Chapter 9

Modeling of Geological Evolution of the Gulf of Mannar Area, South India, by the Event Bush Method

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ABSTRACT

The geological record is never completely available for observation. However, we have to query it – first to suggest or select and then to verify our hypotheses of the geological history, present day, and future of the region in question. So far, this job has been done either intuitively, or on the contrary, by quantitative modeling. Still, the former looks insufficient, especially if the case is contemporary tectonics or other potentially hazardous processes, and the latter gives reliable result only if involves abundant data – and still gives no warranty that is adequate enough to the modeled issue. Therefore, an intermediate solution is desired for regional geology, able to give a reliable result based on available data. The information modeling by means of the event bush method looks promising. In this chapter, the method of event bush is applied to verify the wrench tectonics hypothesis for the neo- and contemporary tectonic regime of the Gulf of Mannar region in the southernmost part of the Hindustan peninsula.

DOI: 10.4018/978-1-5225-5261-1.ch009
INTRODUCTION

The basin of Gulf of Mannar (Mannar Basin) lies between the south-eastern India and western Sri Lanka (6-9°N and 78-80°E), forming a part of extension of Laccadive Sea of the Indian Ocean to the north (Figure 1).

Early workers treated the Mannar Basin as southern extension of a larger Cauvery Basin followed from Muthupattinam at the south to Portonovo at the north (Baillie et al. 2002). Later, Rana et al. (2008) considered Mannar as a separate basin, which only shows some structural similarity to Cauvery Basin, mostly by its horst-graben tectonics. Based on the stratigraphic data, these scientists state that in general the Mannar basin remained a separate graben all through its history between the Sri Lankan and Indian cratons (Figure 2).

The Indian coast of Gulf of Mannar, from Mandapam at the north to Kanyakumari at the south, has received great attention due to its physiographical diversity observed all along its length of 440 km. The coastal landforms are quite diverse, including large strand plains, deltaic marshes, huge sand dune fields, and ridges built of sedimentary rocks and isolated patches of granulitic rocks. Contemporary
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