

2<sup>nd</sup> theme day NCK-Waddenacademie  
Interaction between biotic and abiotic factors in the Wadden Sea  
Webinar 18 may 2021

# Why do plant-sediment interactions in salt marshes affect ecosystem services?

Ketil Koop-Jakobsen

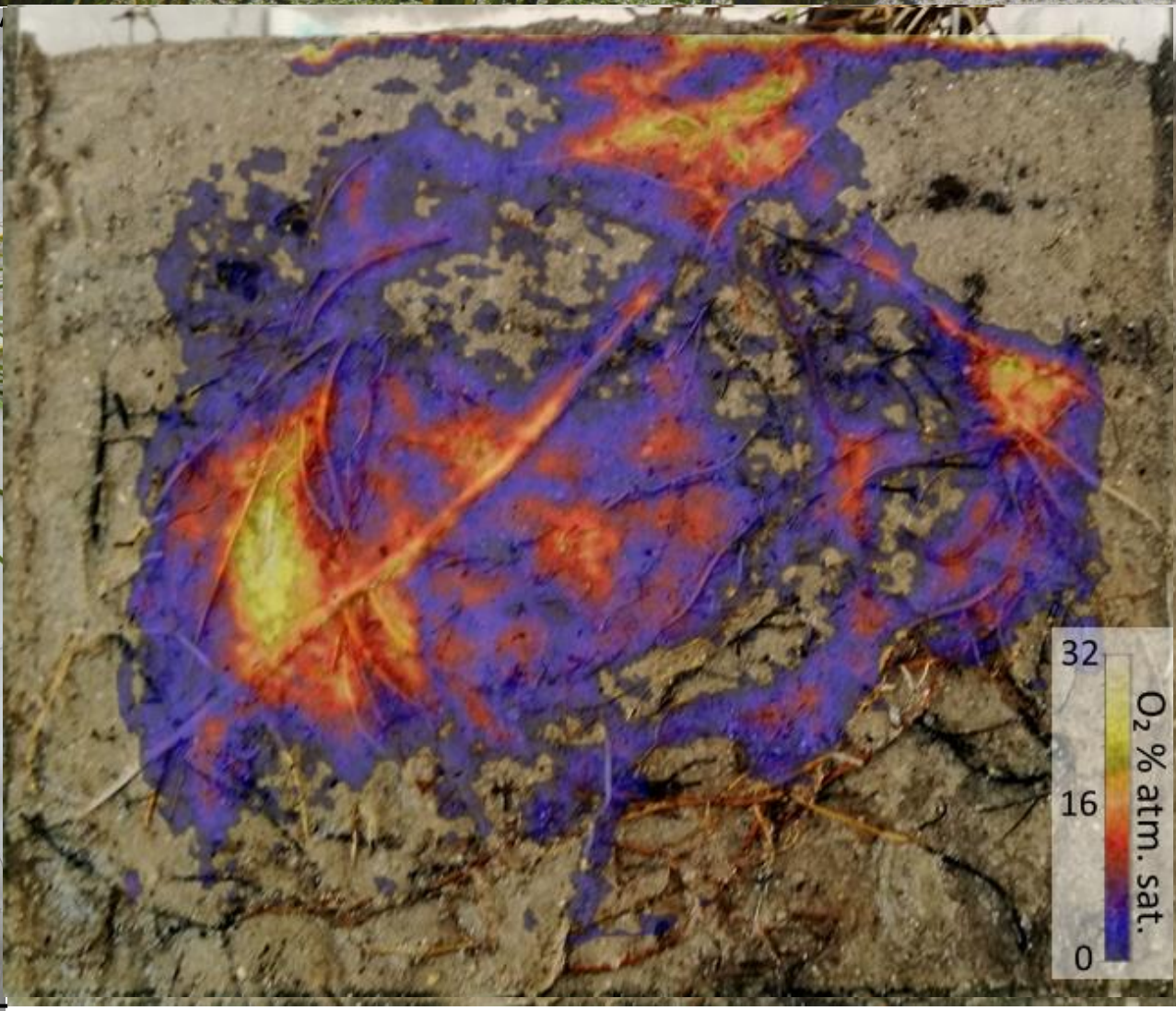
Wadden Sea station Sylt – Germany



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*Elymus athericus*



**Name:** *Elymus athericus*

**Distribution:** Europe

**Wadden sea distribution:**

*Denmark to the Netherlands*

**Habitat:** High marsh



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*Elymus* is spreading drastically in Wadden sea marshes significantly altering the plant composition

