



Schweizerischer Erdbebendienst
Service Sismologique Suisse
Servizio Sismico Svizzero
Swiss Seismological Service

ETH zürich

The Swiss Seismological Service (SED)



History and Mission of the SED

The Swiss Seismological Service registers on average two earthquakes every day. Each year, approximately ten of these earthquakes are strong enough to be felt by the population (from a magnitude of around 2.5).

The SED at ETH Zurich is the official federal agency for earthquake monitoring. Its origins date back to the Swiss Earthquake Commission, founded in 1878, which made Switzerland the first country to establish a permanent organization for the evaluation of earthquakes, even before countries like Italy or Japan. In 1914, the earthquake monitoring mandate was defined in a federal law. Thus, what had previously been a voluntary activity was transformed into an institution.

The SED is currently a nondepartmental unit of ETH Zurich (status since 2009). It employs around 60 persons – scientists, doctoral students, technicians, and administrative staff.

The earthquake monitoring station Degenried in Zurich is located in the forest near the Dolder. Inaugurated in 1911, it was the SED's first and for a long time only earthquake monitoring station.



Earthquake Surveillance



Broadband seismic monitoring station on the Fuorn pass

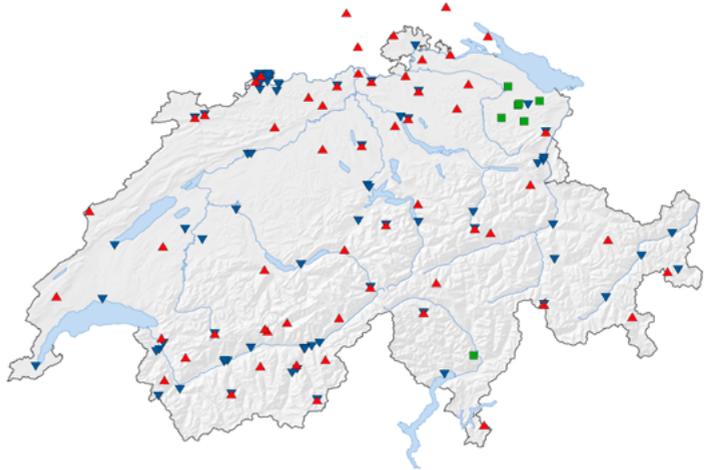


Strong motion seismic monitoring station in the city of Lucerne



Solar-powered temporary seismic monitoring station in the geothermal energy project in St. Gallen

More than 100 seismic monitoring stations are installed and serviced by the SED in order to constantly monitor the earthquake activity in Switzerland and its neighboring countries. These stations can be classified into three different types:



- ▲ Broadband network: Highly sensitive broadband seismometers register even the slightest ground tremors caused by weak local as well as strong global earthquakes. These stations are preferably installed in remote locations on solid rock.
- ▼ Strong motion network: Seismometers that are suited for measuring strong local tremors. These are mainly located in urban areas and high-risk regions.
- Temporary networks: Seismometers with which the SED densifies the network in order to monitor increased natural seismic activity, or any other seismic activity in the context of construction or industry projects by third-party assignment.

Alert in Case of an Earthquake

Earthquakes can neither be predicted nor prevented. However, the SED monitors ground shaking around the clock. Within approximately 90 seconds of an earthquake, details about the time, location, magnitude, and possible effects are displayed on the website www.seismo.ethz.ch. The SED automatically reports any noticeable earthquakes to the authorities and the media. At the same time, this information is transmitted to the SED's 24-hour on-call service via pager, e-mail, and SMS. This service is also available to the authorities and the media for further information about current earthquakes, and prepares background information that is published on the SED website. In case of earthquakes that cause major damage worldwide, the SED additionally informs the Swiss Humanitarian Aid Unit (SHA).

Seismic Hazard and Risk

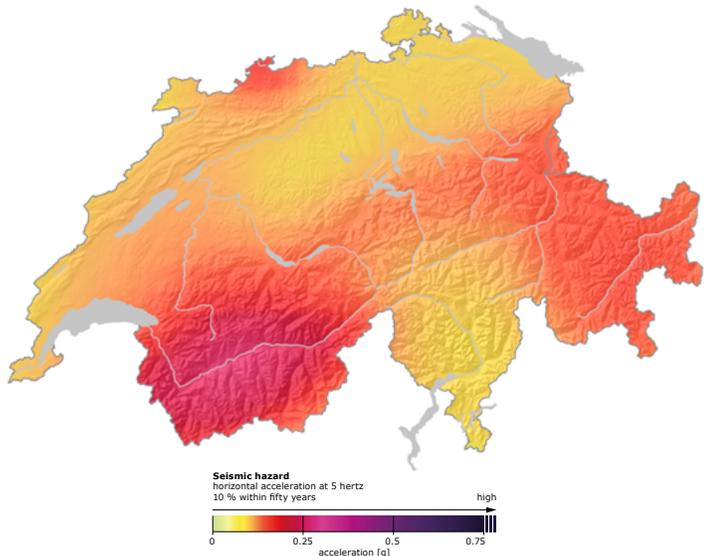
In comparison with other European countries, Switzerland faces a moderate seismic hazard, but there are regional differences: In Valais, Basel, Graubünden, the St. Gallen Rhine Valley, and Central Switzerland more earthquakes are registered than in other regions. However, earthquakes may occur anytime and anywhere in Switzerland.

