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Changes in growth patterns due to climate change

Geologists at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) joined forces with researchers from France, Berlin, and Portugal to investigate the extent to which the growth of belemnites and changes to their appearance depend on ecological reactions and whether these changes are evidence of environmental crises that could have a serious impact on the climate in future.

Marine ectotherms commonly respond to rapid warming by decreasing in body size. Belemnites, various species of cephalopods that are distant relatives of today’s squid, demonstrated this reaction in the Lusitanian basin before they became extinct in that region around 183 million years ago.

The mechanisms behind the reaction were unknown until now. A study has now proven that the growth of marine belemnites during a warming event changed significantly. The researchers computed tomography to scan examples of various species of belemnites to investigate changes in their shape over various stages of development and how these changes correspond with environmental changes.

The study shows that there are differences between the reactions of various species and stages of development. The increasing compactness during various stages indicates varying ecological tolerances between species that probably result from the indirect effects of warming such as the scarcity of resources or increased calcification. The results underline the importance of considering life history and phylogeny when investigating the effects of environmental stress factors on marine organisms.

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