2012 SCEC Annual Report

Southern California Earthquake Data Center
(SCEDC) 2012 Accomplishments

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Proposal Category:
Data Gathering and Products

Disciplinary Committee:
Seismology

Period of Performance:
February 1, 2012 – February 1, 2013

Major 2012 Accomplishments

1. Continued our key data-acquisition and archiving functions by maintaining and updating the primary online, near real-time searchable archive of seismological data for southern California. Added 61,570,083 hours of continuous seismic data for 436 stations and parametric and waveform data for 16,565 local events and 479 teleseismic earthquakes.

2. In our mission to improve distribution of SCEDC holdings to the research community, the SCEDC has developed 3 web services:
   - earthquake parametric data in QuakeML. *www.data.scec.org/ws/event*
   - station metadata in StationXML. *www.data.scec.org/ws/station*
   - waveform data in miniSEED www.data.scec.org/ws/dataselect/

   The SCEDC will continue to build on these efforts, with a priority to develop a new version of web STP.

3. In response to feedback from the SCEC community, the SCEDC began versioning its catalogs on a daily basis starting in August 20, 2012. Versions are stored in a publically accessible repository on github.com (*https://github.com/SCEDC/SCEDC-catalogs*) These files provide static data sets that can be used to produce repeatable results in research.

4. As part of a NASA/AIST project in collaboration with JPL and SIO, the SCEDC is receiving real time 1 sps streams of GPS displacement solutions from the California Real Time Network (http://sopac.ucsd.edu/projects/realtime; Genrich and Bock, 2006, *J. Geophys. Res.*). These channels are archived at the SCEDC as miniSEED waveforms, and now available to the user community through an STP client (*http://www.data.scec.org/research-tools/AIST/AISTstp.html*). This allows seismologists access to real time GPS displacements in the same manner they access traditional seismic data.

5. The SCEDC, in cooperation with QCN and CSN, is regularly archiving waveforms recorded by these networks for events detected by the SCSN to help the SCEC community explore high density, low cost networks (Class C data). The QCN sends waveforms that it has associated with a SCSN detected earthquake. For CSN archival, the SCEDC archives 2 minute windows of waveforms for events based its magnitude and distance from the center of the CSN network in Pasadena. The SCEDC is developing software to distribute this data to users, which will include waveforms, trigger times, and amplitudes.

6. The SCEDC continued to make improvements to the Station Information System (SIS) with the Southern California Seismic Network (SCSN). We have made substantial progress in storing network information such as telemetry equipment and layout. We now have detailed telemetry path information for any station upgraded as part of the American Recovery and Reinvestment Act (178 stations), short period “analog stations” (82 stations), and stations with a basalt digitizers (15 stations) This information will help researchers in Earthquake Early Warning studies understand the role of telemetry in delays retrieving data from network as well as network detection capability, which will be useful in CSEP testing.

7. The SCEDC hosted a mirror site to the SCEC Earthquake Response Content Management System (ERCMS), which was used by the SCEC community for the Golden Guardian Exercise and the Brawley Swarm in 2012. The SCEDC will continue to host this mirror site for SCEC.

8. The SCEDC continued to host the developmental database SCEC WGCEP group for UCERF3.

Contribution to the SCEC Community

The Data Center is a central resource of SCEC and continues to be an integral part of the Center. In 2012, the SCEDC continued to contribute to the SCEC scientific community by providing online access to a stable and permanent archive of seismic waveforms and earthquake parametric data. The seismological data archive held at the SCEDC has contributed significantly to the publication of many scientific papers pertinent to the region, most of which have SCEC publication numbers. The Caltech/USGS catalog archived by the SCEDC is the most complete archive of seismic data for any region in the United States.

