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Technical Note: The MESSy-submodel AIRSEA calculating the air-sea exchange of chemical species

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Abstract. The new submodel AIRSEA for the Modular Earth Submodel System (MESSy) is presented. It calculates the exchange of chemical species between the ocean and the atmosphere with a focus on organic compounds. The submodel can be easily extended to a large number of tracers, including highly soluble ones. It is demonstrated that the application of explicitly calculated air-sea exchanges with AIRSEA can induce substantial changes in the simulated tracer distributions in the troposphere in comparison to a model setup in which this process is neglected. For example, the simulations of acetone, constrained with measured oceanic concentrations, shows relative changes in the atmospheric surface layer mixing ratios over the Atlantic Ocean of up to 300%.

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