NEHRP Final Report
Award # 1434-HQ-98-GR-00034
Project Title: A Pacific Northwest Geodetic Array (PANGA)
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Abstract

As a part of the Pacific Northwest Geodetic Array (PANGA) project, Oregon State University operated two permanent GPS stations, CORV (Corvallis) and NEWP (Newport), in Oregon. A goal of the PANGA is to characterize accumulation of elastic deformation related to the potential megathrust earthquake in the Cascadia subduction zone.

Operations

Two permanent stations on Oregon, at Newport and Corvallis, were supported by NEHRP funding under this award. The two stations had new antennae purchased and installed, upgrading from standard Ashtech geodetic to high-performance choke-ring antennas. These sites are now comparable to SIGN and other permanent GPS geodetic arrays. Two spherical UNAVCO style radomes were also installed. Upgrades to the sites also included new modems, and un interrupible power supplies. Data archiving, quality control, and rinexing were moved from RPI, under Rob McCaffrey, to OSU, under Goldfinger. The data and site logs are now available from the Active Tectonics web site at *http://pandora.oce.orst.edu*. The data are downloaded and archived daily, and are available to other institutions and the public 24 hours after collection. The data are routinely downloaded by NOAA, NGS, other PANGA members, and Scripps, where they are also archived. During the project period, Nabelek and Goldfinger, along with McCaffrey conducted a field campaign in the central Oregon study corridor, in conjunction with a major NGS campaign. OSU measured 12 sites, and NGS measured approximately 70 sites in Oregon. The collaboration between these two campaigns greatly strengthened the GPS network in Oregon, providing strong ties across the Pacific Northwest.

Results

The results of 1998 operations of the two permanent stations operated under NEHRP funding were reported at the 1998 PANGA meeting in October, 1998 in Seattle Washington. The CORS data were combined with campaign data and older USGS data to produce a velocity field for the central Oregon study corridor. Data processing was done by R. McCaffrey. The abstract is included below.

GPS constraints on plate coupling in central western Oregon

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We have been using GPS data from permanent sites and campaigns in 1992 and 1994 by USGS, and in 1996, 1997, and 1998 by OSU, RPI, and NGS to examine the variability and landward extent of interplate coupling in central Oregon. We established a study corridor in central Oregon to investigate potential strong variability of the coupling signal suggested by earlier leveling studies. The leveling results showed little or no landward tilt of the coast range at 45 deg. N, while other arc-normal transects showed landward tilts. The earlier data have been variously interpreted as either poor coupling at this latitude, or as a coupled zone offshore, with the lack of tilt falling within the survey error. New GPS results indicate a probable locking signal in the central Oregon corridor, with station vectors consistent with an elastic signal from JDF-NOAM coupling. Errors are presently large however, and interpretations should be viewed accordingly. GPS measurements also suggest that rapid surface displacement related to plate coupling extend further landward than would be expected from a locked zone lying entirely offshore. Preliminary elastic dislocation models suggest that plate coupling may extend beneath the Oregon Coast Range. The anomalous lack of landward tilt in earlier uplift data might be related to broader distributed coupling beneath the coast range/Siletzia terrane.