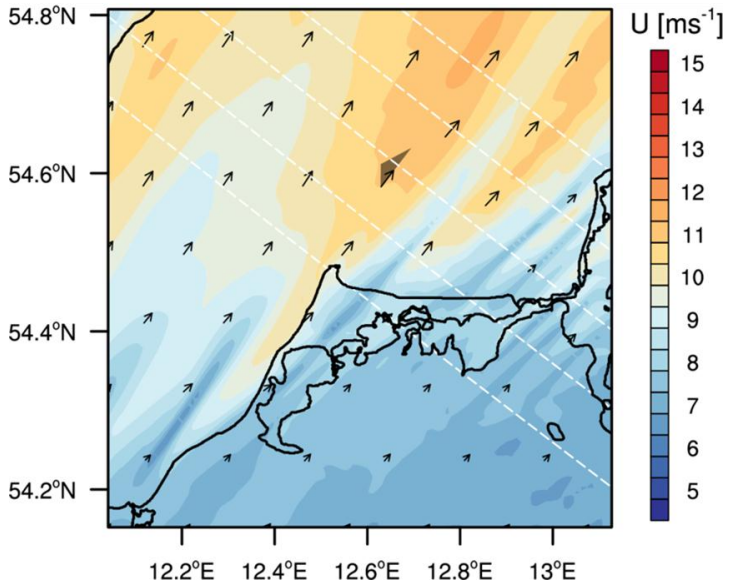
Master thesis

Investigation of flow structures in the marine boundary-layer generated by surface heterogeneities over the land with the means of large-eddy simulation



Source: Dörenkämper et al. (2015): On the Offshore Advection of Boundary-Layer Structures and the Influence on Offshore Wind Conditions, *Boundary-Layer Meteorol.*, **155**, 459-482

Recent high-resolution simulations with the mesoscale model WRF have shown that larger patches of high-roughness elements over the land can trigger streaks of low wind speed that can still be detected several tens of kilometers downstream the land sea transition in case of stable stratification of the atmosphere over the sea. E.g., in the figure above the city of Rostock seems to be the reason for one of the low wind speed streaks over the sea.

Within this project turbulence resolving large-eddy simulations shall be carried out in order to check whether the findings of the simulations with the mesoscale model in which turbulent processes are fully parameterized can be reproduced or whether the parameterization of turbulent processes need to be adapted in the mesoscale model.

Questions that shall be answered within the project are e.g. whether the horizontal mixing in the mesoscale models is too weak and how large the patches of high roughness have to be in order to be able to generate persistent streaks of low wind speed that can still be detected several kilometres downstream of the land-sea transition.

Requirements:	**Begin:** as soon as possible **Duration:** 6-8 months
Bachelor's degree in meteorology, physics, engineering or related fields Interest in offshore meteorology and wind energy Good knowledge in programming and data visualization languages (e.g. Matlab, NCL, R or python)	**Contact:** Dr. Gerald Steinfeld ForWind – University of Oldenburg +49 (0) 441 798 5073 gerald.steinfeld@forwind.de