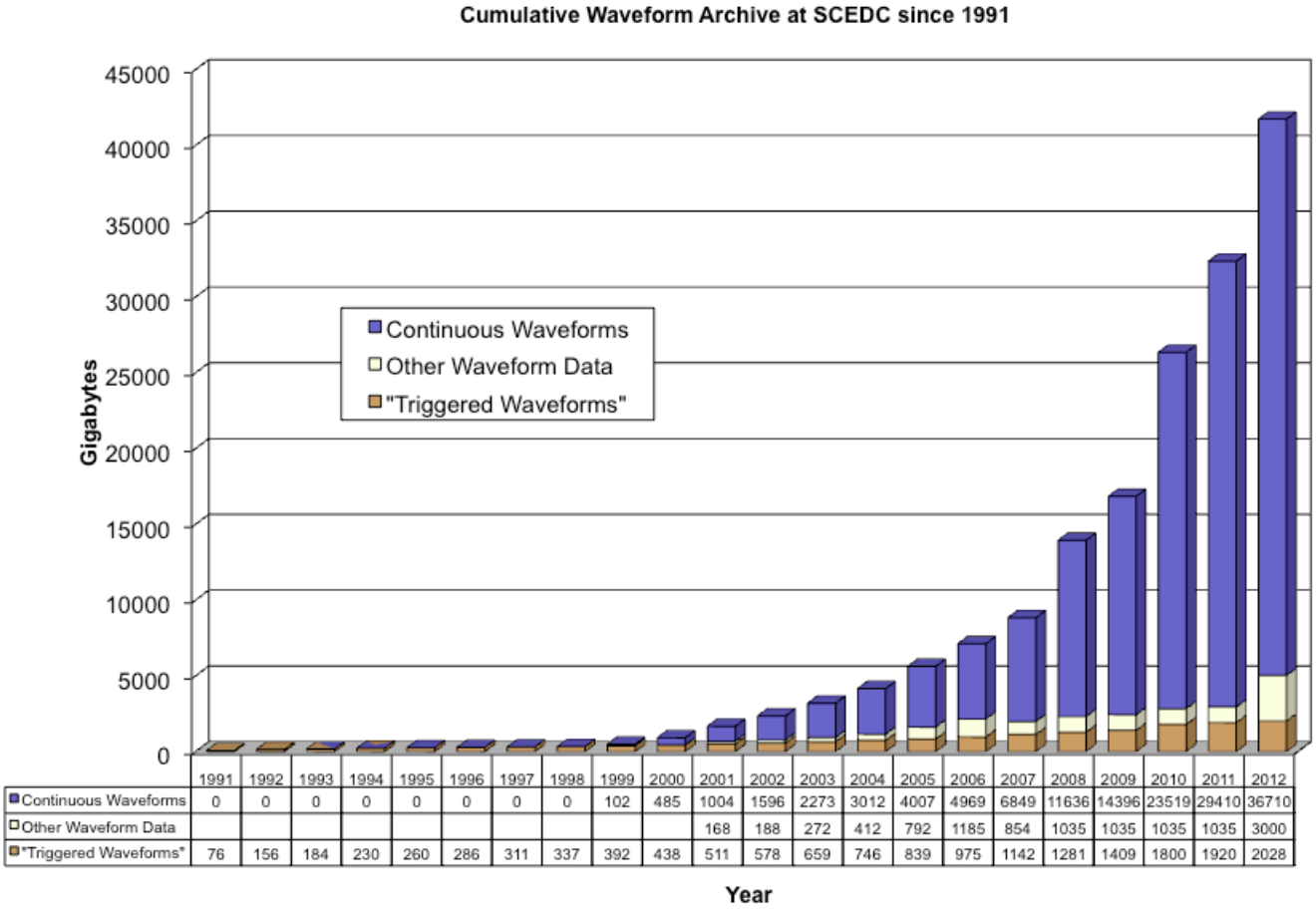
The SCEDC has allowed the data to be distributed to a much broader community of scientists, engineers, technologists, and educators than was previously feasible. The electronic distribution of data allows researchers in the world-wide scientific community to analyze the seismic data collected and archived in southern California and contribute their results to the SCEC community.

