

Dinoflagellates: a new look at old bugs

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Dinoflagellates are planktonic organisms that have left a fossil record of cysts since the Late Triassic. Like foraminifera, their great abundance in certain rocks and their small size have led to their use in subsurface stratigraphic studies, especially in relation to hydrocarbon exploration. This has resulted in an explosion of data in recent years, too much for any individual paleontologist to cope with. The development of databases such as PALYLIT (developed by several oil companies and the Geological Survey of Canada) has not only simplified organization of the data, but has also provided the impetus for refining biostratigraphic correlations

and for pursuing some new and exciting research directions. PALYLIT contains information from more than 17 000 publications and is by far the largest paleontological database used to establish diversity curves. Our plots of dinoflagellate species occurrences (diversities) through time are based on more than 52 000 biostratigraphic records retrieved from PALYLIT. We interpret the appearance and rapid diversification of dinoflagellate cysts in the Late Triassic to Middle Jurassic as representing a successful adaptive radiation for the group. Maximum diversities of cysts were attained in the Maastrichtian and Eocene with about 700 known species.

There was a significant decline between the Maastrichtian and Paleocene and a dramatic decline from Eocene to Recent times. Correlation of the diversity curves with the published sea-level curves indicate some striking similarities. Initial

comparison with other data sets such as extinction plots of other groups of organisms and paleotemperature curves show promise for further avenues of research.