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Near-surface dynamics during Fog Events: An approach to connect fog precipitation with fog deposition at the Gobabeb Namib Research Institute

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In hyper-arid coastal regions of the Namib Desert the regular occurrence of fog provides essential water supply for flora and fauna. Previous studies provide a basic understanding of the fog climatology. The occurrence of fog has often been detected with passive fog collectors and their yield, called fog precipitation (FP), has been interpreted quantitatively as hydrological input of fog water to the ecosystem. Comparisons between FP measurements and estimates of fog water deposition (FD) using microlysimeters at the Gobabeb Namib Research Institute showed that there is not a simple correlation between FP and FD. This was the motivation to look in more detail at the processes during fog events. There, apart from standard meteorology, a multitude of fog-related measurements in 1-min resolution are available. Including: Fog precipitation using four different types of passive fog collectors (“Juvik”-type, “Grunow”-type, harp, SFC; since 2014), visibility and precipitation type using a present weather sensor (Campbell CS125; since 2017) and a laser disdrometer (Thies; since 2018), wetting using a leaf wetness sensor combined with a thermocouple close to the ground (Campbell 237; since 2017) and fog water deposition using four microlysimeters (self-construction; SEP/OCT 2017 and FEB/MAR 2018). Catch characteristics of the different fog collectors are inter-compared with focus on total yields and sampling efficiency for 100 fog events. The typical response time between fog occurrence to first FP signals is around 30 min. As expected FP amount and sample rates depend on the geometry and structural properties of the collectors. A distinct correlation between impact area and total FP amount exists. The inclusion of visibility, precipitation type and dew measurements do not yield an easy explanation for the relation between FP and FD, but it looks like drizzle plays a key role in FD processes.