Geophysical Research Abstracts
Vol. 17, EGU2015-2315, 2015
EGU General Assembly 2015

Palynological records of Gondwana's mid-Permian climate amelioration: New insights from black shale deposits (Collingham Formation, South Africa)

Annette E. Götz
University of Pretoria, Department of Geology, Pretoria, South Africa (annette.goetz@up.ac.za)

Permian black shale deposits of the southern Karoo Basin were studied with respect to palynostratigraphy, palaeoenvironment, and palaeoclimate signatures recorded in palynomorph assemblages. The 28 m thick black shales of the Collingham Formation, exposed along road cuttings of the Ecca Pass north of Grahamstown (Eastern Cape Province, South Africa), are rich in sedimentary organic matter with a high content of amorphous organic matter and prasinophytes, characteristic of a deep, stratified marine basin. Moderately preserved pollen grains of the lower part of the formation reveal a mid-Permian (Roadian) age, corresponding to the stratigraphic position of the Collingham Formation in the Namibian part of the Karoo with an absolute age of 270 Ma obtained from a tuff (Stollhofen et al., 2000).
The samples from the lower Collingham Formation show a very similar composition as samples from coal seams of the upper Vryheid Formation in the northeastern part of the Karoo Basin. Additionally, a similar stratigraphic trend in changes of palynomorph assemblages was detected, showing a striking increase in taeniate bissacate pollen grains up section. This signature points to a warm-temperate bisaccate-producing plant community in the hinterland, replacing cool-temperate floras of the underlying Whitehill Formation (Ruckwied et al., 2014). The detected palaeoclimate signatures document Gondwana's mid-Permian climate amelioration and have proved to be a powerful tool for high-resolution basin-wide correlation of marine and non-marine successions.

References

Ruckwied, K., Götz, A.E., Jones, P. 2014. Palynological records of the Permian Ecca Group (South Africa): Utilizing climatic icehouse-greenhouse signals for cross basin correlations. Palaeogeography, Palaeoclimatology, Palaeoecology 413, 167–172.

Stollhofen, H., Stanistreet, I.G., Bangert, B., Grill, H. 2000. Tuffs, tectonism and glacially related sea-level changes, Carboniferous-Permian, southern Namibia. Palaeogeography, Palaeoclimatology, Palaeoecology 161, 127–150.