high resolution X-ray synchrotron microtomography at the European Synchrotron Radiation Facility (ESRF), Grenoble, France. The plant assemblage is Cenomanian in age and consists of conifers: *Brachyphyllum* Brongn., *Frenelopsis* (Schenk) emend. J. Watson, *Geinitzia* Endl., and *Glenrosa* J. Watson et H.L. Fisher. Plant fossils are preserved in three dimensions including some details of internal tissues. The sedimentology and the association of these conifers with marine organisms (echinoids, foraminifers, and sponges) suggest a coastal depositional environment close by a conifer-dominated forest. The permineralization is suggested to have later occurred during several successive phases of silicification, the most important being a late pedogenic alteration under a warm and wet climate during the Eocene-Oligocene.

Synchrotron micro- and nanotomography of staminate flowers from the Cenomanian of Gard, southern France

POSTER IN SESSION S18

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Charcoalified or lignitized remains of angiosperm reproductive structures have been collected from the Cenomanian Pauletian facies of Gard, Languedoc Roussillon, southern France. Well-preserved 3D specimens are observed using X-ray synchrotron micro- and nano-tomography. One fragment of inflorescence in particular is examined from the gross morphology of flowers to the finest details of *in situ* pollen exine sculpture for the first time. Inflorescence is composed of small, non-pedicellate, actinomorphic, pentamerous, and staminate flowers. Perianth is well-developed showing several whorls of tepals. Androecium consists of one whorl of fertile stamens, each consisting of a short filament bearing long, tetrasporangiate anther. *In situ* pollen consist of monad and triaperturate grains with reticulate exine.

More macrofossils are needed to successfully model late-Quaternary vegetation

TALK IN SESSION S27

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Species distribution models (SDMs) are algorithms that relate species occurrences to environmental and geographical factors to explain and predict past, present and future potential distribution of species. In the last decade, palaeoecological data coupled with global climate models that simulate past conditions have been increasingly combined with SDMs, leading to important developments on SDM validation, and testing of phylogeographical, biogeographical, and macroecological hypotheses. Regarding vegetation, most of SDMs that use palaeobotanical data focus on pollen information due to its higher data abundance and its direct availability in the selected time periods corresponding to global past climate simulations (6 and 21 kyr BP). However, the interpretation of fossil pollen has some limitations that users have to be aware of: i) pollen records may represent a large area of vegetation and, therefore, the information collected should be considered at a regional level; ii) the representativity of the different taxa its hampered by their differences in pollen production and dispersion, iii) pollen morphology normally allows family or genus identification. Because of this reason, monospecific genera of woody taxa are often selected for modeling purposes, although species included in the identified taxa with opposite ecological niches are sometimes grouped together. Additionally, chronology accuracy of pollen diagrams also hampers its use in combination with modelled past climates, which are simulated for specific past time periods. Therefore these models require palaeobotanical data within the same time frameworks and implies, when studying pollen cores, a good control for calibrated ages, and reliable age-depth models. All these limitations restrict the questions that could be addressed by SDMs, especially in studies that cover large study areas that include different latitudes. On the contrary, macrofossils can often be identified with greater taxonomic accuracy and can produce a different palaeobiological signal