

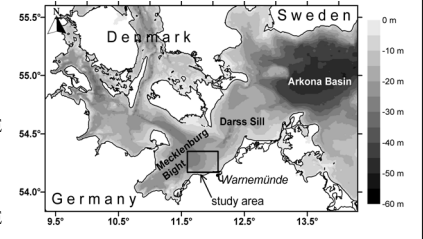
Aims:

Investigation of the influence of benthic diatoms on erosion thresholds of natural sediment surfaces (research project DYNAS, subproject 3.3, BMBF) by ...

- correlating $u^*_{cr-erosion}$ (measured via erosion rates E) and concentrations of diatom biomass/exudates, and
- determining of light environment at the seafloor.

Study area:

- **Mud station**
25 m water depth;
54° 13.26' N, 11° 36.96' E
- **Fine sand station**
19 m water depth;
54° 12.06' N, 11° 54.24' E



Erosion experiments were carried out on cores of mud and fine sand sediments with an erosion device microcosm ('MK-20'; Gust and Müller 1997, Tolhurst et al. 2000) at different times of the year. Concentrations of chlorophyll a (Chl) as an indicator of diatom biomass (Holm-Hansen 1965, UNESCO 1994) and colloidal carbohydrates ($Col S$, $Col EDTA$) indicating microbial exudates (Underwood et al. 1995) were measured. Correlations between these parameters and erosion thresholds were calculated at each sampling occasion in order to determine micro-biostabilisation effects. To further relate these results to *in situ* conditions, the light environment at 20 m water depth was assessed (Walsby 1997).

Erosion behaviour of natural sediments:

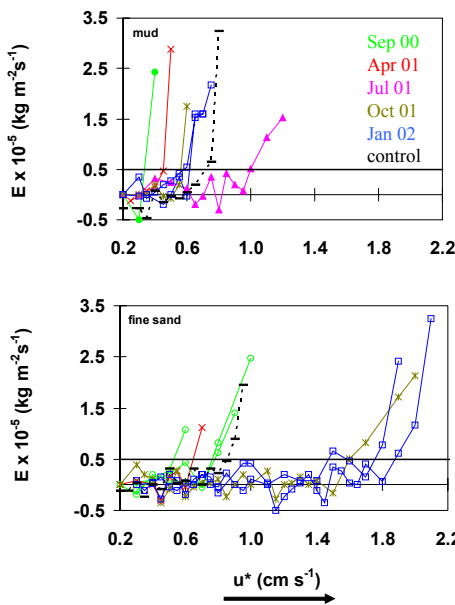


Figure legend:
 E at different sampling dates

$u^*_{cr-erosion}$ of mud
($n = 6$): 0.4 – 1.0 $cm s^{-1}$

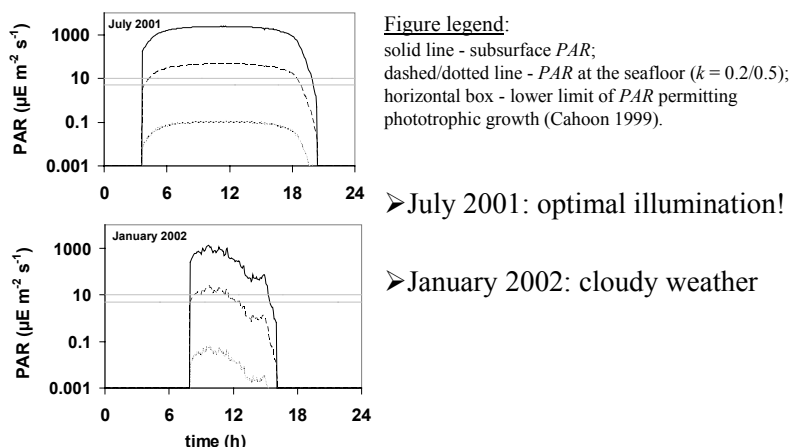
$u^*_{cr-erosion}$ of fine sand
($n = 7$): 0.7 – 1.7 $cm s^{-1}$

No significant correlation between diatom biomass and u^* !

Mud	$u^*_{cr-erosion}$ ($cm s^{-1}$)	$u^*_{cr-erosion}$ ($cm s^{-1}$)	Col-S ($mg m^{-2}$)	Col-EDTA ($mg m^{-2}$)	Chl ($mg m^{-2}$)
$u^*_{cr-erosion}$ ($cm s^{-1}$)	0.83*				
Col S ($mg m^{-2}$)	0.99***	0.88**			
Col EDTA ($mg m^{-2}$)	0.63	0.35	0.66		
Chl ($mg m^{-2}$)	0.57	0.10	0.53	0.78	
Water content (%)	-0.95**	-0.87**	-0.97***	-0.66	-0.58
Finesand					
$u^*_{cr-erosion}$ ($cm s^{-1}$)	0.97**				
Col S ($mg m^{-2}$)	0.14	0.67			
Col EDTA ($mg m^{-2}$)	0.41	0.00	-0.52		
Chl ($mg m^{-2}$)	-0.17	0.03	0.09	0.27	
Water content (%)	0.15	0.48	-0.84*	0.50	-0.55

$n = 5; n = 4$
Values of r are significant at: *** - $P < 0.01$, ** - $P < 0.05$, * - $P < 0.1$

Light environment at 20 m water depth:



Conclusions:

- micro-biostabilisation effects of benthic diatoms play a minor role.
- light environment hardly permits an on-site growth of benthic phototrophs.
- ➔ a major contribution of benthic diatoms by transport from shallow depths (<5 m) to 20 m.

Literature:

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