# NOAA's Horizontal Time-Dependent Positioning Utility

Due to plate tectonics, points located in much of California, Oregon, Washington, and Alaska move approximately one inch per year, relative to the eastern and central United States. Points in these and other regions may move several feet in a few seconds due to earthquakes. **NOAA's Horizontal Time-Dependent Positioning (HTDP) utility** **enables land surveyors, geographic information system professionals, and others to cope with crustal motion** by relating positional coordinates measured today with those measured in the past and/or with those to be measured in the future. HTDP is, therefore, critical for maintaining an accurate and consistent **National Spatial Reference System** over time.

NOAA's National Geodetic Survey has developed HTDP to enable users to perform each of the following functions:

- **Estimate horizontal crustal velocities**,
- **Estimate crustal displacements** from one date to another,
- **Transform positional coordinates** from one reference frame to another and/or from one date to another,
- **Transform certain types of geodetic observations** from one reference frame to another and/or from one date to another,
- **Transform crustal velocities** from one reference frame to another.

HTDP supports the above functions in all recent realizations of the **North American Datum of 1983 (NAD 83)**, as well as in all
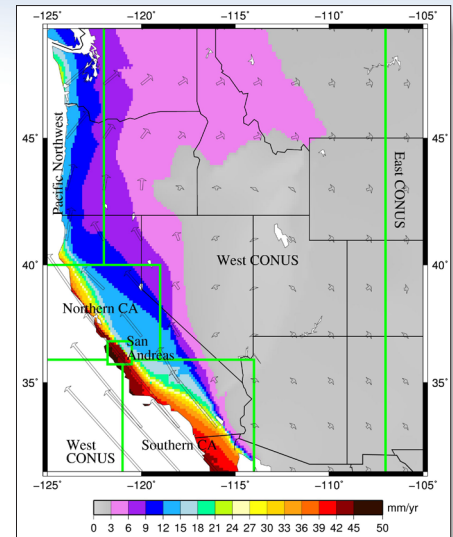
NAD 83 Horizontal Velocities in the Western United States

realizations of the **International Terrestrial Reference System** and the **World Geodetic System of 1984 (WGS 84)**.

Users may run the latest version of HTDP interactively on the Web at **geodesy.noaa.gov/TOOLS/Htdp/Htdp.shtml**. They may also download the **HTDP.for** file from the website. This file contains Fortran-90 source code for HTDP. Users can compile and link the source code to create executable code to run on their own computers. The website also contains:

- A **User's Guide,** containing instructional exercises,
- **Sample data files** for use with the instructional exercises,
- **A LOG** summarizing revisions to HTDP since its inception in 1992,
- Copies of **relevant publications**,
- Several **crustal motion maps**.

For more information on HTDP, contact NGS by email: ngs.cors.htdp@noaa.gov.