



Palynostratigraphy and vegetation history of the Triassic–Jurassic transition in East Greenland

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Plant macrofossils from East Greenland provide vital information on the response of terrestrial vegetation to major environmental change at the Triassic–Jurassic transition (Tr-J; 200 Ma). However, owing to the lack of a robust stratigraphic correlation between the exact horizons containing plant macrofossils in East Greenland ('plant beds') and Tr-J boundary sections in well-studied areas such as Europe, it is difficult to fit the results of palaeoecological investigations in East Greenland into the wider picture of Tr-J biotic change. Recent work has highlighted major differences in the types of plants represented in sporomorph assemblages and macrofossil assemblages from the plant beds in East Greenland, but the taphonomic processes responsible for these differences remain poorly explained. Additionally, the exact nature of Tr-J vegetation change as recorded by sporomorphs from the plant beds is somewhat unclear. In order to address these issues we have undertaken a palynological study of a Tr-J boundary section at Astartekløft, East Greenland. We have generated an updated palynostratigraphic scheme and vegetation history for this locality and have integrated these with existing carbon isotope records. Samples for palynological analysis were collected from precisely the same stratigraphic horizons as plant macrofossils from Astartekløft, allowing the results of palaeoecological analyses based on macrofossils at this locality to be directly compared with palaeoecological analyses of other fossil organisms in different regions. Our analyses highlight four local sporomorph assemblage zones that are compositionally distinct from each other at Astartekløft. The extremely low abundance of Classopollis pollen in all samples, and the pronounced decline in Ricciisporites tuberculatus in the Late Rhaetian are particularly striking features of the sporomorph record of Tr-J vegetation at Astartekløft. Plants with small stature that do not shed fronds by abscission, such as lycophytes and ferns, are under-represented as macrofossils. Plants that may have been deciduous or had a canopy habit, such as conifers and ginkgos, dominate macrofossil assemblages where present. Plants that may have been pollinated by insects are under-represented in the sporomorph record. Correlation of Astartekløft and a marine Tr-J boundary section at St Audrie's Bay provides no support for the idea that extinction and diversity loss in terrestrial ecosystems preceded biotic change in marine ecosystems at the Tr-J. Instead, the available data support suggestions that the onset of the Tr-J biotic crisis was synchronous in terrestrial and marine environments.