**TABLE OF HISTORIC EARTHQUAKES WITH SURFACE RUPTURE**

**Introduction**

Probabilistic hazard assessment of strong shaking accompanying earthquakes is better known than the hazard associated with rupture of the ground surface during an earthquake, particularly ground breakage beneath the foundation of an engineered structure. Surface rupture is regulated only in the states of California and Utah. This is unfortunate because where ground rupture from previous earthquakes is known and shown to be small, the ground-rupture hazard may be mitigated by engineering design (Bray, 2001; Bray and Kelson, 2006). This table shows that surface ruptures are surprisingly common, although their interpretation may not be straightforward, especially the conclusion that the surface rupture connects with the subsurface plane of major moment release or whether it is a secondary effect of folding, landsliding, or lateral spreading.

 The surface effects of earthquakes were first summarized by Lyell (1875), who thought that earthquakes, like volcanic eruptions, demonstrated important concepts in the emerging field of geology. On the other hand, Montessus de Ballore (1925) and Richter (1958) discussed coseismic surface faulting as an insight to the physics of the earthquake process itself. Bonilla and Buchanan (1970) and Bonilla et al. (1984) tabulated world earthquakes known to have surface rupture to determine the relation of surface rupture length to magnitude. Like Richter, they wanted to use surface rupture to learn more about earthquakes. This table was expanded, with many additional case histories, including the 1992 Landers, California, earthquake, by Wells and Coppersmith (1994), again with the purpose of learning more about the relation of surface rupture to magnitude and rupture area. In this table, magnitudes of Wells and Coppersmith (1994) and, for the eastern Mediterranean-Middle East, Ambraseys and Jackson (1998) and Ambraseys (2009), have been used in preference to other sources, unless the other source revised a pre-instrumental magnitude based on geological data that resulted in a revision of earthquake moment (for example, Avouac et al., 1993, for the 1906 Manas, China, earthquake).

 Information for this table comes from two sources: (1) the inspection of surface faulting by qualified observers shortly after the earthquake, and (2) the correlation, long after the earthquake, of surface geological features or observations in trench excavations with historical earthquakes, which I refer to as *historical paleoseismology*. Historical paleoseismology began with Lawson (1908), who, as part of the report he edited about the 1906 San Francisco earthquake, also reported on surface rupture accompanying an earlier earthquake in 1868 on the Hayward fault, near his office at the University of California, Berkeley. However, evidence for surface rupture length collected long after the earthquake may depend in part on shaking intensity that is strongest in the vicinity of a mapped active fault. Where recurrence intervals are short, so that the geomorphic and geochronological evidence might not be sufficient to correlate a surface rupture to a specific historical earthquake, the estimated rupture length is not solely dependent on geologic evidence, as illustrated by estimates for the 1838 San Francisco earthquake (Toppozada et al., 2002). Similarly, the Parkfield earthquakes prior to 1934 had reports of surface disturbance along the San Andreas fault, but because this was reported as ground cracks rather than fault displacement, it is possible that the earlier ground disturbance was not due directly to fault rupture. This problem is complicated because part of the Parkfield area is creeping (Toké et al., 2006); the displacements due to creep are not included in the table (*cf*., Toppozada and Branum, 2006). In the same vein, ruptures assigned to the 1861 San Ramon Valley, California, and 1934 Puerto Armuelles, Costa Rica, earthquakes might be due to secondary effects. The 1976 Guatemala earthquake on the Motagua fault was accompanied by surface rupture, but ground cracks in the alluvium near the Caribbean coast suggest that surface rupture might have continued east of the reach of the fault where offset is clear.

 Inspection of surface faulting soon after the event began with a description of ground fissures on the Nauzad fault in Iran accompanying an earthquake of ML 7.0 on 10 January 1493 (Esfezari, 1493; *cf.,* Berberian and Yeats, 1999). In modern times, description of surface faulting began with the 1855 West Wairarapa, New Zealand, earthquake (*cf.*, Darby and Beanland, 1992), the 1861 Egion earthquake south of the Gulf of Corinth in Greece (Schmidt, 1875), and the 1887 Sonora, Mexico, earthquake (*cf.*, Suter and Contreras, 2002). Systematic study of coseismic surface faulting began in New Zealand with the 1888 Marlborough earthquake, in Japan with the 1891 Nobi earthquake, and in the United States with the 1906 San Francisco, California, earthquake, followed by the publication of descriptions of surface ruptures worldwide in the *Bulletin of the Seismological Society of America*. Yet even with inspection teams of trained observers, there may be controversy about whether disturbance of the ground surface is produced by tectonic rupture or by secondary effects (compare, for example, the accounts of the 1992 Erzincan, Turkey, earthquake by Barka and Eyidogan, 1993, and Trifonov et al., 1993). The 1989 Loma Prieta, California, earthquake is also included even though there is disagreement (compare Prentice and Schwartz, 1991, with Aydin et al., 1992) over the significance of presumed tectonic ruptures. Several listed earthquakes have surface ruptures recorded for a distance less than a few kilometers; these ruptures may represent secondary effects on a pre-existing zone of weakness.

 A controversy has arisen over whether surface faulting is *primary*, part of the same rupture surface that includes the mainshock, or *secondary*, triggered on another fault by the earthquake simply because that fault was a zone of weakness and responded to differential shaking of competent blocks on either side. The 1983 Borah Peak, Idaho, earthquake may have primary rupture only in the Thousand Springs segment. Tectonic ruptures also were found to the north in the Willow Creek Hills and in the Warm Springs Valley, but geodetic data suggest that these may be secondary (Stein and Barrientos, 1985; Barrientos et al., 1987). Because the faulting in the Willow Creek Hills has the same sense as faulting in the Thousand Springs segment, both are included in the table. The 1979 Imperial Valley earthquake triggered up to 10 mm dextral slip on a 39-km-long section of the San Andreas fault more than 90 km away from the seismogenic Imperial fault (Sieh, 1982); this is not included in the table.

 The largest earthquakes on Earth strike subduction zones, most of which are offshore and not available for inspection. Even when bathymetric mapping is conducted immediately after an earthquake, as was the case after the December 26, 2004 ***M*** 9.15 earthquake off Sumatra, evidence of surface rupture is ambiguous (Henstock et al., 2006). Some subduction-zone earthquakes are accompanied by secondary rupture on faults in the hanging wall of the subduction zone, presumably triggered by the subduction-zone earthquake. This is illustrated for the 1964 Alaskan earthquake (***M*** 9.2) and the 1995 Antofagasta, Chile, earthquake (***M*** 8.0), which was accompanied by minor surface rupture on the adjacent Atacama fault, based on DeLouis et al. (1997), who observed scarps after the earthquake that were not present just before the earthquake. The 2011 Tohoku-oki, Japan, earthquake was followed a month later by a normal fault on land (Kelson et al., 2011), which is included in the table. Because strong motion on the subduction zone extended to the trench, or close to it, generating a giant tsunami, the plate boundary itself might have ruptured at the surface during the earthquake. Alternatively, such faulting near the plate boundary may be secondary, rare only because surface rupture is largely underwater and difficult to confirm.

 Displacements accompanying an earthquake may include coseismic slip and afterslip, as for the 1944 San Juan, Argentina, earthquake, where coseismic deformation of 30 cm on the La Laja fault was followed by another 30 cm of afterslip (Harrington, 1944). An earthquake in 2005 of *M* 5.0 south of Kabul, Afghanistan, was accompanied by 6.5 km of surface rupture on the Chaman fault; slow-slip surface rupture continued for at least a year over at least 50 km of the fault (Furuya and Satyabala, 2008). It would be challenging to distinguish coseismic slip from afterslip long after the event or for an earthquake in a remote, uninhabited area, where an expedition is necessary to describe the surface rupture.

 It is now apparent that seismic faulting may warp the ground surface even though faulting is blind (does not reach the surface). These include the 1908 Messina Straits, Italy, earthquake of ***M*** 7.5, which Valensise and Pantosti (1992) interpreted as an earthquake on a blind normal fault. Two linear zones of reverse faults in basement rocks beneath salt of the Iranian Zagros are described as the blind Qir and Assaluyeh faults by Berberian (1995). These are expressed at the surface as broad, southwest-facing escarpments (Lacombe et al., 2006). The 1983 Coalinga, California, earthquake on a blind reverse fault is not included in this table, but a shallow aftershock on June 11 did rupture the ground surface, and it is included. Surface rupture accompanying the ***M*** 7.6 Kashmir earthquake of 2005 was recorded over a distance of about 70 km; these ruptures were not continuous but were separated from one another by unruptured ground (Kaneda et al., 2008). Despite these gaps in surface rupture, the entire length of the zone of faulting is included in the table.

Surface rupture reported in the table may be secondary, related to folding, rather than the surface expression of the main seismic fault, as illustrated for the 1980 El Asnam, Algeria, earthquake of ***M*** 7.3 (Philip and Meghraoui, 1983), the 1988 Spitak, Armenia, earthquake of ***M*** 6.8 (Philip et al., 1992), and the 1970 Uüreg Nuur, Mongolia, earthquake of ***M*** 7 (Baljinnyam et al., 1993).

 Historical paleoseismology is most closely identified with the work of N.N. Ambraseys, J.A. Jackson, and their colleagues in the eastern Mediterranean, the Middle East, the Indian subcontinent, and Africa, M. Berberian in Iran, S. Stiros in Greece, Xu Xiwei and Deng Qidong in China, A. Sangawa of Japan, and T. Toppozada in California. Programs are underway in China, Japan, New Zealand, Iran, Turkey, Italy, Greece, and the United States to correlate surface ruptures based on paleoseismology with large historical earthquakes. Correlating the isoseismals of a historical, pre-instrumental earthquake to a fault conveniently located at the center of strong ground motion (e.g., Ambraseys and Jackson, 1998) must take into account errors in epicenter location, errors in dating the event, and even the possibility of more than one earthquake.

 Recognition of pre-instrumental earthquakes on strike-slip faults relies only partly on construction of isoseismal maps; recognition of a linear zone of disturbed and disrupted ground is also necessary. This permits the recognition of rupture lengths of several pre-instrumental earthquakes on the North Anatolian fault (Ambraseys, 1970; 1975; Ambraseys and Finkel, 1988; Sengör et al., 2005), but generally does not permit the identification of the length of strike-slip offset because contemporary observers did not make observations near the ends of ruptures where offsets were small. The 1662 Kambun, Japan, earthquake of ***M*** 7.8 was originally described as a single earthquake, but a study of contemporary records shows evidence for two earthquakes separated by a few hours (Tsukuda, 2002). Even when paleoseismic trenching provides radiocarbon dates that bracket a trench displacement with a historical earthquake, an offset in a single trench excavation commonly does not provide enough control to establish ***M*** with confidence.

The correlation of fresh topographic expression of fault offset was used by Nakata et al. (1990) to determine the rupture lengths of the 1645 and 1796 earthquakes on the Philippine fault. On the other hand, trenching on the Median Tectonic Line fault of Japan showed that this fault ruptured during the late 16th century, (Okada et al, 1991), but this was probably not the historical 1596 earthquake producing strong damage in populated areas to the northeast. Similarly, tree-ring dating tied the “San Juan Capistrano,” California earthquake of 1812 to the San Andreas fault rather than coastal California, but there is controversy about the length of 1812 surface rupture despite an extensive trenching campaign (Sieh et al, 1989; Salyards et al, 1992; Fumal et al, 1993; 2002) and about whether surface rupture was due to two earthquakes in 1812, not just one (Toppozada et al., 2002). In the table, we follow Fumal et al. (1993; 2002) and assign 1812 surface rupture to a single earthquake on December 8. Trenching commonly does not yield evidence for strike-slip offset unless there are several closely-spaced trenches, including trenches parallel to the fault, that allow the mapping of offset features such as stream channels from one side of the fault to the other, which is now the standard of consulting practice in subsurface investigations for critical facilities.

 Trenching is commonly able to provide evidence for maximum displacement on dip-slip faults, particularly normal faults that are less likely to be blind. Dip-slip faults produce a scarp, the height of which is more likely to be recorded by contemporary observers, as was the case for the 1899 Menderes Valley, Turkey, earthquake (Ambraseys and Finkel, 1987a). However, even for the 1861 Egion, Greece, earthquake, there is lively controversy over whether arcuate scarps with normal displacement are tectonic or are due to slope failure because the surface expression for both may be similar. This has been a particular problem for pre-instrumental (and even twentieth-century) ruptures in Greece (cf. Ambraseys and Jackson, 1990) and in Italy, particularly for the 1783 earthquake in Calabria described by Dolomieu (1784).

Another problem is the correlation of fresh geomorphic expression, such as the preservation of a free face, with isoseismal maps (cf. Armijo et al, 1991, for the earthquake that destroyed Sparta, Greece, in 464 BC, and Liu, 1993, for normal faulting accompanying the 1895 Tashkuergan earthquake in Xinjiang, China). The Pleasant Valley, Nevada, and Avezzano, Italy, earthquakes of 1915 were accompanied by vegetation-free zones near the base of the range front, formed during the earthquake (Wallace, 1984; Vittori et al., 1991), referred to by the Italians as *nastri di faglia*, or fault ribbons. In the central Nevada seismic zone, *nastri di faglia* mark the 1915 and 1954 surface ruptures, but not the middle Holocene rupture at the base of the Stillwater Range in northern Dixie Valley. *Nastri di faglia* are common in limestone terranes of Italy and Greece, and these are not easily correlated with historical earthquakes older than about 2000 years. Although the *nastri di faglia* near Sparta might have formed during the 464 BC earthquake, this has not been confirmed independently by dating, and the vegetation-free zone might be the product of more than one earthquake.

 The Sumatran fault and Philippine fault are marked by isoseismals of large earthquakes that are distributed along most of their lengths, but these isoseismals are not considered sufficient evidence to include most of these earthquakes in this table. The danger of correlating isoseismal maps to a known Holocene fault is illustrated in the Apennines of Italy. Trenching on faults that ruptured the surface in the 1980 Irpinia earthquake showed that these faults did not rupture during the 1694 earthquake with an even larger meizoseismal zone centered on the same region as in 1980 (Pantosti et al, 1993). However, trenching the El Pilar strike-slip fault in Venezuela is suggestive of evidence for surface rupture accompanying earthquakes in 1684 and 1974 (Audemard, 2006).

 Each historical earthquake is a separate problem and potential controversy, discussed in context in the discussions of surface ruptures in each region. For this reason, this table is a work in progress, subject to modification by newer earthquakes and also by paleoseismic investigations of older ones. The original version appeared under copyright in Yeats et al. (1997) and is modified here with permission of Oxford University Press. Because it appears online, it is offered as a wiki; modifications and updates by the earthquake community are invited.

**Explanation**

# Explanation: Date: year, month, day; dates after 1999 in italics; BC dates use negative symbol.

M: magnitude; assume Ml if not specified; other subscripts: b, body wave; s, surface wave; w, moment; t, tsunami. Roman numerals: MMI intensity for some pre-instrumental earthquakes

Name of earthquake

Location: latitude and longitude in degrees and tenths of degrees

Strike of fault

Type: RE, reverse; NN, normal; LL, left lateral; LR, left lateral and reverse; LN, left lateral and normal; RL, right lateral; RR, right lateral and reverse; RN, right lateral and normal; LV, left lateral; dip direction unclear; RV, right lateral; dip direction unclear; VV, dip slip, dip direction unclear.

Length (L). Total length of rupture zone in km, including unbroken sections.

Horiz. (H) Maximum lateral offset in meters

Vert. (V) Maximum vertical offset in meters

Name of fault or faults

Reference: Only last two numbers of year given in table. Years prior to 1900 underlined; year after 1999 in italics. See full references following table.

**References**

(C, Chinese; J, Japanese; R, Russian)

Abdalian, S., 1953, Le tremblement de terre de Toroude, en Iran: *La Nature 81*(3222):314-319.

Abdallah, A., Courtillot, V., Kasser, M., Le Dain, A.-Y., Lépine, J.-C., Robineau, B., Ruegg, J.-C., Tapponnier, P., and Tarantola, A., 1979, Relevance of Afar seismicity and volcanism to the mechanics of accreting plate boundaries: *Nature 282*:17-23.

