

The Strong Ground-Motion Virtual Data Center (VDC) Fact Sheet 2016

Hosted and supported by CESMD (strongmotioncenter.org/vdc)

Facilitated by COSMOS (www.cosmos-eq.org)



About the VDC

The Strong-Motion **Virtual Data Center** (VDC) is an unrestricted web-based search engine for accessing worldwide earthquake ground response data. It provides an interactive resource for researchers, practicing earthquake engineers, earth scientists, and government and emergency response professionals. The VDC, one of the main on-line resources for strong-motion data, is continuing to expand and significantly improve the accessibility and use of worldwide strong-motion records.

The VDC was developed by and began operating at UC Santa Barbara in 2000 with support from SCEC and COSMOS. In 2006, COSMOS, the California Geological Survey (CGS), and the US Geological Survey (USGS) agreed to transfer the operation of the VDC to the Center for Engineering Strong-Motion Data (CESMD), which is jointly supported by USGS and CGS.

The VDC is virtual in the sense that most of the accelerograms reside at the source agencies. Thus, at the time a user issues a download request, the most recent and authoritative versions of the selected data are pulled in real time from the servers at the agencies that have collected and archived the data.

Users of the VDC have a wide range of data selection tools: they may search for records with specific characteristics, view data in interactive maps, preview records, compare recorded data to design spectra, and retrieve the data and metadata of interest to them. Access is provided through the VDC website at:

www.strongmotioncenter.org/vdc

The April 15, 2016, Kumamoto M7.0 earthquake was a powerful event that severely damaged the city of Kumamoto city in the Kyushu region of Japan; it killed 65 people and injured 331 severely (FDMA Report #43).

Strong-motion time histories acquired by seismic networks are critical to Earth scientists for understanding the physics of the earthquake process and for improving our ability to predict ground shaking and related effects from future earthquakes.

The role of the VDC is to provide access to significant strong-motion data recorded anywhere in the world.



(Above) Lateral ground shifts of up to ~2m were observed along the surface trace of a 50-km fault ruptured by the 15 April 2016 M7.0 earthquake of, in south-western Japan. (Quote and photo from Earthquake-Report.com, last accessed 11/12/2016)

VDC Data Inclusion Criteria

Through the VDC, the CESMD works to provide access to significant ground strong-motion records from data providers worldwide. However, the event selection criteria used are not uniform. In areas that are highly active, such as Japan, the magnitude threshold of $M=5.5$ and a maximum hypocentral depth of 100 km are used to limit the data volume to a manageable level. In other areas where the level of seismic activity is low, such as in the Eastern U.S., a magnitude threshold of $M 4.5$ is used. Exceptions to these criteria are made to include events judged to be of significant interest.

VDC Database Updates

Since September 2015, access to 1257 strong-motion records from 63 seismic stations and 9 earthquakes has been added to the CESMD VDC. The regional magnitude thresholds for these events are 5.0 in the U.S. and 5.5 in Japan and New Zealand. These additions represent a 1.1% increase in the number

of earthquakes, and a 2% increase in the number of accelerograms available via the VDC.

Search for Data at the VDC

The [Map Interface](#) displays earthquakes and stations on a world map that users may reconfigure by entering latitude and longitude ranges, by zooming in and clicking on a station or earthquake symbol to transfer to station or earthquake pages, or by highlighting the stations reporting a selected earthquake.

The [Earthquakes Page](#) lists earthquake name, magnitude, number of stations, and data provider for all earthquakes available through the VDC by region, with a drop-down list of regions at the top of the page for quicker navigation.

The [Stations Page](#) lists the owner and station name for all stations available through the VDC by region, and also has a drop-down list of regions at the top of the page.

Increase since 2001 in data available via the VDC

	Sept 2001	Sep 2016	Increase
Earthquakes	199	806	305%
Stations	1,744	5,646	224%
Accelerograms	11,537	64303	457%

The [Basic Search Page](#) allows the user to enter the most common parameters. The user may also tailor the output to reflect station information only, earthquake information only, or all data for the search result.

[Advanced Search Page](#) allows the user to query and recover almost every field in the database. The user may select an html table or a station page as the output of the advanced search, or download the metadata as an rtf file.

