

Basin Modelling: Making A Sedimentary Basin Is Not A Trivial Matter

By Kerry Hegarty (Vic/Tas Branch, May 1999 Luncheon Meeting)

When McKenzie (1978) published one of the first quantitative descriptions of how to make a hole in the earth's crust, he probably had no idea how abused his concepts about sedimentary basin formation would be over the next 20+ years. Nevertheless, the philosophies represented in this critical work have served as the cornerstone of some very important work in understanding sedimentary basins, passive margins and the thermo-mechanical response of the lithosphere in relation to basin formation.

One of the reasons this paper was so popular was because of the simplicity of the quantitative expression describing extension and subsidence. While subsidence was clearly recognised as a necessary component in basin evolution, a clear description of the behaviour of the crust during this process was generally neglected. McKenzie was one of the first to attempt to use the sedimentary column as a record of the behaviour of the crust and lithosphere. (Isn't it nice to have geophysicists interested in geology!). However, he probably never intended his

simplistic 1978 description to mimic in detail the actual behaviour of the lithosphere.

Why does this 20-year old work demand our attention now? First, because of its historic significance in what might be considered today as a very commonplace field, and second because of the ongoing need to be mindful of the proper application of this type of work in today's academic research and industry. As an example, basin modelling is an integral part of oil and gas exploration, and with the popularity and success of 'off the shelf' software, the risk in misapplying quantitative basin descriptions increases. Little knowledge of basin dynamics is required in order to generate stunningly attractive 'basin models'. During the talk, examples of uses and abuses of popular modelling software were given following a brief description of the main parameters in the equations describing the formation of a depocentre. Other approaches in understanding basin formation and lithospheric behaviour from current Geotrack research in the US, Brazil and Australia were also shown.