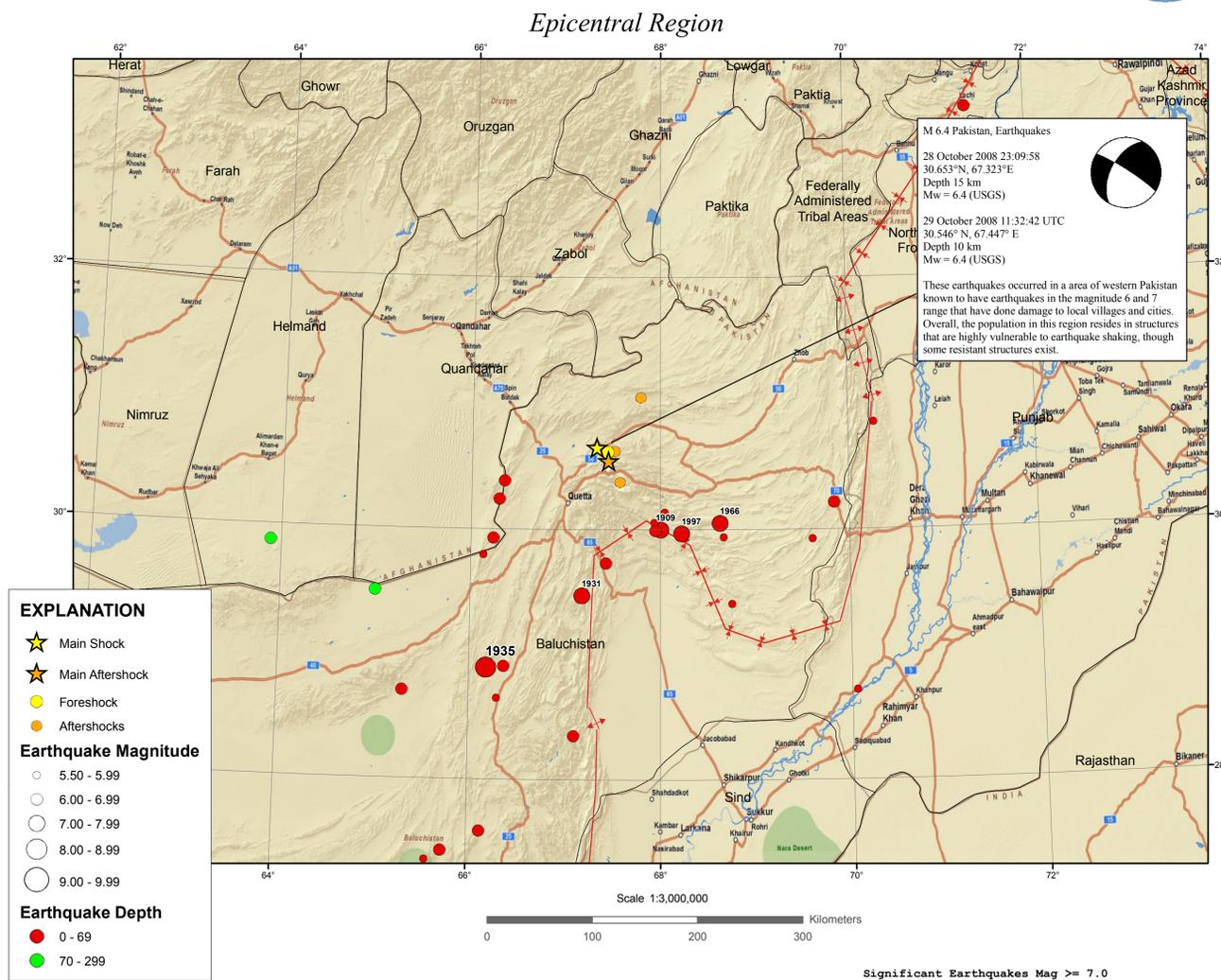
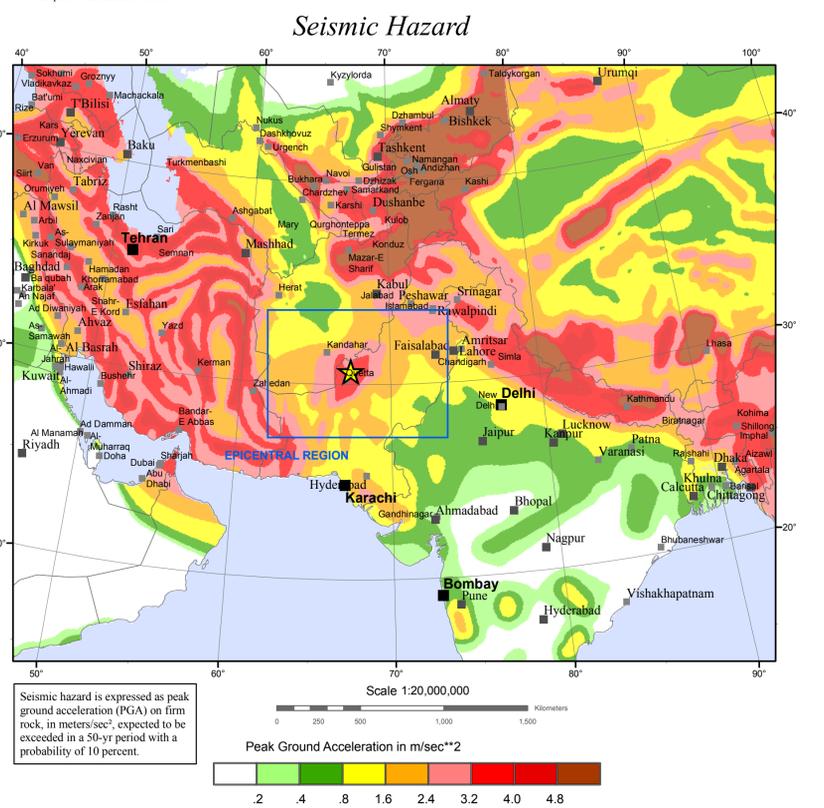
