Salt Creek

This creep-meter was abandoned by Caltech some 20 years ago. In 2004 we installed a low power transducer on the lever arm, but because of its 2.367 mechanical gain and high thermal coefficient (a stainless steel length standard) it was difficult to keep on scale. In March 2006 the original creep-meter installed by Caltech was modified to host a direct transducer instead of a transducer fixed to the lever arm. The stainless steel length standard has a thermal coefficient of 42-45°C/volt . Hence the smoothed temperature data can be subtracted from the voltage data to obtain a signal largely free from the direct effects of temperature.

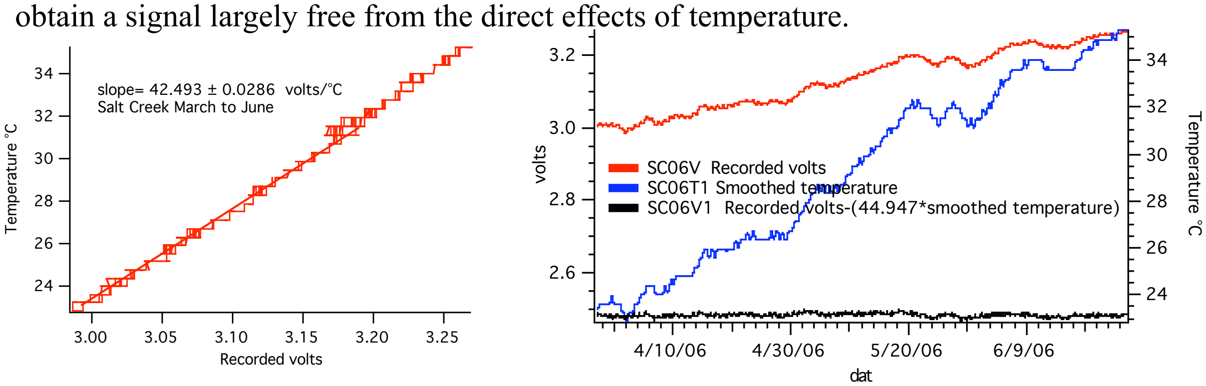

Figure 1 Corrected Salt Creek Data and its temperature correction. Because the instrument has a stainless steel wire it has a large thermal coefficient. However, temperature data reveal a simple correlation that can be used to suppress its effects. This coefficient will be used to correct future data (mm=(volts -°C/44.9)*6.189

All data previous to the direct-attachment arrangement were corrected for lever arm gain by dividing by 2.367, applying a thermal coefficient of 43.802°C/volt , and then a calibration coefficient of 5.1576 mm/volt. This reveals two prominent creep events 8 and 27 December 2005 with a total offset of 0.6 mm. A 0.3 mm less proounced dextral offset may have occurred in March 2005.

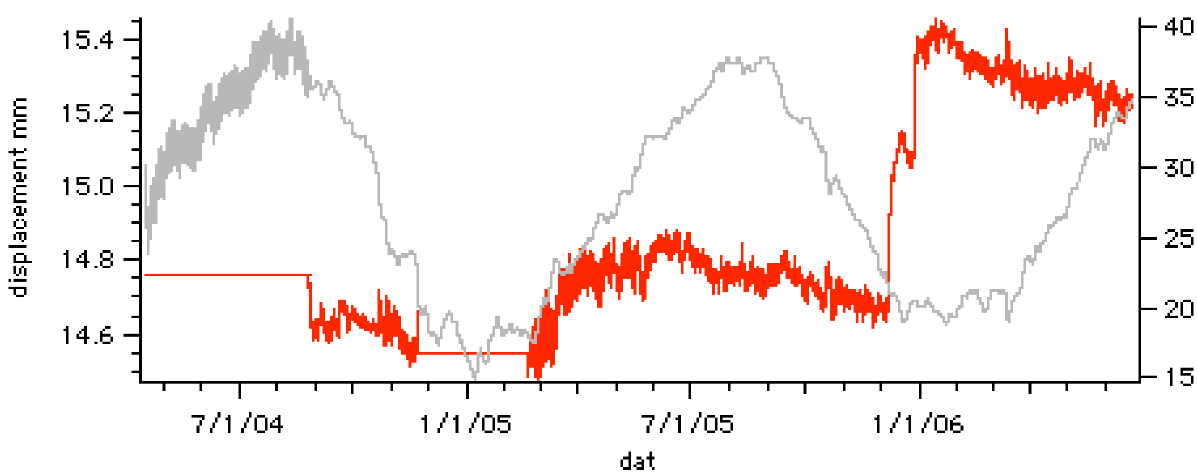

Figure 2 Salt Creek data 2004/2006 corrected for thermal contamination. Two prominent creep events are revealed in the data with a residual sinistral slope of roughly 0.2 mm/year which may result from extension of the stainless steel wire. Straight line segments are missing data when the LVDT was swung out of range by the lever arm prior to 2006.

