CAVERNA DO DIABO,
BRAZIL

PHOTO: HUBERT VONHOF / MPI FOR CHEMISTRY

ON LOCATION

As this scientist works deep underground, she's also journeying into the distant past. For geologists, dripstone formations (speleothems) like the one seen here are an archive of climate history. Speleothems grow over millennia into striking cascades of sedimentary rock, some of which are over 100,000 years old. The Caverna do Diabo southwest of São Paulo is one of many such caves in Brazil in which Hubert Vonhof and his team at the Max Planck Institute for Chemistry in Mainz, in collaboration with the University of São Paulo, are reconstructing the region's prehistoric climate.

Speleothems form via limestone deposits in humid regions, and geochemists can decipher information from their layers. With the help of isotopic measurements, the elements contained in the speleothems can provide chemically precise data, which in turn allows them to be dated. The method is based on the radioactive decay of naturally occurring uranium isotopes that entered the caves with water and were deposited as microscopic inclusions in the dripstone formations. Combined with analysis of the minerals and organic matter in the same sedimentary rock, this provides a precise picture of the paleoclimate. Because dripstones form continuously over very long periods, changes in average temperature and even precipitation patterns can be reconstructed across thousands of years.