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**CONTINUOUS BROADBAND MONITORING OF STRAIN CHANGES NEAR ACTIVE
FAULTS IN SOUTHERN CALIFORNIA**

Duncan Carr Agnew and Frank K. Wyatt

Institute of Geophysics and Planetary Physics

University of California, San Diego

La Jolla, California 92093-0225

(858) 534-2590 (858) 534-2411

(858) 534-5332 (fax)

dagnew@ucsd.edu fwyatt@ucsd.edu

Abstract

This grant has supported us to continue operating the facilities at Piñon Flat Observatory (PFO) that measure crustal deformation in Southern California for periods from seconds to years. At this site, close to the San Jacinto and San Andreas faults, we have long-base strainmeters and tiltmeters whose sensitivity and stability are unmatched anywhere else. The long time over which these data have been gathered, and the multiple measurements available, give the results a strength that is difficult to achieve in this field.

These measurements are relevant to the NEHRP program because they contribute to our understanding of the seismic cycle and how stresses accumulate on faults: for this, there is no substitute for a detailed, extended time history. The measurements from PFO now encompass a lengthy period of enhanced seismic activity (from 1986 on), including the two largest earthquakes in southern California since 1952. The PFO measurements continue to provide a check on any possible strain anomalies throughout Southern California.

Specific activities supported by this grant include:

- Operation of PFO: that is, providing high-quality and timely records of deformation fluctuations by running the long-base instruments and making ancillary measurements. In particular, monitoring the strain changes resulting from the 1992 Landers and 1999 Hector Mine earthquakes, both of which produced a rapid (though decaying) postseismic strain change. The Landers earthquake's postseismic signal was followed by a slower reversal in strain rate and a return to secular strain accumulation; it is too early to know if this pattern will be repeated after the Hector Mine shock, although the data to date suggest not.
- Provision of facilities that serve as a shared resource for the development and testing of emerging new technologies of geophysical interest. Having the components of PFO in place (land, power, shelters, recording) makes this much easier and less expensive than would otherwise be the case. The most recent work has involved various tests of environmental effects on GPS measurements.

The grant supports power, replacement parts, and salaries of technical staff, and is only a part of the PFO support, with other funds coming from the Scripps Director's office and the Southern California Earthquake Center.