

MSc thesis proposal IGÖ



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Rationale

Seagrass meadows promote biodiversity and provide important ecosystem services (ESS) such as carbon sequestration and sediment stabilisation, which is important for coastal protection. While past seagrass declines in the Baltic Sea coastal waters have come to a halt, natural recolonization of meadows is slow due to dispersal limitation and non-linearities for successful establishment (Waycott et al., 2009; Maxwell et al., 2017).

In the [SeaStore](#) project, we are focusing our research to investigate which processes and conditions encourage the establishment and growth of the common eelgrass (*Zostera marina*). In relation to the project, we propose two themes that can be explored in a MSc thesis, especially aimed to apply and develop the methods learnt in the course: “Verbreitungs- und Populationsmodelle”.

Both themes will be based on occurrences and additional phenotypical information of common eelgrass in Swedish coastal waters, downloaded from the [SHARKweb](#) database. Environmental variables suitable for ecological modelling will be extracted from datasets deposited in the [Google Earth Engine](#) catalogue and in the [EMODnet](#) portal.



Proposed themes

1) Estimation of carbon sequestration by Common eelgrass meadows

Aim: Estimate the total amount of carbon stored by common eelgrass meadows

Methods: We will use data on occurrences of common eelgrass, in addition with information of relevant functional traits, such as biomass, shoot density and cover to a) estimate the range of common eelgrass distribution and b) model the spatially- explicit amount of carbon stored according to functional traits of common eelgrass individuals/meadows in response to environmental variables

2) Analysis of functional traits trends in Common eelgrass meadows

Aim: Evaluate potential changes of Common eelgrass functional traits in space and time

Methods: We will use data on occurrences of common eelgrass, in addition with information of relevant functional traits, such as biomass, shoot density, shoot length and cover from selected stations with long term data collections to evaluate if environmental trends such as warming waters or the increase of storm frequency have an impact on common eelgrass individual/meadows functional traits.

For further details, please contact Matteo at m.lattuada@tu-bs.de.

References

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Waycott, M., Duarte, C. M., Carruthers, T. J. B., Orth, R. J., Dennison, W. C., Olyarnik, S., Calladine, A., Fourqurean, J. W., Heck, K. L., Hughes, A. R., Kendrick, G. A., Kenworthy, W. J., Short, F. T., & Williams, S. L. (2009). Accelerating loss of seagrasses across the globe threatens coastal ecosystems. *Proceedings of the National Academy of Sciences*, 106(30), 12377–12381. <https://doi.org/10.1073/pnas.0905620106>