Abe, K., 1975, Re-examination of the fault model for the Niigata earthquake of 1964*: Jour. Phys. Earth 23*:349-366.

Adams, J., Wetmiller, R.J., Hasegawa, H.S., and Drysdale, J., 1991, The first surface faulting from a historical intraplate earthquake in North America: *Nature 352*:617-619.

Akyüz, H.S., Hartleb, R., Barka, A., Altunel, E., Sunal, G., Meyer, B., and Armijo, R., 2002, Surface rupture and slip distibution of the 12 November 1999 Düzce earthquake (*M* 7.1), North Anatolian fault, Bolu, turkey: *Seismol. Soc. America Bull. 92*:61-66.

Allen, C.R., St. Amand, P., Richter, C.F., and Nordquist, J.M., 1965, Relationship between seismicity and geologic structure in the southern California region: *Seismol. Soc. America Bull. 55*:753-797.

Allen, C.R., Luo Z., Qian H., Wen X., Zhou H., and Huang W., 1991, Field study of a highly active fault zone: The Xianshuihe fault of southwestern China: *Geol. Soc. America Bull. 103*:1178-1199.

Allen, C.R., pers. communication, 1993.

Ambraseys, N.N., 1963, The Buyin-Zara (Iran) earthquake of September, 1962, a field report: *Seismol. Soc. America Bull. 53*:705-740.

Ambraseys, N.N., 1970, Some characteristic features of the Anatolian fault zone: *Tectonophysics 9*:143-165.

Ambraseys, N.N., 1975, Studies in historical seismicity and tectonics, *in* Geodynamics of Today: *Royal Society of London* 9-16.

Ambraseys, N.N., 1988, Engineering seismology: *Earthquake Engineering and Structural Dynamics 17*:1-105.

Ambraseys, N.N., 1989, Temporary seismic quiescence: SE Turkey: *Geophys. Jour. 96*:311-331.

Ambraseys, N.N., 1991, Earthquake hazard in the Kenya Rift: The Subukia earthquake 1928: *Geophys. Jour. Internat. 105*:253-269.

Ambraseys, N.N., 2002, The seismic activity of the Marmara Sea region over the last 2000 years: *Seismol. Soc. America Bull. 92*:1-18.

Ambraseys, N.N., 2009, *Earthquakes in the Mediterranean and Middle East: A multidisciplinary study of seismicity up to 1900*: Cambridge, Cambridge University Press, 947 p.

Ambraseys, N.N., and Adams, R.D., 1986, Seismicity of West Africa: *Annales Geophysicae 4B*:679-702.

Ambraseys, N.N., and Barazangi, M., 1989, The 1759 earthquake in the Bekaa Valley: Implications for earthquake hazard assessment in the eastern Mediterranean region: *Jour. Geophys. Res. 94*:4007-4013.

Ambraseys, N.N., and Bilham, R., Earthquakes in Afghanistan: *Seismol. Research Lett. 74*:107-123.

Ambraseys, N.N., and Finkel, C.F., 1987a, Seismicity of Turkey and neighbouring regions, 1899-1915: *Annales Geophysicae 5B*:701-726.

Ambraseys, N.N., and Finkel, C.F., 1987b The Saros-Marmara earthquake of 9 August 1912: *Earthquake Eng. Struct. Dyn. 15*:189-211.

Ambraseys, N.N., and Finkel, C.F., 1988, The Anatolian earthquake of 17 August 1668, in Lee, W.H.K., Meyers, H., and Shimazaki, K., eds., *Historical Seismograms and Earthquakes of the World*: New York, Academic Press, p. 173-180.

Ambraseys, N.N., and Finkel, C.F., 1991, Long-term seismicity of Istanbul and of the Marmara Sea region: *Terra Nova 3*:527-5379.

Ambraseys, N.N., and Jackson, J.A., 1990, Seismicity and associated strain of central Greece between 1890 and 1988: *Geophys. Jour. Internat. 101*:663-708.

Ambraseys N. N. and Jackson J.A., 1998, Faulting associated with historical and recent earthquakes in the Eastern Mediterranean region: *Geophys. Jour. Internat. 133*:390-406.

Ambraseys, N.N., and Melville, C.P., 1982, *A History of Persian Earthquakes*: Cambridge Univ. Press, 219 p.

Ambraseys, N.N., and Melville, C.P., 1988, An analysis of the eastern Mediterranean earthquake of 20 May 1202, in Lee, W.H.K., Meyers, H., and Shimazaki, K., eds., *Historical Seismograms and Earthquakes of the World*: New York, Academic Press, Inc., 181-200.

Ambraseys, N.N., Moinfar, A., and Peronaci, F., 1973, The seismicity of Iran. The Farsinaj, Kermanshah, earthquake of 13th December, 1957: *Annal. di Geofisica 6*:679-692.

Ambraseys, N., and Moinfar, A., 1974, The seismicity of Iran: The Firuzabad (Nehavend) earthquake of 16 August, 1953: *Annal.di Geofisica 27*:1-21.

Ambraseys, N.N., and Moinfar, A.A., 1977, The seismicity of Iran: The Torud earthquake of 12th February 1953: *Annali di Geofisica 30*:185-200.

Ambraseys, N.N., and Pantelopoulos, P., 1989. The Fokis (Greece) earthquake of 1 August 1870: *Jour. European Earthquake Engineering 1*:10-18.

Ambraseys, N.N., and Tchalenko, J.S., 1969, The Dasht-e-Bayaz (Iran) earthquake of August 31, 1968, a field report: *Seismol. Soc. America Bull. 59*:1751-1792.

Ambraseys, N.N., and Tchalenko, J., 1972, Seismotectonic aspects of the Gediz, Turkey, earthquake of March 1970: *Geophys. Jour. Royal Astr. Soc. 30*:229-252.

Ambraseys, N.N., and Zátopek, A., 1968, The Varto Ustukran (Anatolia) earthquake of 19 August 1966--summary of a field report: *Seismol. Soc. America Bull. 58*:47-102.

Ambraseys, N.N., and Zátopek, A., 1969, The Mudurnu Valley, West Anatolia, Turkey, earthquake of 22 July 1967: *Seismol. Soc. America Bull. 59*:521-589.

Anderson, H., Beanland, S., Blick, G., Darby, D., Downes, G., Haines, J., Jackson, J., Robinson, R., and Webb, T., 1994, The 1968 May 23 Inangahua, New Zealand, earthquake: an integrated geological, geodetic and seismological source model: *New Zealand Jour. Geol. Geophysics 37*:57-86.

Anderson, J.G., and Bodin, P., 1987, Earthquake recurrence models and historical seismicity in the Mexicali-Imperial Valley*: Seismol. Soc. America Bull. 77*:562-578.

Ando, M., 1974, Faulting in the Mikawa earthquake of 1945: *Tectonophysics 22*:173-186.

Armijo, R., Tapponnier, P., Mercier, J.L., and Han T.-L., 1986, Quaternary extension in southern Tibet: field observations and tectonic implications: *Jour. Geophys. Res. 91*:13,803-13,872

Armijo, R., Tapponnier, P., and Han T.-L., 1989, Late Cenozoic right-lateral strike-slip faulting in southern Tibet: *Jour. Geophys. Res. 94*:2787-2838.

Armijo, R., Lyon-Caen, H., and Papanastassiou, D., 1991, A possible normal-fault rupture for the 464 BC Sparta earthquake: *Nature 351*:137-139.

Arpat, E., 1977, 1975 Lice depremi: *Yeryuvari Insan 2*:15-28.

Arpat, E., Saroglu, F., and Iz, H.B., 1977, The 1976 Çaldiran earthquake: *Yeryuvari Insan 2*:29-41.

Audemard, F.A., 2006, Surface rupture of the Cariaco July 09, 1997 earthquake on the El Pilar fault, northeastern Venezuela: *Tectonophysics 424*:19-39.

Avouac, J.P., Tapponnier, P., Bai M., You H., and Wang G., 1993, Active thrusting and folding along the northern Tien Shan and late Cenozoic rotation of the Tarim relative to Dzungaria and Kazakhstan: *Jour. Geophys. Res. 98*:6755-6804.

Aydin, A., Johnson, A.M., and Fleming, R.W., 1992, Right-lateral-reverse surface rupture along the San Andreas and Sargent faults associated with the October 17, 1989, Loma Prieta, California, earthquake: *Geology 20*:1063-1067.

Bai M., 1986, Active faults and strong motion earthquakes in Xinjiang: *Acta Seismologica Sinica 8, 1*:79-91. (C, Eng. abs.).

Baljinnyam, I., Bayasgalan, A., Borisov, B.A., Cisternas, A., Dem'yanovich, M.G., Ganbaatar, L., Kochetkov, V.M., Kurushin, R.A., Molnar, P., Philip, H., and Vashchilov, Y.Y., 1993, Ruptures of major earthquakes and active deformation in Mongolia and its surroundings: *Geol. Soc. America Memoir 181*, 62 p.

Barka, A.A., 1992, The North Anatolian fault zone: *Annales Tectonicae, Special Issue, Supp. to 6*:164-195.

Barka, A., Akyüz, H.S., Altunel, E., Sunal, G., Çakir, Z., Dikbas, A., Yerli, B., Armijo, R., Meyer, B., de Chabalier, J.B., Rockwell, T., Dolan, J.R., Hartleb, R., Dawson, T., Christofferson, S., Tucker, A., Fumal, T., Langridge, R., Stenner, H., Lettis, W., Bachhuber, J., and Page, W., 2002, The surface rupture and slip distribution of the 17 August 1999 Izmit earthquake (*M* 7.4), North Anatolian fault: *Seismol. Soc. America Bull. 92*:43-60.

Barka, A., and Eyidogan, H., 1993, The Erzincan earthquake of 13 March 1992 in eastern Turkey: *Terra Nova 5*:190-194.

Barka, A.A., and Kadinsky-Cade, K., 1988, Strike-slip fault geometry in Turkey and its influence on earthquake activity: *Tectonics 7*:663-684.

Barrientos, S.E., Stein, R.S., and Ward, S.N., 1987, Comparison of the 1959 Hebgen lake, Montana and 1983 Borah Peak, Idaho, earthquakes from geodetic observations: *Seismol. Soc. America Bull. 77*:784-808.

Bastias, H., 1985, Fallamiento Cuaternario en la region sismotectonica de precordillera: San Juan, Argentina, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de San Juan, Tesis Doctoral inedita, 160p.

Beanland, S., Blick, G.H., and Darby, D.J., 1990, Normal faulting in a back arc basin: geological and geodetic characteristics of the 1987 Edgecumbe earthquake, New Zealand: *Jour. Geophys. Res. 95*:4693-4707.

Beanland, S., and Clark, M., 1994, The Owens Valley fault zone, eastern California, and surface rupture associated with the 1872 earthquake: *U.S.G.S. Bull. 1982*, 29 p.

Bellier, O., Dumont, J.F., Sébrier, M., and Mercier, J.L., 1991, Geological constraints on the kinematics and fault-plane solution of the Quiches fault zone reactivated during the 10 November 1946 Ancash earthquake: *Seismol. Soc. America Bull. 81*:468-490.

Ben Menahem, A., 1991, 4000 years of seismicity along the Dead Sea rift: *Jour. Geophys. Research 96*:195-216.

Bennett, J.H., Sherburne, R.W., Cramer, C.H., Chesterman, C.W., and Chapman, R.H., 1979, Stephens Pass earthquakes, Mount Shasta - August 1978, Siskiyou County, California: *California Geology 32*(2):27-34.

Berberian, M., 1976, Documented earthquake faults in Iran: Geol. Surv. Iran Rep. no 39:175-183.

Berberian, M., 1979, Earthquake faulting and bedding thrust associated with the Tabas-e-

Golshan (Iran) earthquake of September 16, 1978: *Seismol. Soc. America Bull. 69*:1861-1887.

Berberian, M., 1981, Active faulting and tectonics of Iran, in Gupta, H.W., and Delany, F.M., eds., Zagros, Hindu Kush, Himalaya geodynamic evolution: *American Geophys. Union Geodynamics Series 3*:33-69.

Berberian, M., 1982, Aftershock tectonics of the 1978 Tabas-e-Golshan (Iran) earthquake sequence: a documented active 'thin- and thick-skinned tectonic' case: *Geophys. Jour. Roy. Astr. Soc. 68*:499-530.

Berberian, M., 1995, Master “blind” thrust faults hidden under the Zagros folds: Acive basement tectnoics and surface morphotectonics: *Tectonophysics 241*:193-224.

Berberian, M., 2005, The 2003 Bam urban earthquake: A predictable seismotectonic pattern along the western margin of the rigid Lut block, southeast Iran: *Earthquake Spectra 21*(S1):S35-S99.

Berberian, M., and Tchalenko, J.S., 1976, Field study and documentation of the 1930 Salmas (Shahpur-Azarbaidjan) earthquake: *Geol. Surv. Iran 39*:271-342.

Berberian, M., and Arshadi, S., 1977, The Shibly rift system (Sahand region, NW Iran): *Geol. Min. Surv. Iran 40:*229-235.

Berberian, M., Asudeh, I., and Arshadi, S., 1979, Surface rupture and mechanism of the Bob-Tangol (southeastern Iran) earthquake of 19 December 1977: *Earth and Planet Sci. Lett. 42*:456-462.

Berberian, M., Jackson, J.A., Ghorashi, M., and Kadjar, M.H., 1984, Field and teleseismic observations of the 1981 Golbaf-Sirch earthquakes in SE Iran: *Geophys. Jour. Roy. Astron. Soc. 77*:809-838.

Berberian, M., Qorashi, M., Jackson, J.A., Priestley, K., and Wallace, T., 1992, The Rudbar-Tarom earthquake of 20 June 1990 in NW Persia: preliminary field and seismological observations and its tectonic significance: *Seismol. Soc. America Bull. 82*:1726-1755.

Berberian, M., and Qorashi, M., 1994, Coseismic fault-related folding during the South Golbaf earthquake of November 20, 1989, in southeast Iran: *Geology 22*:531-534.

Berberian, M., Qorashi, M., Jackson, J.A., Priestley, K., and Wallace, T., 1992, The Rudbar-Tarom earthquake of 20 June 1990 in NW Persia: preliminary field and seismological observations and its tectonic significance: *Seismol. Soc. America Bull. 82*:1726-1755.

Berberian, M., and Yeats, R.S., 1999, Patterns of historical earthquake rupture in the Iranian Plateau: *Seismol. Soc. America Bull. 89*:120-139.

Berberian, M., Jackson, J.A., Qorashi, M., Khatib, M.M., Priestley, K., Talebian, M., and Ghafoury-Ashtiany, M., 1999, The 1997 May 10 Zirkuh (Qa’enat) earthquake (Mw 7.2): Faulting along the Sistan suture zone of eastern Iran: *Geophys. Jour. Internat. 136*:671-694.

Berberian, M., Jackson, J.A., Qorashi, M., Talebian, M., Khatib, M.M., and Priestley, K., 2000, The 1994 Sefidabeh earthquakes in eastern Iran: Blind thrusting and bedding-plane slip on a growing anticline, and active tectonics of the Sistan suture zone: *Geophys. Jour. Internat. 142*:283-299.

Berberian, M., Jackson, J.A., Fielding, E., Parsons, B.E., Priestley, K., Qorashi, M., Talebian, M., Walker, R., Wright, T.J., and Baker, C., 2001, The 1998 March 14 Fandoqa earthquake (Mw 6.6) in Kerman province, southeast Iran: Re-rupture of the 1981 Sirch earthquake fault, triggering of slip on adjacent thrusts and the active tectonics of the Gowk fault zone: *Geophys. Jour. Internat. 146*:371-398.

Berberian, M., and Yeats, R.S., 2001, Contribution of archaeological data to studies of earthquake history in the Iranian Plateau: *Jour. Structural Geology 23*:563-584.

Berryman, K.R., 1980, Late Quaternary movement on White Creek fault, South Island, New Zealand: *New Zealand Jour. Geol. Geophysics 23*:93-101.