The spread has been described as one of the most significant changes of the NW European salt-marsh landscape in the last decades (Valéry et al., 2004).

The spread of *Elymus* may significantly impact the ecosystem services that the salt marshes provide altering the sedimentation and carbon storage capacity (Valéry et al., 2004; Hartmann and Stock, 2019; Nolte et al., 2019), and changing the marshes role as a nursery for the coastal fish populations (Laffaille et al., 2005).



Koop-Jakobsen

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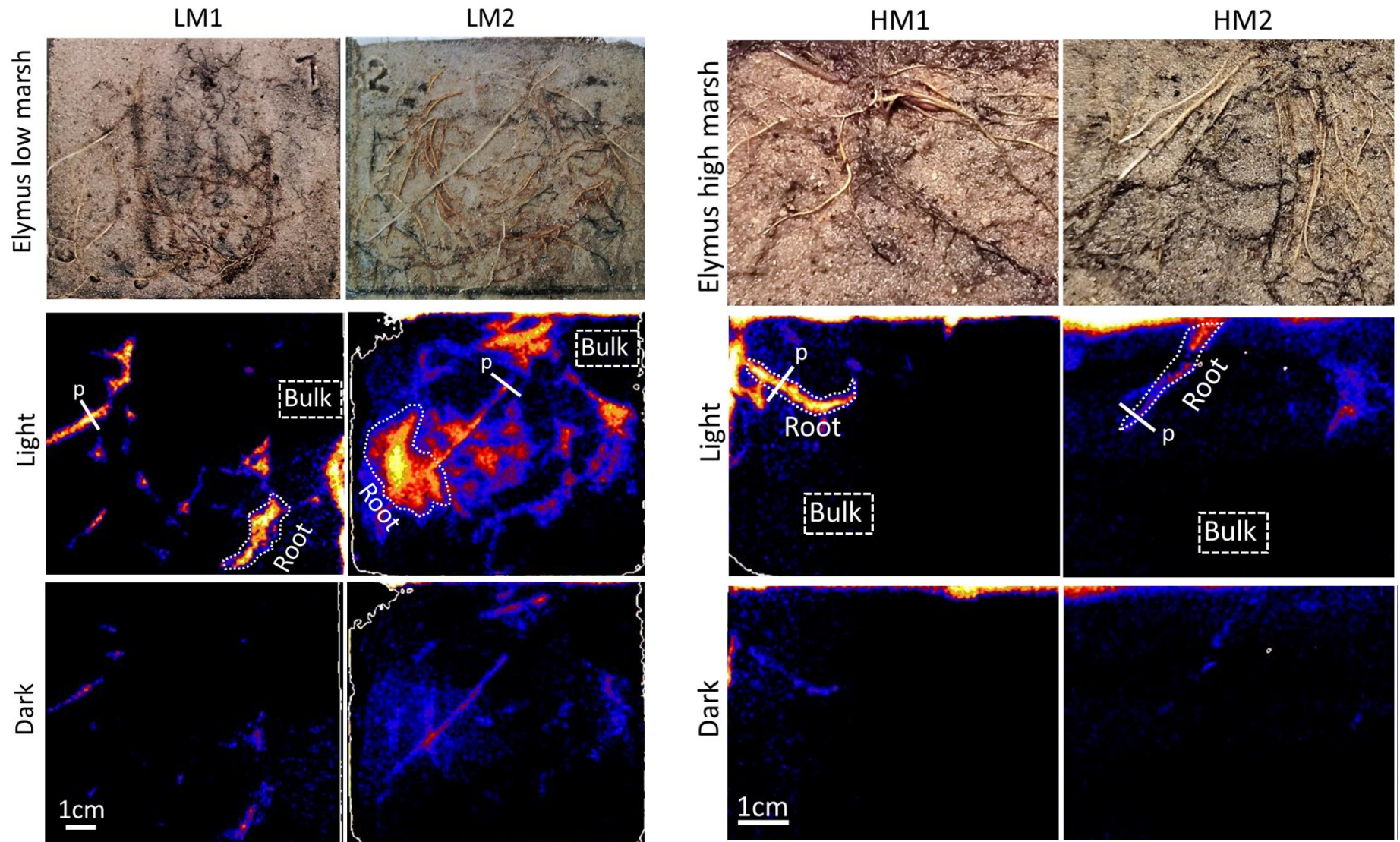
High marsh

