

VM grant title: HATPRO MWR rain flagging and radome status monitoring

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The main achievement of the VMG is a document which assesses the performance of a HATPRO MWR in rainy conditions. The document discusses mitigation strategies implemented by design, i.e. precipitation sensor, heater, blower and hygroscopic radome, complementary mitigation strategies and the adversary effect of radome weathering.

The document contains a description of a complementary mitigation strategy preventing the uninformed use of biased data recorded during or after precipitations events. Figure 1 shows the initially (green) and additionally (orange, blue) flagged data during a precipitation event at the end of the FESSTVaL campaign in Lindenberg.

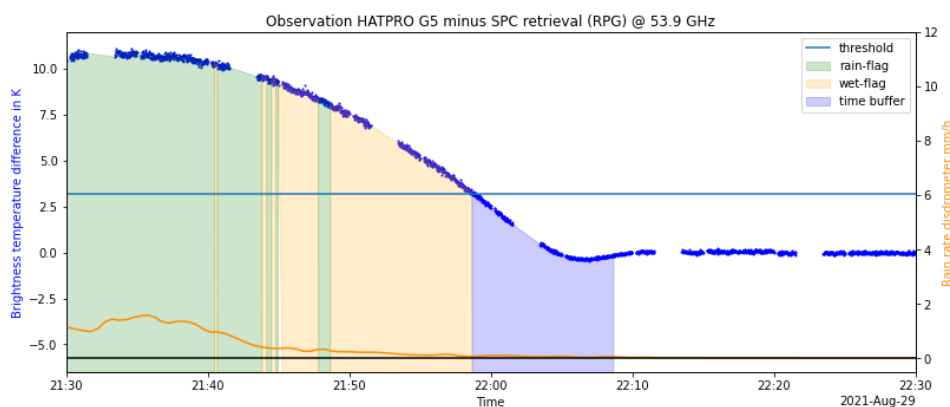


Fig 1: Evolution of observation minus spectral retrieval (blue scatter) during and after a precipitation event. The rain rate is in orange and the resulting flagging is indicated by the color below the curve.

Finally, a Python script is introduced, which enables operators of an MWR to monitor the hygroscopic properties of the radome and adapt the maintenance accordingly. This monitoring can benefit data quality and save money. Figure 2 depicts the evolution of the “time-to-dry” as an indicator for the radome condition.

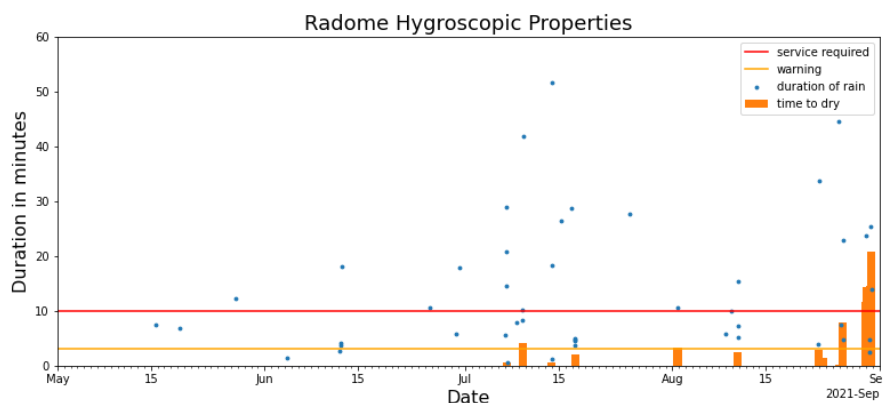


Fig 2: Evolution of the “time-to-dry” after precipitation events (blue) during the FESSTVaL campaign at the Richard-Assmann-Observatory in Lindenberg, 2021. The thresholds for the warnings are indicated by the orange and red lines.