
# How CSEP Really Works

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*Los Angeles, CA, USA*

W. M. Keck Foundation

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USGS science for a changing world

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GNS SCIENCE TE PŪ AO

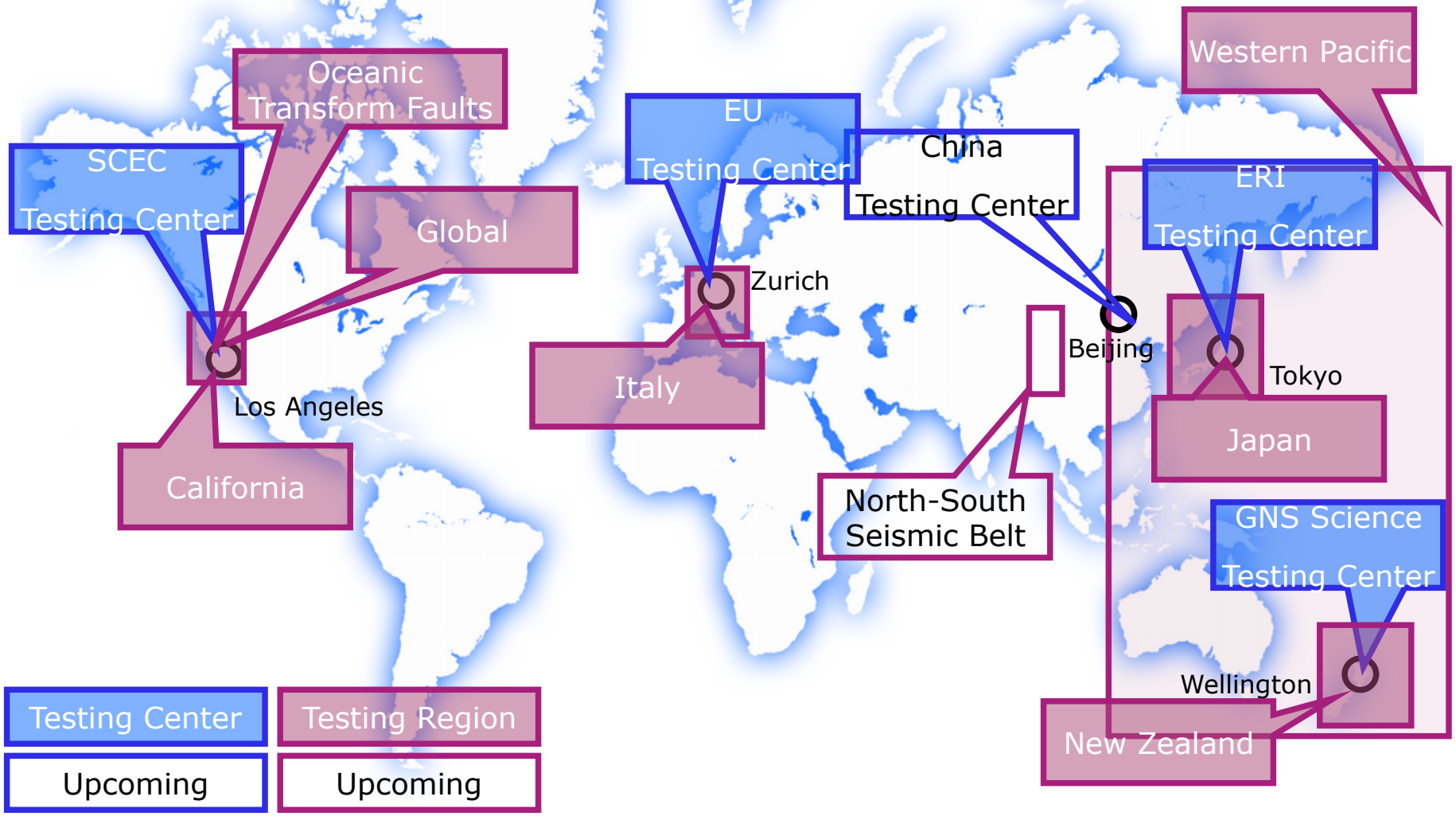
INGV

neries

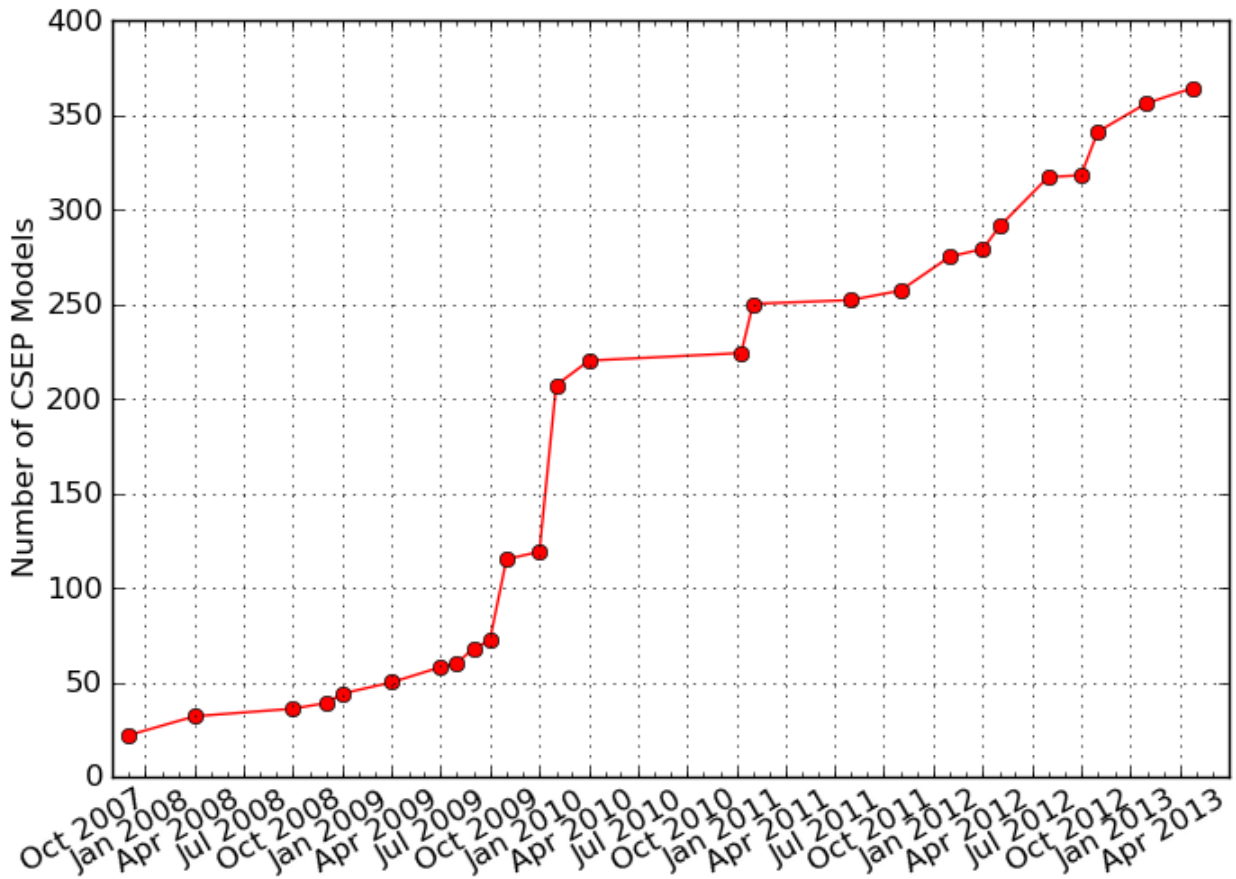
EQC EARTHQUAKE COMMISSION KŌMIHANA RŪWHENUA

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

# CSEP Testing Centers



# All CSEP Testing Centers (364 models)

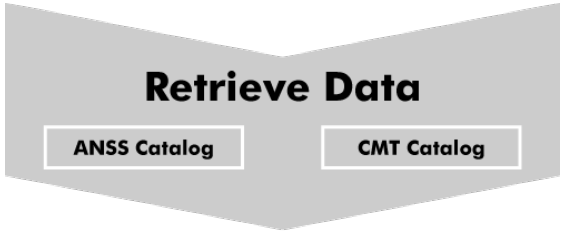


# CSEP Testing Center Goals

- Transparency
  - Data archive
  - Version control
  - Publishing results to the web server
- Controlled Environment
  - Raw catalog from authorized data source
  - Forecast procedures
- Reproducibility
  - Ability to re-run experiment at later time
- Comparability
  - Experiment standards

