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Using ground-based GPS to quantify Soil Moisture

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Within the GNSS-community it is a well-known fact, that multipath effects are an important and hardly to model site-specific error source. Normally one tries to eliminate the effects of multipath e.g. by means of choosing an appropriate antenna type and site location, and by observing during long time spans. However, multipath effects can also be used to gather information about the state of the soil surface at site location.

Within the project MESMERISE (Meteorological Soil Moisture Experiment Series; http://www.imk.uni-karlsruhe.de/seite_1932.php) different sensors and techniques were operated simultaneously for one week with the aim to quantify the soil moisture of a small area (0.01 km^2). Besides standard sensors some experimental techniques (e.g. GPS) were tested.

The GPS experiment uses ground-based multipath-related noise as a signal to monitor the soil moisture. The experiment itself as well as the evaluation strategy will be presented and discussed in detail. Some encouraging preliminary results and comparisons with standard sensors will be presented, too.