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An entropy approach for evaluating an urban rainfall network: an operative case of study

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Hydrological models, that are the base of operational forecasting systems, require an accuracy that is strongly dependent on the quality and quantity of the input information, represented by the rainfall depth. The finer the space-time rainfall resolution, the higher the accuracy of the hazard nowcasting. In this framework, an optimum raingauge network is essential in prediction of flash flood events: the density of raingauge networks represents infact a key parameter for proper observations of rainfall fields.
On the basis that a raingauge network is characterized by an exchange of information, the informative entropy approach is used as a measure of the information content of rainfall data provided by raingauges. In this work the heuristic entropy is a tool for evaluating the optimum number of raingauges in the case study network. This approach is very useful in designing and managing raingauge networks because it can lead to determine the optimum number of raingauges, not only in terms of gained accuracy of rainfall information and flood prediction, but also in terms of money savings. In fact raingauges providing redundant information could be removed.
In this work, results of the application of this methodology to the high density raingauge network of the urban area of Rome, are presented.