Berryman, K.R., 2004, Surface rupture of the Poulter fault in the 1929 March 9 Arthur’s Pass earthquake, and redefinition of the Kakapo fault, New Zealand: *New Zealand Jour. Geology and Geophysics 47*:341-359, doi:10.1080/00288306.2004

Berryman, K., and Villamor, P., 2004, Surface rupture of the Poulter fault in the 1929 March 9 Arthurs Pass earthquake, and redefinition of the Kakapo fault, New Zealand: *New Zealand Jour. Geology and Geophysics 49*:47:341-351, doi:10.1080/00288306.2004.9515060.

Bjarnason, I.T., Cowie, P., Anders, M.H., Seeber, L., and Scholz, C.H., 1993, The 1912 Iceland earthquake rupture: growth and development of a nascent transform system: *Seismol. Soc. America Bull. 83*:416-435.

Bogdanovich, K.I., Kark, I.M., Korolkov, B.Ya., and Mushketov, D.I., 1914, Earthquake in the northern districts of the Tien Shan, 22 December 1910 (4 January 1911): Commission of the Geology Committee, Leningrad, USSR (R).

Bolt, B.A., McEvilly, T.V., and Uhrhammer, R.A., 1981, The Livermore Valley, California, sequence of January 1980: *Seismol. Soc. America Bull. 71*:451-463.

Bonchev, S., and Bakalov, P., 1928, Les tremblements de terre dans la Bulgarie du Sud les 14 et 18 avril 1928: *Rev. Soc. Géol. Bulgarie 1*(2):51-63.

Bonilla, M.G., 1977, Summary of Quaternary faulting and elevation changes in Taiwan: *Geol. Soc. China Mem. 2:*43-55.

Bonilla, M.G., 1988, Minimum earthquake magnitude associated with coseismic surface faulting: Assoc. Engineering Geol. Bull. 25:17-29.

Bonilla, M.G., and Buchanan, J.M., 1970, Interim report on worldwide historic surface faulting: U.S. Geol. Survey Open-File Report 70-34, 32 p.

Bonilla, M.G., Lienkaemper, J.J., and Tinsley, J.C., 1980, Surface faulting near Livermore, California associated with the January 1980 earthquakes: *U.S. Geol. Survey Open-File Report 80-523*, 31 p.

Bonilla, M.G., Mark, R.G., and Lienkaemper, J.J., 1984, Statistical relations among earthquake magnitude, surface rupture length, and surface fault displacement: *Seismol. Soc. America Bull. 74*:2379-2411.

Bounif, A., Haessler, H., and Meghraoui, M., 1987, The Constantine (northeast Algeria) earthquake of October 27, 1985: surface ruptures and aftershock study: *Earth and Planet. Sci. Lett. 85*:451-460.

Bray, J.D., 2001, Developing mitigation measures for the hazards associated with earthquake surface fault rupture, *in* A Workshop on Seismic Fault-Induced Failures—Possible Remedies for Damage to Urban Facilities, Research Project 2000 Grant-in-Aid for Scientific Research (No. 12355020): Japan Society for the Promotion of Science, Workshop Leader K. Konagai, p. 55-79.

Bray, J.D., and Kelson, K.I., 2006, Observations of surface fault rupture from the 1906 earthquake in the context of current practice: *Earthquake Spectra 22* (S2):S69-S89.

Brown, R.D., Vedder, J.G., Wallace, R.E., Roth, E.F., Yerkes, R.F., Castle, R.O., Waanonen, A.O., Page, R.W., and Eaton, J.P., eds., 1967, The Parkfield-Cholame, California, earthquakes of June-August 1966--Surface geologic effects, water-resources aspects, and preliminary seismic data: *U.S. Geol. Survey Prof. Paper 579*, 66 p.

Brown, R.D., Ward, P.L., and Plafker, G., 1973, Geologic and seismologic aspects of the Managua, Nicaragua, earthquakes of December 23, 1972: *U.S. Geol. Survey Prof. Paper 838*, 34 p.

Bucknam, R.C., Plafker, G., and Sharp, R.V., 1978, Fault movement (afterslip) following the Guatemala earthquake of February 4, 1976: *Geology 6*:170-173.

Burkart, B., 1965, Geology of the Esquipulas, Chanmagua, and Cerro Montecristo quadrangles, southeastern Guatemala: unpub. PhD thesis, Rice University, Houston, Texas

Buwalda, J.P., and St. Amand, P., 1955, Geological effects of the Arvin-Tehachapi earthquake, in Earthquakes in Kern County, California, during 1952: *Calif. Div. Mines Bull. 171*:41-56.

Byerly, P., and Wilson, J.T., 1935, The central California earthquakes of May 16, 1933 and June 7, 1934: *Seismol. Soc. America Bull. 25*:223-246.

Callaghan, E., and Gianella, V.P., 1935, The earthquake of January 30, 1934, at Excelsior Mountains, Nevada: *Seismol. Soc. America Bull. 25*:161-168.

Canora, C., Martínez-Díaz, J.J., Villamor, P., Berryman, K., Álvarez-Gómez, J.A., Pullinger, C., and Capote, R., 2010, Geological and seismological analysis of the 13 February 2001 Mw 6.6 El Salvador earthquake: Evidence for surface rupture and implications for seismic hazard: *Seismol. Soc. America Bull. 100*:2873-2890, doi:10.1785/0120090377.

Cao Z., Shen X., Song F., Wang Y., Yu W., and Li Z., 1994,Research on surface rupture zone of the 1500 Yiliang earthquake, Yunnan: *Research on Active Fault 3*:104-114 (C, Eng. abs.).

Carver, G., Plafker, G., Metz, M., Cluff, L., Slemmons, B., Johnson, E., Roddick, J., and Sorensen, S., 2004, Surface rupture on the Denali fault interpreted from tree damage during the 1912 Delta River Mw 7.2-7.4. earthquake: Implications for the 2002 Denali fault earthquake slip distribution: *Seismol. Soc. America Bull. 94*:S58-S71.

Caskey, J., pers. commun.

Castellanos, A., 1945, El terremoto de San Juan, *in* Cuatro Lecciones sobre Terremotos, p. 79-242: Asociación Cultural de Conferencias de Rosario, Argentina.

Chang L.S., Chow M., and Chen P.Y., 1947, The Tainan earthquake of December 5, 1946: *Geol. Survey Taiwan Bull 1*:17-20.

Chatzipetros, A., Valkaniotis, S., Papathanassiou, G. Sboras, S., Neofotistos, P., Mavrodis, P., and Pavlides, S., 2008, Quick report on the surface effects of the June 8, 2008, NW Peloponnese earthquake: Aristotle Univesity of Thessaloniki, Dept. of Geology team.

Chen R. and Li P., 1988, Slip rates and earthquake recurrence intervals of the western branch of Xiaojiang fault zone: *Seismology and Geology 10* (2):1-13.

Clark, D., McPherson, A., and Collins, C.D.N., 2011, Australia’s seismogenic neotectonic record: A case for heterogeneous intraplate deformation: *Geoscience Australia Record 2011/11*, 95 p.

Clark, M.M., 1972, Surface rupture along the Coyote Creek fault, in The Borrego Mountain Earthquake of April 9, 1968: *U.S. Geol. Survey Prof. Paper 787*:55-86.

Clark, M.M., Sharp, R.V., Castle, R.O., and Harsh, P.W., 1976, Surface faulting near Lake Oroville, California, in August, 1975: *Seismol. Soc. America Bull. 66*:1101-1110.

Clark, M.M., Yount, J.C., Vaughan, P.R., and Zepeda, R.L., 1982, Map showing surface ruptures associated with the Mammoth Lakes, California, earthquakes of May 1980: *U.S. Geol. Survey Misc. Field Studies Map MF-1396*.

Cluff, L.S., 1977, Notes of visit to Koyna Dam, India, January 14, 15, 16, 1977: Unpub. report to U.S. Bureau of Reclamation.

Costa, C., Machette, M.N., Dart, R.L., Bastias, H.E., Paredes, J.D., Petrucca, L.P., Tello, G.E., and Haller, K.M., 2000, Map and database of Quaternary faults and folds in Argentina: *U.S. Geological Survey Open-File Report 00-108*, 76 p., map.

Costa, C.H., Smalley, R., Schwartz, D.P., Stenner, H.D., Ellis, M., Ahumada, E.A., and Velasco, M.S., 2006, Paleoseismic observations of an onshore transform boundary: The Magallanes-Fagnano fault, Tierra del Fuego, Argentina: *Revista de la Asociación Geológica Argentina 61*:647-657.

Cowan, H.A., 1991, The North Canterbury earthquake of September 1, 1888: *Jour. Royal Soc. New Zealand 21*:1-12.

Crone, A.J., Machette, M.N., Bonilla, M.G., Lienkaemper, J.J., Pierce, K.L., Scott, W.E., and Bucknam, R.C., 1987, Surface faulting accompanying the Borah Peak earthquake and segmentation of the Lost River fault, central Idaho: *Seismol. Soc. America Bull. 77*:739-770.

Crone, A.J., Machette, M.N., and Bowman, J.R., 1997, Geologic investigations of the 1988 Tennant Creek, Australia, earthquakes--implications for paleoseismicity in stable continental regions: *U.S. Geol. Survey Bull. 2032-A*, 51 p.

Crone, A.J., Personius, S.F., Craw, P.A., Haeussler, P.J., and Staft, L.A., 2004, The Susitna Glacier thrust fault: Characteristics of surface ruptures on the fault that initiated the 2002 Denali fault earthquake: *Seismol. Soc. America Bull. 94*:S5-S22.

Daëron, M., Klinger, Y., Tapponnier, P., Elias, A., Jacques, E., and Sursock, A., 2005, Sources of the large A.D. 1202 and 1759 Near East earthquakes: *Geology 33*:529-532.

Daëron, M., Klinger, Y., Tapponnier, P., Elias, A., Jacques, E., and Sursock, A., 2007, 12,000-year-long rexord of 10 to 13 paleoearthquakes on the Yammoûneh fault, Levant Fault System, Lebanon: *Seismol. Soc. America Bull. 97*:749-771.

Dai H.G., 1983, On the Dari earthquake of 1947 in Qinghai Province: *Northwestern Seismological Journal 5*, 3:71-77. (C).

Darby, D.J. and Beanland, S., 1992, Possible source models for the 1855 Wairarapa earthquake, New Zealand: *Jour. Geophys. Res. 97*:12,375-12,389.

Daryono, M.R, Natawidjaja, D.H., and Sieh, K., 2011, Twin surface ruptures of the March 2007 magnitude 6+ earthquake doublet on the Sumatran fault: In review, *Seismol. Soc. America Bull*.

Davison, C., 1893, Note on the Quetta earthquake of Dec. 20, 1892: *Geol. Mag. 10*:356-360.

Day, S.J., Watts, P., Grilli, S.T., and Kirby, J.T., 2005, Mechanical models of the 1975 Kalapana, Hawaii earthquake and tsunami: *Marine Geology 215*:59-92.

Delouis, B., Monfret, T., Dorbath, L., Pardo, M., Rivera, L., Comte, D., Haessler, H., Caminade, J.P., Ponce, L., Kausel, E., and Cisternas, A., 1997, The Mw = 8.0 Antofagasta (northern Chile) earthquake of 30 July 1995: A precursor to the end of the large 1877 gap: *Seismol. Soc. America Bull. 87*:427-445.

Deng Q.D., Wang T.M., Li J.G., Xiang H., and Cheng S.P., 1976, A discussion on source model of Haicheng earthquake: *Scientia Geologica Sinica 3*:195-204. (C).

Deng Q., and Zhang P., 1984, Research on the geometry of shear fracture zones: *Jour. Geophys. Res. 89*:5699-5710.

Deng Q.D., Wang Y., Liao Y., Zhang W., and Li M., 1984, Fault scarps, colluvial wedges on the frontal fault of Mt. Helanshan and its active history during Holocene: *Chinese Science Bull. 9*:557-560. (C).

Deng Q.D., Chen S., Song F.M., Zhu S., Wang Y., Zhang W., Burchfiel, B.C., Molnar, P., Royden, L., and Zhang P., 1986, Variations in the geometry and amount of slip on the Haiyuan fault zone, China and the surface rupture of the 1920 Haiyuan earthquake: *Earthquake Source Mechanics, Geophysical Monograph 37*:169-182.

Deng Q., Zhang W., Wang Y., Zhang P., and Song F., 1990, *Haiyuan active fault*: Seismological Press, Beijing, 286 p. (C).

Deng Q., Yu G., and Ye W., 1992, Relationship between earthquake magnitude and parameters of surface ruptures associated with historical earthquakes: *Research on Active Fault 2*:247-265 (C, Eng. abs.).

Denyer, P., Arias, O., and Personius, S., 1994, Efecto tectónico del terremoto de Limón: *Revista Geológica de América Central, Special Volume (Terremoto de Limón),* p. 39-52.

dePolo, C.M., and Ramelli, A.R., 1987, Preliminary report on surface fractures along the White Mountains fault zone associated with the July 1986 Chalfant Valley earthquake sequence: *Seismol. Soc. America Bull. 77*:290-296.

dePolo, C.M., Clark, D.G., Slemmons, D.B., and Ramelli, A.R., 1991, Historical surface faulting in the Basin and Range province, western North America: implications for fault segmentation: *Jour. Structural Geology 13*:123-136.

Ding G.Y., chief ed., 1985, *The Fuyun earthquake fault zone in Xinjiang, China*: Beijing, Seismological Press, 206p. (C).

Dogan, B., Karakas, A., and Karaagaç, S., 2011, Preliminary report of the Van (Bardakçı, Kozluca villages) earthquake on October 2011: University of Kocaeli, Engineering faculty, Department of Engineering Geology (in Turkish).

Dolomieu, D. G. de, 1784, *Memoire sur les tremblements de terre de la Calabre pendant l’année 1783*: Rome, Antoine Fulgoni, 70 p.

Dorbath, C., van der Woerd, J., Arefiev, S.S., Rogozhin, E.A., and Aptekman, J.Y., 2008, Geological and seismological field observations in the epicentral region of the 27 September 2003 Mw 7.2 Gorny Altay earthquake (Russia): *Seismol. Soc. America Bull. 98*:2849-2865.

###### Doser, D.I., 1987, The Ancash Peru earthquake of November 19, 1946-Evidence for low-angle normal faulting in the high Andes of northern Peru. *Jour. Geophys. Research, 91*: 57-71.

Doser, D.I., 1989, Extensional tectonics in northern Utah-southern Idaho, U.S.A., and the 1934 Hansel Valley sequence: *Physics of the Earth and Planetary Interiors 54*:120-134.

Doser, D.I., 1994, Contrasts between source parameters of M > 5.5 earthquakes in northern Baja California and southern California: *Geophys. Jour. Internat. 116*:605-617.

ERI (Earthquake Research Institute), 1936, Papers and reports on the Formosa earthquake of 1935: Tokyo Univ., *Earthquake Res. Inst. Bull., Supp. 3*, 238 p.

Einarsson, P., Bjornsson, S., Foulger, G., Stefansson, R., and Skaftadottir, T., 1981, Seismicity pattern in the South Iceland seismic zone, in Simpson, D., and Richards, P.G., eds., Earthquake Prediction: an international review: *Amer. Geophys. Union Maurice Ewing Series 4*:141-151.

Einarsson, P., and Eiríksson, J., 1982, Earthquake fractures in the districts Land and Rangárvellir in the South Iceland Seismic Zone: *Jökull 32*:113-120.

Elias, A., Tapponnier, P., Singh, S.C., King, G.C.P., Briais, A., Daëron, M., Carton, H., Sursock, A., Jacques, E., Jomaa, R., and Klinger, Y., 2007, Active thrusting offshore Mount Lebanon: Source of the tsunamigenic A.D. 551 Beirut-Tripoli earthquake: *Geology 35*:755-758.

Ellenblum, R., Marco, S., Agnon, A., Rockwell, T., and Boas, A., 1998, Crusader castle torn apart by earthquake at dawn, 20 May 1202: *Geology 26*:303-306.

Erentöz, C., and Kurtman, F., 1964, Rapport sur la tremblement de terre de Manyas survenir en 1964: *Bull. Min Res. Expl. Inst. Turkey 63*:1-8.

