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Assessing the applicability of low-cost soil moisture sensors

Abdulla Alshahri

Email: aalshahr@smail.uni-koeln.de

Environmental Sciences Institute of Geography ,Germany

Abstract

Knowledge about soil moisture is required for many environmental applications. Recent advances in low-cost sensor technologies allow scientists and laymen to capture data about soil moisture levels in a cost-effective manner. In this paper, the performance of five low-cost soil moisture sensors was evaluated for accuracy, reproducibility, and practicability. A standard calibration was performed in the laboratory. The results show that the Truebner SMT100 sensor has a relatively high level of performance (R2=0.98, RMSE=1.39), which is consistent with the reference instrument. The paper concludes that the tested sensors are applicable for measurement in different applications, depending on their merits.

Index Terms—Low-cost sensing, Sensor performance, Data analysis, Sensor calibration.

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