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Devonian mio- and megaspores in Western Gondwana

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Devonian miospore assemblages from 16 localities in Saudi Arabia and North Africa have been studied in order to characterize the palynostratigraphy of the northern margin of Western Gondwana. More than 200 miospore species, including many new species endemic to Western Gondwana, have been identified. Although the standard Devonian miospore zonations established in Euramerica are commonly used in most palynological studies, they are not always easily applicable to Western Gondwanan localities because of the endemic nature of the assemblages. Therefore, a new local/regional biozonation based on Gondwanan miospore species has been established. It consists of nine assemblage zones, eight interval zones and two acme zones, from the late Pragian to the late Givetian and possibly the early Frasnian. A biozonation based on the first downhole occurrence of species is also developed for oil exploration. Thanks to this type of biozonation, only the top of a biozone has to be reached in order to be identified. This provisional downward biozonation consists of eight interval zones. Although it seems relatively reliable by comparison with the previously defined upward biozonation, it needs to be further tested. The review of the Emsian-Givetian miospore assemblages from the literature allows evaluation the provincialism of assemblages on a worldwide scale. Coefficient of similarity is calculated between palynofloras from northern and southern Euramerica and eastern, Southwestern and Northwestern Gondwana. The resulting low values correspond to low to moderate similarity of miospore assemblages. The provincialism may be explained by a latitudinal climatic gradient as no significant palaeogeographic barrier is known during this time. Despite a certain degree of provincialism, floristic interchanges existed. Northwestern Gondwana constituted an intermediate warm temperate region with shared taxa mainly from more arid Euramerican localities in the north, and cooler Southwestern Gondwanan localities in higher latitudes. It seems that a progressive homogenization of the vegetation took place in Middle Devonian as the standard Euramerican biozones are more easily recognized in Givetian than in Eifelian and Emsian. This transition from provincialism to cosmopolitanism during the Devonian is not only shown by palynofloras but also by the palaeogeographic distribution of many other fossil groups. It is likely due to a decrease of the latitudinal climatic gradient in Middle Devonian.