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130 000-year-old fossil elephant found near Durban, South Africa: preliminary report

P.J. Ramsay, A.M. Smith, J.C. Lee-Thorp, J.C. Vogel, M. Tyldsley and W. Kidwell

A modern African elephant tusk was discovered within a late Pleistocene aeolianite at Reunion Rocks, south of Durban. Ionium dating indicates that the tusk is older than 112 kyr BP with stratigraphic control suggesting a date at ca. *130 kyr BP. Preliminary carbon stable-isotopic analyses indicate that the elephant was a grass-grazer. Strontium isotopic analyses indicate a marine signature: this implies that the tusk suffered marine diagenesis or that the elephant accumulated a marine strontium isotope signature by living along the coastline. Research is continuing.*

A subfossil late Pleistocene *Loxodonta africana* (modern African elephant) tusk was discovered at the base of an intertidal rock pool within a late Pleistocene aeolianite at Reunion Rocks, south of Durban. The tusk was excavated by scientists from the Geological Survey's Marine Geoscience Unit in Durban. The solid ivory tusk fragment is up to 0.2 m in diameter and 2 m long. Modern African elephant tusks have a hollow portion which can be as much as a third of the tusk length. This section has not been preserved and so the original tusk was probably about 3 m long. This find is unique in this area, although an extinct elephant (*Palaeoloxodon zulu*) of middle Pleistocene age was discovered in the Port Durnford beds[1] near Richards Bay.

Dating and age of the tusk

U/Th disequilibrium dating of the tusk gave an age of 112 ± 23 kyr BP (U-415). This is a minimum age and the laboratory (CSIR, Pretoria) stressed that the true age is probably thousands of years older. The tusk was found within an aeolianite which is upwardly truncated by a beach horizon representing the 125 000 BP Eemian sea-level high-stand at 6 m above present sea-level.[2] Therefore the true age of the tusk and aeolianite is about 130 000 BP (this is within the U/Th date specified limits).

Table 1. Isotopic analyses of the tusk and host rock.

Isotopic analysis	$^{13}C/^{12}C$	$^{18}O/^{16}O$	$^{87}Sr/^{86}Sr$
Elephant tusk	−5.9	−1.4	0.70925±2 (treated)
			0.70919±2 (untreated)
Aeolianite			0.70994±2

Host rock palaeocoastline reconstruction

A careful study of the Reunion Rocks beachrocks and aeolianites indicates that during that time the Eemian coastline was orientated north-east–south-west, similar to the present coastline at Durban's Bluff.[2] Sedimentary structures within these rocks indicate that the ancient sea-level was a few metres lower than at present and that tidal and swell regimes were also comparable to today's. These ancient dunes contain rhizoliths (fossilized roots and stems) which show that they were thickly vegetated.

Significance of isotopic analyses

$^{13}C/^{12}C$ and $^{18}O/^{16}O$ isotopic analyses were carried out (Table 1). The former gave a bone apatite value of -5.9, which is more or less equivalent to a collagen value of 17.9 parts per thousand. This suggests that the elephant was a grass-grazer or, alternatively, the tusk has been extensively modified by marine diagenesis. The carbon isotope value quoted here is similar to that of Tsavo National Park in Kenya.[3] This comparison suggests that the palaeoclimate of Reunion Rocks was hotter and drier than that of today, if the possible diagenetic effect is ignored. $^{18}O/^{16}O$ isotopic analysis gave a value of −1.4. The significance of this value, if any, is not known at present. Strontium isotopic analysis of the tusk indicates a marine signature. There are two possible explanations for a strontium marine signature: (1) the tusk has suffered marine diagenesis due to exposure to seawater during the Eemian high- and Holocene high- and present sea-level stands; or (2) the elephant accumulated a marine strontium isotope signature by living along the coastline.

The late Pleistocene age of the tusk just precedes the Eemian climatic optimum, when average global temperatures were greater than those of today. This is supported by the palaeosea-level data. This period can be used as an analogue for any future warm climate due to global warming.

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P.J. Ramsay, A.M. Smith and W. Kidwell are with the Joint Geological Survey – University of Natal, Marine Geoscience Unit, University of Natal, King George V Avenue, Durban, 4001; J.C. Lee-Thorp is in the Department of Archaeology, University of Cape Town; J.C. Vogel is in the Quaternary Dating Laboratory, CSIR, Pretoria; and M. Tyldsley is with the Natal Parks Board, P.O. Box 17090, Congella.