

Langzeitdaten von Mikroklima und Mopsfledermäusen zeigen einen Effekt des Klimawandels in Fledermaus-Winterquartieren

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Long-term data of microclimate and barbastelle bats show an effect of climate change in bat hibernacula

Abstract

Climate change can negatively impact biodiversity. With increasing global warming, environmental conditions for bats are changing, for example, the micro climate of hibernation sites in temperate zone. Effects and consequences of climate change can often only be detected by analyzing long-term data. In this study, six hibernacula in northern Thuringia (“Thüringer Pforte”) were studied for a period of approximately 30 years. Humidity and temperature within the sites were measured during winters and numbers of barbastelle bats (*Barbastella barbastellus*) were counted. Data was analyzed by linear models and a general additive model. Relative humidity within the hibernation sites decreased dramatically over the course of the period. Air temperature within the sites decreased from the end of the 80s to the millennium and approximately since then, temperatures increase. Numbers of barbastelle bats increased until the begin-

ning of the millennium and are decreasing since then. The modelling shows that humidity had a strong effect on bat numbers. The results show that hibernation sites are directly affected by climate change. In the long term, these changes could lead to loss of bat hibernacula for several species. In case of barbastelle bats, it remains unclear whether the decline in hibernacula indicates a decline in the population in the area, or whether the animals move to other sites which are climatically more appropriate for hibernation. However, the study highlights that climate change is likely to bring risks to underground habitats and possible consequences for bat species and other speleo fauna.

Keywords

global warming, hibernacula, relative humidity, temperature, cave climate, barbastelle bats (*Barbastella barbastellus*)

Zusammenfassung

Der Klimawandel birgt Risiken für die Biodiversität. Mit der zunehmenden Erderwärmung werden sich die Umweltbedingungen für Fledermäuse verändern. So werden sich zum Beispiel auch die Winterquartiere mikroklimatisch verändern. Wie diese Veränderungen aussehen können und wie sich das auf die Fledermaus-

bestände auswirken kann, war Gegenstand der Auswertung einer langjährigen Untersuchung (ca. 30 Jahre) in 6 verschiedenen Winterquartieren in Nord-Thüringen (Thüringer Pforte), in welchen kontinuierlich Mopsfledermäuse gezählt sowie Luftfeuchtigkeit und Temperatur innerhalb der Quartiere gemessen wurden. Die