A strong earthquake with a magnitude of approximately 6 occurs every 50 to 100 years on average. The last time an earthquake of such magnitude was recorded was in 1946 near Sierre in Valais. The strongest earthquake in Switzerland so far had a magnitude of approximately 6.6 and destroyed large parts of the city of Basel in 1356.

If such an earthquake were to occur in Basel today, several thousand fatalities, tens of thousands of injuries, and property damage on the order of approximately CHF 140 billion could be expected.

The best protection measures against the effects of an earthquake are an earthquake-resistant building design and securing objects that may topple. 90 percent of the buildings in Switzerland are not built to a seismic code, and it is not clear to what extent they could withstand a strong earthquake. Only few cantons have statutory regulations requiring adherence to construction standards for earthquake-resistant building.

The Seismic Hazard
Map of Switzerland
(2015)

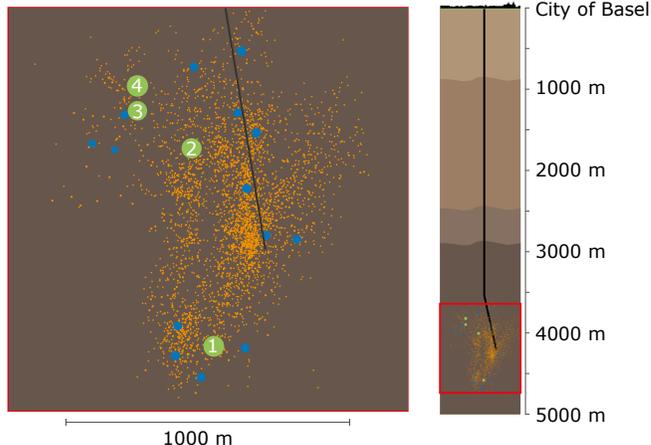


Research and Teaching

Besides earthquake monitoring and the assessment of seismic hazard, the researchers of the SED are involved in numerous national and international research projects, which are largely financed by third parties. This guarantees the permanent exchange of information across national borders. Fields in which the SED researchers are involved include, for example, glacial and engineering seismology, statistical seismology, induced seismicity, as well as the monitoring of landslides and seismotectonics. The training of junior researchers also is an SED priority. Lectures and seminars are integral parts of the teaching program at ETH Zurich, which also includes the supervision of Master's and Doctoral theses.

Analysis of the Induced Earthquakes during the Basel Geothermal Energy Project

- Not noticeable (Magnitude < 2)
 - Barely noticeable (Magnitude > 2)
 - Noticeable (Magnitude > 3)
- 1 December 8, 2006
Magnitude 3.4
 - 2 January 6, 2007
Magnitude 3.1
 - 3 January 16, 2007
Magnitude 3.2
 - 4 February 2, 2007
Magnitude 3.3



Swiss Involvement in the International Monitoring of the Nuclear Test Ban

In 1996, the UN member states drafted an agreement on the ban of nuclear tests. An international monitoring system coordinated in Vienna was established to control the adherence to this agreement. The SED contributes by providing data recorded by a seismic station near Davos, which was constructed for exactly this purpose. For example, this seismic station recorded ground shaking twelve minutes after the nuclear test in North Korea in 2013.

Informed at Any Time

The SED Website

Here you will find detailed information about earthquakes in Switzerland and abroad besides lots of background information about all aspects of earthquakes.

www.seismo.ethz.ch

Seismic Hazard
Switzerland

Consult a variety of different maps using our web tool to find out how likely certain earthquakes are in Switzerland.

www.seismo.ethz.ch/knowledge/seismic-hazard-switzerland

Your Personal
Earthquake Risk

Use the interactive tool on the SED website to approximately investigate the earthquake risk in your region.

www.seismo.ethz.ch/knowledge/seismic-risk-switzerland

Did You Feel an
Earthquake?

Enter your observations in the online questionnaire on the SED website.

www.seismo.ethz.ch/earthquakes/did-you-feel-an-earthquake

@seismoCH_E

Follow us on Twitter and receive an immediate notification when an earthquake with a magnitude of 2.5 or greater has occurred in Switzerland or neighboring countries.

www.twitter.com/seismoCH_E

The Earthquake
Simulator

Visit the earthquake simulator in the *focusTerra* museum. With the three tons, room-sized shaker, you can physically experience shaking from real earthquake records without putting yourself in danger. Admission is free of charge. Guided tours are offered every Sunday.

www.seismo.ethz.ch/knowledge/miscellaneous/earthquake-simulator

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