Geophysical Research Abstracts, Vol. 7, 02028, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02028

Diatom biofilms and the stability of intertidal mudflats

L.J. Stal and J.F.C. de Brouwer

Department of Marine Microbiology, Netherlands Institute of Ecology-KNAW, Yerseke, The Netherlands (l.stal@nioo.knaw.nl / +31 113 573616)

Epipelic diatoms form biofilms on the surface of intertidal mudflats and they may be implicated in sediment stability. We show that sediment stability increases during the emersion period and that this correlated with the biofilm coverage. The mechanisms that cause sediment stability are not clear. Benthic diatoms exude large amounts of extracellular polymeric substances (EPS) that forms the matrix of the biofilm. We demonstrate that this occurs during daytime and emersion of the sediment. EPS could render stability to the sediment by gluing the particles. The diatoms exude EPS either as the result of unbalanced growth or because of their migration. We distinguish two operational fractions of EPS in marine benthic diatoms. One type is a rather neutral polymer with high glucose content, while the other is acidic and contains a large amount of uronic acids and other acid groups and has low glucose content. We compared two epipelic diatoms, Cylindrotheca closterium and Nitzschia cf brevissima. Both species produced equal amounts of both types of EPS, but C. closterium had only a minor effect on sediment stability, while N. cf. brevissima was very effective. Both types of EPS contributed to the sediment stability but the acidic type appeared to be more effective. We hypothesize that the diatoms actively structure the biofilm and that sediment stability may be species dependent.