Geophysical Research Abstracts
Vol. 21, EGU2019-1674, 2019
EGU General Assembly 2019


# Improving Universal Multifractal parameter estimation for large radar data sets, a case study in the Greater Paris

Ilektra Skouri-Plakali, Auguste Gires, Ioulia Tchiguirinskaia, and Daniel Schertzer
HM&Co, Ecole des Ponts, ParisTech, HM&Co, Champs-sur-Marne, Marne- la- Vallée, France (ilektra.skouri@enpc.fr)

The evolution of the precipitation events is a key-question of climate change. Due to its outstanding complexity, its answer mainly relies on the improvement of both measurement technologies (mainly small weather radars such as polarimetric X-band radars) and the analysis techniques of the large data sets they produced.
We focus on the case study of, different products of the X-band radar operate over a 64 km x 64 km grid in the Greater Paris area. The spatial resolution is of 250 m while the temporal one is of 3,4 min.
The analysis is based on the widely used Universal Multifractals (UM) framework by Ecole des Ponts ParisTech (hmco.enpc.fr) during three events of different duration that enable to quantify the variability across scales of a field with the help of only three physically meaningful parameters with:
• the mean intermittency (C1),
• the multifractality index (alpha) and
• the degree of non-conservation (H)
They are estimated for all the radar products via (classical) spectral analysis, Trace Moment (TM) and Double Trace Moment (DTM) .
Due to a rather systematic discrepancy between the theoretical TM curve and the empirical curve, we have been led to modify the TM method by introducing a (mono/uni) fractal correction. This correction is supported by various theoretical arguments that we discuss. We also point out several consequences, in particular the fact that the DTM results are biased. This leads us to revise the time evolution of the UM parameters, hence that of the characteristics of the precipitation.