Esfezari, 1493, The paradise gardens in describing the City of Harat (Rauzat al-Janat fi Ausaf Madinat Harat), 2 vols., Sayyed Mohammad Kazem Emami, ed, republished in Tehran, 1959 (in Persian).

Eyidogan, H., and Jackson, J.A., 1985, A seismological study of normal faulting in the Demirci, Alasehir and Gediz earthquakes of 1969-1970 in western Turkey: Implications for the nature and geometry of deformation in the continental crust: *Geophys. Jour. Royal Astron. Soc. 81*:569-607.

Eyidogan, H., Nalbant, S.S., Barka, A., and King, G.C.P., 1999, Static stress changes induced by the 1924 Pasinler (M = 6.8) and 1983 Horasan-Narman (M = 6.8) earthquakes, noartheastern Turkey: *Terra Nova 11*:38-44.

Farah, A., 1976, Study of recent seismotectonics in Pakistan: *Report CENTO Working Group on Recent Tectonics*, Istanbul.

Feng X., 1987, Paleoseismological study for Kaxhe fault zone, Xinjiang: *Seismology and Geology 9*, 2:74-77. (C, Eng. abs.).

Feng X., 1994, Surface rupture associated with the 1985 Wuqia earthquake, in Xinjiang: *Research on Active Fault 3*:45-55 (C, Eng. abs.).

Feng X., Luan C., Li J., and Zhang Y., 1988, The deformation zone of Wuqia earthquake of M=7.4 in 1985: *Seismology and Geology 10*, 2:39-44. (C, Eng. abs.).

Fenton, C.H., and Bommer, J.J., 2006, The Mw 7 Machaze, Mozambique, earthquake of 23 February 2006: *Seismological Research Letters 77*:426-439.

Fletcher, J., Rockwell, T.K., Teran, O., Masana, E., Paneros, G., Hudnut, K., Gonzalez, J., Gonzalez, A., Spelz, R., and Mueller, K., 2010, The surface ruptures associated with the El Mayor-Borrego earthquake sequence: Geological Society of America, Cordilleran section, Abs. LB 1-5, Anaheim, California.

Florensov, N.A., and Solonenko, V.P., 1965, The Gobi-Altai earthquake: Moscow, Nauka, 1963 (R). English translation available from U.S. Dept. of Commerce, Springfield, VA, 1965.

Fumal, T.E., Pezzopane, S.K., Weldon, R.J., and Schwartz, D.P., 1993, A 100-year average recurrence interval for the San Andreas fault at Wrightwood, California: *Science 259*:199-203.

Fumal, T.E., Weldon, R.J., II, Biasi, G.P., Dawson, T.E., Seitz, G.G., Frost, W.T., and Schwartz, D.P., 2002, Evidence for large earthquakes on the San Andreas fault at the Wrightwood, California, paleoseismic site: A.D. 500 to present: *Seismol. Soc. America Bull. 92*:2726-2760.

Furuya, M., and Satyabala, S.P., 2008, Slow earthquake in Afghanistan detected by InSAR: *Geophys. Res. Lett. 35*, L06309, doi:10.1029/2007GL033049.

Galadino, F., and Galli, 1999, The Holocene paleoearthquakes on the 1915 Avezzano earthquake faults, central Italy: Implications for active tectonics in the central Apennines: *Tectonophysics 308*:143-170.

Gao W., Zheng L., and Lin Z., 1988, Earthquake-generating structures of the 1668 Tancheng earthquake with M=8.5: *Earthquake Research in China 4*, 3:9-15. (C).

Ghose, S., Mellors, R.J., Korjenkov, A.M., Hamburger, M.W., Pavlis, T.L., Pavlis, G.L., Omuraliev, M., Mamyrov, E., and Muraliev, A.R., 1997, The Ms = 7.3 Suusamyr, Kyrgyzstan, earthquake in the Tien Shan: 2. Aftershock focal mechanisms and surface deformation: *Seismol. Soc. America Bull. 87*:23-38.

Gianella, V.P., 1957, Earthquakes and faulting, Fort Sage Mountains, California, December, 1950: *Seismol. Soc. America Bull. 47*:1173-177.

Gianella, V.P., and Callaghan, E., 1934, The Cedar Mountain, Nevada, earthquake of December 20, 1932: *Seismol. Soc. America Bull. 24*:345-377.

Gordon, F.R., and Lewis, J.D., 1980, The Meckering and Calingiri earthquakes October 1968 and March 1970: *Geol. Survey of Western Australia Bull. 126*, 229 p.

Gouin, P., 1979, Earthquake history of Ethiopia and the Horn of Africa: Ottawa, Canada, *International Development Research Centre Monograph IDRC-118e*, 258 p.

Grange, L.I., 1932, Taupo earthquakes 1922. Rents and faults formed during earthquake of 1922 in Taupo district: *New Zealand Jour. Sci. Technology 14*:139-141.

Grant, L., and Donnellan, A., 1994, 1855 and 1991 surveys of the San Andreas fault: Implications for fault mechanics: *Seismol. Soc. America Bull. 84*:241-246.

Grant, L.B., and Sieh, K., 1993, Stratigraphic evidence for 7 meters of dextral slip on the San Andreas fault during the 1857 earthquake in the Carrizo Plain: *Seismol. Soc. America Bull. 83*:619-635.

Grapes, R., Little, T., and Downes, G., 1998, Rupturing of the Awatere fault during the 1848 October 16 Marlborough earthquake: *New Zealand Jour. Geology and Geophysics 41*, 388.

Griesbach, C.L., 1893, Notes on the earthquake in Baluchistan on the 20th December 1892: *Geol. Survey India Records 26*, part 2:57-61.

Grindley, G.W., and Hull, A.G., 1986, Historical Taupo earthquakes and earth deformation: *Royal Soc. New Zealand Bull. 24*:173-186.

Groeber, P., 1944, Movimientos tectónicos contemporáneos: *Univ. Nac. La Plata Notas Mus. Geol. 9*:263-375.

Guo J., Lin A., Sun G., and Zheng J., 2007, Surface ruptures associated with the 1937 *M* 7.5 Tuosuo Lake and the 1963 *M* 7.0 Alake Lake earthquakes and the paleoseismicity along the Tuosuo Lake segment of the Kunlun fault, northern Tibet: *Seismol. Soc. America Bull. 97*:474-496.

Guo S., Li Z., Cheng S., Chen X.C., Chen X., Yang Z., and Li R.C., 1977, Discussion on the regional structural background and the seismogenic model of the Tangshan earthquake: *Scientia Geologica Sinica 4*:305-321. (C, Eng. abs.).

Guo S., Xiang H., Zhang J., Hu R., and Zhang G., 1988, Discussion on the deformation band and magnitude of the 1511 Yongsheng earthquake in Yunnan Province: *Jour. Seismological Research 11*, 2:153-162. (C. Eng. abs.).

Guo S.M., Xiang H., Wang Z., Ji F., and Li B.D., 1993, *Active fault zones in Mt. Qilianshan and Hexizoulong regions*: Seismological Press, Beijing, 285 p. (C).

Gupta, H., 1993, The deadly Latur earthquake: *Science 262*:1666-1667.

Haeussler, P.J., Schwartz, D.P., Dawson, T.E., Stenner, H.D., Lienkaemper, J.J., Sherrod, B., Cinti, F.R., Montone, P., Craw, P.A., Crone, A.J.,and Personius, S.F., 2004, Surface rupture and slip distribution of the Denali and Totschunda faults in the 3 November 2002 M 7.9 earthquake, Alaska: *Seismol. Soc. America Bull. 94*:S23-S52.

Harrington, H.J., 1944, El sismo de San Juan; del 15 enero de 1944: Buenos Aires Corporación para la promoción del intercambio, 79 p.

Hauksson, E., Stock, J., Hutton, K., Yang, W., Vidal-Villegas, J.A., and Kanamori, H., 2010, The 2010 Mw 7.2 El Mayor-Cucapah earthquake sequence, Baja California, Mexico and southernmost California, USA: Active seismotectonics along the Mexican Pacific margin: *Pure Appl. Geophys*., doi:10.1007/s00024-010-0209-7.

Hecker, S., 1993, personal commun.

Henderson, J., 1933, The geological aspects of the Hawke’s Bay earthquakes: *New Zealand Jour. Sci. Technology 15*:38-75.

Henderson, J., 1937, The west Nelson earthquake of 1929: *New Zealand Jour. Sci. Technology 19*(2):66-143.

Henstock, T.J., McNeill, L.C., and Tappin, D.R., 2006, Seafloor morphology of the Sumatran subduction zone: Surface rupture during megathrust earthquakes? *Geology 34*:485-488, doi:10.1130/22426.1.

Heuckroth, L.E., and Karim, R.A., 1970, Earthquake history, seismicity and tectonics of the regions of Afghanistan: Seismological Center, Faculty of Engineering, Kabul University, 102 p.

Herd, D.G. et al., 1979, Surface faulting accompanying the August 6, 1979, Coyote Lake earthquake: *EOS 60*:890.

Hill, R.L., and Beeby, D.J., 1977, Surface faulting associated with the 5.2 magnitude Galway Lake earthquake of May 31, 1975, Mojave Desert, San Bernardino County, California: *Geol. Soc. America Bull. 88*:1378-1384.

Hill, R.L., Pechmann, J.C., Treiman, J.A., McMillan, J.R., Given, J.W., and Ebel, J.E., 1980, Geologic study of the Homestead Valley earthquake swarm of March 15, 1979: *California Geology 33*:60-67.

Hirabayashi, C.K., Rockwell, T.K., Wesnousky, S.G., Stirling, M.W., and Suárez-Vidal, F., 1996, A neotectonic study of the San Miguel-Vallecitos fault, Baja California, Mexico: *Seismol. Soc. America Bull. 86*:1770-1783.

Hirano, S., Nakata, T., and Sangawa, A., 1986, Fault topography and Quaternary faulting along the Philippine fault zone, central Luzon, the Philippines: *Jour. Geography 95*, 2:71-96. (J, Eng. abs.).

Hirooka, K., 1991, Quaternary paleomagnetic studies in Japan: *The Quaternary Research 30*:151-160.

Hollingsworth, J., Nazari, H., Ritz, J.-F., Salamati, R., Talebian, M., Baroudi, A., Walker, R.T., Rizza, M., and Jackson, J., 2010, Active tectonics of the east Alborz Mountains, NE Iran: Rupture of the left-lateral Astaneh fault system during the great 856 A.D. Qumis earthquake*: Jour. Geophys. Research 115*, B12313, doi:10.1029/2009JB007185.

Hou Z., ed., 1992, *Changma active fault zone*: Seismological Press, 219 p. (C).

Hull, A.G., 1990, Tectonics of the 1931 Hawke's Bay earthquake: *New Zealand Jour. Geology and Geophysics 33*:309-330.

Hull, A.G., and Grindley, G.W., 1983, Active faulting near Taupo: *EOS 65*:51-52.

Hsu, T.L., 1962, Recent faulting in the Longitudinal Valley of eastern Taiwan: *Memoir Geol. Soc. China 1*:95-102.

Hsu, T.L., 1976, Neotectonics of the Longitudinal Valley, eastern Taiwan: *Bull. Geol. Survey of Taiwan 25*:53-62.

Hsu, T.L., and Chang, H.C., 1979, Quaternary faulting in Taiwan: *Memoir Geol. Soc. China 3*:155-165.

Ihara, K., and Ishii, K., 1932, The earthquake of northern Izu: *Imp. Geol. Survey of Japan Rept. 112*, 111p (J) + 7 p. (Eng.).

Ikeda, Y., 1983, Thrust-front migration and its mechanisms—evolution of intraplate thrust fault systems: *Dept. Geography, Univ. Tokyo Bull. 15*:125-159.

Imamura, A., 1924, Preliminary note on the great earthquake of S.E. Japan on Sept. 1, 1923: *Seismological Notes 6*:1-22.

Imamura, A., 1928, The Tazima earthquake of 1925: *Imperial Earthquake Investigation Committee Bull. 10*:71-107.

Imamura, A., 1930, Topographical changes accompanying earthquakes or volcanic eruptions: *Publications of the Earthquake Investigation Committee in Foreign Languages 25*, 143 p.

Ishibashi, K., 1989, The possible activation of the Median Tectonic Line during the Keicho earthquake and its influence on the 1605 Nankai trough tsunami earthquake: *Seismol. Soc. Japan 1989, No. 1*, p. 62 (J).

Jackson, J.A., Gagnepain, J., Houseman, G., King, G.C.P., Papadimitriou, P., Soufleris, C., and Virieux, J., 1982, Seismicity, normal faulting, and the geomorphological development of the Gulf of Corinth (Greece): the Corinth earthquakes of February and March 1981: *Earth Planet. Sci. Lett. 57*:377-397.

Jackson, M.D., Endo, E.T., Delaney, P.T., Arnadottir, T., and Rubin, A.M., 1992, Ground ruptures of the 1974 and 1983 Kaoiki earthquakes, Mauna Loa volcano, Hawaii: *Jour. Geophys. Res. 97*:8775-8796.

Jankov, D., 1945, Changes in ground level produced by the earthquakes of April 14 and 18, 1928, in southern Bulgaria; Tremblements de terre en Bulgarie, nos. 29-31, *Institut météorologique central de Bulgarie*, Sofia, 131-136 (in Bulgarian).

Jia Y., Dai H., and Su X., 1988, Tuosuo Lake earthquake fault in Qinghai province, *in Research on Earthquake Faults in China, Xinjiang Seismological Bureau*, ed., Xinjiang Press: 66-71. (C).

Jia Y., Su X., Liu H., Chen Y., Dai H., and Hou K., 1994, Active characteristics of the eastern segment (Qilian-Shuangta segment) of the Huangcheng-Shuanta fault zone since late Pleistocene: *Research on Active Fault 3:*170-179 (C, Eng. abs.).

Johnson, A.M., and Fleming, R.W., 1993, Formation of left-lateral fractures within the Summit Ridge shear zone, 1989 Loma Prieta, California, earthquake: *Jour. Geophys. Res. 98*:21,823-21,837.

Junner, N.R., 1941, The Accra earthquake of 22nd June, 1939: *Gold Coast Geol. Survey Bull. 13*:1-67.

Kahle, J.E., Bryant, W.A., and Hart, E.W., 1986, Fault rupture associated with the July 21, 1986 Chalfant Valley earthquake, Mono and Inyo counties, California: *California Geology 39*:243-245.

Kahle, J.E., Wills, C.J., Hart, E.W., Treiman, J.A., Greenwood, R.B., and Kaumeyer, R.S., 1988, Preliminary report - surface rupture Superstition Hills earthquakes of November 23 and 24, 1987, Imperial County, California: *California Geology 41*:75-84.

Kakimi, T., Kinugasa, Y., Suzuki, Y., Kodama, K., and Mitsunashi, T., 1977, Geological researches on the Izu-Hanto-oki earthquake of 1974: *Geol. Survey Japan Spec. Rep. 6*:1-51(J, Eng. abs.).

Kamata, S., Hosono, T., Ito, K., and Hayakawa, M., 1966, A study on the geologic structures by sonic exploration around the epicenter of the Niigata earthquake, in Research Group of Niigata Earthquake, Report of the Geological Survey on the Niigata earthquake: *Geol. Survey of Japan Spec. Rept. 3*:32-42.

Kanamori, H., 1972, Determination of effective tectonic stress associated with earthquake faulting: The Tottori earthquake of 1943: *Physics of the Earth and Planet. Interiors 5*:1426-1434.

Kanamori, H., 1973, Mode of strain release associated with major earthquakes in Japan: *Earth Planet. Sci. Ann. Rev. 1*:213-239.

Kaneda, H., Kinoshita, H., and Komatsubara, T., 2008, An 18,000-year record of recurrent folding inferred from sediment slicer and cores across a blind segment of the Biwako-seigan fault zone, central Japan: *Jour. Geophys. Research 43*, B05401, doi:10.1029/2007JB005300.

Kaneda, H., Nakata, T., Tsutsumi, H., Kondo, H., Sugito, N., Awata, Y., Akhtar, S.S., Majid, A., Khattak, W., Awan, A.A., Yeats, R.S., Hussain, A., Ashraf, M., Wesnousky, S.G., and Kausar, A.B., 2008, Surface rupture of the 2005 Kashmir, Pakistan, earthquake and its active tectonic implications: *Seismol. Soc. America Bull. 98*:521-557, doi:10.1785/0120070073.

