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Reconstructing paleoenvironment in the west-tethyan continental domain at the Late Permian and Early Triassic from sedimentological and palaeobotanical data

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The final buildup of Pangea at the end of the Palaeozoic led to the formation of massive landmass unrivaled in later times. On a climatic perspective, the end of the Carboniferous ice age opened into a period of progressive warming, creating vast arid regions on land. The lower Triassic is the culmination of this trend, and represents a period where land vegetation is scarce or non-existent. The following work presents the palaeogeographical evolution of the north-western tethyan terrestrial domain (currently most of western Europe), re-evaluated by a sedimentological and palaeobotanical (megafloras and palynofloras) combined approach. Preservation condition required for fossilization is a limit for dating the upper Permian and lower Triassic sedimentary sequences. As the general climate underwent a major warming phase, the use of fossils as biostratigraphical and palaeoenvironmental tools becomes limited. In these conditions, sedimentary proxies linked to climate can be used instead as valuable correlation tools in continental sections.

During the Early Permian, continental sedimentation was limited in a series of isolated endoreic basins, in between differences in preservation and floral assemblages can be observed. This partitionning, at the scale of western Europe, is mainly driven by the Variscan topography. However, the general evolution of Permian flora in the western tethyan domain is still linked at the first order to the global warming event. The general aridification of climates on Pangea led to profound modifications of floras long before the Permian/Triassic biotic crisis.

In all sedimentary basins of the north-western tethyan domain, with the exception of the Germanic Basin, the Permian/Triassic transition is characterized by a lack of sedimentary deposition of variable time. This period of no record is associated with: (1) an angular uncomformity of increasing angle towards the axis of the Variscan range, (2) important sedimentary flux at the re-initiation of sedimentation during the Triassic, (3) periods of sedimentation stops indicated by palaeosols, (4) a switch in palaeocurrent direction for fluvial systems between the Permian and the Triassic and, (5) by sedimentary transit and bypass during the lower Triassic. All these observations imply the existence of a still active Variscan range, modifying palaeoclimatic conditions and controlling sedimentation in the end-Permian sedimentary basins of western Europe.