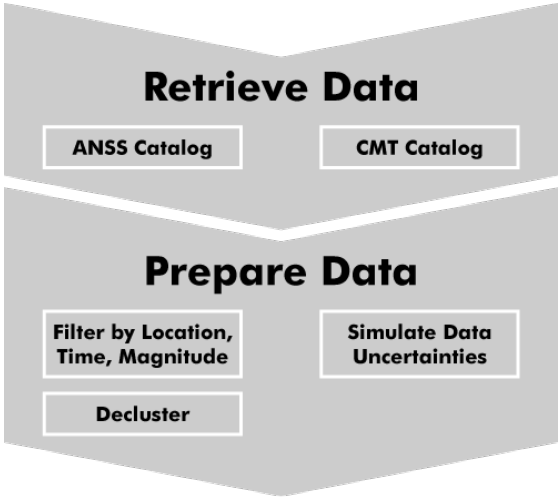
# CSEP Software

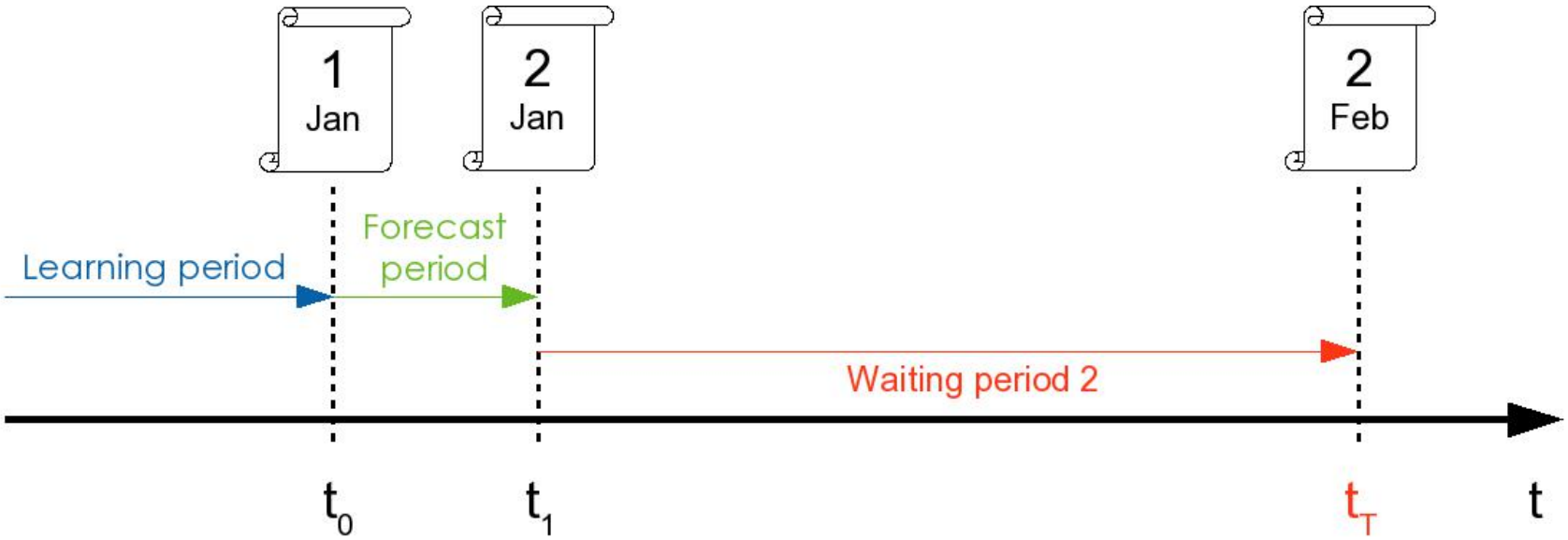
- Retrieve data on a daily basis



# CSEP Software

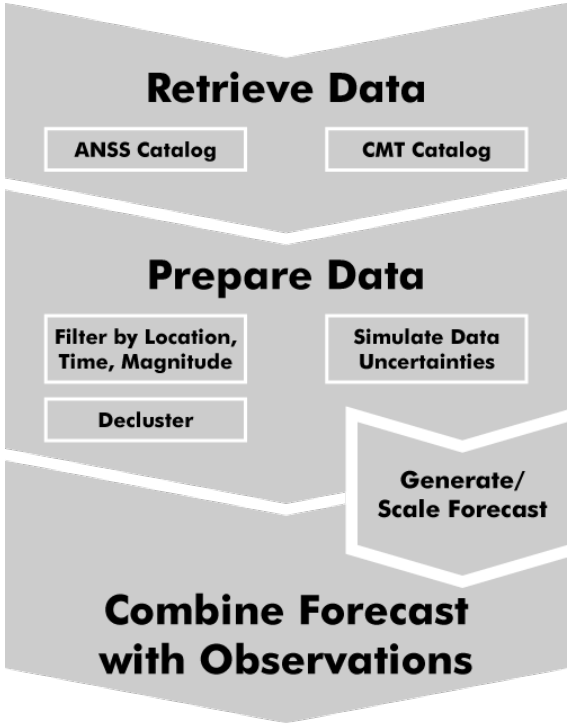
- Retrieve data on a daily basis
- Prepare data sets



# CSEP Software

- Retrieve data on a daily basis
- Prepare data sets
- Prepare for testing

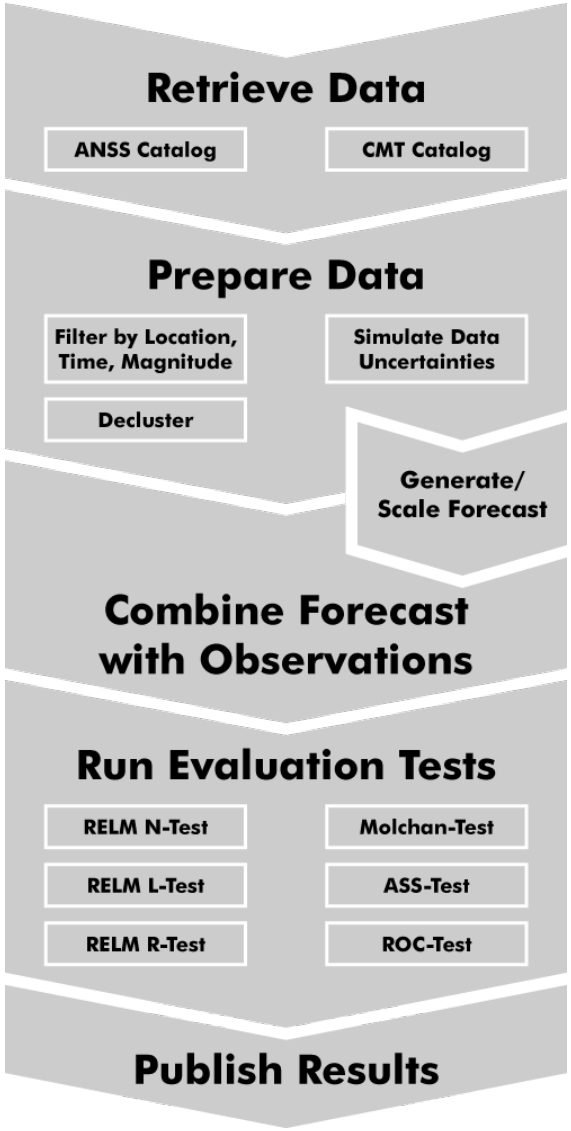


# CSEP Software

- Retrieve data on a daily basis
- Prepare data sets
- Prepare for testing
- Test

# CSEP Software

- Retrieve data on a daily basis
- Prepare data sets
- Prepare for testing
- Test
- Publish results




# Model Submission Requirements

- http://northridge.usc.edu/trac/csep/wiki/CSEPModelRequirements

CSEP
Collaboratory for the Study of Earthquake Predictability

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wiki: CSEPModelRequirements

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*Last modified 19 months ago*

## CSEP SCEC Testing Center requirements for a model submission

For the CSEP Testing Center at SCEC to support more forecasts groups and to host more models and algorithms, we request that modelers comply with the following set of requirements to enter their models into the Testing Center.

