effects were not caused by toxic monomers of styrene or additives leaching out of the polymer, which was demonstrated in a follow-up test with the PS leachates. By contrast, no significant effects were found in the daphnids exposed to PLA compared to the reference treatment. Thus, a significantly higher toxicity of the conventional polymer was observed, whereas effects of the biodegradable microplastics were similar to those caused by the ubiquitously occurring clay particles. More studies are needed to identify the mechanisms of PS toxicity and to confirm the observed ecotoxicological differences between the polymer types using different test materials and natural particulates.

Keywords: bioplastics, benchmarking, Daphnia magna, ecotoxicity testing, reference materials

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Towards improved predictions of dispersal of weathering microplastics in the aquatic environment by numerical modelling

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The distribution and quantification of microplastics (MP) in the aquatic environment re- mains very difficult. Numerical models are a useful tool for the assessment of the dispersion of MP particles in water bodies. Thus far, the prediction of the fate of MP in aquatic systems has been carried out by models for passive tracer dispersal, which may help to find possible pathways from source to accumulation spots. But these models do not account for many processes and do not predict particle concentrations. Thus far, several studies have been able to find approximate predictors for the terminal settling velocity of individual particles, but since the size and shape of different particles varies from particle to particle, it is not straightforward to replace each particle by a single representative particle. The proposed model assumes that the MP particles around a certain point location in the model show a lognormal particle size distribution (PSD). It is demonstrated that the net settling flux of such a particle population cannot be reproduced by the settling flux of the same number of particles with the mean size of the entire population, but is dominated by the heavier particles. Since the latter settle down faster, the PSD changes in space and time: with

increasing time and drift from the source the PSD at the water surface is expected to shift its mean size to smaller fractions, while the PSD will show a relatively larger mean size with increasing depth. Besides this differential settling, the particle size and density is also expected to change due to weathering, biofouling and associated aggregation. Within the framework of the WEATHER-MIC project it is the ambition to develop an im- proved model, based on the methodology adopted in cohesive sediment transport studies, and to demonstrate its potential with applications to some Scandinavian coastal areas.

Keywords: settling velocity, weathering, biofouling, population kinetics, dispersion modelling

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Microplastics Disrupting the Biological Pump?

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