

L.A. Frakes: Aspects of basin analysis

Laporan (Report)

The talk by Prof. L.A. Frakes (Douglas Mawson Professor and Chairman of Department of Geology & Geophysics, University of Adelaide, Adelaide, South Australia) was held on 30th April 1992 at 5.00 pm at the Geology Lecture Hall of Geology Department, University of Malaya.

Abstrak (Abstract)

For any task in understanding a sedimentary basin, a procedure needs to be established. Such a model for basin analysis depends on what one is trying to learn about the basin; for example a study of maturation of petroleum fluids requires quite a different approach to one addressing primarily sea-level history.

Most basin studies first establish some sort of model for basin evolution. By examining the major structures seen in cross-sections or seismic sections, as well as subsidence curves from well data, the methods of formation of a basin can be determined. To reach a broader understanding of basin genesis, these results can be compared to the range of basin types separated in basin classifications, as in Dickinson (1974) and Bally and Oldow (1986). While many basins can be readily placed in such classifications, others are found to differ in important ways from all recognized types. In other words, no known basin classification can encompass all basins. For this reason Exxon Petroleum Research has now embarked on a program of treating each basin as unique; one can hope such a method will eventually lead to an all-encompassing. Classification of basins, including varieties formed in cratons, on continental margins, both active and passive, and in wrench zones.

Similarly the basin fill has been perhaps over-simplified. The coastal onlap and eustatic sea-level curves used so extensively today in petroleum exploration are based on assumptions which are not always valid. Certainly the level of the sea has varied but has it done so in the way suggested by Vail *et al* (1977) and Haq *et al* (1986)? In most such analyses, the role of sediment supply is played down, both in governing the various sedimentary facies and in contributing to further subsidence by increasing the load on the crust. The systems tract method of Postamentier and Vail (1988) is useful for depicting the history of a basin, but now explorationists are looking at even smaller subdivisions of the stratigraphic record. In this new approach, recognition of parasequences and their boundaries (maximum flooding surfaces) is important because they tell us more about the role of sedimentation in the filling of a basin.

In summary, basin analysis is both a variable type of operation, depending on what one is trying to achieve, and a developing field. As in all science, we should not be content to use a method if new approaches are more appropriate.

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