Archive Contents

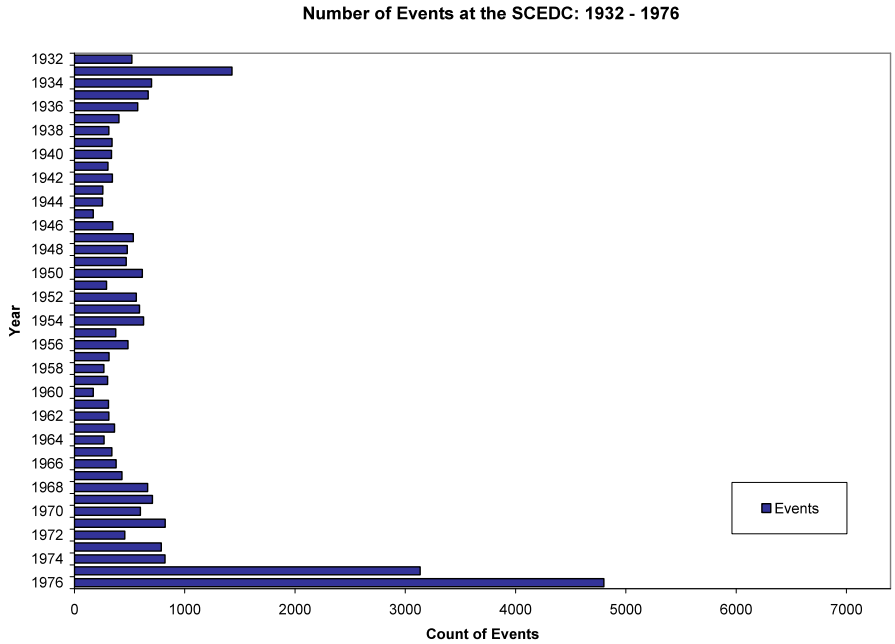
The archive at the SCEDC currently has the following holdings:

- The Caltech/USGS catalog of over 709,974 earthquakes spanning 1932-present.
- 37.8 terabytes of continuous and triggered waveforms.
- 13.8 million phase picks.
- 161.6 million triggered waveform segments.
- 10+ years of continuous broadband, high sample short period and strong motion waveforms.
- 38.9 million amplitudes available for electronic distribution.
- Triggered data for more than 11,656 significant teleseismic events.

