and on how this has affected the mountain's lakes, streams and terrestrial ecosystems. More broadly they also tell the history of past climate change over East Africa. This research project investigates characteristic signatures of this history preserved in sediment cores recovered from a select number of Mount Kenya lakes. Analyses of changes in sediment texture and composition, and of the fossil remains of aquatic biota deposited through time will reveal the magnitude of past ecosystem response to climate change, and help evaluate the resilience of these unique tropical high-mountain ecosystems to current and future climate change.

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Mount Kenya's lakes: archives for past climate change and glacier dynamics

The unique aquatic fauna and flora of East African mountain lakes

Spread over East Africa, small areas of high-mountain ecosystems form isolated 'sky islands' of habitat suitable for peculiar tropical fauna and flora which have adapted to the cold and harsh conditions prevailing at high altitude. Surrounded by a vast 'sea' of low-lying plains, the separated populations of these high-mountain plants and animals constitute a natural laboratory to study how new species originate and persist through long periods of isolation.

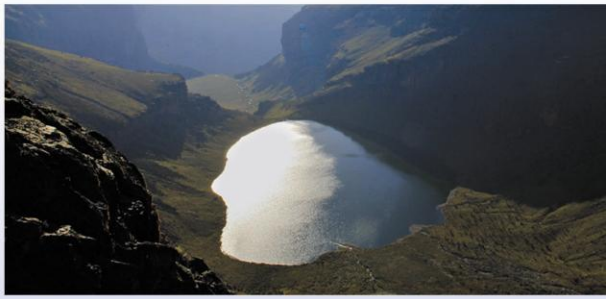
Although most of these high-mountain ecosystems in East Africa are now protected through national-park status, their integrity is threatened by encroachment, tourism and the local impacts of climate change. Sound knowledge of these rare and precious ecosystems is therefore urgently needed in order to draw out effective protective measures.

One principal aim of this research project is to document the biodiversity of freshwater organisms inhabiting the dozens of high-mountain lakes and tarns on the slopes of Mount Kenya, to evaluate their uniqueness in relation to the organisms inhabiting lakes in the African lowlands and in high-mountain lakes elsewhere. The plant and animal species encountered in these lakes are often tiny in size, but play a crucial role in the healthy functioning of the mountain's aquatic ecosystems. Combined with the findings of similar research in the Rwenzori Mountains (Uganda and DR Congo) and the Bale Mountains (Ethiopia), this effort will improve our understanding of the dynamics and resilience of East African mountain lakes and their indigenous biota, and allow us to discern the impact of any exotic species which may have recently immigrated.

Photo: Joachim Mergeay

Past climate change and glacier dynamics recorded in the sediments of Mount Kenya's lakes

The climate of East Africa is naturally unstable. Over the past centuries, the region experienced major changes in annual rainfall which severely impacted the landscape and the living conditions of its human population. However, scientific documentation of these climate fluctuations remains fragmentary, and this hampers the development of climate models designed to make robust prognoses of future climate change.



The current trend of global climate change is evidenced locally by the rapid melting of Mount Kenya's mountain glaciers. To understand the possible impacts of this climate change on East Africa's ecosystems, and on the role of Mount Kenya as a water tower for its densely populated surroundings, we must look back at how climate has changed in the past, and differentiate human-induced climate change from the natural climate variability to which the ecosystems are adapted.

The sediments slowly accumulating on the bottom of Mount Kenya's lakes contain valuable information on how its glaciers have grown and