

INFLUENCE OF ENVIRONMENTAL, FUNCTIONAL AND EVOLUTIONARY CONSTRAINTS ON LONG BONE SHAPE VARIATION: PRELIMINARY RESULTS ON THE FORELIMB OF PLIO-PLEISTOCENE RHINOCEROTINA

In vertebrates, limb long bones fulfil numerous vital functions (locomotion, feeding, reproduction...) and are therefore assumed to be strongly influenced by several functional (e.g., body mass, locomotor type) and environmental factors (e.g., habitat, feeding habits). Moreover, the shape of the long bones is assumed to be under the additional influence of evolutionary legacy. In this context, the subtribe Rhinocerotini constitutes an ideal study group to quantify and qualify the effect of these various functional and evolutionary influences on the bone shape. The subtribe Rhinocerotini comprises most of the Miocene and Plio-Pleistocene Eurasian and African rhinoceroses, including the five living species. Beyond their relative morphological homogeneity, they display an important diversity of body mass, locomotor habits and habitats. This study proposes the first exploration of the shape of the forelimb long bones within this subtribe, using a 3D geometric morphometrics approach to untangle the relative effect of functional, environmental and evolutionary influences on the shape of the forelimb long bones (humerus, radius, ulna). Our preliminary results tend to confirm previous results obtained among the superfamily Rhinocerotidae, indicating that the shape of stylopod bone (humerus) is more influenced by evolutionary legacy, while that of zeugopodial bones (radius, ulna) is more likely related to functional factors such as body mass. These preliminary results call for an extension of this approach to the bones of the hindlimb (femur, tibia, fibula) to provide a general morpho-functional overview of limb bones within this emblematic group of Eurasian ungulates, particularly those from Mediterranean landscapes during the Neogene.

by

C. Mallet^{1,2*} and T. Martin³

¹Institute of Natural Sciences, Operational Directorate Earth and History of Life, Brussels, Belgium

²Faculty of Engineering, Department of Geology and Applied Geology, University of Mons, Mons, Belgium

³PACEA Laboratory, Université de Bordeaux, Pessac, France

*cmallet@naturalsciences.be

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