Low marsh

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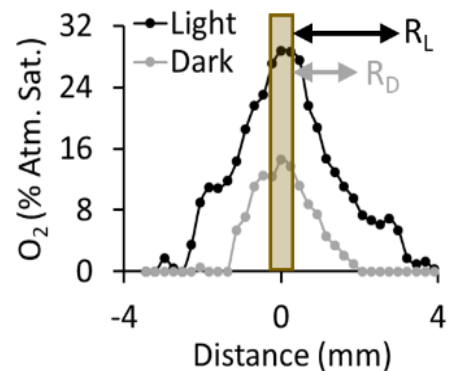


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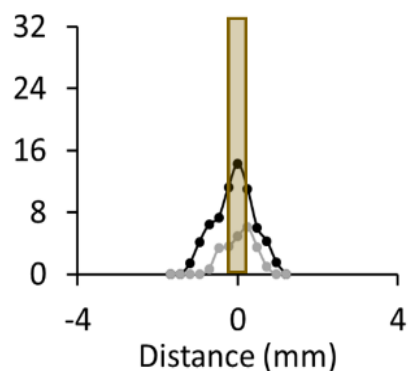
## Interaction between biotic and abiotic factors in the Wadden Sea

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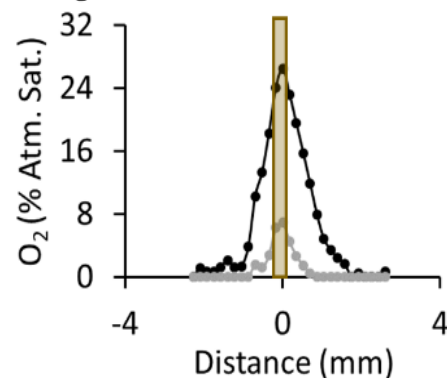
A Low marsh LM1



