Reflections On African Rift Lakes: A Journey Through The History Of The World's Most Interesting Lakes

The East African Rift Valley houses an extraordinary variety of lakes, formed as a result of the combined tectonic and climatic history of that region. These lakes range in from shallow hypersaline/alkaline and hypereutrophic pans, housing only extremophile microbial communities, to some of the deepest freshwater lakes in the world, containing an unparalleled biodiversity of endemic fish and invertebrates. The landscapes and lakescapes we observe in the eastern and western branches of the African rift today have their antecedents extending back to the Miocene, if not earlier. Our understanding of this history has improved tremendously over the past few decades through an interdisciplinary approach, integrating the findings of geology, geophysics, paleoclimatology, paleoecology and evolutionary biology. In addition to outcrop studies, science has benefitted from the advent of precision coring and scientific drilling through African Rift lake beds. These tools have allowed us to collect continuous, high resolution records of this history, critical for reconstructing the environmental history of the rift system and making sense of the biological evolutionary history of ecosystems both within and around the rifts. Detailed studies from the two deepest rift lakes, Malawi and Tanganyika (both in the Western Rift), provide important insights into the climatological and tectonic controls on rift lake history and the extraordinary biotic communities that have evolved in these lakes. They also shed light on the rapidly changing nature of these lake systems as they respond to modern landscape alteration from human activity in the region and from climate change. Finally, current research in the Eastern Rift on lake deposits associated with important fossil hominin (early human relatives) and archaeological sites extending back over the last 4 Ma promises to vastly improve our understanding of the environmental context of human origins.