



SoilDTS: Distributed soil moisture observations along fiber optic cables

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Soil moisture controls the distribution of water and energy at the land surface. Although point observations of soil moisture are not difficult to make, capturing large scale moisture variability requires a large number of such observations. Here, we present a new method to measure soil moisture along fiber optic cables with lengths of up to five kilometers, with observations each one to two meters. The method, called SoilDTS, uses Distributed Temperature Sensing equipment that allows for the precise temperature measurement along fiber optic cables. Two to four of these cables are plowed into the soil. Subsequent measured changes in temperature can directly be related to soil moisture content. Such temperature changes can either be induced through the natural diurnal temperature and radiation cycle (“passive method”) or through a heat pulse induced by an electric current sent through the metal housing of the cable (“active method”). SoilDTS is still a very experimental way to measure soil moisture. We will present principles, practical applications, first results, and data assimilation approaches.