Antarctic Science 22(5), 531–532 (2010) © Antarctic Science Ltd 2010 doi:10.1017/S0954102010000362

Short Note
New fossil turtle remains from the Eocene of the Antarctic Peninsula

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Received 18 December 2009, accepted 4 March 2010, first published online 25 June 2010

Introduction

The fossil record of reptiles from the Paleogene of Antarctica is very scarce. Only postcranial fragments of Dermochelyidae turtles have been recovered from several localities on Isla Marambio (Seymour Island, fig. 1 in de la Fuente *et al*. 1995, Albright *et al*. 2003). These authors provisionally assigned this specimen to "*Psephophorus*" *terrypratchetti* Köhler, a species from upper Lutetian of South Island, New Zealand. In this contribution we describe two turtle carapace plates recently recovered from the middle levels (*Cucullaea* I Allomember) of the La Meseta Formation, Isla Marambio (Marenssi 2006). This material represents the first record of a turtle with a bony carapace from the Eocene of Antarctica, and it increases the diversity of the group on this continent.

Systematic palaeontology

Order TESTUDINES (Batsch 1788)
Testudines indet.
Fig. 1

Referred material. MLP 00-I-5-1 and MLP 00-I-5-2, two costal fragments (MLP is Museo de la Plata, La Plata, Argentina).

Locality. IAA 1/90, Isla Marambio, Antarctic Peninsula at 64°14'04.672"S and 56°39'56.378"W (Reguero *et al*. 2002).

Horizon and age. This locality is stratigraphically located within the *Cucullaea* I allomember of the La Meseta Formation (fig. 2 in Marenssi *et al*. 1998) assigned to the Middle Eocene. This age corresponds well with the $^{87}Sr/^{86}Sr$ derived ages of 44.54 or 47.35 Ma reported by Dutton *et al*. (2002) for the *Cucullaea* I or *Cucullaea* II allomembers.

Description

The surface of the costal bones is smooth, only in close detail (under lenses of 0.63x or more) does it show small punctuations resembling a microgranulose texture. MLP 00-I-5-1 (Fig. 1a & b) is a proximal costal fragment without marks of epidermal scutes (i.e. sulci). Although it is eroded, it has an anteroposterior length of 4.1 cm. Along the anterior and posterior margins sutures are preserved, indicating sutured contacts between costals and thus the presence of a carapace that was at least partially ossified (see below). The thoracic rib is incorporated into the costal plate, and in visceral view this plate shows the remnants of the head of the rib, as is typical for Testudines. MLP 00-I-5-2 (Fig. 1c & d) is also a medial fragment of a costal plate, without marks of sulci in dorsal surface, and with presence of sutures, at least at it posterior margin. In visceral view this plate also shows a mark of a head of a rib.

Discussion

De la Fuente *et al*. (1995) described the first remains of Dermochelyidae turtles from Antarctica, tentatively assigned to *Psephophorus*, a cosmopolitan dermochelyid genus recorded from the middle to upper Eocene–Pliocene of Europe, New Zealand and North America (Wood *et al*. 1996). Posteriorly, Albright *et al*. (2003) studied more complete material consisting of numerous, small carapace fragments, rather than individual ossicles, and also assigned these remains to "*Psephophorus*" *terrypratchetti* Köhler, a species from the upper Lutetian of South Island, New Zealand, by the absence or paucity of ossicle external sculpturing and the lack of keels.

