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Evaluating beach wrack decay through the seasons under wet (underwater) and changing (wet/dry) conditions at the Baltic Sea coast

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Beach wrack, defined as material washed ashore by wind, waves and tides, is a natural phenomenon observed at all coasts worldwide. Often seen as a nuisance and being removed at recreational beaches, it is an important component for dune vegetation succession and habitat for beach faunal components both being negatively impacted by beach management practices. In order to balance the conflicting interests of tourism and nature protection, sound data about amounts, seasonality and composition of beach wrack washed ashore as well as residence time and decomposition kinetics are required, but not available yet for microtidal Seas as the Baltic.

The decay of beach wrack at the beach and under controlled and dry conditions was investigated in the past several times. In this work, the decay of beach wrack, and i.e. seagrass of the genus *Zostera marina* was documented under natural conditions. Therefore, litterbags of fine mesh were sewed and filled with a defined amount of freshly detached seagrass from the local shore. Altogether six experiments were carried out: first two experiments starting in summer or winter, respectively, with constant wet conditions in appx. 1 m water depth. The remaining four experiments were conducted throughout the four seasons. Here, the litterbags were put into water, removed onto land, and vice versa for a total time period of six weeks. The experiments were run in the shallow water at the island of Poel completely submerged and, for a comparison with changing conditions between water and land, at the beach of Warnemünde. Additionally, the experiments were split between light and dark conditions by the use of different mesh colors.

Data about degradation rate through loss of biomass have been retrieved, as well as abiotic parameters influencing the rate of decomposition. For additional insights into the decay of seagrass each sampling time the biofilm was removed, DNA extracted and analyzes of the microbial biofilm are at an initial stage. This work will give valuable information on the degrading community, the influence of seasons, temperature, light availability and the continued change when beach wrack is washed ashore and retrieved back by the sea for many times through all decomposition stages.