

SUMMARY

Copper-binding ligands show statistically significant outward fluxes across the sediment-water interface when the presence of *S. benedicti* was ignored, and a majority of the cores tested showed a net flux of Cu- and Zn- complexing ligands out of the sediment when this same assumption was employed. Seasonality was a significant factor in the flux of total dissolved Cu, which decreased from April to June 2001, but did not affect the fluxes of any of the other chemical species studied. The polychaete, *S. benedicti*, causes rapid rearrangement of the sediment surface in Cape Fear sediments, but did not significantly affect the flux or the nature of any Cu- or Zn-binding ligands at the sites examined in the Cape Fear estuary, nor did it affect the flux of total dissolved Zn. The total dissolved Cu flux was unaffected by the presence of *S. benedicti* in the April experiment, but seeded cores showed a decreased Cu flux for the June experiment. The fluxes of ligands and total dissolved Zn and Cu from the estuarine sediment are not significant contributors to the standing stock of these species in the CFR estuary. However, the ligands that do flux from sediments in the Cape Fear estuary are not distinguishable from those that occur in the overlying water. Thus, a portion of these ligands may have a source in the sediments.