

# Tracks swimming hippopotami: Koobi Fora (Kenya)



*Matthew R Bennett, Sarita A Morse and Peter Falkingham*  
 Bournemouth University, Talbot Campus, Fern Barrow, Poole, BH12 5BB, UK  
 Liverpool John Moores University, Liverpool L3 3AF, UK

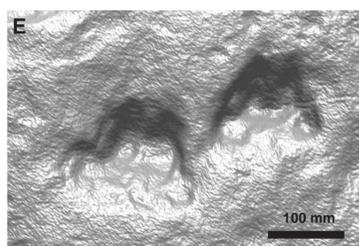
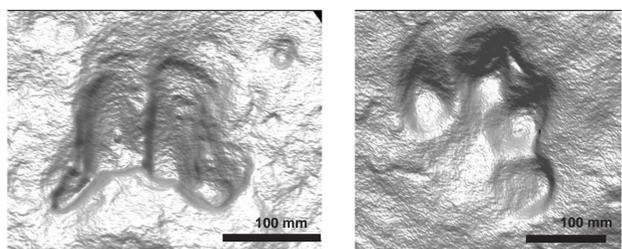
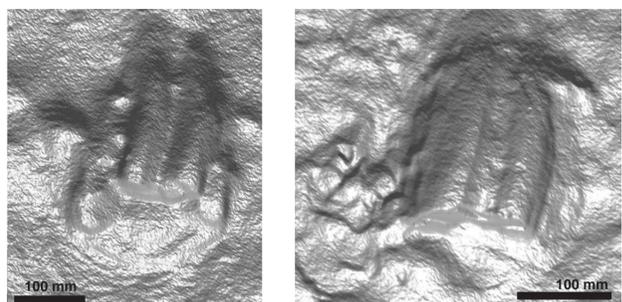
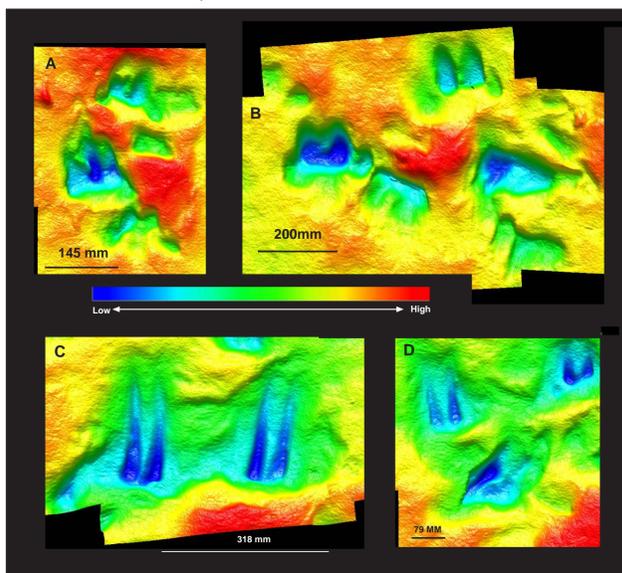
ABSTRACT

Here the authors report an ichnological surface close to Koobi Fora (Kenya) dating to 1.4 Ma.. The surface is marked by hominin tracks, as well as many traces from large animals. A southern excavation of the surface some 70 m from the hominin tracks displays a diverse range of animal track typologies, most of which appear to have been made by a four digit animal moving via punting or bottom walking in a shallow water body. Due to the track morphology and the associated fossil record, the non-hominin tracks are interpreted as being made by hippopotami, potentially including pygmy species or juveniles. The track typologies are interpreted using modern analogue observations of hippopotami sub-aquatic locomotion. This work provides important environmental context for adjacent hominin tracks and fossils, as well as providing the first recorded description of fossilized swim tracks made by mammals. The site has implications for the interpretation of swim tracks in the geological record particularly the widespread and controversial tracks made by sauropods and other dinosaurs.

