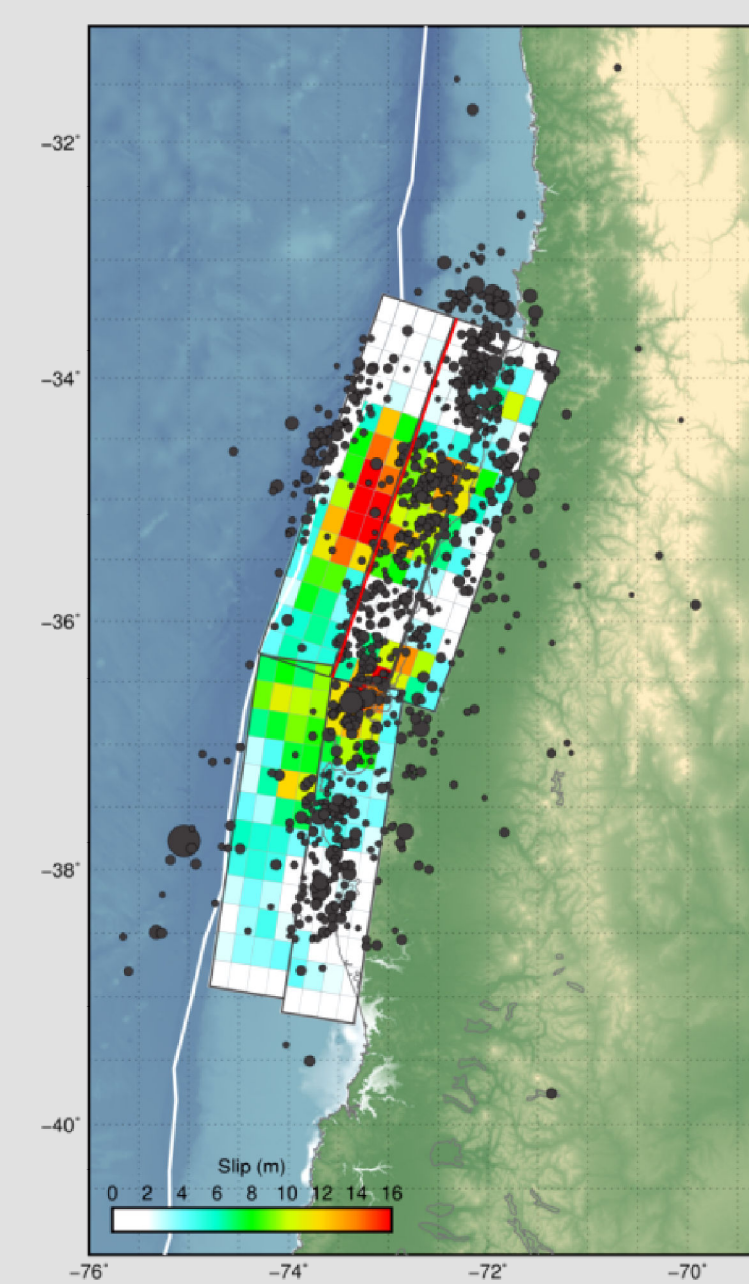
Coastal Chile has a history of very large earthquakes. Since 1973, there have been 13 events of magnitude 7.0 or greater. The February 27 shock originated about 230 km north of the source region of the magnitude 9.5 earthquake of May, 1960 -- the largest earthquake worldwide since the beginning of instrumental seismology at the beginning of the twentieth century. The giant 1960 earthquake spawned a tsunami that caused destruction on coasts throughout the Pacific Ocean basin. An estimated 1600 lives were lost to the 1960 earthquake and tsunami in Chile, and the 1960 tsunami took another 200 lives among Japan, Hawaii, and the Philippines. Approximately 300 km to the north of the February 27 earthquake is the source region of the magnitude 8.2 earthquake of August 17, 1906. The tsunami associated with the 1906 earthquake produced some damage in Hawaii, with reported run-up heights as great as 3.5 m. Approximately 870 km to the north of the February 27 earthquake is the source region of the magnitude 8.5 earthquake of November, 1922. The 1922 earthquake significantly impacted central Chile, killing several hundred people and causing severe property damage. The 1922 quake generated a 9-meter local tsunami that inundated the Chile coast near the town of Coquimbo; the tsunami also crossed the Pacific, washing away boats in Hilo harbor, Hawaii. The magnitude 8.8 earthquake of February 27, 2010 ruptured the portion of the South American subduction zone separating the source regions of the 1960 and 1906 earthquakes. This earthquake injured about 12,000 and was responsible for the deaths of at least 523. Approximately 800,000 people were displaced while 370,000 houses, 4,000 schools, 79 hospitals, and 4,200 boats were damaged by the earthquake and tsunami in the Valparaíso-Concepción-Temuco area. At least 1.8 million people were affected in Araucanía, Bio-Bio, Maule, O'Higgins, Region Metropolitana and Valparaíso. The total economic loss in Chile was estimated at 30 billion US dollars. Electricity, telecommunications and water supplies were disrupted and the airports at Concepción and Santiago had minor damage. The tsunami damaged or destroyed many buildings and roads at Concepción, Constitución, Dichato and Pichilemu and also damaged a dock and a dock in the San Diego area, USA. Maximum acceleration of 0.65g was recorded at Concepción and more than 2 meters of uplift along the coast was observed near Arauco.

