

USGS Menlo Park Seismic Data Library

by Willie Lee and Steve Walter, USGS

Abstract

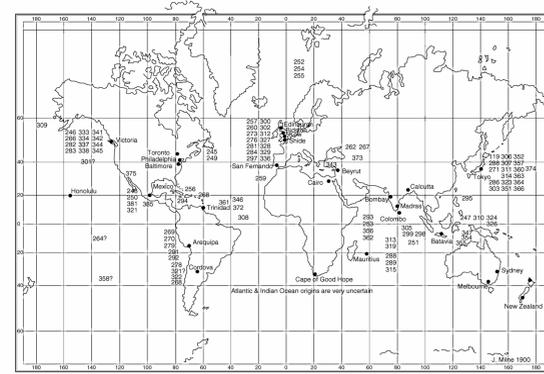
Modern digital seismograms from stations with adequate global coverage are available only since 1990. For prior earthquakes we must use the WWSSN and other historical analog seismograms. The seismograms of pre-1990 earthquakes from the world's subduction zones are especially important to researchers seeking to understand where future tsunamigenic earthquakes might occur and how big they might be.

Background

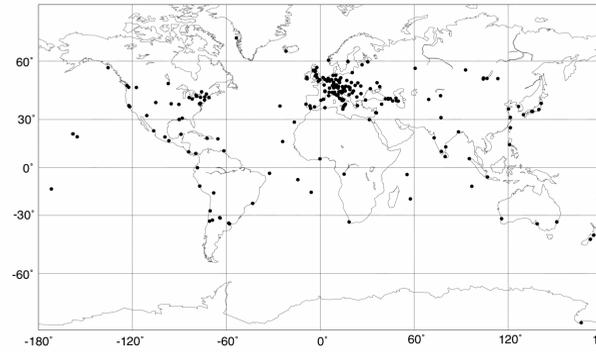
The USGS Seismic Data Library was first established as a "project" in the early 1970s when the Earthquake Mechanism Laboratory of NOAA in San Francisco merged with the USGS National Center for Earthquake Research in Menlo Park. With Willie Lee as its project chief starting in 1976 the library grew to include one of the world's largest archives of seismograms, seismic station bulletins, and related materials from around the world.

Unfortunately, following a reorganization of USGS, this Data Library was abandoned around 1996. The collection of WWSSN seismograms (about 5 million 70mm film chips) was sent to the USGS Albuquerque Seismological Lab (ASL) and seismograms from the California Seismic Network (Calnet) were moved to USGS storage. In the end, some of the seismic station bulletins (mostly pre-1940) were saved by Lee in his garage and the rest of the holding - including large quantities of magnetic tapes, punch cards, and most of the seismic station bulletins - was simply discarded.

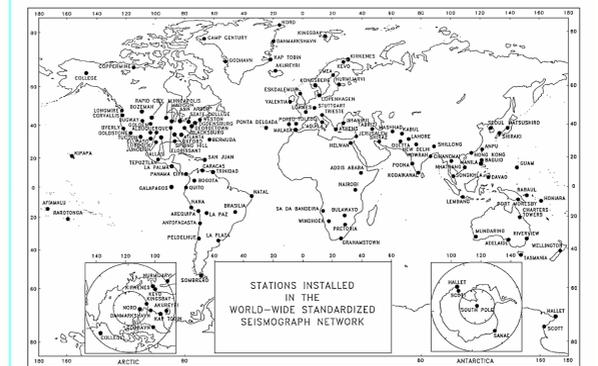
Now, more than a decade later, the USGS Seismic Data Library is being re-established in Menlo Park in order to support the research being conducted by the USGS Tsunami Source Working Group.



The First Global Seismic Network by John Milne in 1899. [Stations shown in Black dots; Numbers refer to earthquakes listed in Milne's catalogue and show approximate locations.]

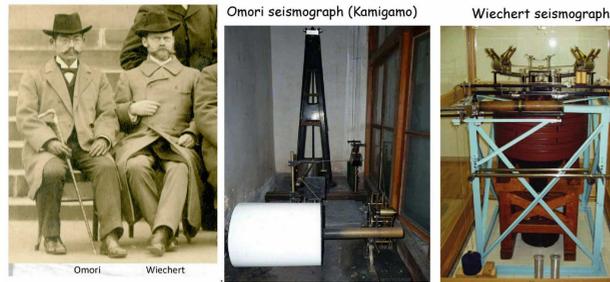


A Map Showing Seismographic Stations with Seismic Bulletin Materials before 1921 (from Schweitzer and Lee 2003)

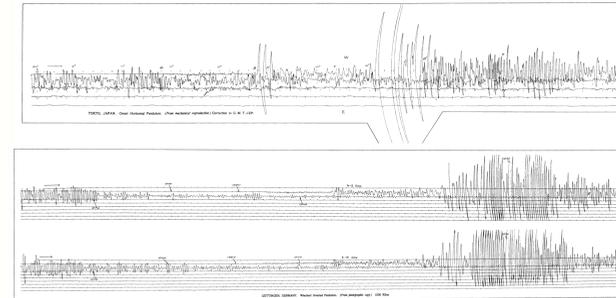


Stations Installed in the World-Wide Standardized Seismograph Network (WWSSN) in the 1960s.