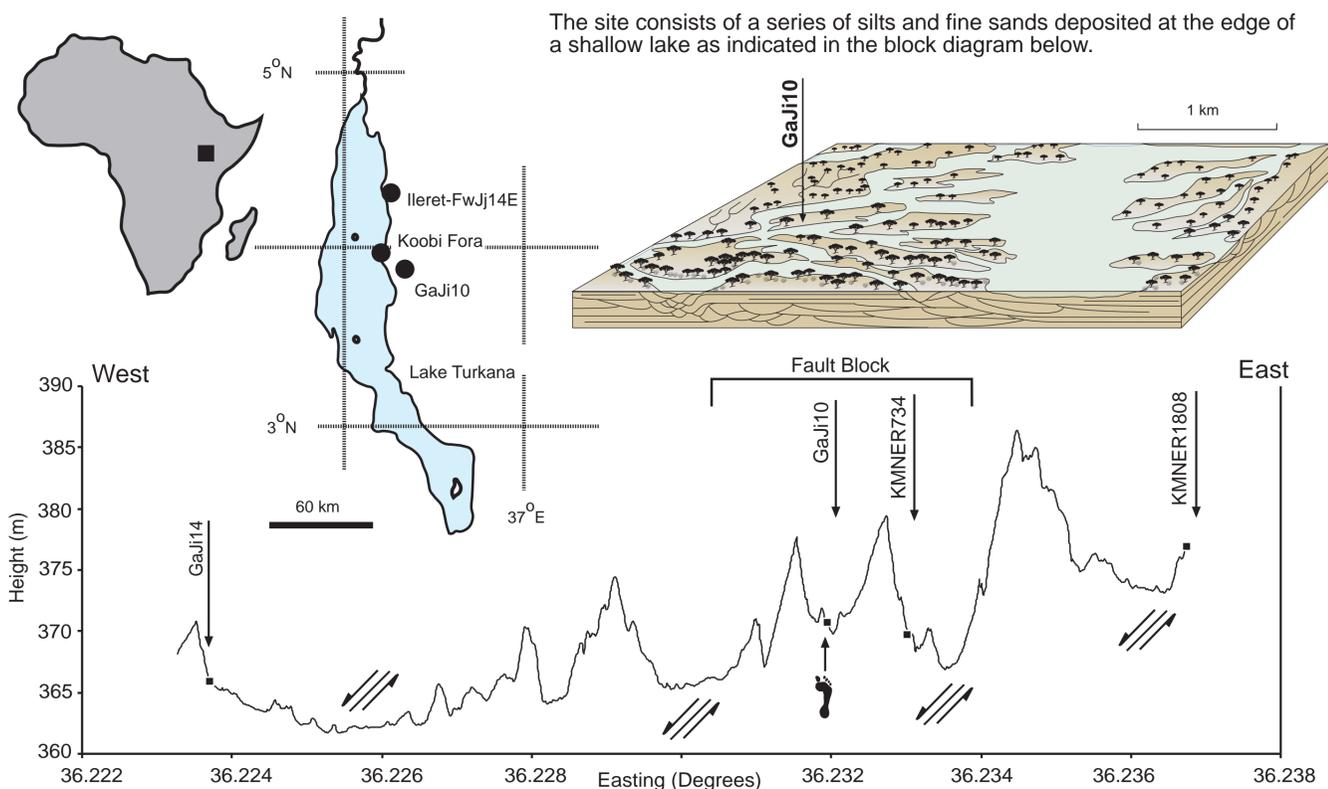
Bennett et al. (2014). Tracks made by swimming Hippopotami: an example from Koobi Fora (Turkana Basin, Kenya) *Palaeogeography, Palaeoclimatology, Palaeoecology* 409: 9–23.



The site GaJi10 is located just south of Koobi Fora. The fine-grained silts dip into the hillside as shown above. Hominin footprints, probably made by *Homo erectus* has been found just to the north of the excavation shown and date from 1.4 million years ago (Behrensmeier et al., 1979). In contrast to those found at Ileret 45 km to the north they appear to have been formed in a semi-aquatic environment on the margins of a lake fed by ephemeral streams. In the excavation shown above there are multiple tracks made by swimming hippos 'punting' of the floor of a shallow pool. The three-dimensional images below show some of the tracks present.



Location of GaJi10, one of a series of back-tilted fault blocks



Hippos have distinctive feet and are unable to swim according to most authorities. They move about in water by 'bottom-walking' or 'punting'. This involves them using their legs to move underwater by a process of pushing off the bottom and gliding. This is illustrated in the sequence of photographs below and represents a small part of the video and time-lapse footage used by the research team to help interpret the Koobi Fora tracks. Two different types of motion were observed: (1) periods of gliding, frequently maintained by contact via a single extended forelimb; and (2) more stable trot when greater control was needed. Each of these different types of motion is associated with a different type of swim face.

As the feet make contact with the ground they leave different tracks depending on the contact force and the number of digits in contact with the ground. This results in a very wide range of trace fossils being produced by a single animal.

There remains considerable debate about whether hippos can actually swim with most authorities saying that they can't. However extinct and extant hippos species are found amongst the faunal assemblage of a number of islands, including for example those of the Mediterranean which does beg the question as to how they got there?

Further research is currently on-going to explore this question.



## Dinosaur swim traces?

Dino tracks give us some insight into how these large animals roamed our planet, but how did these giant beasts move in water? Swim tracks have been found for a number of dinosaurs including theropods and sauropods and it has been suggested that they might propel themselves along by 'bottom-walking or punting'. These traces of fossilised motion have attracted considerable controversy. The hippo swim traces described from Koobi Fora are not only the first swim traces to be described for a large mammal but may help interpret some of the more controversial dinosaur tracks. Perhaps the most striking aspect of the hippo traces is the sheer diversity of different track morphologies associated with a single animal, each representing a distinctive sub-aquatic locomotive behaviour.

