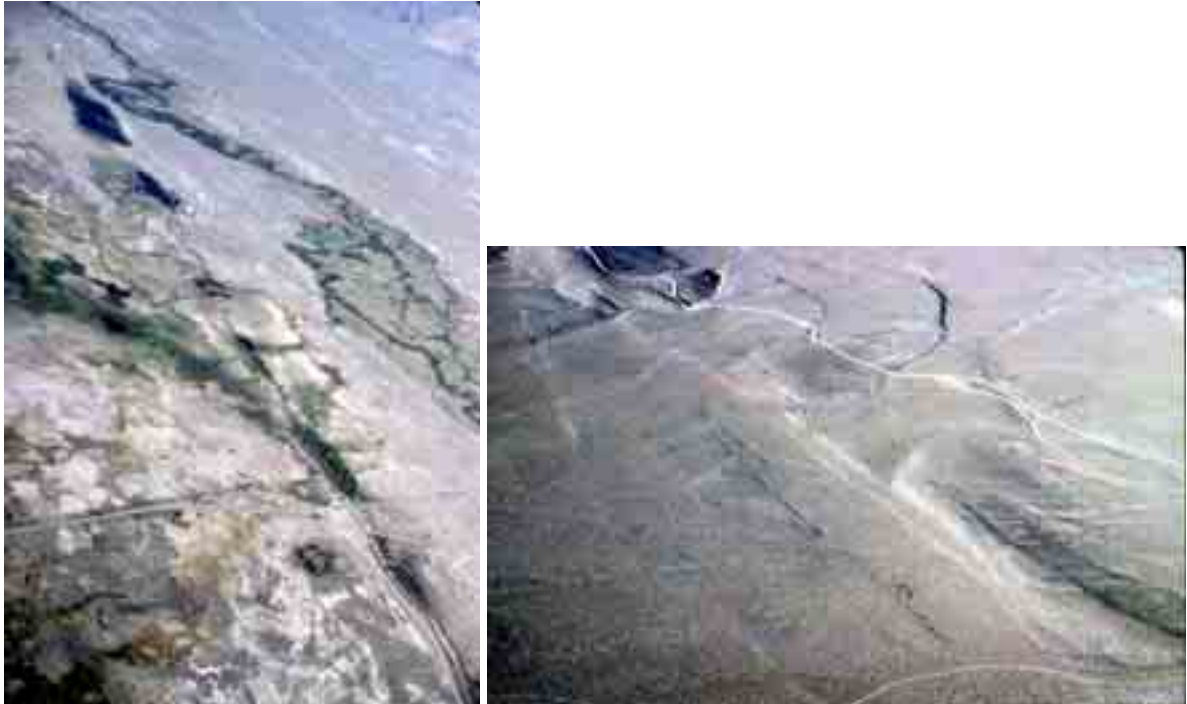


## SURFACE FAULTING



**Figure A3.1** – Oblique aerial views of the Owens valley fault zone (eastern California), affected by more than 110 km of surface faulting during the 3 March 1872 earthquake ( $M_s$  7.6) (Vittori et al., 2003). Photos E. Vittori.



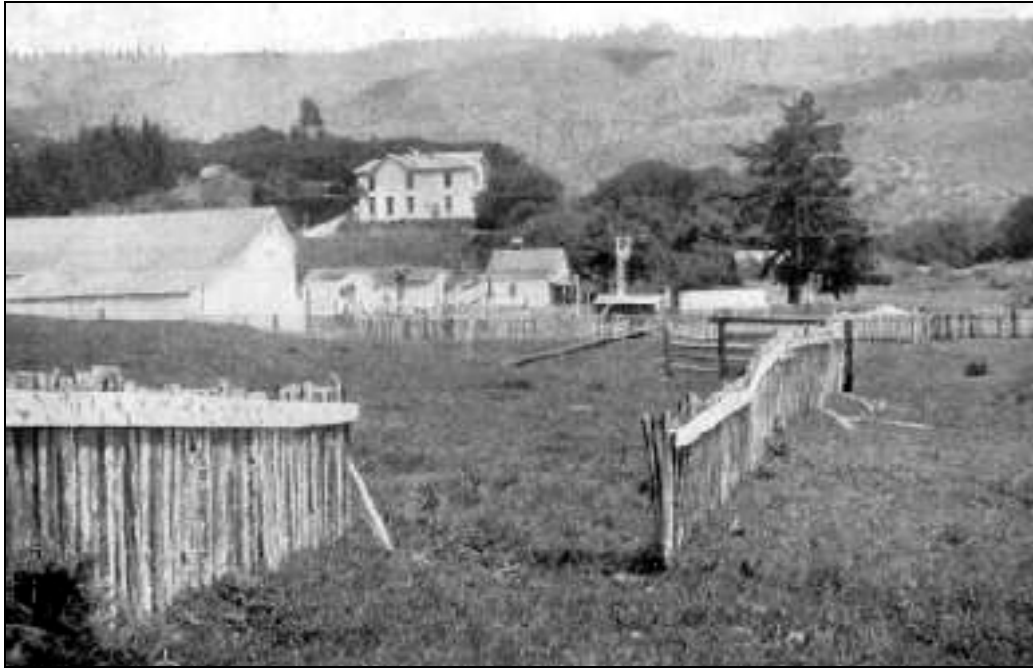
**Figure A3.2** – Fault scarp of Owens Valley 1872 earthquake ( $M_s$  7.6), near Manzanar (Vittori et al., 2003). Photo E. Vittori.