Keightley, W.O., 1975, Destructive earthquakes in Burdur and Bingöl, Turkey – May 1971: U.S. National Research Council, 82 p.

Kelson, K.I., Harder, L.F., Jr., Kishida, T., and Ryder, I., 2011, Preliminary observations of surface fault rupture from the April 11, 2011 Mw 6.6 Hamadoori earthquake, Japan: Geotechnical Extreme Events Reconnaissance (GEER).

Ketin, I., 1966, 6 Ekim 1964 Manyas depremi enasinda ziminde meydana gelen tansiyon çatlaklari: *Türkiye Jeoloji Kurumu Bülteni 10*:1-2.

Ketin, I., 1969, Über die nordanatolische Horizontalverschiebung: *Mineral. Res. Explor. Inst. Turk. 72*:1-28.

Ketin, I., and Abdüsselamoglu, S., 1969, 23 Mart 1969 Demicri ve 28 Mart 1969 Alasehir Sarigöl depremleri Hakkinda Makro-Sismik Gözlemler: *Maden Mecumuasi 4*, no. 5:21-26, Geol. Dept. Univ. Istanbul.

Ketin, I., and Roesli, F., 1954, Makroseismische Untersuchungen über das nordwestanatolische Beben wom 18 März 1953: *Eclogae Geol. Helvetiae 46*:187-208.

Khil'ko, S.D., Kurushin, R.A., Kochetkov, V.M., Balzhinnyam, I., and Monkoo, D., 1985, Strong earthquakes, paleoseismolgeological and macroseismic data, in Earthquakes and the Bases for Seismic Zoning of Mongolia: *The Joint Soviet-Mongolian Scientific Geological Research Expedition, Transactions 41*, Moscow Nauka 19-83.

Kinugasa, Y., 1976, The Izu-Hanto-oki earthquake of 1974 and Irozaki earthquake fault: *Geol. Soc. Japan Mem. 12*:139-149 (J, Eng. abs.).

Klepeis, K.A., 1994, The Magallanes and Deseado fault zones: Major segments of the South American-Scotia transform plate boundary in southernmost South America, Tierra del Fuego*: Jour. Geophys. Res. 99*:22,001-014.

Klinger, Y., Rivera, L., Haessler, H., and Maurin, J.-C., 1999, Active faulting in the Gulf of Aqaba: New knowledge from the Mw 7.3 earthquake of 22 November 1995: *Bull. Seismol. Soc. America 89*:1025-1036.

Koçiaj, S., and Sulstarova, E., 1980, The earthquake of June 1, 1905, Shkodra, Albania; intensity distribution and macroseismic epicentre: *Tectonophysics 67*:319-332.

Koto, B., 1893, On the cause of the great earthquake in central Japan, 1891: *Jour. College Science, Imperial Univ. Japan 5*(4):296-353.

Koukouvelas, I., Kokkalas, S., and Xypolias, P., 2008, Surface deformation during the Mw 6.4 (June 08, 2008) Movri Mt. earthquake, Greece (abs.). field report at <http://www.emsc-csem.org/Doc/20080608_GREECE/Surface_ruptures.pdf>.

Koukouvelas, I., 1998, The Egion fault, earthquake related and long term deformation, Gulf of Corinth, Greece. *J. Geodynamics 26*:501-513.

Koukouvelas, I., and Doutsos, T.T., 1996, Implications of structural segmentation during earthquakes: The 1995 Egion earthquake, Gulf of Corinth, Greece. *J. Struct. Geol. 18*:1381-1388.

Kuchai, V.K., 1969, Results of repeated examination of the remaining deformation in the pleistoseist of the Kebin earthquake: *Geol. Geophys.* 101-108 (R).

Lacombe, S., Mouthereau, F., Kargar, S., and Meyer, B., 2006, Late Cenozoic and modern stress fields in the western Fars (Iran): Implications for the tectonic and kinematic evolution of central Zagros: *Tectonics 25*, p. TC1003.

Lahr, K.M., Lahr, J.C., Lindh, A.G., Bufe, C.G., and Lester, F.W., 1976, The August 1975 Oroville earthquakes: *Seismol. Soc. America Bull. 66*:1085-1099.

Langer, C.J., Bonilla, M.G., and Bollinger, G.A., 1987, Aftershocks and surface faulting associated with the intraplate Guinea, west Africa, earthquake of 22 December 1983*: Seismol. Soc. America Bull. 77*:1579-1601.

Lawrence, R.D., Khan, S.H., and Nakata, T., 1992, Chaman fault, Pakistan-Afghanistan, in Bucknam, R.C., and Hancock, P.L., eds., Major active faults of the world. Results of IGCP Project 206: *Annales Tectonicae Special Issue, Supplement to 6*:196-223.

Lawson, A.C., chairman, 1908, The California earthquake of April 18, 1906 - report of the State Earthquake Investigation Committee: *Carnegie Institute, Washington, Pub. 87*, v. 1.

Lépine, J.C., Ruegg, J.-C., and Abdallah, A.M., 1980, Sismicité du rift d'Asal-Ghoubbet pendant la crise sismo-volcanique de novembre 1978: *Bull. Soc. Géol. France 22*:809-816

Lewis, J.D., Daetwyler, N.A., Bunting, J.A., and Moncrieff, J.S., 1981, The Cadoux earthquake, 2 June 1979: *Geol. Survey of Western Australia Report 11*, 133 p.

Li T., Du C., You Z., Zhang C., and Huang Q., 1992a, Recent activity of the Zheduotang fault and the earthquake of magnitude 7.5 in 1955: *Research on Active Fault 2*:15-23 (C., Eng. abs.).

Li T., Du Q., You Z., Zhang C., and Huang Q., 1992b, Activity of the Selaha-Kangding-Moxi (SKM) fault: *Research on Active Fault 2*:1-14 (C., Eng. abs.).

Lienkaemper, J.J., and Prescott, W.H., 1989, Historic surface slip along the San Andreas fault near Parkfield, California: *Jour. Geophys. Res. 94*:17,647-17,670.

Lienkaemper, J.J., Pezzopane, S.K., Clark, M.M., and Rymer, M.J., 1987, Fault fractures formed in association with the 1986 Chalfant Valley, California, earthquake sequence: preliminary report: *Seismol. Soc. America Bull. 77*:297-305.

Lin A., Jia D., Rao G., Wu X., Yan B., and Ren Z., 2011, Recurrent morphogenic earthquakes in the past millennium along the strike-slip Yushu fault, central Tibetan Plateau: *Seismol. Soc. America Bull*., in press.

Liu Qing, 1993, Paléoclimat et contraintes chronologiques sur les mouvements récents dans l'ouest du Tibet: failles du Karakorum et de Longmu Co-Gozha Co, lacs et pull-apart de Longmu Co et de Sumxi Co: Thése de doctorat, Univ. Paris VII, 358 p.

Lomnitz, C., and Hashizume, M., 1985, The Popayán, Colombia, earthquake of 31 March 1983: *Seismol. Soc. America Bull. 75*:1315-1326.

Long D., and Deng T., 1990, A preliminary study on the 1786 Kangding earthquake deformation characteristics: *Jour. Seism. Res. 13*, 1:50-60. (C, Eng. abs.).

Louderback, G.D., 1947, Central California earthquakes of the 1830's: *Seismol. Soc. America Bull. 37*:33-74.

Loupekine, I.S., 1966, The Toro earthquake of 20 March 1966: UNESCO Rep. RP/CON 0766, Paris.

Lyell, C., 1875, *Principles of Geology*, 12th edition.

Lyon-Caen, H., Armijo, R., Drakopoulos, J., Baskoutass, J., Delibassis, N., Gaulon, R., Kouskouna, V., Latoussakis, J., Makropoulos, K., Papadimitriou, P., Papanastassiou, D., and Pedotti, G., 1988, The 1986 Kalamata (South Peloponnesus) earthquake: detailed study of a normal fault, evidences for east-west extension in the Hellenic arc: *Jour. Geophys. Res. 93*:14,967-15,000.

Maasha, N., and Molnar, P., 1972, Earthquake fault parameters and tectonics in Africa: *Jour. Geophys. Res. 77*:5731-5743.

Macharé, J., Fenton, C.H., Machette, M.N., Lavenu., A., Costa, C., and Dart, R.L., 2003, Database and map of Quaternary faults and folds in Peru and its offshore region: *U.S. Geological Survey Open-File Report 03-451*, 49 p., map.

Machette, M.N., Crone, A.J., and Bowman, J.R., 1993, Geologic investigations of the 1986 Marryat Creek, Australia, earthquake--implications for paleoseismicity in stable continental regions: *U.S. Geol. Survey Bull. 2032-*B, 29 p.

Madeira, J, and Brum da Silveira, A., 2003, Active tectonics and first paleoeismological results in Faial, Pico and S. Jorge islands (Azores, Portugal): Annals of Geophysics 46:733-761.

Malloy, R.J., 1964, Crustal uplift southwest of Montague Island, Alaska: *Science 146*:1048-1049.

Marco, S., and Agnon, A., 2005, Repeated earthquake faulting revealed by high-resolution stratigraphy: *Tectonophysics 401*:101-112.

Marco, S., Hartal, M., Hazan, N., Lev, L., and Stein, M., 2003, Archaeology, history, and geology of the 749 AD earthquake, Dead Sea Transform: *Geology 31*:665-668.

Marshall, P., 1933, Effects of earthquake on coastline near Napier: *New Zealand Jour. Sci. Technology 15*:79-92.

Maruyama, T., Toda, S., and Yoshimi, M., 2010, Application of terrestrial LiDAR to detailed mapping of surface rupture of the 2008 Iwate-Miyagi, Japan, earthquake, *in* Toda, S., and Okumura, K., eds., Forecasting Large Earthquakes from Active Faults in Time and Space: Abstracts, Hokudan Internat. Symposium on Active Faults: January 17-21, 2010, p. 50.

Mason, D.P.M., and Little, T.A., 2006, Refined slip distribution and moment magnitude of the 1848 Marlborough earthquake, Awatere fault, New Zealand: *New Zealand Jour. Geology and Geophysics 49*:375-382.

Matsuda, T., 1967, Geological aspect of the Matsushiro earthquake fault: *Earthquake Research Inst., Univ. Tokyo Bull. 45*:537-550. (J, Eng. ats.).

Matsuda, T., 1974, Surface faults associated with Nobi (Mino-Owari) earthquake of 1891, Japan: Earthquake Research Inst., Univ. Tokyo, Spec. Bull. 13:85-126 (J, Eng. abs.).

Matsuda, T., Yamazaki, H., Nakata, T., and Imaizumi, T., 1980, The surface faults associated with the Rikuu earthquake of 1896: *Earthquake Res. Inst., Univ. Tokyo Bull. 55*:795-855.

Matsuda, T., Yui, M., Matsushima, Y., Imanaga, I., Hirata, D., Togo, M., Kashima, K., Matsubara, A., Nakai, N., Nakamura, T., and Matsuoka, K., 1988, Subsurface study of Isehara fault, Kanagawa prefecture, detected by drilling--depositional environments during the last 7000 years and fault displacement associated with the Gangyou earthquake in A.D. 878: *Earthquake Res. Inst., Univ. Tokyo, Bull. 63*:145-182.

Matumoto, T., 1959, Tesikaga earthquake of Jan. 31, 1959: *Earthquake Res. Inst. Bull. 37*:531-544 (J, Eng. abs.).

McCalpin, J., and Thakkar, M.G., 2003, 2001 Bhuj-Kachchh earthquake: Surface faulting and its relation with neotectonics and regional structures, Gujarat, western India: *Annals of Geophysics 46*:937-956.

McCalpin, J., Robinson, R.M., and Gan, J.D., 1987, Neotectonics of the Hansel Valley-Pocatello Valley corridor, northern Utah and southern Idaho: *U.S.G.S. Open-File Rept. 87-585*, v.1, p. G1-G44

McKay, A., 1890, On the earthquake of September 1888, in the Amuri and Marlborough districts of the South Island: *New Zealand Geol. Survey Reports of Geological Exploration 1885-1889*, 20:1-16.

Meghraoui, M., 1991, Blind reverse faulting system associated with the Mont Chenoua-Tipaza earthquake of 29 October 1989 (north-central Algeria): *Terra Nova 3*:84-93.

Meghraoui, M., Gomez, F., Sbeinati, R., van der Woerd, J., Mouty, M., Darkal, A.N., Radwan, Y., Layyous, I., al Najjar, H., Darawcheh, R., Hijazi, F., and al Ghazzi, R., and Barazangi, M., 2003, Evidence for 830 years of seismic quiescence from palaeosseismology, archaeology and historical seismicity along the Dead Sea fault in Syria: *Earth Planetary Sci. Lett. 210*:35-52.

Meghraoui, M., Delouis, B., Ferry, M., Giardini, D., Huggenberger, P., Spottke, I., and Granet, M., 2001, Active normal faulting in the Upper Rhine Graben and paleoseismic identification of the 1356 Basel earthquake: *Science 293*:2070-2073.

Meltzner, A.J., and Rockwell, T.K., 2004, The Tejon Pass earthquake of 22 October 1916: An *M* 5.6 event on the Lockwood Valley and San Andreas faults, southern California: *Seismol. Soc. America Bull. 94*:1293-1304.

Mercier, J.L., Mouyaris, N., Simeakis, C., Roundoyannis, T., and Angelidhis, C., 1979, Intraplate deformation: a quantitative study of the faults activated by the 1978 Thessaloniki earthquakes: *Nature 278*:45-48.

Mercier, J.L., Sébrier, M., Lavenu, A., Cabrera, J., Bellier, O., Dumont, J.-F., and Machare, J., 1992, Changes in the tectonic regime above a subduction zone of Andean type: the Andes of Peru and Bolivia during the Pliocene-Pleistocene: *Jour. Geophys. Res. 97*:11.945-11,982

Meyer, B., 1991, Mecanismes des grands tremblements de terre et du raccourcissement crustal oblique au bord nord-est du Tibet: Thèse de doctorat, Université Paris VI, 129 p.

Meyer, B., Tapponnier, P., Gaudemer, Y., Mercier, N., Valladas, H., Suo S., and Chen Z., 1991, 1932 Chang Ma (M = 7.6) earthquake surface breaks and implications on regional seismic hazard, *in* Proceedings of the first I.N.S.U.-S.S.B. Workshop, Earthquakes from Source Mechanism to Seismic Hazard, October 22-25, 1991, Institut de Physique du Globe de Paris.

Meyer, B., Armijo, R., Massonnet, B., de Chabalier, J.,B., Delacourt, C., Ruegg, J.C., Achache, J., Briole, P., and Papanastassiou, D., 1996, The 1995 Grevena (Northern Greece) earthquake: Fault model constrained with tectonic observations and SAR interferometry: *Geophys. Res. Lett. 23*:2677-2680.

Meyer, B., Sébrier, M., and Dimitrov, D., 2007, Rare destructive earthquakes in Europe: the 1904 Bulgaria event case: *Earth Planet. Sci. Lett. 253*:485-496.

Min, A., 2011, Yushu earthquake in western China: *Seismol. Soc. America Bull*., in press.

Molnar, P., and Deng Q., 1984, Faulting associated with large earthquakes and the average rate of deformation in central and eastern Asia: *Jour. Geophys. Research 89*:6203-6227.

Montero, W., Denyer, P., Barquero, R.,, Alvarado, G.E., Cowan, H., Machette, M.N., Haller, K.M., and Dart, R.L., 1998, Map and database of Quaternary faults and folds in Costa Rica and its offshore regions: *U.S. Geol. Survey Open-File Report 98-481*, 63 p., map.

Montessus de Ballore, F. de, 1924, *La Géologie Sismologique*: Paris, Librairie Armand Colin, 488 p., 118 fig., 16 pl.

Mocquet, A., Beltran, C., Lugo, M., Rodriguez, J.A., and Singer, A., 1996, Seismological interpretation of the historical data related to the 1929 Cumaná earthquake, Venezuela, *Third International Symposium on Andean Geodynamics, Saint-Malo (France), Sept. 17–19*, 1996, 203–206 (extended abs.)