Did You Feel It?

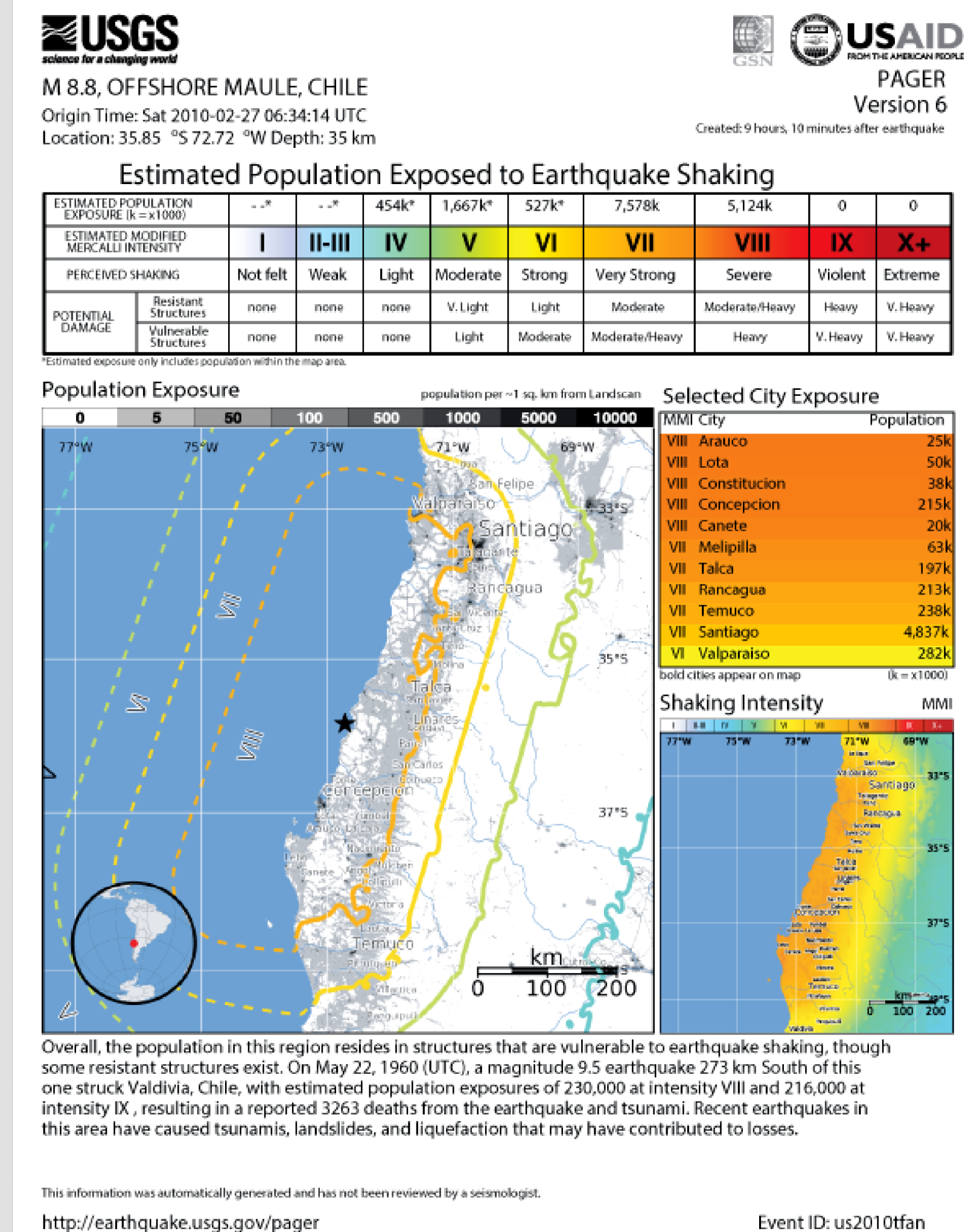


Finite Fault Model

Distribution of the amplitude and direction of slip for subfault elements of the fault rupture model are determined from the inversion of teleseismic body waveforms and long period surface waves. Arrows indicate the amplitude and direction of slip (of the hanging wall with respect to the foot wall); the slip is also colored by magnitude. The view of the rupture plane is from above. The strike of the fault rupture plane is 19° and the dip is 18°E. The dimensions of the subfault elements are 30 km in the strike direction and 20 km in the dip direction. The rupture surface is approximately 450 km along strike and 160 km along down-dip. The seismic moment release based upon this plane is 2.5e+29 dyne.cm.



PAGER



Seismic Hazard