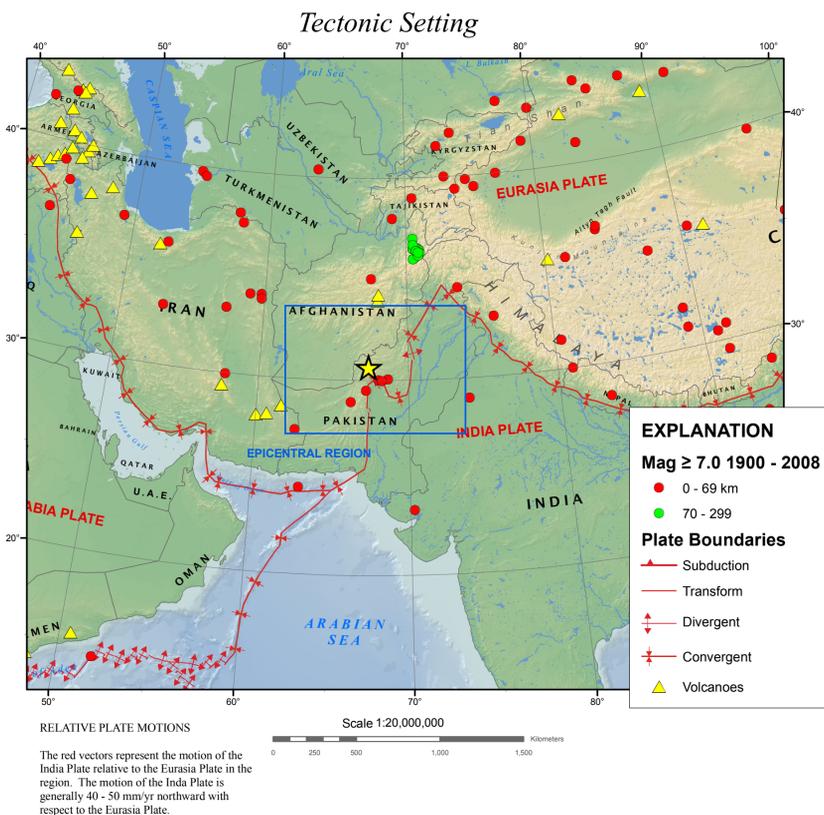


