

## EVALUATING MARINE CONNECTIONS BETWEEN PARATETHYS AND THE MEDITERRANEAN IN THE LATE MIOCENE

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Fossil distribution patterns have long been used to establish the timing and nature of connectivity between marginal basins and the global oceans. However, since the salt flux can be independent of the water flux in semi-enclosed seas, faunal and lithological responses to salinity change may not be directly linked to changes in restriction. Recent developments in geochemistry provide additional tools for examining the relative influence of global marine and freshwater fluxes on marginal basins.

Sr isotope ratios of marginal basin water can be recorded and preserved both in the calcitic shells of subaqueous fauna and in some chemical lithologies. Late Miocene Mediterranean and Paratethyan samples were selected from three contrasting environments:

- Hypersaline conditions indicated by evaporite (gypsum) deposits.
- An environment with normal marine salinity containing abundant foraminifera.
- A brackish water environment indicated by low salinity ostracods.

Sr isotope analyses for all three environments show similar deviation from coeval oceanic  $^{87}\text{Sr}/^{86}\text{Sr}$  values. This suggests that they all had a comparable degree of oceanic influence, significantly less than the Mediterranean today. Hydrologic modelling of marginal systems indicates that the rate of restriction may be a more important control on salinity change than absolute degree.

Evaluating palaeo-rate of restriction in the Balkan region requires an understanding of eustatic and tectonic controls on sealevel change along with hydrologic modelling on a sub-basin scale. While there are a large number of potential errors (e.g. palaeoclimate and stratigraphic framework), this approach does represent a novel way of examining the causes and timing of changes in faunal distribution patterns.

**Key words:** Miocene, Paratethys, Mediterranean, geochemistry, Sr isotopes

## THE ENVIRONMENTAL IMPACT OF PREHISTORIC HUMAN GROUPS ON THE BALKAN LANDSCAPE

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The aim of this paper is to introduce the human factor, in the shape of our prehistoric past, into the study of Balkan biodiversity. This will be achieved by examining the overall effects on the environment of the movements, settlement patterns and subsistence and economic practices of the human groups who lived in this area between the Palaeolithic and the Bronze Age. The paper's perspective is a long-term one, for this period encompassed many thousands of years, witnessing the extinction of many animal and plant species and the rise of human groups with many different economies and ways of life. The most important questions that arise are whether these dramatic events were related to each other and what they can teach us for the future.

Careful consideration of the palaeoenvironmental and archaeological records suggests a dichotomy roughly dividing the Pleistocene and the early Holocene from the late Holocene. The end of the Pleistocene coincided with the extinction of some of the populations that thrived during the Ice Age; human groups, however, had only a minimal impact on this process. It is not until the later periods of Balkan prehistory, the Neolithic and the Bronze Age, when new domesticated species were introduced, that the environmental impact of humans becomes clearly visible. To explain these processes requires a comparative examination of a number of factors such as demography, economic practices and subsistence patterns from the Palaeolithic onwards. At the same time it is interesting to explore epistemological issues such as time scale differences and the idealised views of a dichotomy dividing hunter/gatherers from farmers and pastoralists, or primitive societies from complex ones, that lie behind the ways in which we approach the past and the explanations we give for it. The paper will thus develop on two levels. The first is factual: data are presented and the evidence suggesting how prehistoric human groups affected Balkan biodiversity is discussed. The second is more theoretical, exploring the epistemological foundations of our explanations.

**Key words:** environmental impact, Palaeolithic, Bronze Age, settlement, palaeoeconomy