### Submission deadline

The CSEP Testing Center at SCEC follows quarterly releases of January1, April 1, July1 and October 1 of each year. Source code repository is "frozen" one month priory to the release date meaning that there are no code changes are allowed one month before the release date. For example, code freeze date for January 1st release is December 1st of previous year (March 1 for the April 1st release, June 1st for the July 1st release, and September 1st for the October 1st release). This good software practice guarantees that all code changes targeted for upcoming release, including new models, are intensively tested for the whole month on SCEC certification server before code base of new release is installed on SCEC operational server. We ask modelers to allow enough time for their model submission before the code freeze for targeted CSEP release they would like their model to be part of. Installation of new model within testing center requires work on CSEP development team side after the model codes are submitted for installation. Please consider submitting the model at least two months priory to the targeted CSEP release date. This will allow for one month of interactive installation process between the modeler and the CSEP development team before the code freeze takes place.

### Installation

**CSEPRQ1** We request that the modeler provide source code along with rules to generate executable file if applicable. This includes specification of:

- All dependent packages the model is relying on (including version numbers), and rules for how to build them
- Compiler (including version number) if applicable
- Rules to build executable(s) is applicable

**CSEPRQ2** We request that the modeler install the model's source code on CSEP integration server *csep-devel.usc.edu* (accessible through *motion.usc.edu*), and builds executable(s) if applicable.

- Please contact John Yu (johnyu@...) to get an account

### Execution

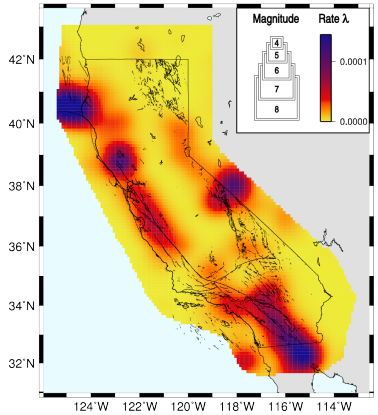
**CSEPRQ3** We request that the modeler provide command(s) required to invoke the model.

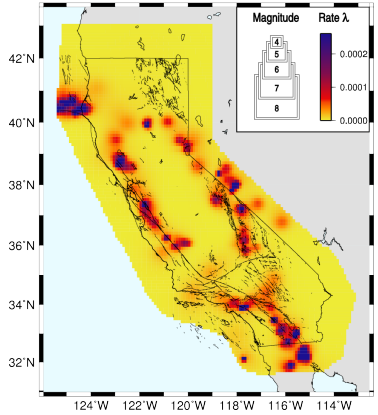
Currently, CSEP testing framework supports ANSS and CMT authorized data sources.

- ANSS input catalog is provided in ZMAP format (ASCII or Matlab):
  1. Please refer to examples of input catalogs
- CMT input catalog is provided as reduced data set of raw CMT catalog in ASCII format
  1. Please refer to examples of input catalog

# Forecasts Models Examples

- ETAS one-day model for California by Jiancang Zhuang




/home/csep/operations/dispatcher/runs/csep/20130503000006/OneDayModelInputCatalog.dat

3.95

2013-04-02

2013-04-03

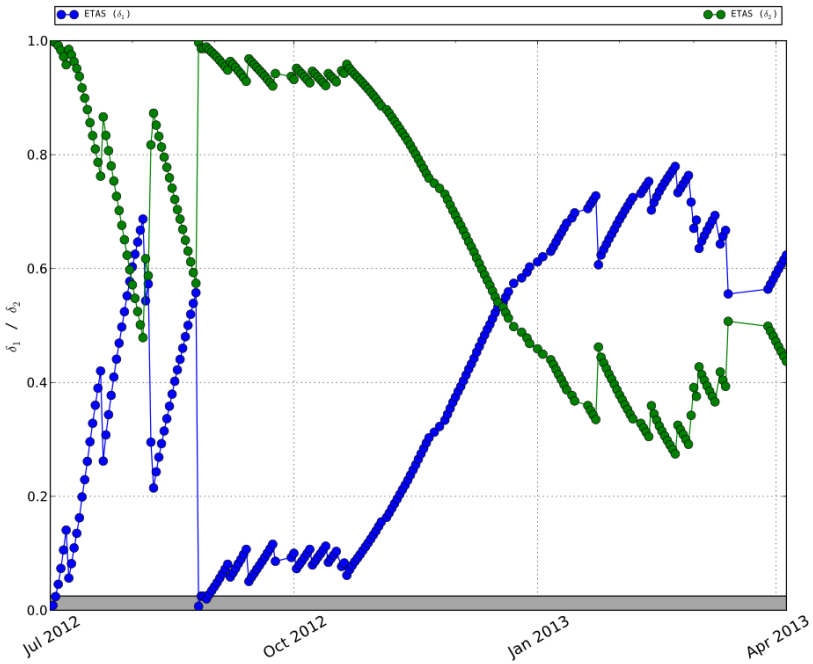
/home/csep/operations/dispatcher/runs/csep/2013_05/20130503000006/pid10836/para

