Science

# Ten years of earthquake research underground

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**Carinthia is also a geological view of the border area. From Lesachtal in the west to the Jauntal in the east, the periadriatic seam stretches. A fault line in the rock that was formed in the course of Earth's history. Since 2014, research has been conducted in the obiro caves. The goal is the earthquake prediction.**

The pal.Idriatic seam stretches from west to east throughout the Alps, from Piedmont in Italy to the north-east of Croatia. In some cases, it is only recognizable by geologists, but in some areas it is also visible, for example in the obircad caves near Bad Eisenkappel.

The Obir is located on the border between two large rock plates, the Adriatic plate in the south and the Pannonian Plate in the east. Andreas Langer from the caving group of the natural science association for Carinthia: “There the two and the Adriatic plate begin to push themselves under the Pannonian Plate. This means that this is exactly where we have a fracture field or a collision of these two rock plates.”

## Unique research project

This fault line becomes visible as a crack in the rock and it also moves in this area. It is about tiny lifts and subsidence, which often only make up a fraction of a millimeter. The reason for this is the tensions and relaxations of the earth's plates that pass deep in the earth.

Ivo Baron is a geologist at the Czech Academy of Sciences and, with his research team in the rock fracture line, installed measuring instruments in the obircave to record these movements in the rock. It is a globally unique research project: “Our group is the only one in the world that can make three-dimensional measurements in the microometric field of disturbances.”


ORF Andreas Langer

## Measuring instruments on the fault line

These measurements are carried out using special equipment that is installed in the fault line in the rock. Andreas Langer supports the scientists in the assembly of these measuring instruments. He explains how such an apparatus works: “He takes photos of a special plate every half hour and can thus see if something is shifting and something is shifting in which direction. This allows him to recognize and see micro-tonton shifts, as the project is called, in which direction the whole thing is moving.” These measurement data are intended to gain important scientific insights.

ORF Sound 15.4.2024, 14.10 pm

### Nature experience (1)

ORF Sound 15.4.2024, 14.20 pm

### Experience Nature (2)

Baron said one could gain insights into which tectonic squeezes play along or which factors provoke this smallest movement in the caves. The aim is also to identify the connection with earthquakes more precisely. They arise when the tension in the earth plates subsides. Until now, Ivo Baron can only predict when the earth's plates are tensing. When the final tension and thus also earthquakes take place is not yet predictable at the moment.

Measuring instrument

However, the measurements in the area of the obirm caves could eventually contribute to be able to predict earthquakes in the future. To this end, Baron and his team are collecting data not only in Carinthia, but also in several Austrian caves as part of the research project Speleotect of the Czech Academy of Sciences and the Natural History Museum Vienna.

Obir cave

## Exceptional data line underground

Together with the spele research group of the Natural Science Association for Carinthia, not only the measuring instruments were assembled in the cave, but also the pipes with which the data is transported to the outside were laid. A technical challenge, because these lines are 600 metres long, says Andreas Langer: “Perhaps he is lucky that I am a communications technician from my training and have accidentally had to deal with data and data transfer in the direction and knew how to build such a line on 600 meters, that it also works underground.”

The data is then collected and evaluated by Baron on a server in order to better understand how the ground moves in depth.

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