

Interactive comment on “Laminae type and possible mechanisms for the formation of laminated sediments in the Shaban Deep, northern Red Sea” by I. A. Seeberg-Elverfeldt et al.

Anonymous Referee #1

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Overall this is a well-written and well-evidenced contribution to the understanding of sedimentary processes and lamina formation in important Red Sea sediments. The methods and assumptions are generally valid and the conclusions are appropriately justified.

Overall rating: Scientific Significance: 2; Scientific Quality: 2; Presentation Quality: 2.

Review. This paper represents an extension of prior research by the authors on the intriguing laminated sediments of the Red Sea. Laminated sediments are a potential "gold mine" of information on ancient water-column and climatic processes, but to realise this potential the appropriate analytical techniques must be applied. The first step therefore is painstaking description of the sediment components and fabrics

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which these authors have undertaken, appropriately, using backscattered electron imagery (BSEI) of resin-embedded sediment. The authors present detailed descriptions and illustrations of the sediment fabrics from which they successfully discuss and show evidence for many of the water column and sediment processes (including diagenesis) that have combined to produce the record. They combine the careful fabric work with an up-to-date appreciation of water column studies of sinking particles and aggregates to produce a broadly convincing interpretation of the formation of these sediments.

A number of points arise from the study. 1) The authors refer to the earlier work of Erba and colleagues on sedimentation in the Mediterranean brine basins which highlighted the influence of processes at the seawater-brine interface (SBI). In the Erba papers there are several topographic or secondary electron images of untreated sediment that clearly showed the organic, bacterial component. The present authors state that there is no evidence of bacterial involvement in the formation of the Shaban Deep sediments but do not state on what evidence this is based and do not provide topographic SEM images of sediment (BSEI of resin-embedded sediment would be unlikely to reveal bacterial elements. If they indeed have used complementary SEM techniques to verify the absence of bacterial structures this should be stated. 2) The process of material accumulating at the SBI en route to the sediment is discussed although it is unclear what, if any, difference to the observed sediment fabric the authors argue for the SBI. For example, might it promote formation of the "pocket-like structure" rather than the "alternating ..layers". It would be useful to have some discussion on this. 3) Significant recent research has been undertaken on the fabrics of diatom- and coccolith-bearing sediment from the Black Sea laminated sediment (e.g. Pike & Pilskaln, 2001). Some appropriate consideration of this might have added comparative insights to the current study.

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