Effects of ecoengineering species in estuaries

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Introduction

Development of estuaries is a result of constant interaction between abiotic and biotic processes. Within these ecosystems there is significant habitat heterogeneity in terms of environmental predictors (e.g. salinity, temperature, depth, substrate and water velocity). These limiting factors are crucial for the distribution of organisms. Further, these organisms can affect the sediment dynamics, and we distinguish stabilising and destabilising species. We want to know if there is a correlation between the distribution of the stabilising and destabilising species and the morphology of estuaries.

Methodology

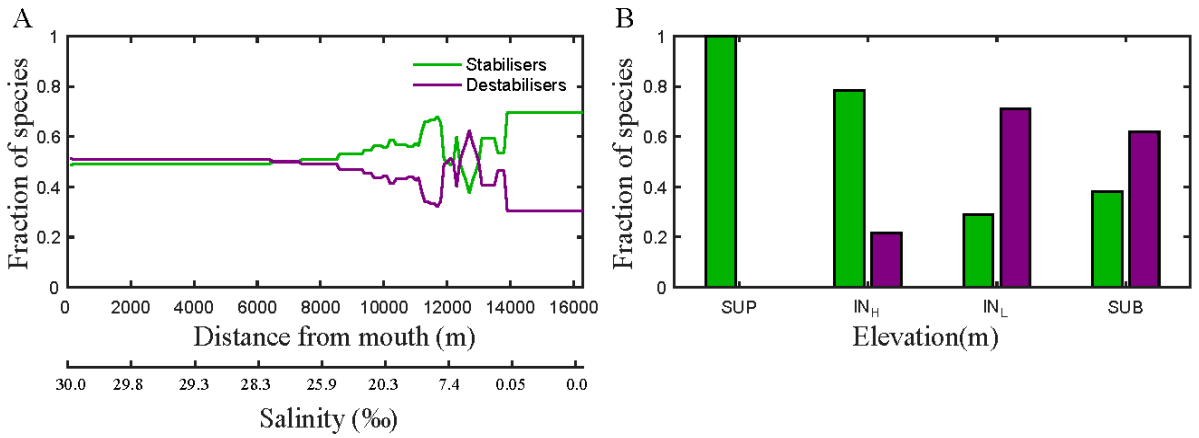
We collected literature data about salinity, elevation (depth), mud content and water velocity preference for more than 100 species of known ecosystem engineers of Western Scheldt estuary (The Netherlands). The data for minimum, optimum and maximum values for these factors were collected from the literature in combination with data base Encyclopedia of Life (http://eol.com). We used this data together with bathimetry and salinity function (Savenije, 1993) to model distribution of species in the gradient of Dovey estuary (UK) from its mouth to tidal limit with additional 10 meanders upstream (the location of last transect is Dyfi bridge).

Results

Estuaries support equal proportion of stabilising and destabilising species with an increase of stabilising species in the fresh water. Distribution of species in different elevation ranges show higher number of stabilizing species in supratidal and upper intertidal zones compared to higher number of destabilizing species in lower intertidal and subtidal zones.

Discussion

Stabilising and destabilising species are widespread in estuary gradient. However limiting environmental factors (salinity, elevation, mud content and water velocity) affect their distribution and effect on sediment dynamics. Our first results show proportion of stabilizing and destabilizing species in estuary gradient in terms of numbers of species. Next step is to include biomass of the species as well as proportion of elevation zones and quantify the stabilizing and destabilizing effects in different parts of the estuary.



Distribution of stabilising and destabilising species in A) gradient of estuary going from saline estuary mouth to freshwater river, B) different tidal zones (SUP-supratidal, IN_H-upper intertidal, IN_L- lower intertidal, SUB-subtidal).