Morante, E.M., and Allen, C.R., 1974, Displacement of the Philippine fault during the Ragay Gulf earthquake of 17 March 1973: *Geol. Soc. America Abs. with Programs 7*:744-745.

Mouyaris, N., Papastamatiou, D., and Vita-Finzi, C., 1992, The Helice fault? *Terra Nova 4*:124-129.

Mueller, K.J., and Rockwell, T.K., 1995, Late Quaternary activity of the Laguna Salada fault in northern Baja California, Mexico: *Geol. Soc. America Bull. 107*:8-18.

Munguía, L., Glowacka, E., Suárez-Vidal, F., Lira-Herrera, H, and Sarychikhina, O., 2009, Near-fault strong ground motions recorded during the Morelia normal-fault earthquakes of May 2006: *Seismol. Soc. America Bull. 99*:1538-1551, doi:10.1785/0120080256.

Mushketov, I.V., 1890, Verny earthquake: 28 May (9 June) 1887: *Commission of the Geology Committee, Leningrad, USSR*, 154 p. (R).

Myers, W.B., and Hamilton, W., 1964, Deformation accompanying the Hebgen Lake earthquake of August 17, 1959: *U.S. Geol. Survey Prof. Paper 435-I*, 55-98.

Nakata, T., 1996, Surface fault ruptures of the 1990 Luzon earthquake, Philippines*: Jour. Geography 00, 5*:95-112*, Research Center for Regional Geography, Hiroshima University, v. 25*, 86 p.

Nakata, T., Tsutsumi, H., Punongbayan, R.S., Rimando, R.E., Daligdig, J., and Daag, A., 1990, Surface faulting associated with the Philippine earthquake of 1990: *Jour. Geography 99*(5):95-112, J., Eng. abs.

Nakata T., Yomogida, K., Odaka, J., Sakamoto, T., Asahi, K., and Chida, N., 1995, Surface fault ruptures associated with the 1995 Hyogoken-Nanbu Earthquake. Journal of Geography 104:127–142, [J., Eng. abs.].

Natsag-Yüm, L., Balzhinnyam, I., and Monkho, D., 1971, Earthquakes of Mongolia, *in* *Seismic Regionalization of Ulan-Bator 54-82* (R).

Nowroozi, A.A., and Mohajer-Ashjai, A.M., 1980, Faulting of Kurizan and Koli (Iran) earthquakes of November 1979, a field report: *Bull. du Bureau de Recherches Geologiques et Minieres (2e series), Sec. IV, Geologie General, no. 2*:91-99.

Nowroozi, A.A., and Mohajer-Ashjai, A.M., 1985, Fault movements and tectonics of eastern Iran: boundaries of the Lut plate: *Geophys. Jour. Royal Astron. Soc. 83*:215-237.

Öcal, N., Uçar, S.B., and Taner, D., 1968, Manyas-Karacabey depremi 6 Ekim 1964: Istanbul Kandilli Rasathanesi, Sismoloji Yayinlari , v. 11, Kandilli Observatory Internal Report.

Okada, A., 1992, Proposal of the segmentation on the Median Tectonic Line active fault system: *Geol. Soc. Japan Memoir 40*:15-30. (J, Eng. abs.).

Okada, A., Ando, M., and Tsukuda, T., 1981, Trenches, late Holocene displacement and seismicity of the Shikano fault associated with the 1943 Tottori earthquake: *Ann. Rept. Disaster Prevention Research Inst., U. Kyoto*:105-126. (J, Eng. abs.).

Okada, A., Ando, M., and 'Tsukuda, T., 1987, Trenching study for Yasutomi fault of the Yamasaki fault system at Anji, Yasutomi Town, Hyogo Prefecture, Japan: *J. Geography 96*, 2:81-97. (J, Eng. abs.).

Okada, A., Takeuchi, A., Tsukuda, T., Ikeda, Y., Watanabe, M., Hirano, S., Masumoto, S., Takehana, Y., Okumura, K., Kamishima, T., Kobayashi, T., and Ando, M., 1989, Trenching study of the Atotsugawa fault at Nokubi, Miyagawa village, Gifu Prefecture, central Japan: *Jour. Geography 98*:440-463. (J, Eng. abs.).

Okada, A., Matsuda, T., Tsutsumi, H., Morooka, T., and Mizota, K., 1991, Was the latest event of the Median Tectonic Line during the 1596 Keicho earthquake (M=7.5)? - excavation study of the Chichio fault belonging to the Median Tectonic Line in Shikoku*: Seismol. Soc. Japan 1991, 2*, p. 264. (J).

Okamura, Y., Satoh, M., and Miyazaki, J., 1994, Active faults and folds on the shelf off Niigata and their relation to the 1964 Niigata earthquake: *Jour. Seismol. Soc. Japan 46*:413-423 (J, Eng. abs.).

Okumura, K., Shimokawa, K., Yamazaki, H., and Tsukuda, E., 1994, Recent surface faulting events along the middle section of the Itoigawa-Shizuoka Tectonic Line -- trenching survey of the Gofukuji fault near Matsumoto, central Japan: *Jour. Seismol. Soc. Japan 46*:425-438 (J, Eng. abs.).

Oldham, R.D., 1898, A note on the Allah Bund in the north-west of the Rann of Kucch: *Geol. Survey India Mem. 2*8:27-30.

Oldham, R.D., 1928: The Cutch (Kacch) earthquake of 16th June 1819, with a revision of the great earthquake of 12th June 1897: *Geol. Survey India Mem. 46*:71-147.

Omori, F., 1900, Notes on the Tokyo earthquake of June 20th, 1894: *Imperial Earthquake Investigation Committee in Foreign Languages 4*:25-33.

Omori, F., 1907, Preliminary note on the Formosa earthquake of March 17, 1906: *Imperial Earthquake Inves. Comm. Bull. 2*:53-69.

Omori, F., 1913, An account of the destructive earthquakes in Japan: *Reports of the Imperial Earthquake Investigation Committee in Japanese Language (translation) 68B*:1-180.

Omori, F., 1922, The Omachi (Shinano) earthquakes of 1918: *I: Imperial Earthquake Investigation Committee Bull. 10*:1-41.

Ongley, M., 1937, The Wairoa earthquake of 16th September 1932. 1. Field observations: *New Zealand Jour. Sci. Technology 18*:845-851.

Ongley, M., 1943, Surface trace of the 1855 earthquake: *Royal Soc. New Zealand Trans. 73*:84-99.

Page, W.D., 1986, Seismic geology and seismicity of Northwestern Colombia: San Francisco, California, Woodward-Clyde Consultants Report for ISA and Integral Ltda., Medellín, 200 p.

Paige, S., 1930, The earthquake at Cumana, Venezuela, January 17, 1929: *Seismol. Soc. America Bull. 20*:1-10.

Pantosti, D., and Valensise, G., 1990, Faulting mechanisms and complexity of the 23 November 1980, Campania-Lucania earthquake, inferred from surface observations: Jour. Geophys. Res. 95:15,319-15,341.

Pantosti, D., and Valensise, G., 1993, Irpinia earthquake fault based on field geologic observations: *Annali di Geofisica 36*:41-49.

Pantosti, D., Schwartz, D.P., and Valensise, G., 1993, Paleoseismology along the 1980 surface rupture of the Irpinia fault: implications for earthquake recurrence in the southern Apennines, Italy: *Jour. Geophys. Research 98:*6561-6577.

Papadopoulos, G.A., Drakatos, G., Papanastassiou, D., Kalogeras, I., and Stavrakakis, G., 2000, Preliminary results about the catastrophic earthquake of 7 September 1999 in Athens, Greece: *Seismol. Research Lett. 71*:318-329.

Papastamatiou, I., 1957, The earthquakes of Velestino of 8 March 1957: *Report Inst. Geologias and Erevnon Ypedaphos*, 11 p., Athens.

Papastamatiou, D., and Mouyaris, N., 1986, The earthquake of April 30, 1954, in Sophades (Central Greece): *Geophys. Jour. Roy. Astron. Soc. 87*:885-895.

Papazachos, B.C., Mountrakis, A., Psilovikos, A., and Leventakis, G., 1979, Surface fault traces and fault plane solutions of the May-June 1978 shocks in the Thessaloniki area, north Greece: *Tectonophysics 53*:171-183.

Papazachos, B., Panagiotopoulos, D., Tsapanos, T., Mountrakis, D., and Dimoupoulos, G., 1983, A study of the 1980 summer seismic sequence in the Magnesia region of central Greece: *Geophys. Jour. Roy. Astron. Soc. 75*:155-168.

Papazachos, B.C., and Papazachou, C., 1997, *The Earthquakes of Greece*: Editions ZITI, Thessaloniki, 304 p.

Paris, G., Machette, M.N., Dart, R.L., and Haller, K.M., 2000, Map and database of Quaternary faults and folds in Colombia and its offshore regions: U.S. Geol. Survey Open-File Report OFR 00-0284, 61 p.

Park, S.-C, and Mori, J., 2007, Triggering of earthquakes during the 2010 Papua New Guinea earthquake sequence: *Jour. Geophys. Research 112*, B03302, doi:10.1029/2006JB004480.

Pavlides, S.B., and Tranos, M.D., 1991, Structural characteristics of two strong earthquakes in the North Aegean: Ierissos (1932) and Agios Efstratios (1968): *Jour. Structural Geology 13*:205-214.

Pavlides, S.B., Zouros, N.C., Chatzipetros, A.A., Kostopoulos, D.S., and Mountrakis, D.M., 1995, The 13 May 1995 westren Macedonia, Greece (Kozani-Grevena) earthquake; preliminary results: *Terra Nova 7*:544-549.

Pavlides, S., and Caputo, R., 2004, Magnitude versus faults’ surface parameters: Quantitative relationships from the Aegean region: *Tectonophysics 380*:159-188.

Peltzer, G., and Rosen, R., 1995, Surface displacement of the 17 May 1993 Eureka Valley, California earthquake observed by SAR interferometry: *Science 268*:1333-1336.

Peltzer, G., Tapponnier, P., Gaudemer, Y., Meyer, B., Guo S., Yin K., Chan Z., and Dai H., 1988, Offsets of late Quaternary morphology, rate of slip, and recurrence of large earthquakes on the Chang Ma fault (Gansu, China): *Jour. Geophys. Res. 93*:7793-7812

Peltzer, G., Crampé, F., and King, G., 1999, Evidence of nonlinear elasticity of the crust from the Mw 7.6 Manyi (Tibet) earthquake: *Science 286*:272-276.

Person, W.J., 1991, Seismological notes - November 1990-February 1991*: Seismol. Soc. America Bull. 81*:2520-2528

Philip, H., and Mégard, F., 1977, Structural analysis of the superficial deformation of the 1969 Pariahuanca earthquakes (central Peru): *Tectonophysics 38*:259-278.

Philip, H., and Meghraoui, M., 1983, Structural analysis and interpretation of the surface deformations of the El Asnam earthquake of October 10, 1980: *Tectonics 2*:17-49.

Philip, H., Rogozhin, E., Cisternas, A., Bousquet, J.C., Borisov, B., and Karakhanian, A., 1992, The Armenian earthquake of 1988 December 7: faulting and folding, neotectonics and palaeoseismicity: *Geophys. Jour. Internat. 110*:141-158.

Pinar, A., 1998, Source inversion of the October 1, 1995, Dinar earthquake (Ms = 6.1): A rupture model with implications for seismotectonics in SW Turkey: *Tectonophysics 292*:255-266.

Pinar, N., 1953, Geological and macroseismic investigation of the August 13th 1951 earthquake: *Ist. Univ. Fen. Fak. Dergisi, Seri A,* 18, 131.

Plafker, G., 1967, Surface faults on Montague Island associated with the 1964 Alaska earthquake: *U.S. Geol. Survey Prof. Paper 543-G*, 42 p.

Plafker, G., 1969, Tectonics of the March 27, 1964, Alaska, earthquake: *U.S. Geol. Survey Prof. Paper 543-I,* 74 p.

Plafker, G., Bonilla, M.G., and Bonis, S.B., 1976, Geologic effects, in Espinosa, A.F., ed., The Guatemalan Earthquake of February 4, 1976, A Preliminary Report: *U.S. Geol. Survey Prof. Paper 1002*:38-51.

Plafker, G., Hudson, T., Bruns, T., and Rubin, M., 1978, Late Quaternary offsets along the Fairweather fault and crustal plate interactions in southern Alaska: *Canadian Jour. Earth Sciences 15*:805-816.

Plafker, G., Agar, R., Asker, A.H., and Hanif, M., 1987, Surface effects and tectonic setting of the 13 December 1982 North Yemen earthquake: *Seismol. Soc. America Bull. 77*:2018-2037.

Prentice, C.S., and Schwartz, D.P., 1991, Re-evaluation of 1906 surface faulting, geomorphic expression, and seismic hazard along the San Andreas fault in the southern Santa Cruz Mountains: *Seismol. Soc. America Bull. 81*;1424-1479.

Qian H., Tang Y., Zhang C., and Cao Y., 1984, Characteristics of ground fissures during the Daofu earthquake and movement of the faults in this earthquake area: *Jour. Seismol. Research 7*:53-60 ©.

Quittmeyer, R.C., Farah, A., and Jacob, K.H., 1979, The seismicity of Pakistan and its relation to surface faults, in Farah, A., and DeJong, K.A., eds., *Geodynamics of Pakistan*: Quetta, Geol. Survey of Pakistan 271-284.

Qureshi, I.R., and Sadig, A.A., 1967, Earthquakes and associated faulting in central Sudan: *Nature 215*:263-265.

Ramazi, H., and Haghani, H., 2006, the 22 June 2002 Avaj, Iran, earthquake: A field report: *Seismol. Research Lett. 77*:723-730.

Ramirez, J.E., 1971a, La catastrofe de Bahía Solano del 26 de Spetiembre de 1970, in El Terremoto de Bahía Solano del 26 de Septiembre de 1970: *Instituto Geofísico de los Andes Colombianos, Publ. Ser. A, Sismología 33*:9-36.

Ramirez, J.E., 1971b, The destruction of Bahía Solano, Colombia, on September 26, 1970 and the rejuvenation of a fault: *Seismol. Soc. America Bull. 61*:1041-1049.

Reasenberg, P., and Ellsworth, W.L., 1982, Aftershocks of the Coyote Lake, California, earthquake of August 6, 1979: a detailed study: *Jour. Geophys. Res. 87*:10,637-10,655.

Reicherter, K.R., Jabaloy, A., Galindo-Zaldívar, J., Ruano, P., Becker-Heidmann, P., Morales, J., Reiss, S., and González-Lodeiro, F., 2003, Repeated paleoseismic activity of the Ventas de Zafarraya fault (S. Spain) and its relation with the 1884 Andalusian earthquake: *Geol. Rundschau 92*:912-922, doi:10.1007/s00531-003-0366-3.

Reid, H.F., 1913, Sudden earth movements in Sumatra in 1892: *Seismol. Soc. America Bull. 3*:72-79.

RSBX (Regional Seismological Bureau of Xizang, Tibet), 1980, Map of macroseismic observations related to the magnitude 6.8 earthquake of February 22, 1980, in Xainza County, Tibet: Lhasa, People's Republic of China.

Research Group for Active Faults of Japan, 1991, Active faults in Japan: sheet maps (1:100,000) and inventories: *Univ. Tokyo Press*.

Research Group for Active Faults of Japan, 1992, Maps of active faults in Japan with an explanatory text: *Univ. Tokyo Press*.

Restrepo, A.H., 1971, Zona de falla de Puerto Mutis en Bahía Solano*, in* El Terremoto de Bahía Solano del 26 de Septiembre de 1970: *Instituto Geofísico de los Andes Colombianos: Publ. Ser. A., Sismología 33*;9-26.

Ren J., and Li P., 1989, Earthquake-caused landforms and paleoseismic study on the northern segment of Zemuhe fault: *Seismology and Geology 11*, 1:27-34. (C, Eng. abs.).

Richter C.F., 1958, *Elementary Seismology*: San Francisco, W.H. Freeman, 768 p.

