RADIO FREQUENCY INTERFERENCE DETECTION ALGORITHM BASED ON SPECTROGRAM ANALYSIS

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Microwave radiometry is today routinely used to obtain geophysical parameters remotely. As it measures thermal noise, high sensitive instruments must be designed. Nowadays, due to the high concentration of Radio-Frequency Interference (RFI) present in microwave radiometry measurements, device sensitivity can be useless, if an efficient RFI detection and mitigation algorithm is not implemented [1, 2, 3]. Sources of RFI include spurious signals and harmonics from lower frequency bands, spread-spectrum signals overlapping the "protected" band of operation, or out-of-band emissions not properly rejected by the pre-detection filters due to its finite rejection.

RFI present in the radiometric signal modifies the value of the measured power leading to an erroneous retrieval of the measured geophysical parameters. In recent years, techniques to detect the presence of RFI in radiometric measurements have been developed. They include time- and/or frequency domain analyses [4, 5], or statistical analysis of the received signal [6]. In addition, the so called Spectral Kurtosis algorithm has been studied in [7] with good results, and takes advantage of the effectiveness of the combination of different analysis in the RFI detection.

In this work a combined frequency and time-domain algorithm has been developed to detect the presence of RFI, and consists of the treatment of the radiometric signal's spectrogram as a whole, hence RFI is detected by 2D filtering. A series of Monte-Carlo simulations have been performed to evaluate the performance of this algorithm for different kinds of RFI.

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