# M 6.4 Pakistan Earthquakes of 28-29 October 2008



#### TECTONIC SUMMARY

Earthquakes and active faults in western and northern Pakistan and adjacent parts of Afghanistan are the result of the India plate moving northward at a rate of about 40 mm/yr (1.6 inches/yr) and colliding with the Eurasia plate. Along the northern edge of the Indian subcontinent, the India plate is subducting beneath the Eurasia plate, causing uplift that produces the highest mountain peaks in the world, including the Himalayan, the Karakoram, the Pamir and the Hindu Kush ranges. West and south of the Himalayan front, the relative motion between the two plates is oblique, which results in strike-slip, reverse-slip, and oblique-slip earthquakes. The pattern of elastic waves that were radiated by the October 28 and 29, 2008, earthquakes implies that each earthquake was the result of predominantly strike-slip faulting. Seismographically recorded waveforms imply that the shocks were caused by either left-lateral slip on a northeast-striking fault or right-lateral slip on a northwest-striking fault.

The October 28 and 29 earthquakes occurred in the Sulaiman fold-and-thrust belt, a region where geologically young (Tertiary; [http://vulcan.wr.usgs.gov/Glossary/geo\\_time\\_scale.html](http://vulcan.wr.usgs.gov/Glossary/geo_time_scale.html)) sedimentary rocks have been folded and squeezed by forces associated with the India-Eurasia collision. The earthquakes are located approximately 80 km east of the 650-km-long Chaman fault, which is a major left-lateral strike-slip fault that accommodates a significant amount of the slip across the plate boundary. The occurrence of the earthquakes suggests that other strike-slip faults are present beneath the fold-and-thrust belt and that they accommodate some of the relative motion of the India and Eurasia plates.

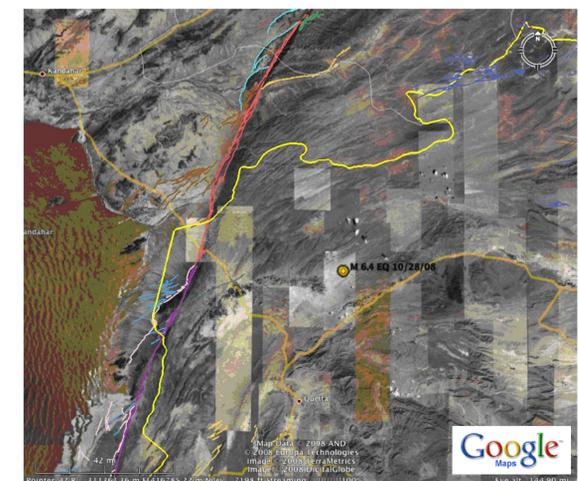
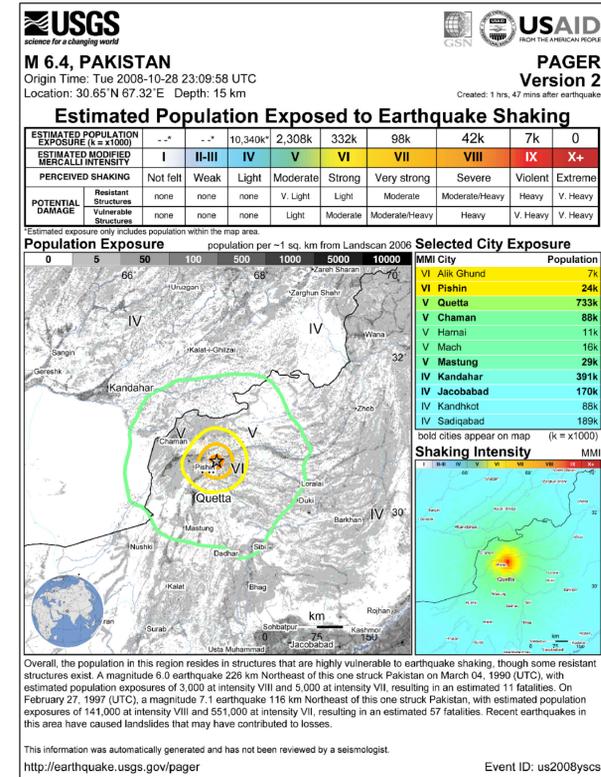
The earthquakes of October 28 and 29, 2008, are located approximately 50 km northeast of the region of most intense damage from the Pakistan earthquake of May 30, 1935 (M 7.76), which is estimated to have killed 30,000 people. The 1935 earthquake probably occurred as the result of left-lateral strike-slip motion on a northeast-striking fault.

#### 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.

#### Significant Earthquakes Mag ≥ 7.0

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1909	10	20	2341	30.000	68.000	0	7.0
1931	08	27	1527	29.473	67.172	35	7.1
1935	05	30	2132	28.894	66.176	35	8.1
1966	08	01	2102	30.051	68.629	9.8	7.0
1997	02	27	2108	29.970	68.220	22	7.1



#### DATA SOURCES

**EARTHQUAKES AND SEISMIC HAZARD**  
USGS, National Earthquake Information Center  
NOAA, National Geophysical Data Center  
IASPEI, Centennial Catalog (1900 - 1999) and extensions (Engdahl and Villaseñor, 2002)  
HDF (unpublished earthquake catalog) (Engdahl, 2003)  
Global Seismic Hazard Assessment Program

**PLATE TECTONICS AND FAULT MODEL**  
PB2002 (Bird, 2003)  
Finite Fault Model, Chen Ji, UC Santa Barbara (2007)

**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, 932 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.