Durmid Hill creep

Three creep-meters operate on Durmid Hill: at Ferrum coFE, at Salt Creek coSC, and on the crest of the hill soDU. The Ferrum data from 2004-2006 suggest a maximum creep rate of 3 mm/year. The Salt Creek data are corrected for temperature but no temperature correction is applied to the graphite rod instruments. In October 2004 the two graphite instruments detected a reversal in slope, accompanied by a sinistral creep event at one of the sites that may have been associated with heavy rain. Coincidentally the event occurred a few hours after the Indonesian Mw=9.1 earthquake. By June this left-lateral trend had been replaced by dextral slip at 3 mm/yr interrupted by a pair of creep events with a total slip amplitude of 0.6 mm. Creep events occurred synchronously at Salt Creek and Ferrum (1.37 km apart and within two minutes-the sampling interval of the data). The obliquity of the Salt Creek instrument to the fault is thought to be much more than 30° yet the Salt Creek displacement is similar to the dextral slip calculated for the other two sites. It is possible that the pipe is bent into a form that is now parallel to the fault zone since it has been there for several years . If the pipe has been bent it would explain the curious amplitude consistency.

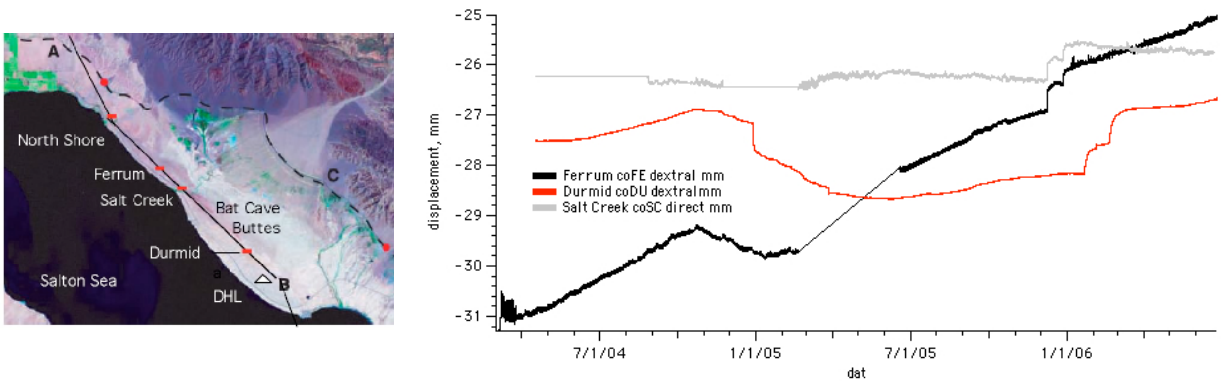

Figure 4 Locations of creepmeters on Durmid Hill and data since 2004.

location	GMT	Amplitude	Comment
coDU	1/21/06 23:35	0.21 mm	interrupted by second event
coDU	1/23/06 19:15	0.20 mm	3 days to 0.1 mm, 14 days total
coDU	2/20/06 09:52	0.65 mm	14 days total
coFE	12/8/05 06:40	0.4 mm	5 days
coFE	12/27/05 13:30	0.2 mm	3 day duration

site	km along fault		Latitude and longitude
Ferrum	0 km	cuFE	33.45725°N , 115.85386°W
Salt Creek	1.37 km	coSC	33.44855 N 115.8437 W
Durmid Hill	5.58 km	coDU	33.4147 N 115.7985 W

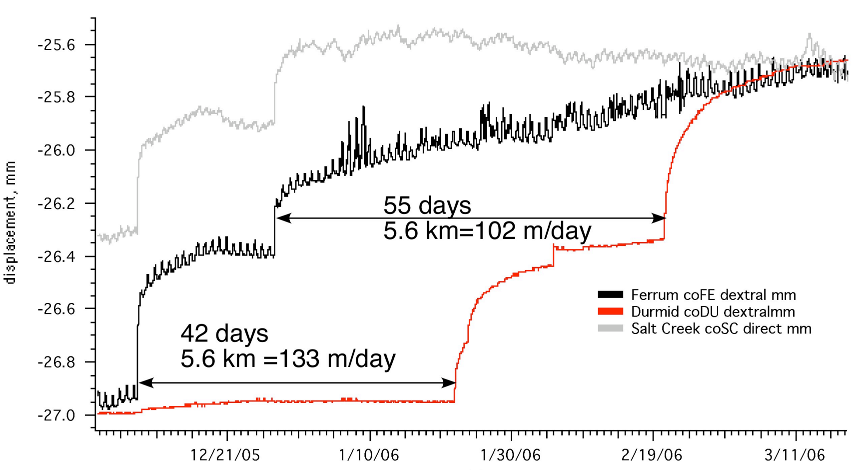

Figure 5 Creep events on Durmid Hill occurred approximately synchronously north of Salt Creek, but were delayed by more than a month before they occurred south of Bat Cave Buttes. If the process occurred by linear propagation the rate is 100-130 m day. The small amplitude of the events suggests they are quite shallow, perhaps confined to the uppermost 1 km of the fault zone.