



Rainfall estimation by microwave links in Uruguay: First results

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Uruguay has a humid climate with an average annual precipitation of 1400 mm / year presenting a high spatio-temporal variability. The main way of measuring rainfall is through a network of conventional daily rainfall stations with an approximate average distance between stations of 50 km. One of the main difficulties of this network is that it is not possible to capture events of great spatio-temporal variability and a certain latency in the availability of data for its use. To a lesser extent, in the northern part of the country there is a network of automatic stations with a temporal resolution of 15 minutes. There are no meteorological radars in Uruguay. Some successful advances have been made in combining satellite precipitation with the daily rain gauge network, but at the moment there is no operational product. For a large number of applications where rainfall is the main variable (flood early warning system, agricultural insurance, etc.) it is necessary to improve the spatio-temporal estimation of rainfall in Uruguay.

The use of microwave links to determine occurrence and amount of rainfall has been demonstrated as a promising alternative method by several authors and at a different places around the world. In Uruguay there is a network of 294 microwave links that operate at a frequency of 7 Ghz administered by the national telecommunications company of ANTEL. As a way to explore the feasibility of its use, an experiment was developed in three microwave links. 8 automatic rain gauges were installed in line with two of the microwave links and a record of precipitation was obtained with a frequency of 1 minute and the telecommunications company supplied transmitted and received power values every 1 minute. From the data collection of 1 year and a half it has been possible to calibrate and evaluate the rain-attenuation relation for the conditions of Uruguay, develop a filter for the detection of non-rain rain from the attenuation and identify other meteorological events. The results of this study represent the first step on the development of a microwave link precipitation product for Uruguay