Urban hydrology has been looking for a while to go well beyond the classical radar resolution of $1\text{km}^2 \times 5\text{minutes}$, which is commonly provided by meteorological services. This can be achieved with the rather recent technology of polarimetric X-band radars because of their higher frequency and the fact that they are much more affordable and versatile. For instance, sub networks of X-band radars are to appear around metropolis.

However, to take advantage of this technology at full extent, in particular to achieve a sophisticated polarimetric “self-calibration”, would require to explore further fundamental questions that have been scarcely addressed: the limitations implied by several approximations that have been cornerstones of radar meteorology. For instance, ad-hoc homogeneity approximations and/or factorization of the drop distribution have lead to the common practice to average several scans, therefore degrading the measurement resolution, in attempt to reduce coherent backscattering due to “drop rearrangement.

With the help of various rainfall data, including high resolution 3D pictures of drop distribution, we come back to the question of instantaneous measure of the heterogeneous field of reflectivity with the help of multifractals.