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Impact of off-shore wind parks on inland meteorology

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On the transition to renewable energy supply more and more wind parks emerge, not only inland but also off-shore. Wind turbines use the kinetic energy of the flow and thereby change the energy budget of the atmosphere. The current study investigates, how the local impacts of off-shore wind farms situated in the German Bight impact their direct surrounding and the more remote regions in Northern Germany. For the studies the mesoscale numerical model METRAS is applied with a 4 km resolution and with a parametrisation to include effects of wind turbines on the flow.
Results are presented for average changes of the climatic situation in summer with focus on the urban climate of Hamburg (Germany), about 100 km away from the German Bight. Depending on the actual weather pattern, the impact of the wind farms varies from nearly no influence to non-neglectable changes, with an, in average, slight decrease in temperature. The physical processes relevant for the simulated changes will be discussed.