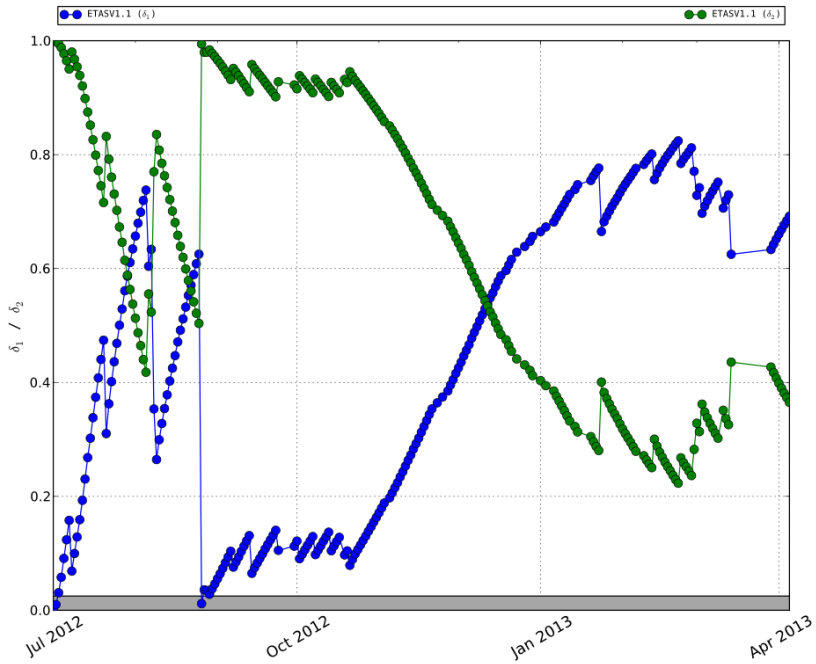
/usr/local/csep/data/templates/forecast.td.dat

/home/csep/testing-regions/California/one-day-models/forecasts/ETAS_4_2_2013.dat

/usr/local/csep/src/SCECModels/California/src/ETAS/template.poly

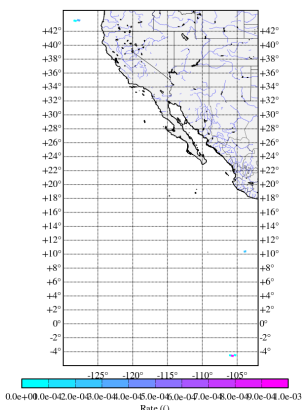
# Evaluation Results Example



# Forecasts Models Examples

- OceanicTransformFault one-day model by Margaret Boettcher (installed as of 2012/01)



starttime = [2013 4 2]; endtime = [2013 4 3];

forecasttime = 'T00:00:00'; depthrange = [0 30];

coeffvar_v2 = [0.2]; magbinwidth = 0.6; maxmag = 10;

path2cmtcat = '/home/csep/operations/dispatcher/runs/OceanicTransformFaults/csep/20130503003502/';

cmtcat = 'OneDayModelInputCatalog.dat';