Rockwell, T.K., 1989, Behavior of individual fault segments along the Elsinore-Laguna Salada fault zone, southern California and northern Baja California: implications for the characteristic earthquake model, *in* Schwartz, D.P., and Sibson, R.H., eds., Fault Segmentation and Controls of Rupture Initiation and Termination: *U.S.Geol. Survey Open-File Report 89-315*:288-308.

Rockwell, T.K., Gath, E.M., Gonzalez, T., Madden, C., Verdugo, D., Lippincott, C., Dawson, T., Owen,, L.A., Fuchs, M., Cadena, A., Williams, P., Weldon, E., and Franceschi, P., 2010, Neotectonics and paleoseismology of the Limón and Pedro Miguel faults in Panama: Earthquake hazard to the Panama Canal: Seismol. Soc. America Bull. 100:3097-3129, doi:10.1785/0120090342.

Rodgers, D.W., and Little, T.A., 2006, World’s largest coseismic strike-slip offset: the 1855 rupture of the Wairarapa fault, New Zealand, and implications for displacement/length scaling of continental earthquakes: *Jour. Geophys. Res. 111*, B12408, doi:10.1029/2005JB004065.

Roquemore, G.R., and Zellmer, J.T., 1983, Ground cracking associated with 1982 magnitude 5.2 Indian Wells Valley earthquake, Inyo County, California: *California Geology 36*(9):197-200.

Rymer, M.J., Kendrick, K.J., Lienkaemper, J.J., and Clark, M.M., 1990, Surface rupture on the Nuñez fault during the Coalinga earthquake sequence, in Rymer, M.J., and Ellsworth, W.L., eds., The Coalinga, California, earthquake of May 2, 1983: *U.S. Geol. Survey Prof. Paper 1487*:299-318.

Rymer, M.J., Tinsley, J.C. III, Treiman, J.A., Arrowsmith., J.R., Clahan, K.B., Rosinski, A.M., Bryant, W.A., Snyder, H.A., Fuis, G.S., Toké, N.A., and Bawden, G.W., 2006, Surface fault slip associated with the 2004 Parkfield, California, earthquake: *Seismol. Soc. America Bull. 96*:S11-S27, doi:10.1785/0120050830.

Salyards, S.L., Sieh, K.E., and Kirschvink, J.L., 1992, Paleomagnetic measurement of nonbrittle coseismic deformation across the San Andreas fault at Pallett Creek: *Jour. Geophys. Res. 97*:12,457-12,470.

Sanders, C.O., and Slemmons, D.B., 1979, Recent crustal movements in the central Sierra Nevada-Walker Lane region of California-Nevada: Part III, the Olinghouse fault zone: *Tectonophysics 52*:585-597.

Schmidt, J.F.J., 1875, *Studien über Erdbeben*: Carl Scholtze, Leipzig, Germany.

Sébrier, M., Mercier, J.L., Macharé, J., Bonnot, D., Cabrera, J., and Blanc, J.L., 1988, The state of stress in an overriding plate situated above a flat slab: The Andes of central Peru: *Tectonics 7*:895-928.

Seeber, L., Jain, S.K., Murty, C.V.R., and Chandak, N., 1993, Surface rupture and damage patterns in the Ms = 6.4, Sept. 29, 1993 Killari (Latur) earthquake in central India: Am. Geophys. Union 1993 Fall Meeting Program, p. 222.

Sengör, A.M.C., Tüysüz, O, Imren, C., Sakinç, M., Eyidogan, H., Görür, N., Le Pichon, X., and Rangin, C., 2005, 2005, The North Anatolian fault: A new look: *Ann. Reviews Earth Planet Sci. 33*:37-112, doi:10.1146/annurev.earth.32.101802.120415.

Serva, L., Blumetti, A.M., and Michetti, A.M., 1986, Gli effetti sul terreno del terremoto del Fucino (13 Gennaio 1915); tentativo di interpretazione della evoluzione tettonica recente di alcune strutture: *Mem. Soc. Geol. Ital. 35*:893-907 (Eng. abs).

Seymen, I., and Aydin, A., 1972, The Bingöl earthquake fault and its relation to the North Anatolian fault zone: *Miner. Res. Explor. Inst. Turkey Bull.* 79:1-8.

Sharp, R.V., 1975, Displacement on tectonic ruptures: *California Div. Mines and Geol. Bull.196*:187-194.

Sharp, R.V., 1976, Surface faulting in Imperial Valley during the earthquake swarm of January-February, 1975: *Seismol. Soc. America Bull. 66*:1145-1154.

Sharp, R.V., 1982, Comparison of 1979 surface faulting with earlier displacements in the Imperial Valley, in The Imperial Valley California, Earthquake of October 15, 1979 *U.S. Geol. Survey Prof. Paper 1254*:213-221.

Sharp, R.V., Lienkaemper, J.J., Bonilla, M.G., Burke, D.B., Fox, B.F., Herd, D.G., Miller, D.M., Morton, D.M., Ponti, D.J., Rymer, M.J., Tinsley, J.C., Yount, J.C., Kahle, J.E., Hart, E.W., and Sieh, K.E., 1982, Surface faulting in the central Imperial Valley, *in* The Imperial Valley California, Earthquake of October 15, 1979: *U.S. Geol. Survey Prof. Paper 1254*:119-143.

Sharp, R.V., Rymer, M.J., and Lienkaemper, J.J., 1986a, Surface displacement on the Imperial and Superstition Hills faults triggered by the Westmorland, California, earthquake of 26 April 1981: *Seismol. Soc. America Bull. 76*:949-965.

Sharp R.V., Rymer, M.J., and Morton, D.M., 1986b, Trace-fractures on the Banning fault created in association with the 1986 North Palm Springs earthquake*: Seismol. Soc. America Bull. 76*:1838-1843

Sharp, R.V., et al., 1989, Surface faulting along the Superstition Hills fault zone and nearby faults associated with the earthquakes of 24 November 1987: *Seismol. Soc. America Bull. 79*:252-281.

Shieh C.I., 1987, Engineering aspect of the Meishan fault in southern Taiwan: *Geol. Soc. China Mem. 9*:383-396.

Shor, G., and Roberts, E.E., 1958, San Miguel, Baja California Norte, earthquakes of February, 1956 - a field report: *Seismol. Soc. America Bull. 46*:101-116.

Shyu, J.B.H., Sieh, K., Chen, Y.-G., and Liu, C.-S., 2005, Neotectonic architecture of Taiwan and its implications for future large earthquakes: *Jour. Geophys. Research 110*, B08402, doi:10.1029/2004.JB003256.

Sieh, K.E., 1978a, Prehistoric large earthquakes produced by slip on the San Andreas fault at Pallett Creek, California: *Jour. Geophys. Res. 83*:3907-3939.

Sieh, K.E., 1978b, Slip along the San Andreas fault associated with the great 1857 earthquake: *Seismol. Soc. America Bull. 68*:1421-1428.

Sieh, K., 1982, Slip along the San Andreas fault associated with the earthquake: *U.S. Geol. Survey Prof. Paper 1254*:155-159.

Sieh, K.E., Stuiver, M., and Brillinger, D., 1989, A more precise chronology of earthquakes produced by the San Andreas fault in southern California*: Jour. Geophys. Res. 94*:603-623.

Sieh, K., Jones, J., Hauksson, E., Hudnut, K., Eberhart-Phillips, D., Heaton, T., Hough, S., Hutton, K., Kanamori, H., Lilje, A., Lindvall, S., McGill, S.F., Mori, J., Rubin, C., Spotila, J.A., Stock, J., Thio, H.K., Treiman, J., Wernicke, B., and Zachariasen, J., 1993, Near-field investigations of the Landers earthquake sequence, April to July 1992: *Science 260*:171-176.

###### Silgado, E., 1951, The Ancash, Peru, earthquake of November 10, 1946: *Seismol. Soc. America Bull, 41*: 83-100.

Simpson, G.D., and Lettis, W.R., 1992, Segmentation model for the northern Calaveras fault, Sunol Valley to Walnut Creek, *in* Proceedings of the Second Conference on Earthquake Hazards in the Eastern San Francisco Bay Area, p. 240-246.

Sissons, B.A., 1979, The horizontal kinematics of the North Island of New Zealand: Ph.D. thesis, Victoria Univ., Wellington, N.Z.

Skuphos, T., 1894, Die zwei grossen Erdbeben im Lokris: *Zeitschrift der Gesellschaft für Erdkunde 29*:409-474.

Slemmons, D.B., 1957, Geological effects of the Dixie Valley-Fairview Peak, Nevada, earthquakes of December 16, 1954: *Seismol. Soc. America Bull. 47*:353-375.

Slemmons, D.B., Steinbrugge, K.V., Tocher, D., Oakeshott, G.B., and Gianella, V.P., 1959, Wonder, Nevada, earthquake of 1903: *Seismol. Soc. America Bull. 49*:251-265.

Smalley, R., Pujol, J., Regnier, M., Chiu, J.-M., Chatelain, J.-L., Isacks, B.L., Araujo, M., and Puebla, N., 1993, Basement seismicity beneath the Andean Precordillera thin-skinned thrust belt and implications for crustal and lithospheric behavior: *Tectonics 12*:63-76.

Solonenko, V.P., 1965, Tectonics of the Muya earthquake area*: Izvestia Acad. Sci. USSR Geol. Ser. 4*:58-70 (R).

Solonenko, V.P., 1968, Strong earthquakes according to seismostatistics, *in Seismic Regionalization of the USSR: Nauka*, Moscow, 60-66.

Solonenko, V.P., and Treskov, A.A., 1960, Central Baikal earthquake, 29 August 1959: *Irkutsk, USSR, Irkutsk Book Publishers*, 37 p (R).

Solonenko, V.P., Kurushin, R.A., and Khilko, S.D., 1966, Strong earthquakes, *in Recent Tectonics, Volcanoes, and Seismicity of the Stanovoy Upland: Moscow, Nauka*, 145-171 (R).

Stein, R.S., and Barrientos, S.E., 1985, Planar high-angle faulting in the Basin and Range: Geodetic analysis of the 1983 Borah Peak, Idaho, earthquake: *Jour. Geophys. Research 90*:11,355-11,366.

Stein, R.S., and Lisowski, M., 1983, The 1979 Homestead Valley earthquake sequence, California--control of aftershocks and postseismic deformation: *Jour. Geophys. Res. 88*:6477-6490.

Stein, R.S., and Thatcher, W., 1981, Seismic and aseismic deformation associated with the 1952 Kern County, California, earthquake and relationship to the Quaternary history of the White Wolf fault: *Jour. Geophys. Res. 86*:4913-4928.

Stein R.S., Briole, P., Ruegg, J.-C., Tapponnier, P., and Gasse, F., 1991, Contemporary, Holocene, and Quaternary deformation of the Asal rift, Djibouti: implications for the mechanics of slow spreading ridges: *Jour. Geophys. Res. 96*:21,789-21,806.

Stiros, S.C., 1995, The 1953 seismic surface fault: Implications for the modeling of the Sousaki (Corinth area, Greece) geothermal field: *Jour. Geodynamics 20*:167-180.

Stiros, S.C., and Vougioukalakis, G., 1996, the 1970, Yali (SE edge of the Aegean volcanic arc) earthquake swarm: Surface faulting associated with a small earthquake: Annales Tectonicae 10:20-30.

Suárez-Vidal, F., Munguia-Orozco, L., González-Escobar, M., González-Garcia, J., and Glowacka, E., 2007, Surface rupture of the Morelia fault near the Cerro Prieto Geothermal Field, Mexicali, Baja California, Mexico, during the Mw 5.4 earthquake of 24 May 2006: Seismol. Research Letters 78:394-399.

Sugiyama, Y., Awata, Y., and Tsukuda, T., 1991, Holocene activity of the Miboro fault system, central Japan, and its implications for the Tensho earthquake of 1586 - verification by excavation survey: *Seismol. Soc. Japan Programme and Abstracts, No. 2*, p. 260. (J).

Sultan, D.I., 1931, The Managua earthquake: *Military Engineer 23*:354-361.

Sulstarova, E., and Koçiaj, S., 1980, The Dibra (Albania) earthquake of November 30, 1967: *Tectonophysics 67*:333-343.

Suter, M., Quintero-Legorreta, O., López-Martínez, M., Aguirre-Díaz, G., and Farrar, E., 1995, The Acambay graben: Active intraarc extension in the trans-Mexican volcanic belt, Mexico: *Tectonics 14*:1245-1262.

Suter, M., and Contreras, J., 2002, Active tectonics of northastern Sonora, Mexico (southern Basin and Range Province) and the 1887 Mw 7.4 earthquake: *Seismol. Soc. America Bull. 92*:581-589.

Takada, Y., Kobayashi, T., Furuya, M., and Murakami, M., 2009, Coseismic displacement due to the 2008 Iwate-Miyagi Nairiku earthquake defined by ALOS/PALSAR: Preliminary results: *Earth Planets Space 61*:e9-e12.

Takeuchi, A., and Sakai, H., 1985, Recent event of activity along the Atotsugawa fault, central Japan - a paleomagnetic method for dating of fault activity: *Active Fault Research 1*:67-74. (J).

Tang C., Wen D., Deng T., and Huang S., 1976, A preliminary study on the characteristics of the ground features during the Luhuo M = 7.9 earthquake 1973 and the origin of the earthquake: *Acta Geophysica Sinica 19*, no. 1:18-27 (C, Eng. abs.).

Tapponnier, P., Meyer, B., Avouac, J.P., Peltzer, G., Gaudemer, Y., Guo S., Xiang H., Yin K., Chen Z., Cai S., and Dai H., 1990, Active thrusting and folding in the Qilian Shan, and decoupling between upper crust and mantle in northeastern Tibet: *Earth Planet Sci. Lett. 97*:382-403.

Tapponnier, P., and Molnar, P., 1979, Active faulting and Cenozoic tectonics of the Tien Shan, Mongolia, and Baykal regions: *Jour. Geophys. Res. 84*:3425-3459.

Taylor, G.C., and Bryant, W.A., 1980, Surface rupture associated with the Mammoth Lakes earthquakes of 25 and 27 May, 1980: *California Div. Mines and Geology Spec. Rept. 150*:49-67.

Taymaz, T., Jackson, J., and McKenzie, D., 1991a, Active tectonics of the north and central Aegean Sea: *Geophys. Jour. Internat. 106*:433-490.

Taymaz, T., Eyidogan, H., and Jackson, J., 1991b, Source parameters of large earthquakes in the East Anatolian fault zone (Turkey): *Geophys. Jour. Internat. 106*:537-550.

TFTRG (Tanna Fault Trenching Research Group), 1983, Trenching study for Tanna fault, Izu, at Myoga, Shizuoka Prefecture, Japan: *Earthquake Research Inst., Univ. Tokyo, Bull. 58*:797-830. (J, Eng. abs.).

Tchalenko, J.S., 1975, Seismicity and structure of the Kopet Dagh (Iran, USSR): Phil. Trans. Roy. Soc. London 278:1-25.

Tchalenko, J.S., and Ambraseys, N.N., 1970, Structural analysis of the Dasht-e Bayaz (Iran) earthquake fractures: *Geol. Soc. America Bull. 81*:41-60.

Tchalenko, J.S., and Berberian, M., 1974, The Salmas (Iran) earthquake of May 6th, 1930: *Annales Geofisica (Rome) 27*:151-212.

Tchalenko, J.S., and Berberian, M., 1975, Dasht-e Bayaz fault, Iran: earthquake and earlier related structures in bed rock: *Geol. Soc. America Bull. 86*:703-709.

Tchalenko, J.S., and Braud, J., 1974, Seismicity and structure of the Zagros (Iran): The Main Recent fault between 33º and 35º N: *Phil. Trans. Roy. Soc. Lond. 227*:1-25.

Tchalenko, J.S., Braud, J., and Berberian, M., 1974, Discovery of three earthquake faults in Iran: *Nature 248*:661

Thatcher, W., 1975, Strain accumulation and release mechanism of the 1906 San Francisco earthquake: *Jour. Geophys. Res. 80*:4862-4872.

Tocher, D., 1956, Movement on the Rainbow Mountain fault: *Seismol. Soc. America Bull. 46*:10-14.

