

# A comparison of estimates of mean annual precipitation from different proxies: a pilot study for the European Neogene

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## ABSTRACT

**Question:** How well does the precipitation estimate method based on fossil mammal evidence correspond with results from the paleobotanical co-existence approach?

**Data:** Large herbivorous fossil mammals and plants for Western Eurasia. Data cover 23 to 2 million years ago. The data come from the NOW database and data compilation of the NECLIME Project.

**Research method:** We used standard statistical methods and GIS to compare plant and mammal proxies at different resolutions and through time.

**Conclusions:** The mammal and paleobotanical proxies give precipitation estimates that are very close to each other. On the regional scale, the integrated patterns are consistent. Overall, paleobotanical reconstruction gives higher precipitation estimates than those based on fossil mammals.

*Keywords:* Europe, fossil mammals, Neogene, paleobotany, paleoclimate.

## INTRODUCTION

There is increasing interest in reconstructing the climate of the past. Various methods are available for climate reconstruction, including leaf margin analysis (Wolfe, 1979), the Climate Leaf Analysis Multivariate Program [CLAMP (Wolfe, 1993)], the co-existence approach (Mosbrugger and Utescher, 1997), and the climate amplitude method (Fauquette *et al.*, 1998). Reconstructions are used for various purposes, such as to derive quantitative climate estimates to validate climate models and to make comparisons between past, present, and future environmental conditions. Yet the applicability of, and differences between, methods in

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