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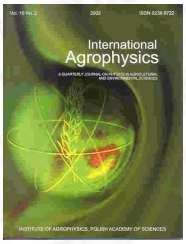

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TDR and low-frequency measurements for continuous monitoring of moisture and density in a snow pack

(get PDF)

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abstract An in-situ sensor for the simultaneous measurement of density and liquid water content of snow is presented in this paper. The system consists of radio frequency transmission lines of up to 25 m length cast in a flat PVC-band, which can either be set up horizontally to monitor single snow layer properties or sloping from a mast to the soil surface to determine vertical snow pack properties. The dielectric coefficient along the flat-band cable is measured with a time domain reflectometer (TDR) at high frequencies, and with a low frequency impedance analyzer. The performance of the sensor system has been tested during two winter seasons (2001-2003) at a high alpine test site in Switzerland. Overall, the sensing system proved to be quite robust and produced results in agreement with manual snow pack observations.

keywords snow density, moisture, time domain reflectometry