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A Generative Model of Synthetic Rain Intensity Time-Series

(1) A. Núñez, (1) F.P. Fontán, (2) U.-C. Fiebig, (1) P.Mariño and (1) F.Machado

(1) University of Vigo, ETSE Telecomunicación, Campus Universitario, E-36200, Vigo, Spain,
(2) German Aerospace Center (DLR), Institute for Communications and Navigation, D-82230
Wessling, Germany, (fpfontan@tsc.uvigo.es / Fax: +34 986 50 7761 +34 986 812116 / Phone: +34 986 812 137)

In the proposed paper a generator of synthetic time-series corresponding to rain intensities will be presented. The model parameters were extracted from measured data sets of several years' duration for two different climatic areas: Vigo on the Northwestern Atlantic coast of Spain and Wessling, in the vicinity of Munich, Germany. The recorded intensities correspond to integration times of 5 and 3 minutes, respectively. The synthetic time-series produced also correspond to the same integration times. From such small integration times, synthetic series for other, longer integration times can easily be derived.

Comparisons were performed between the cumulative distributions corresponding to the measured and generated series. Other tests were carried out in terms of the socalled second-order statistics, i.e., time-dependent, such as event and inter-event durations for various rein intensity thresholds. Good agreements were observed in all tests performed.

The main feature of the model is that two different types of rain are assumed: (A) of small-medium intensity corresponding to stratiform/widespread rain, and (B) of high intensity corresponding to convective rain.

The model can be parameterized in such a way that it can be easily extended to other climatic areas, thus being possible to convert it into a global model.

The model can be used for simulation purposes in a wide range of applications including hydrology and radiocommunications.