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A new tower for monitoring atmosphere-forest exchange processes at TERENO site Wüstebach

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In the German national park Eifel, a 36-m tower was erected in a spruce forest covering the catchment of a small creek called "Wüstebach". It is part of the "Eifel/Lower Rhine Valley" Observatory within the German Terrestrial Environmnetal Observatories (TERENO) network. The tower instrumentation is intended to yield long-term monitoring of the atmosphere-canopy exchange processes of a typical mid-latitude forest. Intended applications are, among others, monitoring reactions of the forest to recent climate change, serving as national and international comparison site, validation of regional climate modeling, and basic studies on turbulence over forests. As a primary goal, the site will serve as a reference for a nearby clearcut intended to accelerate succession from the current spruce plantation (*picea abies*) to natural vegetation dominated by beech.

To characterize the entire exchange process, quantities are measured above, within an below the vegetation: Flux measurements – above the canopy – comprise eddy-covariance (EC) measurements of heat, momentum, CO_2 and water-vapor fluxes, measurements of the radiation budget, sunshine hours, and rainfall. Profile measurements – from the ground to 1.2 times canopy height – at six levels include temperature, humidity, and horizontal wind vector. Measurements of CO_2, and N_2O concentration profiles are planned. Surface and soil property measurements – around the tower base – are designed for spatially averaging measurement of surface temperature, stem temperature, as well as soil temperature and moisture (five levels).

Currently the EC istrumentation is operational and the two other blocks of measurements being set up. First results show turbulent fluxes that conform with the behaviour of a spruce forest as reported by other authors. Evaporation apparently matches typical values expected from the measured rain fall. The performance of different popular turbulence processing softwares is currently being evaluated.