Toké, N.A., Arrowsmith, J.R., Young, J.J., and Crosby, C.J., 2006, Paleoseismic and postseismic observations of surface slip along the Parkfield segment of the San Andreas fault: *Seismol. Soc. America Bull. 96*:S221-S238.

Toppozada, T.R., 1981, Preparation of isoseismal maps and summaries of reported effects for pre-1900 California earthquakes: *California Div. Mines and Geology Open-File Report 81-11*.

Toppozada, T.R., and Parke, D.L., 1982, Area damaged by the 1868 Hayward earthquake and recurrence of damaging earthquakes near Hayward, in Hart, E.W., Hirschfeld, S.E., and Schulz, S.S., eds., Proceedings of the Conference on Earthquake Hazards in the Eastern San Francisco Bay Area: *Calif. Div. Mines Geol. Spec. Rep. 62*:321-328.

Toppozada, T.R., Real, C.R., and Parke, D.L., 1981, Preparation of isoseismal maps and summaries of reported effects for pre-1900 California earthquakes: *California Div. Mines and Geology Open-File Report 81-11*, SAC 1-182.

Toppozada, T.R., Branum, D.M., Reichle, M.S., and Hallstrom, C.L., 2002, San Andreas fault zone, California: M ≥ 5.5 earthquake history: Seismol. Soc. America Bull. 92:2555-2601.

Toppozada, T., and Branum, D., 2006, San Andreas M~6 earthquakes within 40 km of the Priest Valley end zone of the 1857 faulting: *Seismol. Soc. America Bull. 96*:S385-S396.

Treiman, J.A., Kendrick, K.J., Bryant, W.A., Rockwell, T.K., and McGill, S.F., 2002, Primary surface rupture associated with the Mw 7.1 16 October 1999 Hector Mine earthquake, San Bernardino County, California: *Seismol. Soc. America Bull. 92*:1171-1191.

Trifonov, V.G., 1988, Mongolia - an intracontinental region of predominantly recent strike-slip displacement: Active faults, *in Neotectonics and Contemporary Geodynamics of Mobile Belt: Moscow, Nauka* 239-272 (R).

Trifonov, V.G., Vostriakov, G.A., Lykov, V.I., Orazsahatov, H., and Skobelev, S.F., 1986, Tectonic aspects of the 1983 Kumdag earthquake in western Turkmenia: *Izvestia of the USSR Academy of Science, Geological Serial 5*:3-16 (R).

Trifonov, V.G., Bayractutan, M.S., Karakhanian, A.S., and Ivanova, T.P., 1993, The Erzincan earthquake of 13 March 1992 in eastern Turkey: Tectonic aspects: *Terra Nova 5*:184-189.

Tsuboi, S., 1922, Note on the Oomati earthquakes of 1918: *Reports of the Imperial Earthquake Investigation Committee in Japanese Language (translation): 98*:13-21.

Tsuneishi, Y., Ito, T., and Kano, K., 1978, Surface faulting associated with the 1978 Izu-Oshima-Kinkai earthquake: *Earthquake Research Inst., U. Tokyo Bull. 53*:649-674.

Tsuneichi, Y., and Nakamura, K., 1970, Faulting associated with the Matsushiro Swarm earthquakes: *Bull. Earthquake Research Inst., U. Tokyo 48*:29-51.

Tsutsumi, H., and Sato, T., 2009, Tectonic geomorphology of the southernmost Sagaing fault and surface rupture associated with the May 1930 Pegu (Bago) earthquake, Myanmar: *Seismol. Soc. America Bull. 99*:2155-2168, doi:10.1785/0120080113.

Tsuya, H., 1938, Report on an investigation of the Kussharo earthquake of May 29, 1938: *Zishin 10*:285-313 (J).

Tsuya, H., 1944, Geological observations of earthquake faults of 1943 in Tottori Prefecture: Tokyo, *Imperial Univ. Earthquake Res. Inst. Bull. 22*:1-32.

Tsuya, H., ed., 1950, The Fukui earthquake of June 28, 1948: *Tokyo, Special Committee for the Study of the Fukui earthquake*, 197 p., 2 pl.

Tuttle, M.T., and Sykes, L.R., 1992, Re-evaluation of several large historic earthquakes in the vicinity of the Loma Prieta and Peninsular segments of the San Andreas fault, California: *Seismol. Soc. America Bull. 82*:1802-1820.

Ulrich, F.P., 1941, The Imperial Valley earthquakes of 1940: *Seismol. Soc. America Bull. 31*:13-31.

Untung, M., Buyung, N., Kertapati, E., Undang, and Allen, C.R., 1985, rupture along the Great Sumatran fault, Indonesia, during the earthquakes of 1926 and 1943: *Seismol. Soc. America Bull. 75*:313-317.

Valensise, G., and Pantosti, D., 1992, A 125 Kyr-long geological record of seismic source repeatability: the Messina Straits (southern Italy) and the 1908 earthquake (Ms 71/2): *Terra Nova 4*:472-483.

Vanneste, K., Radulov, A., De Martini, P. Nikolov, G., Petermans, T., Verbeeck, K., Camelbeeck, T., Pantosti, D., Dimitrov, D., and Shanov, S., 2006, Paleoseismologic investigation of the fault rupture of the 14 April 1928 Chiripan earthquake (*M* 6.8), southern Bulgaria*: Jour. Geophys. Res. 111*: B01303, doi:10.1029/2005JB003814.

Vilgelmzon, P.M., 1947, Kemino-Chuiskoe earthquake of June 21, 1938*: Acad. Science of Kazak SSR*, 39 p. (R).

Vittori, E., Labini, S.S., and Serva, L., 1991, Palaeoseismology: review of the state-of-the-art: *Tectonophysics 193*:9-32.

Vittori, E., di Manna, P., Blumetti, A.M., Comerci, V., Guerrieri, L., Esposito, E., Michetti, A.M., Porfido, S., Piccardi, L., Roberts, G.P., Berlusconi, A., Livio, F., Sileo, G., Wilkinson, M., McCaffrey, K.J.W., Phillips, R.J., and Cowie, P.A., 2011, Surface faulting of the 6 April 2009 Mw 6.3 L’Aquila earthquake in central Italy: *Seismol. Soc. America Bull. 101*:1507-1530, doi:10.1785/0120100140.

Volponi, F., Quiroga, M. and Robles, A., 1978. El terremoto de Caucete del 23 de noviembre de 1977. *Inst. Sismologico Zonda, Univ. Nac. San Juan*, 81p., San Juan.

Walker, R.T., Andalibi, M.J., Gheitanchi, M.R., Jackson, J.A., Karegar, S., and Priestley, K., 2005, Seismological and field observations from the 1990 November 6 Furg (Hormozgan) earthquake: A rare case of surface rupture in the Zagros Mountains of Iran: *Geophys. Jour. Internat. 163*:567-579, doi:10.1111/j.1365-246X.2005.02731.x.

Wallace, R.E., 1968, Earthquake of August 19, 1966, Varto area, eastern Turkey: *Seismol. Soc. America Bull. 58*:47-102.

Wallace, R.E., 1984, Fault scarps formed during the earthquakes of October 2, 1915, Pleasant Valley, Nevada, and some tectonic implications: *U.S. Geol. Survey Prof. Paper 1274-A*:A1-A33.

Wang T., Li X., Zheng B., and Wang Y., 1991, Newly discovered geological evidences for the seismogenic structure of 1695 strong earthquake in Linfen, Shanxi province, China: *Seismology and Geology 13*, 1:76-77. (C).

Ward, S.N., and Valensise, G.R., 1989, Fault parameters and slip distribution of the 1915 Avezzano, Italy, earthquake observed from geodetic observations: *Seismol. Soc. America Bull. 79*:690-710.

Watanabe, K., and Sato, H., 1928, The Tango earthquake of 1927: *Imp. Geol. Survey of Japan Report 100*, 102 p. (J), 16 p. (Eng.).

Wells, D.L., and Coppersmith, K.J., 1994, Updated empirical relationships among magnitude, rupture length, rupture area, and surface displacement: *Seismol. Soc. America Bull. 84*:974-1002.

Westaway. R., and Jackson, J.A., 1984, Surface faulting in the southern Italian Campania-Basilicata earthquake of 23 November 1980: *Nature 312*:436-438.

White, R.A., 1985, The Guatemala earthquake of 1816 on the Chixoy-Polochic fault: *Seismol. Soc. America Bull. 75*:455-473.

Witkind, I.J., Myers, W.B., Hadley, J.B., Hamilton, W., and Fraser, G.D., 1962, Geologic features of the earthquake at Hebgen Lake, Montana, August 17, 1959: *Seismol. Soc. America Bull. 52*:163-180.

Wu Z. and Deng Q.D., 1989, Deformation features and fracture mechanism of surface rupture of 1951 Bengco, Tibet M-8 earthquake: *Seismology and Geology 11*, 1:15-26. (C, Eng. abs.).

Wu Z., Shentu B., Cao Z., and Deng Q.D., 1990a, The surface ruptures of Danxiong (Tibet) earthquake (M=8) in 1411: *Seismology and Geology 12*, 2:98-106. (C, Eng. abs.).

Wu Z., Cao Z., Shentu B., and Deng Q.D., 1990b, Preliminary research on the Nianqingtanggula mountain southeastern piedmont fault*: J. Seism. Res. 13*, 1:40-50. (C).

Wu Z., Wang Y., Ren J., and Ye J., 1994, The active faults in the central Tibet plateau: *Research on Active Fault 3*:56-73. (C, Eng. abs.).

Xiang H., Fang Z., Xu J., Li R., Jia S., Hao S., Wang J., and Zhang W., 1988, Seismotectonic background and recurrence interval of great earthquakes in 1679 Sanhe-Pinggu M=8 earthquake area: *Seismology and Geology 10*, 1:29-37.

Xu X.W. and Deng Q.D., 1990, The features of late Quaternary activity of the piedmont fault of Mt. Huoshan, Shanxi province and 1303 Hongdong earthquake (Ms=8): *Seismology and Geology 12*, 1:21-30. (C., Eng. abs.).

Xu X.W., Wen X., Yu G., Chen G., Tian Q., Chen J., Klinger, Y., Hubbard, J., and Shaw, J., 2009, Coseismic reverse- and oblique-slip surface faulting generated by the 2008 Mw 7.9 Wenchuan earthquake, China: *Geology 37*:515-518, doi:10.1130/G25462A.1.

Xu X.W., Yeats, R.S., and Yu G., 2010, Five short historical earthquake surface ruptures near the Silk Road, Gansu Prvince, China: *Seismol. Soc. America Bull. 100*:541-561, doi:10.1785/0120080282.

Yamasaki, N., 1896, Preliminary report of the Rikuu earthquake: *Report, Imperial Earthquake Investigating* Commission *11*:50-74 (J).

Yamasaki, N., 1925, Physiographical investigation of the Great Kwanto earthquake: *Reports of the Imperial Earthquake Investigation Committee in Japanese Language (translation): 100B*:11-54.

Yamasaki, N., 1927, On the cause of the Tajima earthquake of 1925: *Reports of the Imperial Earthquake Investigation Committee in Japanese Language (translation): 101*:31-34.

Yamasaki, N., and Tada, F., 1928, The Oku-Tango earthquake of 1927: *Earthquake Research Inst., U. Tokyo Bull. 4*:159-177.

Yamazaki, H., 1985, Features of earthquake faults, Chapter 4 of *Earthquakes and Active Faults*: ISU Company, Tokyo, p. 237-442.

Yamazaki, H., 1992, Tectonics of a plate collision along the northern margin of Izu Peninsula, central Japan: *Geol. Survey of Japan Bull. 43*:603-657.

Yamazaki, H., Koide, H., and Tsukuda, E., 1979, Surface faults associated with the Izu-Oshima-Kinkai earthquake of 1978, Japan: *Geol. Survey of Japan Spec. Rept. 7*:7-35 (J., Eng. abs.).

Yang Z., Guo H., Ding D., and Xu D., 1988, Finding of Tekes-Zhaosu earthquake faults in Xinjiang and some discussion: *Seismology and Geology 10*, 3:21-27 (C, Eng. abs.).

Yarwood, D. R., and Doser, D.I., (1990). Deflection of oceanic transform motion at a continental margin as deduced from waveform inversion of the 1939 Accra, Ghana earthquake, *Tectonophysics 172*:341–349.

Yeats, R.S., 2000, The 1968 Inangahua, New Zealand, and 1994 Northridge, California, earthquakes: Implications for northwest Nelson: *New Zealand Jour. Geology and Geophysics 43*:587-599.

Yeats, R.S., Sieh, K., and Allen, C.R., 1997, *The Geology of Earthquakes*: New York, Oxford University Press, 568 p.

Yerkes, R.F., Ellsworth, W.L., and Tinsley, J.C., 1983, Triggered reverse fault and earthquake due to crustal unloading, northwest Transverse Ranges, California: *Geology 11*:287-291.

Yielding, G., Jackson, J.A., King, G.C.P., Sinvhal, H., Vita-Finzi, C., and Wood, R.M., 1981, Relations between surface deformation, fault geometry, seismicity and rupture characteristics during the El Asnam (Algeria) earthquake of 10 October 1980: Earth Planet. Sci. Lett. 56:287-304.

Yirgu, G., Ayele, A., and Ayalew, D., 2006, Recent seismovolcanic crisis in northern Afar, Ethiopia: EOS 87 (33):325, 329.

Yu, E., and Segall, P., 1996, Slip on the 1868 Hayward earthquake from the analysis of historical triangulation data: Jour. Geophys. Res. 101:16,101-16,118.

Yu W., Cai T., and Hou X., 1991, Deformation zone of M=7.6 Lanchang earthquake: *Seismology and Geology 13,* 4:343-352.

Yuan D., Liu B., Lu T., He W., Liu J., and Liu X., 1994, Research on earthquake ruptures along the Laohushan active fault zone: *Research on Active Fault 3*:151-159 (C, Eng.abs.).

Yule, D., and Sieh, K., 2003, Complexities of the San Andreas fault near San Gorgonio Pass: Implications for larte earthquakes: *Jour. Geophys. Res. 108*, B11, 2548. Doi:10.1029/2001JB000451.

Zerkal, O.V., and Vinnichenko, S.M., 1990, Main regularities of the development of seismogenic features connected with the Gissar earthquake of 1989: Report submitted to meeting at Dushanbe May 29-June 2, 1990.

Zhang J., 1988, Characteristics of the 1970 Tonghai earthquake fault, *in Research on Earthquake Faults in China, Wurumuqi, China*: Xinjiang Seismological Bureau, eds., Xinjiang Press, 70-72 ©.

Zhang B., Liao Y., Guo S., Wallace, R.E., Bucknam, R.C., and Hanks, T.C., 1986, Fault scarps related to the 1739 earthquake and seismicity of the Yinchuan graben, Ningxia Huizu Zhizhiqu, China: *Seismol. Soc. America Bull. 76*:1253-1287.

Zhang A., Mi F., and Chong J., 1989, Deformation relics of the 1556 Huaxian great earthquake and the study of paleoseismicity on the frontal fault zone of the Huashan Mts.: *Seismology and Geology 11*, 3:73-81.

Zhang, P., Slemmons, D.B., and Mao, F., 1991, Geometric pattern, rupture termination and fault segmentation of the Dixie Valley-Pleasant Valley active normal fault system, Nevada, U.S.A.: *Jour. Structural Geology 13*:165-176.

Zhang W., Jiao D., Chai Z., Song F., and Wang Y., 1988, Neotectonic features of the Xiangshan-Tianjingshan arc fracture zone and the seismic deformation zone of 1709 south of Zhongwei M=71/2 earthquake: Seismology and Geology 10, 3:1-20. (C, Eng. abs.).

Zhou R., Yu W., Gu Y., and Yao X., 1990, A study on rupture zone of 1988 Genma earthquake with magnitude 7.2 in Yunnan province: *Seismology and Geology 12*, 4:291-302. (C, Eng. abs.).

Zhu C., Teng D., Duan J., and Wang Y., 1988, Ground rupture of 1733 Dongchuan earthquake, *in*: *Research on Earthquake Faults in China*, ed. Xinjiang Seismological Bureau, China, Xinjiang Press:38-44. (C).