



A field evaluation of a satellite microwave rainfall sensor network

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An innovative environmental monitoring system - Smart Rainfall System (SRS) - that estimates rainfall in real-time by means of the analysis of the attenuation of satellite signals (DVB-S in the microwave Ku band) is presented.

Such a system consists in a set of peripheral microwave sensors placed on the field of interest, and connected to a central processing and analysis node. It has been developed jointly by the University of Genoa, with its departments DITEN and DICCA and the Genoese SME "Darts Engineering Srl".

This work discusses the rainfall intensity measurements accuracy and sensitivity performance of SRS, based on preliminary results from a field comparison experiment at the urban scale. The test-bed is composed by a set of preliminary measurement sites established from Autumn 2016 in the Genoa (Italy) municipality and the data collected from the sensors during a selection of rainfall events is studied. The availability of point-scale rainfall intensity measurements made by traditional tipping-bucket rain gauges and radar areal observations allows a comparative analysis of the SRS performance. The calibration of the reference rain gauges has been carried out at the laboratories of DICCA using a rainfall simulator and the measurements have been processed taking advantage of advanced algorithms to reduce counting errors.

The experimental set-up allows a fine tuning of the retrieval algorithm and a full characterization of the accuracy of the rainfall intensity estimates from the microwave signal attenuation as a function of different precipitation regimes.