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From climate change to diet change – biochemistry investigations on Late Glacial and Early Holocene brown bear remains from caves in the Alpine region

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Bones of brown bears from caves in the Alpine region in Germany, Austria, Italy and Switzerland were examined and dated in the last years. The finds originate from the transition from the Bölling/Alleröd to the Early Holocene. In total we analyzed 15 samples from bones and teeth of directly radiocarbon dated brown bears from the alpine region for isotopic analyses. All collagen considered here exhibit carbon and nitrogen content similar to that of collagen extracted from fresh bones, and most of the bones and teeth contained almost the same quantity of collagen than fresh bone (around 25% weight). Atomic C/N ratios range from 3.1 to 3.4, well within the acceptable range (2.9-3.6). The d13C values are rather high during the Late Glacial then a clear decrease is observed at the beginning of the Holocene. This trend coincides with the development of dense forests at low altitudes and the shift of timberline towards higher altitudes. The d15N values are relatively low in Bölling-Alleröd, then quite high during the Younger Dryas, and they decrease again during the Boreal and more recent periods.
For the first time a more precise picture of the former habitat of the brown bears during the transition from the Bölling/Alleröd to the Early Holocene in the Alpine region could be reconstructed. The described investigation can also give an outlook of the coexistence of the herbivore cave bears and the omnivore/carnivore brown bears during the late Upper Pleistocene.