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Analysis of splash loss for different throughfall trough designs

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Measurement uncertainty through splash losses is a known issue in rainfall measurements. In the case of rain gauges this has resulted in standard funnel designs. In forest hydrology and specifically for throughfall measurements few standard trough designs or evaluation reports exist. We present a laboratory experiment in which the splash loss for different trough types were systematically compared and give a recommendation which trough designs show the least splash losses.

For throughfall troughs the cross-sectional shape of the pipe or trough determines the magnitude of splash loss. To assess which trough design is most suitable four alternatives were built and tested in the laboratory: a classic half pipe, a u-shaped pipe with a (7 cm high) border, an elongated u-shaped pipe (10 cm high), and an open pipe with a sectoral opening.

The splash loss was determined by dripping colored water into the different designs and collecting the splash on paper sheets mounted next to the pipes. The paper sheets were then scanned and processed so that the area of the sheets covered by splash could be quantified.

Results show that the pipe system with the sectoral opening and the elongated u-shaped pipe were the designs with the least splash losses. Further recommendations towards field installation of the different designs with regard to structural stability were assessed.