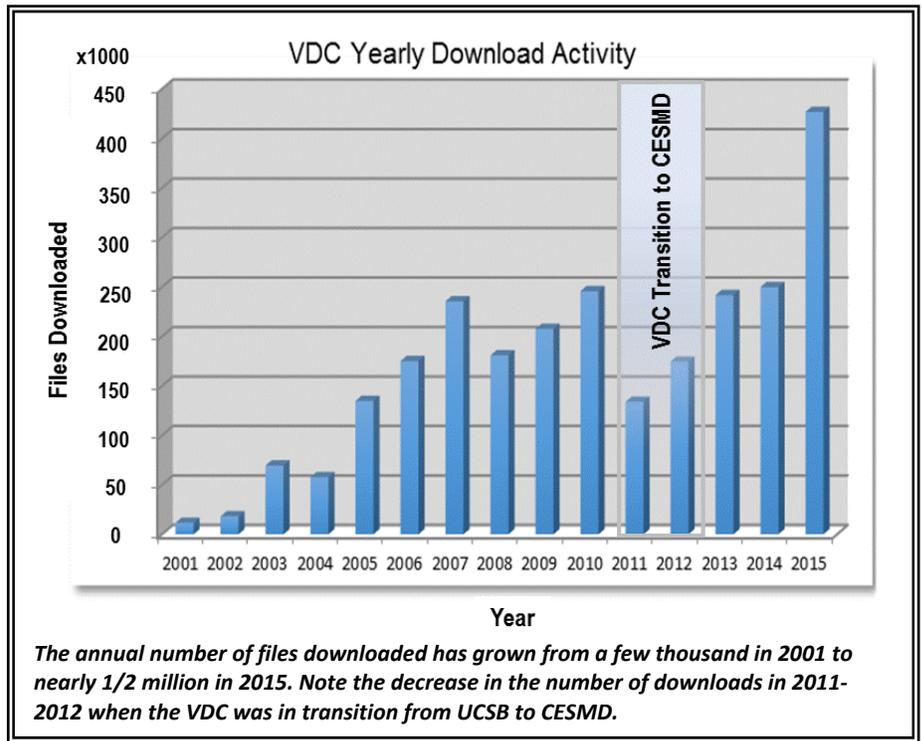
Data at the EDC

Strong-motion records for some earthquakes that occurred in 2016 in Chile, Italy, and Ecuador are posted at the Engineering Data Center (EDC) of the CESMD instead of the VDC. COSMOS has funded a project to develop a tool to convert strong-motion data from the formats of Chile and Taiwan networks to COSMOS xml format. This tool will facilitate uploading data about strong-motion records (metadata) to the VDC database for the Chile and Taiwan networks.

Downloading Data

There are three ways to download data:

- On many Earthquake Pages there is a link to a zipped archive of files for the event, thus allowing the user to download all data for the selected earthquake.



- On the Download Page, users may select individual files for downloading.
- Also on the Download Page, users may select files and receive them as a set of zipped files containing up to 30 data files each, together with a log of the files included and information on how to attribute the contributing networks.

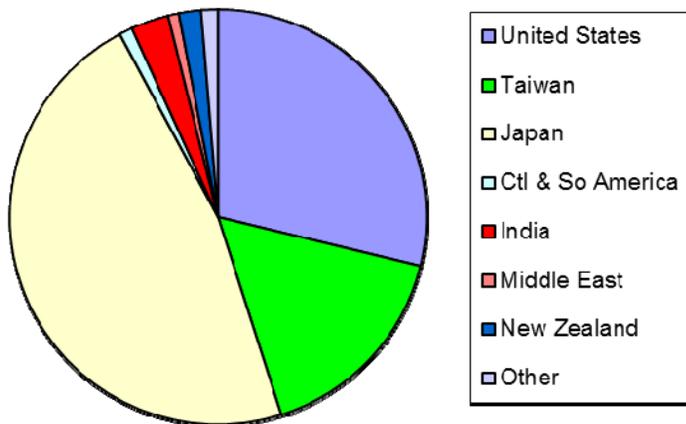
Users who access strong-motion data via the VDC are kindly requested to acknowledge both the data owners and the VDC in their publications and presentations.

The Role of COSMOS

COSMOS serves as a liaison in facilitating data access from international strong-motion networks by advocating and promoting the use of strong-motion data, and by providing input and advice on developing tools and software applications.

The VDC provides a one-stop shopping approach for obtaining ground response strong-motion data collected anywhere in the world.

Please send comments to:
cesmd@strongmotioncenter.org



Users download data from a variety of data providers through the Strong-Motion VDC. This chart displays the source regions of data that were accessed between January and September 2016. This chart reflects high interest in records from Japan, the United States, and Taiwan.

