

MIXED PIXEL SOIL MOISTURE RETRIEVALS WITH AIRBORNE RADIOMETER IN AURAJOKI WATERSHED, FINLAND

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One of the main challenges of Soil Moisture and Ocean Salinity (SMOS) mission of European Space agency (ESA) [1] is observing soil moistures in various environments, as the pixel size of the satellite (tens of kilometers) causes pixels to contain different vegetation and land usage classes, known as the mixed pixel problem [3].

These problems have been studied in an airborne measurement campaign between August 2013 and May 2014, utilizing the skyvan research aircraft and HUT2D interferometric radiometer of Aalto University. Comparisons were made between the soil surface moisture measured by airborne (HUT2D) [5] and satellite (SMOS) radiometers and calculated with soil moisture model of Watershed Simulation and Forecasting System (WSFS) [6].

The mixed pixel problem was assessed through observations of the variations in surface soil moisture within pixel and between land usage classes. The WSFS data and in situ measurements were combined to produce a map of soil water content over the test area. The simulated soil moisture map was compared to soil moisture retrieved from HUT2D measurements and consequent SMOS measurements. Our results show that water content of different land usage classes exhibited significant spatial differences, which could be observed in high resolution HUT2D images and in situ measurements. We also show that good agreement was achieved between SM from WSFS and retrieved from HUT2D data for the mixed pixels according to the SMOS DGG grid, which was further improved by taking soil properties into account for accordingly.

References

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