



Contribution ID: 21

Type: Oral

Opportunistic Use of Data from Satellite Communication Networks for Rainfall Estimation

Tuesday, June 25, 2019 1:55 PM (15 minutes)

There are more than 300,000 satellite ground terminals across Europe and 2 million worldwide which are being used for providing broadband internet services. To maintain a certain level of quality of service, gateway stations (of satellite operators) continuously monitor links between satellite and ground terminals (enabled by the bidirectional link). Carrier-to-Noise ratio (C/N) parameter denotes quality of the received signal and the link. The C/N parameter is highly dependent on the link condition and is mainly affected by the rain attenuation at the operational Ka/band frequencies. By using appropriate signal processing and machine learning techniques, we are able to estimate the rainfall from C/N measurements to a high accuracy.

In this presentation, we will briefly overview our relevant research activities, which were conducted in collaboration with University of Luxembourg. We will present operational set-up used for rainfall estimation. It includes 35 satellite ground terminals in southwest of Germany (Eifel region) which receive services from ASTRA 2F satellite located at the orbital position of 28:2 E. The links from satellite to ground terminals operate at K-Band (19:70-20:20 GHz). C/N data from these terminals are collected every 5 minutes and stored in a database. We will introduce a tool developed for data collection, processing and visualization.

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Session Classification: Overview presentations

Track Classification: HyMet CML overview presentations and posters (Day1)