



Redistribution of intertidal sediment contaminants by microphytobenthos

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Microphytobenthos (MPB) is a mixed community of microscopic algae inhabiting the top few millimetres of bottom sediment in the intertidal zone. It is a key component of the estuarine ecosystem, interacting with the sediment and fauna to influence sediment distribution and resuspension and forming the base of the estuarine food chain. Estuarine sediments, with which the MPB is closely associated, are a significant sink for contaminants from both fluvial and marine sources.

Algae are known to have the capacity to take up contaminants, and the phytoplankton has been well studied in this respect, however there has been little research involving MPB. The extent to which contaminant uptake by MPB occurs and under what conditions is therefore very poorly understood. It seems probable that the paucity of research in this area is due to the complexity of the bioavailability of contaminants in the intertidal zone coupled with difficulties in separating MPB from the sediment.

A series of experiments are proposed in which we will investigate (at a range of spatial scales) contaminant partitioning in the presence of MPB; the effect of changing temperatures on contaminant uptake and toxicity to MPB; effects of sediment resuspension on contaminant availability and uptake to MPB; and the uptake of contaminants from MPB to molluscs.

A mesocosm (or experimental enclosure) is being constructed to replicate the natural system and enable manipulation of conditions of interest. This will attain greater realism than laboratory toxicity tests, with more statistical power than can be achieved through field studies.

By gaining a better understanding of processes governing contaminant bioavailability and mechanisms for uptake by MPB it will be possible to relate these to projected climate change effects and ascertain potential consequences for contaminant redistribution.