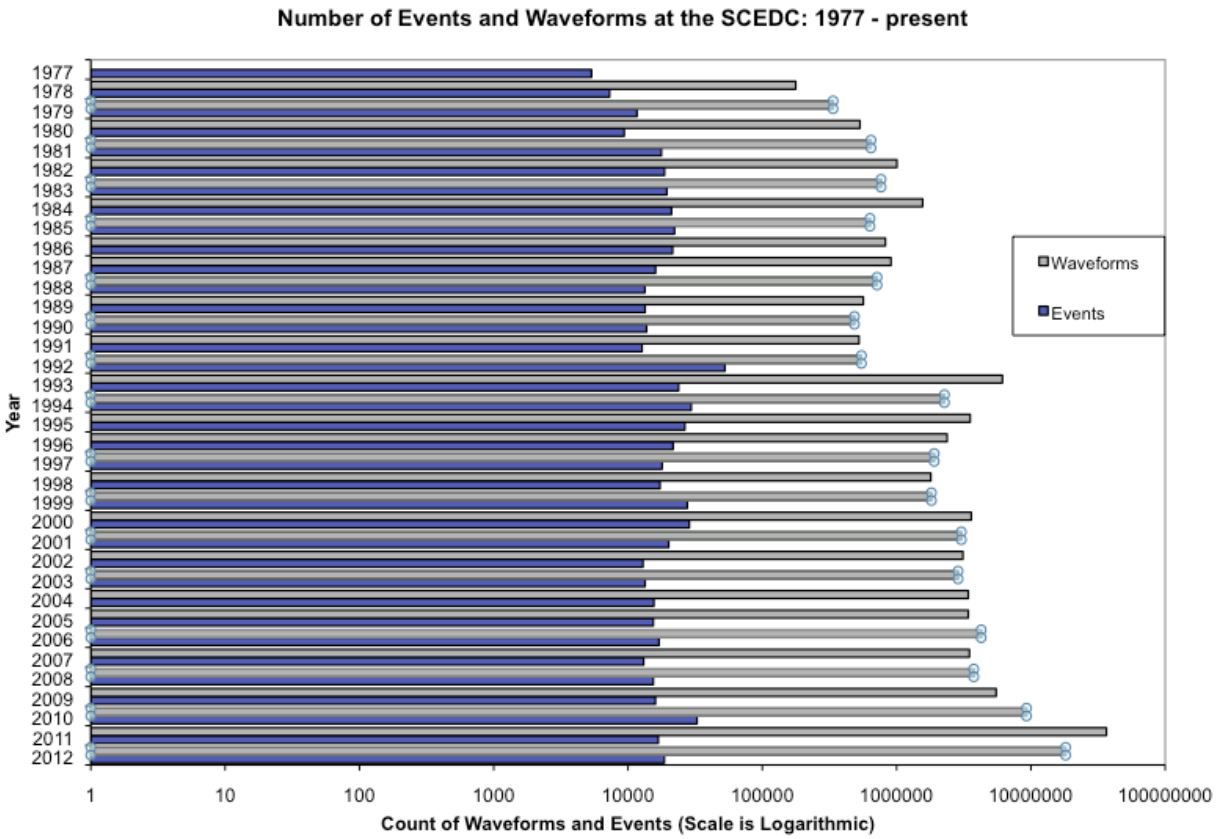
Figure 1: Size of Waveform Archive at SCEDC



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Continuous Waveforms	0	0	0	0	0	0	0	0	102	485	1004	1596	2273	3012	4007	4969	6849	11636	14396	23519	29410	36710
Other Waveform Data											168	188	272	412	792	1185	854	1035	1035	1035	1035	3000
"Triggered Waveforms"	76	156	184	230	260	286	311	337	392	438	511	578	659	746	839	975	1142	1281	1409	1800	1920	2028



Event parametric data for this era is available electronically



All event parametric and waveform data for this era are available electronically.

Figure 2. Number of events and event associated waveforms in the archive over time

Outreach

The SCEDC maintains a web site (www.data.scec.org) that has resources for researchers access to the waveform archive, event catalogs, and station metadata, as well as general information about recent and past significant earthquakes that are of interest to the public.

Quarter	Hits	Page views
2011, Q4	11,883,366	3,791,626
2012, Q1	11,009,018	3,930,650
2012, Q2	14,185,418	4,152,324
2012, Q3	20,520,327	5,256,214
2012, Q4	18,930,058	7,909,785

Figure 3. 2011 Web Statistics (www.data.scec.org)

Data Volume Served and Archived

Data transferred via STP in 2012:

	waveforms	waveforms/day	gigabytes	megabytes/day	kilobytes/sec
2011 Q4	29,101,940	316,325	2,933	32,652	387
2012 Q1	97,768,361	1,074,378	2,031	22,854	271
2012 Q2	67,043,612	736,743	2,715	30,556	362
2012 Q3	99,698,143	1,083,675	2,455	27,328	324
2012 Q4	11,046,899	120,075	815	9,073	108

In 2012, the SCEDC archived:

- 16,565 local events
- 18,194,058 triggered waveforms
- 22,974,077 continuous waveforms
- 613,556 arrivals
- 4,219,185 amplitudes

Magnitude	Number of local events (le):
-1-0	228
0-1	7303
1-2	7282
2-3	1537
3-4	187
4-5	26
5-6	2

2012 event type break down:

# events:	Event type
16565	le (local event)
569	qb (quarry blast)
859	re (regional event)
165	sn (sonic blast)
479	ts (teleseism)
25	st (subnet trigger)
18662	Total