temperatures have probably been attained during underthrusting of these units below the Tisza megatectonic unit (thrusting being top-east). The ages obtained from the Bihor, Codru and Biharia nappes (Turonian to Campanian, 95-71Ma) correspond to the age of the late Cretaceous top-NW event that led to the present-day nappe stack in the Apuseni Mountains. The internal parts of the Baia de Aries nappe and the overlying Transylvanides were not reheated during this second event since they occupied the highest tectonic position.

Zircon FT age distribution, combined with thermal modelling of the apatite FT data, show that rapid post-tectonic cooling of the area during the late Cretaceous was followed by relatively slow cooling during the early Paleogene.

Role of climate and carbon dioxide in tree-ring growth of Greek firs from Ainos Mountain, Western Greece: 1820-2007 AD

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Nine billion metric tons of carbon are emitted annually by human industrial activities around the world. Approximately 30% of this is taken up by the oceans, and another 20% by the land biosphere. The land uptake has long been known as the “missing carbon sink” and has remained elusive, in that the underlying processes remain unidentified. A major mechanism contributing to this uptake is thought to involve enhanced growth of forests as a consequence of increased photosynthesis due to elevated atmospheric CO_2. This mechanism, known as the CO_2 fertilization effect, is well documented in controlled laboratory and field studies but remains controversial in natural forests bathed in ambient air. If CO_2 fertilization is indeed operating in natural ecosystems it could have important implications for terrestrial ecosystem and carbon cycle dynamics around the world.

Here I present tree-ring evidence for CO_2 fertilization in Greek firs (Abies cephalonica, Loudon) growing at 1300-1600 m elevation on the Ainos Mountain forest on the island of Cephalonia (Kefalonia) in western Greece. Core samples were collected from firs growing near the peak of the mountain, and ring widths were measured and processed into a master chronology extending from 1820 to 2007 AD. Standardized ring-width variations were regressed with instrumental records of temperature, precipitation and Palmer Drought Severity Index (PDSI) to identify growth-climate relationships. It was found that growth is favoured by late spring and early summer moisture availability, with wet and cool June conditions being optimal for growth. Surprisingly however these relationships have degraded or vanished in recent decades, indicating that growth sensitivity to moisture has declined. This is an unexpected finding in light of recent trends toward aridification of the background climate extending over the entire Mediterranean basin. In addition to loss of moisture sensitivity, the tree-rings from Ainos firs indicate significant acceleration of radial stem growth, which is especially pronounced after 1990 AD. The combination of enhanced growth and loss of moisture sensitivity despite increased aridity are diagnostic of a CO_2 fertilization effect operating via a “water use efficiency” mechanism. Elevated CO_2 induces stomatal closure, which helps conserve leaf water by limiting evapotranspiration, thus allowing greater growth and reducing sensitivity to moisture. This effect is predicted to be strongest in moisture-stressed, arid and semi-arid environments such as the eastern Mediterranean basin. Its detection in greek firs from western Greece may not be an isolated process, but possibly indicative of broader forest responses to elevated CO_2 over the greater Mediterranean basin. Further tests are needed to establish the spatial extent and regional or global significance of this effect.