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Adding pieces to the atmosphere-biosphere feedback puzzle

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The SMEAR Estonia station was established in 2012 as southernmost “Station for Ecosystem-Atmosphere Relations” in Northern Europe. The station provides continuous data since 2014 and has steadily increased the amount of measured variables. Measurements cover atmospheric gases, air ions and particulate matter, radiation and energy fluxes, forest ecosystem and soil related parameters.

Located in the hemiboreal forest ecosystem at the southern edge of the boreal forest biome the forests are characterised by a mix between coniferous and broadleaved species. The SMEAR Estonia station’s location near to an old growth forest, which is the oldest Estonian forest nature reserve established in 1924, allows for comparisons of atmosphere-biosphere related processes between unmanaged and managed forests. The application of continuous multi-scale data allows us to see first trends of hemiboreal ecosystem-atmosphere interactions in relation to natural and man made disturbances and climatic drivers.

Here, we report and present our available multi-scale data and research results. Our focus lies on the heterogeneity and the dynamics of atmosphere-biosphere exchange processes and feedbacks in the footprint of the SMEAR Estonia station.