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Evaluation of the hydrologic measure quality of the Saint Nizier weather radar data on the local urban area of Greater Lyon

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The meteorological radar of Saint Nizier d'Azergues, part of Meteo France network Aramis, is situated at only 40 km from the urban community of Greater Lyon, in the north of the Rhône valley, south-east of France. This area gathers many human, environmental and materials stakes and vulnerability. From an operational use, an assessment based on a simulation and analysis of real data has identified certain sectors of the community affected by problems of ground clutter, which have to be filtered before any furthermore hydrologic use.
There is a very good consistency between the two types of analysis. This agreement helps to confirm the cause and extent of sources of error in the real images. These confirm the areas within the urban area affected by the phenomena of ground clutter. The list of these pixels considered less reliable, has been compiled and they were screened to very locally compare the radar values to the values of rainfall in the urban community of Lyon.
Indeed, Lyon has a network of measuring the rain in urban areas among the densest in Europe, totaling about fifty rainfall stations of various organizations on its territory, which creates a density of about one rain gauge for sixteen km^2. In this study, only raingauges properties of the Urban Community of Lyon were used: 29 tipping bucket devices currently in operation, providing data each 6 minutes.
The average rain radar on the town were calculated for the sample of 17 rain episodes from the period 2001 - 2005, and compared to average from 29 rain gauges Grand Lyon. The differences between radar estimations and rainfall values show high amplitude over time, especially in winter. Thus, a factor based on raingauges was assigned to radar data in order to match the average values and radar rainfall for each rain events. These radar adjusted data were then compared to each punctual rainfall values associated (each raingauge value has been compared to a radar pixel value associated thanks to a vertical extraction).
The comparison of surface and punctual radar data to the values of the dense network of rain gauges in the community showed a small difference between these measurement values after the use of a spatial uniform weighting ratio, and filtering pixels of lower quality.
Specifically, the average difference between radar data and rainfall values around 20% episodes all together, but drops to nearly 10% during exceptionally abundant or long term time rainy episodes potentially harmful. To provide complete coverage of data on the study territory, especially on ground clutter zones filtered, two spatialization techniques were used. The results of the cross validation have shown the usefulness of ordinary kriging compared to cokriging, which is a lot more complicated to use and not really better in this precise study case.