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Research in Graubünden

Snow is important for marmots

An early snow cover in winter keeps the burrow warm



In winter, a mighty blanket of snow will keep this marmot family nice and warm.

Image: © Swiss National Park / Hans Lozza

For his master's thesis at the University of Zurich, wildlife biologist Sven Buchmann studied how environmental and climate factors affect the distribution and abundance of alpine marmots in the Swiss National Park. He recently presented his research project at the conference "Graubünden forscht" in Davos: "I wanted to find out why marmots are more numerous in some places than in others. In this context, I was particularly interested in the influence of snow on the distribution and abundance of marmots."

The alpine meadows above the tree line are the habitat of the marmots. They have to eat as much as possible over the summer and then save energy in hibernation from the end of September. They retreat into their burrow as family colonies, snuggle up to each other and shut down their bodily functions. Body temperature is then in the single digits and the heart beats only a few times per minute. This is how they sleep through the winter until they emerge again in April. Buchmann explains why the snow cover is important for the marmots: "The snow insulates the ground very well and thus preserves the warmth in the marmot burrow."

To investigate the influence of snow cover duration on marmot abundance, Buchmann conducted four months of field research in the Swiss National Park in the summer of 2021 and counted around 700 marmots. To do this, he used a thermal imaging camera to record footage

at various observation points for ten minutes each to detect the marmots. Counting the marmots is not easy, Buchmann explains: “I only ever see a portion of the marmots because some animals are hiding in their burrows or I simply overlook them. To account for this uncertainty when estimating the total number, I had to use statistical methods.”

He obtained the snow cover data using satellite images that he analyzed for the years 2017 to 2021. Comparing the snow cover data with the abundance of marmots, the young researcher found the following: “The snow that is left in spring does not seem to have any influence on the abundance of marmots, although a later snowmelt delays plant growth and marmots therefore have to wait longer for their food. In contrast, the timing of when the first snow falls has a greater influence. Fewer marmots were observed at sites where the snow came later. This underscores the importance of insulating snow cover during hibernation. Climate models predict that winters will become much shorter during the next hundred years. Presumably, marmots will increasingly have to contend with the problem that the insulation of their burrow will deteriorate. But whether and how they will cope with this problem is still unclear.”

Sven Buchmann and Daniela Heinen

Further information

The Swiss National Park (SNP) is the largest wilderness area and the only national park in Switzerland. Since its foundation in 1914, it has pursued three main objectives: Nature conservation, public relations/environmental education and research. www.nationalpark.ch

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Sven Buchmann