**Figure A3.3** – Fault scarp of Borah Peak 28 October 1983 earthquake ( $M_s$  7.3). Epicentral Intensity IX MM. Photo E. Vittori.



**Figure A3.4** – Fault scarp of Dixie Valley 16 December 1954 earthquake ( $M$  7.2) (left). Close-up view of the scarp with Burt Slemmons for scale (right). The estimated epicentral intensity was X MM. Photos E. Vittori.



**Figure A3.5** – 18 April 1906, San Francisco earthquake ( $M_s$  8.3): ca. 250 cm of right-lateral fault movement northwest of Woodville, California. Photo G.K. Gilbert.



**Figure A3.6** – 14 November 2001 Kunlun (NW China) earthquake ( $M_w$  7.8): pushup structures on the frozen surface of Kushuiwan Lake (a) and west of Sun Lake (b). Photo courtesy of Bihong Fu.





**Figure A3.7** – Left-lateral (5m) and vertical (0.7 m) faulting associated to the 16 July 1990 Luzon (Philippines) earthquake ( $M_s$  7.8) (Yomogida and Nakata, 1994). Photo courtesy of T. Nakata.



**Figure A3.8** – Aerial view of the fault rupture on northern Awaji Island due to 17 January 1995 Kobe earthquake ( $M_w$  6.9). Photo courtesy of Y. Kinugasa.



**Figure A3.9** - Fault scarp of the 7 December 1988 Spitak (Armenia) earthquake ( $M_s$  6.8) a few days after the event. Photo courtesy of A. Kharakanian.



**Figure A3.10** – Fault scarp of the 7 December 1988 Spitak (Armenia) earthquake ( $M_s$  6.8) in October 1998. Photo E. Vittori.



**Figure A3.11** – Cumulative effect of repeated earthquakes along the Chon Kemin fault zone (Kyrgyzstan). The last event ( $M_s$  8.2) took place on January 3, 1911. Photo E. Vittori.



**Figure A3.12** – Detail of the fault scarp of the 1911 ( $M_s$  8.2) Chon Kemin (Kyrgyzstan) earthquake. Courtesy of D. Delvaux (for more details see <http://www.uiggm.nsc.ru/issyk-kul/1911%20kem.htm>).





**Figure A3.13** – Fault scarp (ca. 1 m high) of the 13 January 1915 (M 7.0) Avezzano earthquake (from Oddone, 1915).



**Figure A3.14** – Fault scarp in the Fucino basin (San Benedetto dei Marsi site) reactivated during the January 13, 1915 (Ms 7.0) Avezzano earthquake (Michetti et al., 1996). Photo E. Vittori.



**Figure A3.15** – view of the Serrone active Fault on the northwestern side of the Fucino basin (Central Apennines). Its last reactivation (ca. 1 meter of normal slip) occurred in 1915, during the ruinous Avezzano earthquake (Ms = 7) (Michetti et alii, 1996). It is readily evident the post-LGM displacement (shown by the large offset of the regularized slope), indicating the occurrence of several coseismic reactivations during the Holocene. Photo E. Vittori.



**Figure A3.16** – Aerial oblique view of the Parasano fault, another fault reactivated in the Fucino area during the 1915 earthquake. Photo G. Carver.



**Figure A3.17** – (left) Slickenside reactivated at Senerchia during the Irpinia (southern Apennines) earthquake in 1980 ( $M_s$  6.9). Photo courtesy of A. Pissart. (Right) scarp ca. 80 cm high at Piano di Pecore (Monte Marzano) formed during the same earthquake.





**Figure A3.18** – Trench across a fault scarp along the Pollino active fault zone (located near the border between Basilicata and Calabria, Southern Apennines). No historical events are known in the area, but the trenches have revealed a Middle Age earthquake, with significant impact for seismic hazard (Michetti et alii, 1997). Photo E. Vittori.



**Figure A3.19** – Fault rupture of the September 26, 1997 earthquake ( $M_w$  6) in Umbria-Marche region (central Italy); Vittori et alii, 2000. Photo E. Vittori.



**Figure A3.20** – Left-lateral faulting in the eastern slope of Etna volcano (Pernicana fault). Different segments of this fault move either by creep or stick-slip. More than half a meter of slip took place here during the october-november 2002 volcanic and seismic crisis. Photo E. Vittori