

Mesowear analysis for cheek teeth of Ungulate fossils from Kenya and reconstruction of the Late Miocene paleoenvironments

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The tooth mesowear method is a new approach of reconstructing ungulate diets and their paleoenvironments. We analyzed mesowear of Hipparion and bovids upper and lower cheek teeth (P4 to M3) from the Late Miocene Nakali (9.6 to 10 Ma) and Namurungule (9.3 to 9.6 Ma) Formations from Northern Kenya to evaluate diet and compare paleoenvironments at these two sites. The distance between sites is approximately sixty kilometers and the geologic age of the formations is similar.

Both sites have yielded an important Late Miocene hominoid fossil. *Samburupithecus kiptalami* was found from the Namurungule Formation, and *Nakalipithecus nakayamai*, other hominoids, and several catarrhine taxa were recently discovered from the Nakali Formation.

For tooth mesowear analysis, the occlusal relief of the buccal side is scored as high or low. Cusp shape is classified as sharp, round or blunt.

The following conclusions are reached: The paleoenvironment of the Nakali Formation may have been a woodland environment, while the Namurungule Formation may have been an openland environment.

This environmental difference between the Namurungule Formation and Nakali Formation probably indicates the environmental change through geological age and/or the topographic difference between highland and lowland at the similar age.

This result is supported by stable isotope analysis of Hipparion and bovids tooth enamel from both formations and pollen analysis from the Nakali Formation.