



## Meiofauna Analyses of Sediment Cores to Investigate the Influence of Sea Level Rise on Saltmarsh Development

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The text-book explanation for the development of coastal saltmarshes is through increase in sediment elevation (with respect to sea level), mainly facilitated by plants leading to seaward progradation and succession from the lowest plant species to higher ones. An alternative hypothesis is that saltmarshes develop mainly by sea level rise leading to landward migration, where succession will be from the higher to lower species. These competing hypotheses are tested by comparing the assemblages of foraminifera in sediment cores with surface samples, in saltmarshes on isostatically rising (NW Scotland) and sinking coasts (SE England and Wales).

The surface meiofauna assemblages differ with saltmarsh vertical zones and between saltmarshes. Ostracod abundance decreased with elevation at both sites and none were found in the high marsh (among sea couch grass *Elytrigia atherica*), limiting their use in some succession studies. The ratio of agglutinated foraminifera (e.g. *Jadammina macrescens*) to calcified species (e.g. *Quinqueloculina* spp.) increases with elevation. Geographical differences also occur which may be related to different sediment characteristics, particularly grain size, water content and plant species or grazing effects. For example, the domination of the mid-low saltmarsh by *Cornuspira involuens* on the sandier west coast in Wales and *Quinqueloculina* spp. in a muddier saltmarsh in SE England.

Foraminifera assemblages throughout a 2.5 meter core in Tollesbury (SE England) were dominated by agglutinated species, indicating high marsh. The absence of lower marsh assemblages supports the hypothesis for the importance of sea level rise in saltmarsh development. In Loch Riddon (W Scotland) too there is no evidence of low marsh assemblages in the sediment strata (1 meter core). While there is no evidence of facilitation succession in this saltmarsh, sea level rise is unlikely to be responsible for its formation and development as it is on a rising coast.