



GEOLOGY AND PALEONTOLOGY OF THE UPPER CRETACEOUS KEM KEM GROUP OF EASTERN MOROCCO

BY

NIZAR IBRAHIM, PAUL C. SERENO,
 DAVID J. VARRICCHIO, DAVID M. MARTILL,
 DIDIER B. DUTHEIL, DAVID M. UNWIN, LAHSEN BAÏDDER,
 HANS C.E. LARSSON, SAMIR ZOUHRI, ABDELHADI KAOUKAYA



Spinocaudichthys oumtkoutensis Filleul & Dutheil, 2002

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The Kem Kem Group strata of mid-Cretaceous age in eastern Morocco are astonishingly rich in vertebrate fossils, including remains of some of the largest known predatory dinosaurs. Although the fossils have been known for almost a century, a number of field expeditions, ad hoc (chance) discoveries, and a thriving commercial fossil trade has resulted in a massive influx of new fossils over the last 20 years. Most of these new discoveries have been described widely across the paleontological literature, and no overall synthesis of the geology, sedimentology, paleontology and taphonomy of this unusual assemblage has been produced until now.

The Kem Kem Group comprises a sequence of fine sandstones and thin conglomerates in its lower part, and variegated mudstones in its upper part. The vertebrate remains are concentrated towards the middle of the sequence in thin event horizons that are either omission surfaces or rapidly deposited mud-flake conglomerates.

The environments represented by the Kem Kem Group sediments include sand dominated braided and meandering river systems and meandering mud dominated deltas. Flash flood events were frequent, and evaporitic lakes and lagoons occasionally developed.

Articulated skeletons are exceedingly rare, but isolated bones and teeth are common at some horizons and may be in an excellent state of preservation, with even the delicate bones of pterosaurs preserved in three dimensions.

The fauna is biased, but the taphonomic controls of the bias remain poorly understood. There is, for example, an excess of pterosaur jaws compared to any other part of the pterosaur skeleton.

The vertebrate assemblage includes bony and cartilaginous fishes, rare amphibians, snakes, diverse turtles and crocodyliforms, sauropod and theropod dinosaurs, and toothed and edentulous pterosaurs. Oddly, ornithischians are only represented by rare tracks and an isolated tooth.

Many of the vertebrates are extremely large forms for their clade, including giant coelacanths, crocodyliforms, and dinosaurs, but small animals are also present.

The work presented here is the first comprehensive coverage of the Kem Kem Group vertebrate assemblage and its geological context and we hope it will provide a stimulus for further exploration and discovery.

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Smithsonian Institution
PO Box 37012, MRC 187, Rm. CE-723
Washington, DC 20013-7012
U.S.A.
E-mail: erwint@si.edu

Managing Editor

Lyubomir Penev
Institute of Biodiversity and Ecosystem Research
Bulgarian Academy of Sciences
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1113 Sofia, Bulgaria
E-mail: info@pensoft.net

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Pensoft Publishers
Prof. Georgi Zlatarski 12, 1700 Sofia, Bulgaria. Tel. +359-2-8704281, Fax +359-2-8704282
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