

Impact of being evergreen or deciduous on the wood anatomy of the trees in polar regions during the warm geological period: case study from Upper Cretaceous of the James Ross Island (Antarctic Peninsula)

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Global warming and its influence on the environment has become a popular and widespread issue. Nowadays, an analogy of a high latitude ecosystem during the greenhouse type of climate does not exist. The Cretaceous polar ecosystem gave us a unique possibility of understanding these extreme ecosystems and the specific adaptations of organisms to these conditions. Such types of ecosystem are crucial for a better understanding of possible future climate changes.

Extensive palaeobotanical record from the Antarctic region proves that under appropriate climatic conditions in Late Cretaceous, the poles were inhabited by vegetation. Nevertheless, these plants had to adapt to a specific solar regime: half-year mild polar nights (Spicer 2003). The Cretaceous forest had been responding to these specific conditions in two different ways as to the type of terrestrial arborescent plants: evergreen or deciduous (Beerling 2007). Both strategies had their advantages and disadvantages and were leaving an anatomic trace in the fossil wood of a particular plant (Falcon-Lang 2005). The fossil material for this study comes from the Late Cretaceous (Cenomanian – Campanian) of Brandy Bay and Crame Col, James Ross Island, Antarctic. The material was carefully collected from Kotic point to Santa Marta Formations so it has a good informative value as to the species diversity and vegetation types during the Late Cretaceous. A detailed and systematic analysis was performed on five out of fifty-five samples that well represented the studied region and age: *Agathoxylon kellerense*, *Agathoxylon antarcticus*, *Araucarioxylon chapmanae*, *Podocarpoxyton multiparenchymatosum* and *Phoroxylon* sp.

The research is mainly focused on the adaptation strategies of terrestrial plants (evergreen vs. deciduous) and the influence of leaves longevity on the growth ring anatomy. Based on the detailed study of *Agathoxylon kellerense* wood anatomy and growth rings structure, adaptation strategies were determined. *Agathoxylon kellerense* was determined as an evergreen plant with leaf retention times presumably between three and five years.

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