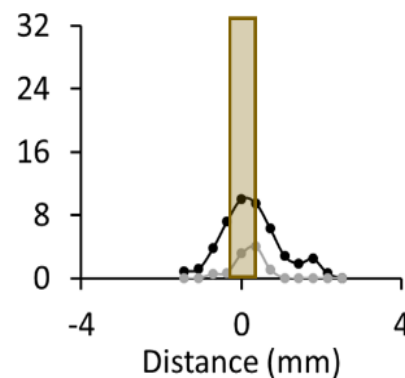
LM2



B High marsh HM1



HM2

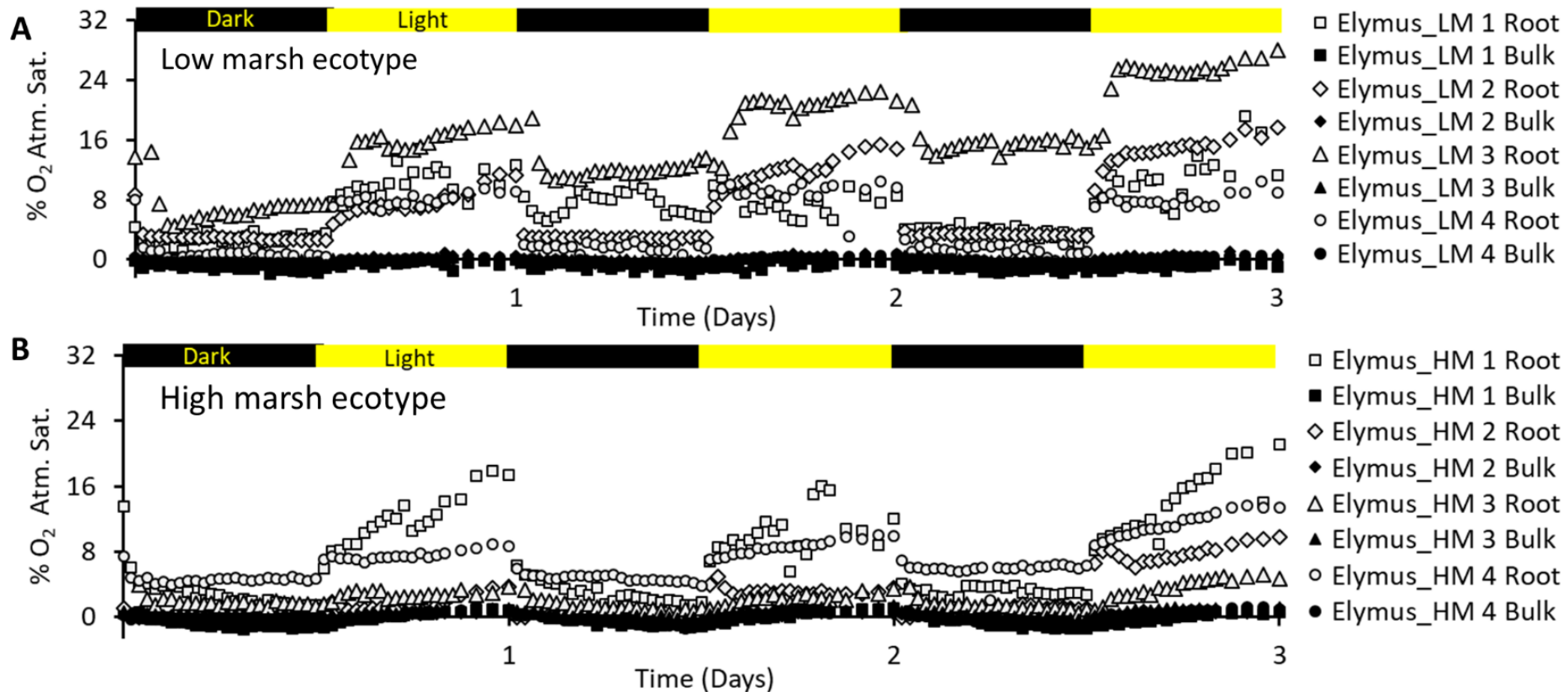


	Radius Light $R_L$ (mm)	Radius Dark $R_D$ (mm)	Radius reduction
Elymus LM 1	2.62	1.36	-48%
Elymus LM 2	1.04	0.69	-33%

	Radius Light $R_L$ (mm)	Radius Dark $R_D$ (mm)	Radius reduction
Elymus HM 1	1.82	0.69	-62%
Elymus HM 2	1.04	0.68	-35%



## Temporal oxygen distribution in *Elymus* rhizospheres



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- *Elymus athericus* has a marked impact on rhizosphere chemistry via plant-mediated sediment oxygenation
- This specific trait enables *Elymus* to spread in to the more waterlogged parts of the low marsh
- This spread may alter essential ecosystem services, such as sedimentation and carbon storage capacity

Koop-Jakobsen and Mueller 2021 *Frontiers in Plant Sciences*.

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