Annual Report 1998
Regional GPS Surveys

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We performed two GPS field surveys in 1998 and collected valuable data in the Mojave desert and the Los Angeles basin areas using Ashtech Z12 receivers. A total of 68 station days of data from 50 sites were collected, with site occupation times ranging from 7 hours to 3 days.

The Mojave desert survey was a continuation of the 1997 work. Three groups of sites were surveyed this year. In the first group, 10 of the SCEC/UCLA post-Landers monitoring sites were resurveyed. The second group includes 9 sites surveyed by triangulation in 1935 and by EDM in late 1970s. The third group has 7 stations located in the 29 Palms Marine base that were surveyed for the first time at useable accuracy. The stations occupied this year have effectively filled holes existing in the region for the Landers postseismic deformation study. They also provide an opportunity to compare the GPS site positions with the historical triangulation and EDM measurements in the region to derive long term deformation results.

The Los Angeles basin experiment includes most of the "Inter-county" sites previously surveyed in 1990-1993 in a cooperative study involving crews from several different counties, and organized by Ken Hudnut. Our survey was started on day 260, 1998, and is still being carried out at the time this report is submitted. Our plan is to survey about 70 sites in the region, and we have finished 24 sites so far (Fig. 1). Because we mainly rely on a couple of experienced undergraduate students to do the work, we have to sometimes accommodate to their schedules. One of the students has committed to work full time for a month in March. We expect to survey 25 more Inter-county sites by then. Part of the work, about 10 sites, will be accomplished using remaining funds from last year. The rest will be part of the survey for this year as proposed in this year's proposal.

Completion of these surveys will improve the next edition of the Crustal Deformation Velocity Map, improving the resolution and accuracy of the map in two crucial locations. The Los Angeles basin survey will help to resolve the slip rates on the faults of the "frontal fault system" at the base of the San Gabriel Mountains. These faults include the Sierra Madre and Cucamonga fault systems, both of which pose significant and poorly quantified seismic hazards. The Landers survey will help to define the mechanism and extent of post-seismic deformation, leading to constraints on the rheology of lower crustal rocks and a better understanding of stress transfer between faults.

Figure caption:

Figure 1. 1998 GPS survey stations. The site symbols are: squares in the Los Angeles basin area, Inter-county sites; triangles, SCEC/UCLA post-Landers sites; diamonds, EDM/triangulation sites; squares in the Mojave desert region, new sites in the 29 Palms Marine base. The sites located in the Landers region with no names were observed in late 1997.

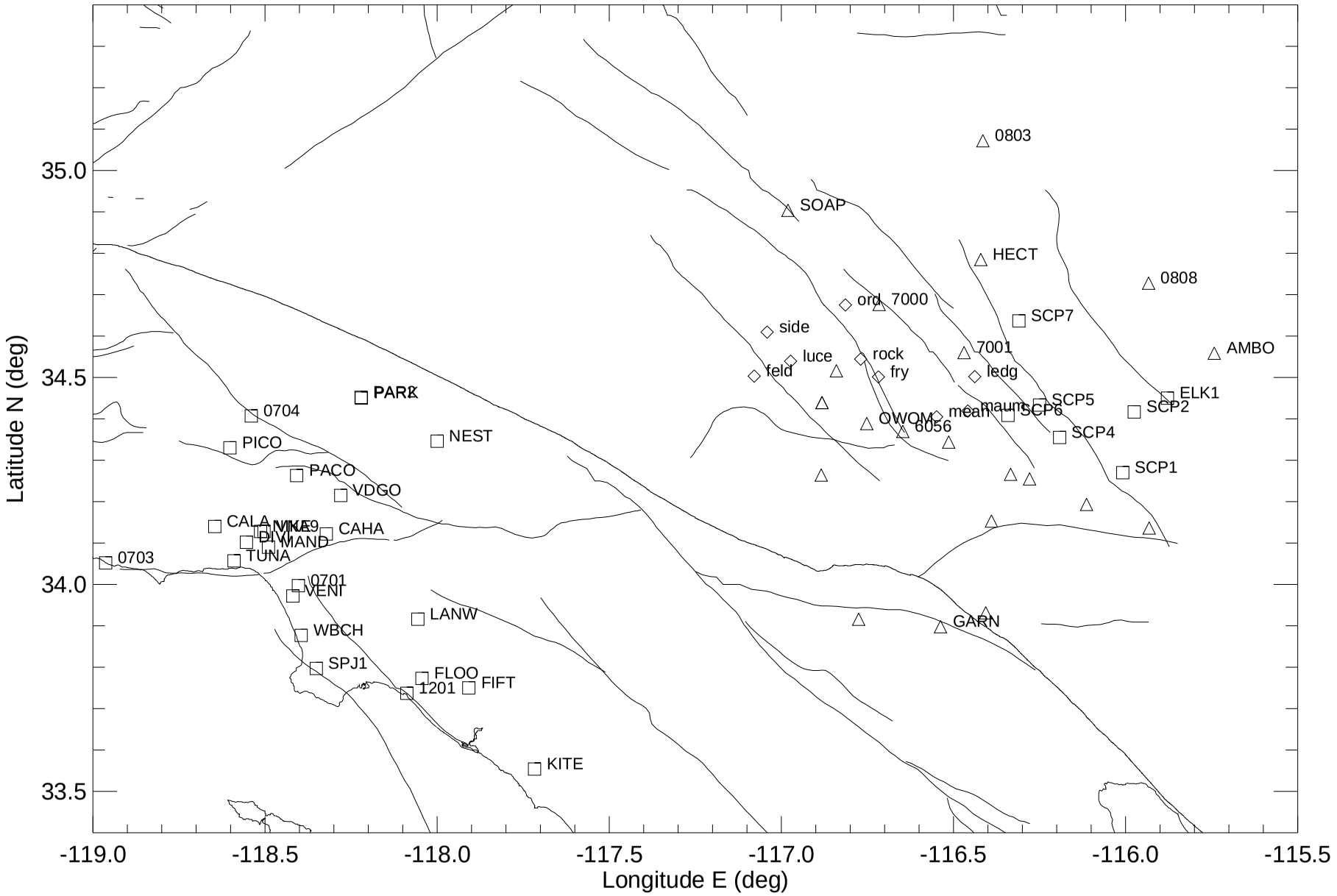

Fig. 1. GPS stations observed in 1998.