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Microclimate change: the hidden driver of species redistributions

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Recent research has shown that the impacts of climate change on terrestrial species distributions are more complex than expected. Species distributions are showing significant delays in responses, or have shifted in unexpected directions. Scientists have identified several mechanisms that could explain these mismatches, including slow population dynamics, habitat fragmentation, and biotic interactions that limit the spread of species. Yet, one crucial aspect remains largely overlooked: we first need relevant high-resolution baseline climate change data to accurately answer this question.

Indeed, organisms respond to microclimate change, which can differ significantly from macroclimate change. We know that local temperatures near the ground or below vegetation can be several degrees different from weather station data. However, it remains a mystery how quickly these microclimates are changing, as this depends as much on climate change as on land use changes.

In this talk, we will explore how the SoilTemp-database, a global database of more than 75,000 in-situ measured microclimate time series, can be used to improve global microclimate products and ultimately provide better estimates of microclimate change. By applying these products to improve our estimates of species distributions, we can better understand the impacts of climate change on biodiversity, crucial for adjusting biodiversity management to a rapidly changing world.