<<Note to Geophysical Geodesy class participants: The contents of this page were copied from a google groups page that is hosting the interchange for the SCEC Transient Detection Exercise.>>

Dear participants,

Welcome to Phase I of the transient detection exercise sponsored by SCEC in 2009. This exercise is in support of one of SCEC III's main science objectives; to "develop a geodetic network processing system that will detect anomalous strain transients." Fulfilling this objective is a high priority for SCEC and will fill a major need of the geodetic community. A means for systematically searching geodetic data for transient signals has obvious applications for network operations, hazard monitoring, and event response, and may lead to identification of events that would otherwise go (or have gone) unnoticed.

Test Data

The data provided to the participants for Phase I are time series for a network of GPS sites that will mirror the continuous GPS station distribution of southern California, extending east to the Colorado River, spanning 1999-2006. The synthetic data are may include data gaps, noise with a character unknown to the participants, as well as a deformation signal.

The data may be downloaded here:

simulations.1a.tar.gz

<<Note to Geophysical Geodesy class participants: you can download this file at: http://geodesy.unr.edu/billhammond/Courses/GeophysicalGeodesy/simulations.1a.tar.gz
>>

This is a 42-Mb tar file which unpacks to 2009.016.045624.tar.gz, 2009.016.045727.tar.gz, 2009.016.045829.tar.gz, 2009.016.050004.tar.gz, each of which is a separate simulation. These files in turn unpack to a set of .csv files (warning, in the same directory), which have names like pin1.2009.016.005407.csv. The 2009.... is simply the creation time used as a unique ID. The .csv files look like:

```
Station pin1,    33.6122,   -116.4582,   1256.17
2000-01-01,    -0.015,     0.081,     2.322, 51545.0000
2000-01-02,    -0.343,     0.229,     3.572, 51546.0000
2000-01-03,    -0.081,    -0.380,     4.881, 51547.0000
2000-01-04,     0.131,     0.590,     1.802, 51548.0000
2000-01-05,     0.125,     0.273,     3.105, 51549.0000
2000-01-06,    -0.085,     0.649,    -1.191, 51550.0000
2000-01-07,    -0.790,     0.565,     4.001, 51551.0000
2000-01-08,     0.565,     0.250,    -1.357, 51552.0000
2000-01-09,     0.318,     0.545,    -0.131, 51553.0000
```

which is very similar to the PBO csv file, with the MJD included in the last column. The displacements are in order East, North, Up.

Each simulation uses a different random number sequence to generate the "noise", and the noise parameters for the stations are randomly altered between simulations. So there should be no common elements.

Metrics for Comparison and Submission of Results
Detection algorithms will likely employ a variety of approaches (for example, time series analysis, identification of spatially coherent transient signals, or using the displacement expected for known deformation sources to extract signals of interest) that will return different information about the transient signal, making comparisons among algorithms difficult. Based on discussion at the August workshop and input from leaders of other similar exercises it was decided that the minimum information that all algorithms should return as a basis for comparison is the centroid and extent in space and time of the transient displacement signal extracted from the test data. Since each method will define the temporal evolution of the signal in a different way, we leave it to the individual groups to define how they will identify the centroid. The results to be submitted are as follows:

Required:
1)One numerical value for each of the following items:
Centroid Latitude
Centroid Longitude
Centroid Time (decimal year)
Temporal Extent (years)
2) An ellipse describing the spatial extent of ground deformation:
Length of semi-major and semi-minor axes
Rotation of major axis from north
3) A description of how the spatial and temporal centroids and extents were defined.
Results are to be submitted in ascii text format through the "Files" link for this group.

Optional: Additional information regarding the source or noise characteristics of the test data is welcome and may be used to shape the metrics used in Phase II. We strongly encourage all participants to provide us the following quantities as relevant to their particular analysis method:
1. Forward model of ground deformation predicted by their best-fit signal; please use the same format as the test data. 2. A measure of the signal amplitude/time history (e.g., peak slip on a fault, peak ground displacement, etc.). Suggested format is two-column list of time, amplitude. If amplitude is given in units of length, please use meters; if given in units of moment release, please use N m. 3. Description of other features of their model that are not adequately described by the Phase I metric (e.g., ground deformation not well-described by an ellipse, etc.)

2 messages about this page

Jan 20 2009 by Jessica Murray-Moraleda. Duncan Agnew graciously agreed to provide test data for Phase I, and due to time constraints the noise estimates you describe were not within the scope of his efforts. I think everyone would agree that providing uncertainties is necessary going forward.

Jan 20 2009 by TomHHello All: In the long run, it would seem to me that we need a time series format that includes estimates of the noise in each time series value. In the gamit processing, site noise is determined from the phase RMS scatter and in the sigmas of the position estimates show a distinct annual signal (especially around the Salton Sea area).