The Hamam and Mughanniyya formations of northwestern Jordan form part of the major carbonate shelf that existed over Arabia and the associated southern Tethyan margin during the Jurassic, but their precise age context and depositional setting have not yet been firmly established. To address this issue, the Hamam and Mughanniyya formations are compared with better biostratigraphically constrained successions in adjacent countries using a sequence stratigraphic framework. Two stratigraphic sections of the Hamam and Mughanniyya formations are shown by analysis of vertical trends from new lithofacies descriptions to comprise two primary depositional sequences that equate to the Bathonian and Middle-Late Callovian J30 and J40 Arabian Plate sequences sensu Sharland et al. (2001). New carbon (δ¹³C) and oxygen (δ¹⁸O) isotope records (amongst the first published for the Jurassic of Arabia) are helpful in locating sequence boundaries by means of diagenetically induced abrupt shifts in values and provide general support to the age interpretations of the formations/sequences.
Abstract

The present work describes the first fossil sponge assemblage from Jordan, belonging to Demospongiae and Calcarea; hexactinellid sponges are absent from the collections. *Mughanniyyum hanium* gen nov., sp. nov. is described, and a new subfamily, Jordaniinae, is proposed, belonging to Scleritodermatidae (Demospongiae). Another new demosponge species, *Geoditesia jordaniensis* sp. nov., is described on the basis of well-preserved specimens. The genus *Geoditesia* is previously known only from loose *Geodia*-type spicules. It is the first description of an articulated sponge bearing this kind of spicule. The assemblage is compared with similar occurrences in the Negev Desert (Israel) and Kachchh Basin (India). While the sponge fauna and the facies represented by the Negev Desert assemblage are very different, in the Kachchh Basin there are sponges present with similar external morphology belonging to related taxonomic groups. The palaeobathymetry of the studied sections from Jordan indicates slightly shallower water than in the Kachchh Basin. There is also slight stratigraphic difference between Jordan and the Indian Basin, in that the Jordanian assemblage is of Callovian age, while in Kachchh it is Bathonian. urn:lsid:zoobank.org:pub:6ED83BB8-E199-47B5-9A11-7B03E2C449F4