The new fossil turtle material described here originates from one of the localities that yielded dermochelyid ephitecal plates (de la Fuente *et al*. 1995, Albright *et al*. 2003), and it consists of two carapacial fragments (costal plates). Both plates were found associated, but not articulated and are reworked, so they cannot be accurately assigned to the same individual or even species. However, both fossils probably belonged to an adult specimen with a large carapace. Although the costal plates of turtle can exhibit diagnostic traits, the lack of such traits, especially unique sculpturing patterns, preclude us from identifying these fragments any further than Testudines indet. Nevertheless, the presence of sutured costals indicates that these fossils belong to a specimen with an ossified carapace, a feature which is absent in Cenozoic and extant dermochelyid turtles. However, no epithecal plates except carapacial bones (e.g. costal, neural, nuchal, and peripheral

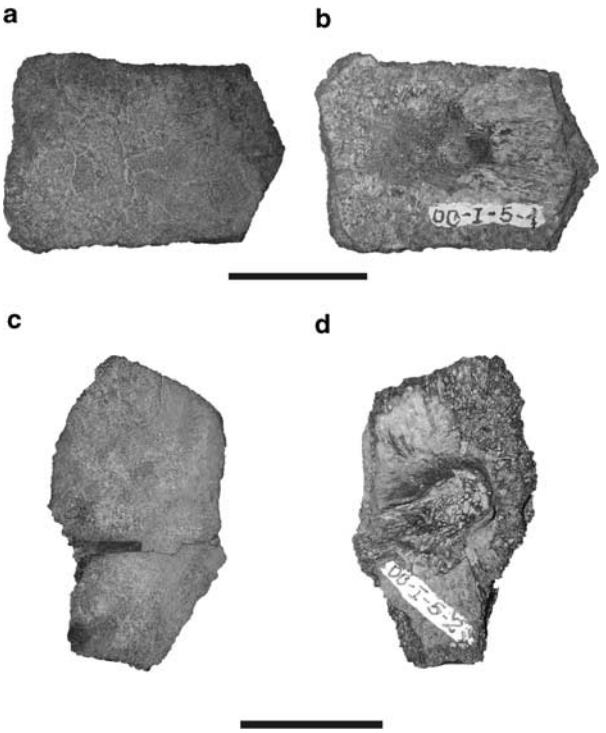

Fig. 1. Testudines indet. costal bones. MLP 00-I-5-1, **a**. dorsal view, **b**. visceral view. MLP 00-I-5-2, **c**. dorsal view, and **d**. visceral view. Scale bar = 3 cm.

bones) with very poorly developed or absent scute sulci are recognized in some putative Cretaceous dermochelyids such as *Corsochelys haliniches* or *Mesodermochelys undulatus* (Zangerl 1960, Hirayama & Chitoku 1996).

These new fossils show that turtle diversity was greater in Antarctica during the Eocene than previously thought, extending beyond only dermochelyids. Albright *et al*. (2003) speculated that the presence of leatherback sea turtles in Antarctica should be taken as evidence of middle Eocene gigantothermy in this group, because any turtle could only survive this time of climate deterioration with such an adaption.

Although a cool-temperate sea has been proposed for the Eocene by several authors (e.g. Ditchfield *et al*. 1994), warmer temperate conditions were suggested by Cione *et al*. (2007) during the deposition of the *Cucullaea* I Allomember. The new turtle record reported herein indicates that turtle diversity was greater in the middle Eocene of Antarctica than previously known, and it possibly supports a hypothesis of warmer sea surface temperatures. The temperature decline proposed for the time of deposition of the interval represented by the uppermost part of the La Meseta Formation (Submeseta Allomember) appears to correspond to a global lowering temperature at the end of the Eocene and beginning of the Oligocene, and not necessarily to the establishment of the Antarctic Circumpolar Current (Cione *et al*. 2007), which would probably have isolated marines turtles from Antarctica.

Acknowledgements

This is a contribution to the projects PICT 365, PICTA 1/2008 and PIP-CONICET 00795. The Instituto Antártico Argentino provided the logistics support in Antarctica. The authors wish to thank the CONICET for their constant support. Thanks are due to L.B. Albright (Museum of Northern Arizona) and W. Joyce (Eberhard Karls Univerität, Tübingen) for useful comments which helped to improve the manuscript. The constructive comments of the reviewers are also gratefully acknowledged.

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