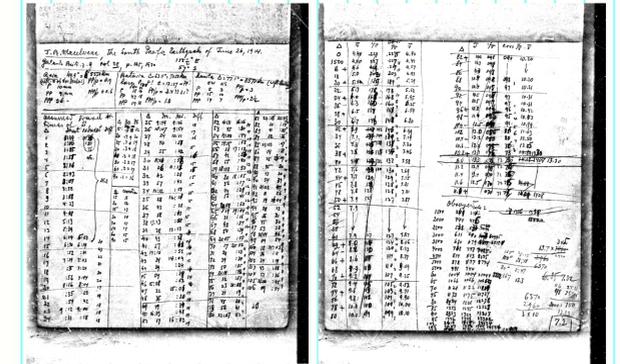
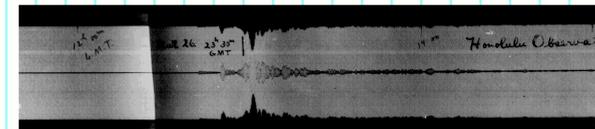
Geophysikalisches Institut-Göttingen.								
1897/98 1898 September 10 ^h - Oktober 2. 9 ^h (Grenzwich-Zeit)								
Datum	Ort	Ph.	Zellen	T	A ₁	A ₂	A ₃	Bemerkungen
1897/98	10	10	54,5	14	C	3	-	
1897/98	10	10	40					
1897/98	10	10	19,23	42	4	+	+	1
1897/98	10	10	27	42	4	-	-	1
1897/98	10	10	15	24	45	16	30	5
1897/98	10	10	14	11,4	20	42	15	20
1897/98	10	10	16	50				
1897/98	10	10	3,50,4					3 haben rit schiefen
1897/98	10	10	1,21	37	27	24		2 Elms in der Zimm
1897/98	10	10	192	33	45	4		2 postentzwickelung
1897/98	10	10	193	53	24	4		2 dal usser Betrieb
1897/98	10	10	19	5	12	13	4	2 Starke mikrosismi-
1897/98	10	10	46	34,9				2 sche Bewegung vor
1897/98	10	10	8	40,7	24	10	12	10 geht die Elmsion.
1897/98	10	10	8	20				2 Zimm- von P. u. Z.
1897/98	10	10	14	40,6				
1897/98	10	10	12	42,4	20	6	7	
1897/98	10	10	11	20				
1897/98	10	10	11	12	19,6	6		5
1897/98	10	10	11	30				



Two Great Seismologists (Strasbourg, 1901) & Their Famous Seismographs



Above: the 1906 San Francisco Earthquake Recorded by the Omori Seismograph and by the Wiechert Seismograph. Below: The July 30, 1909 earthquake recorded at the Honolulu Observatory.



Scans from lab notebook of Beno Gutenberg showing his analysis of an earthquake from June 26, 1904.

A Sample of Hand Written Seismic Station Bulletin

A Sample of Typewritten Seismic Station Bulletin

Station Bulletins

In the spring of 2010 the UC Berkeley Seismological Laboratory contributed its collection of world-wide seismic station bulletins to the USGS Seismic Data Library. This collection covers the period from the late 19th century through the mid-20th century. Combined with what Lee had saved in his garage, this is probably the most complete set Station Bulletins that exists in the United States. Due to lack of funding, most of this collection is yet to be sorted and cataloged.



Microfilms

In 2009 the Data Library acquired a nearly complete collection of over 18,000 35mm microfilms of the WWSSN seismograms from the Pasadena Seismic Laboratory spanning the period from 1964 - 1975. They are equivalent to the 70mm film chips at ASL, but are on film rolls. The Data Library also includes a good subset of the microfilms from the Historical Seismogram Filming Project in which about 500,000 seismograms from 1890s to 1963 were microfilmed. This includes 460 16mm film rolls, and around 600 35mm film rolls.



Scanner

In order to view and digitize the collection of microfilms records, we recently purchased a Konica-Minolta MS7000 Microform Scanner, which is designed to view and scan both 16mm and 35 mm microfilm rolls, as well as standard microfiche.



Miscellaneous Collections

The USGS Seismic Data Library also includes a number of historically significant records including, but not limited to, microfilms of laboratory notebooks of Beno Gutenberg and Charles Richter, a photo album that belonged to Gutenberg, as well as a map cabinet of full-size copies of helicorder records of many of the largest Tsunamigenic Earthquakes of the 20th Century.

