

Environmental Controls on the Distribution of Intertidal Foraminifers in Sabkha Al-Kharrar, Saudi Arabia: Implications for Sea-Level Changes

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Abstract : Contemporary foraminiferal samples sediments were collected from the intertidal sabkha of Al-Kharrar Lagoon, Saudi Arabia, to study the vertical distribution of Foraminifera and, based on a modern training set, their potential to develop a predictor of former sea-level changes in the area. Based on hierarchical cluster analysis, the intertidal sabkha is divided into three vertical zones (A, B & C) represented by three foraminiferal assemblages, where agglutinated species occupied Zone A and calcareous species occupied the other two zones. In Zone A (high intertidal), *Agglutinella compressa*, *Clavulina angularis* and *C. multicamerata* are dominant species with a minor presence of *Peneroplis planatus*, *Coscinospira hemprichii*, *Sorites orbiculus*, *Quinqueloculina lamarckiana*, *Q. seminula*, *Ammonia convexa* and *A. tepida*. In contrast, in Zone B (middle intertidal) the most abundant species are *P. planatus*, *C. hemprichii*, *S. orbiculus*, *Q. lamarckiana*, *Q. seminula* and *Q. laevigata*, while Zone C (low intertidal) is characterised by *C. hemprichii*, *Q. costata*, *S. orbiculus*, *P. planatus*, *A. convexa*, *A. tepida*, *Spiroloculina communis* and *S. costigera*. A transfer function for sea-level reconstruction was developed using a modern dataset of 75 contemporary sediment samples and 99 species collected from several transects across the sabkha. The model provided an error of 0.12m, suggesting that intertidal foraminifers are able to predict the past sea-level changes with high precision in Al-Kharrar Lagoon, and thus the future prediction of those changes in the area.

Keywords : Lagoonal foraminifers, intertidal sabkha, vertical zonation, transfer function, sea level

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