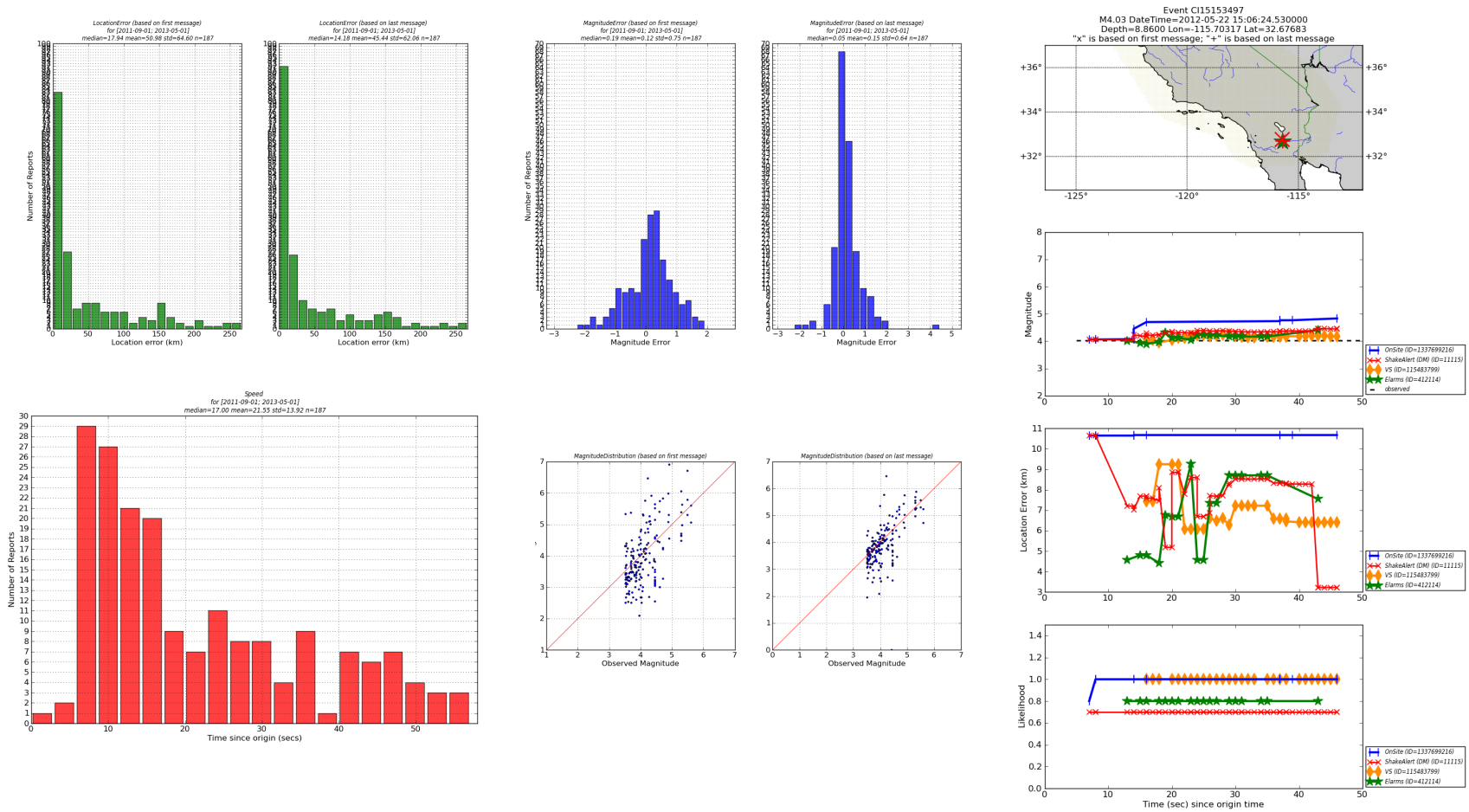
path2RTFrates = '/usr/local/csep/src/SCECModels/OceanicTransformFaults/src/OceanicTransformFaultModel';

path2RTFparameters = '/usr/local/csep/src/SCECModels/OceanicTransformFaults/src/OceanicTransformFaultModel';

forecastfile = '/home/csep/operations/testing-regions/OceanicTransformFaults/one-day-models-V12.1/forecasts/OceanicTransformFaults_CV0.2_4_2_2013.dat';

# CSEP Testing Framework

- Earthquake Early Warning (EEW)



# CSEP Testing Framework

- Transient Detection