

Pilot location: Sucy-en-Brie Catchment, Paris area (France)

Location and Environmental Setting

Sucy-en-Brie is a city located in the South-East of Paris, in the Val-de-Marne County. The catchment is a 269 ha urban area, with an average coefficient of imperviousness of approximately 35%. The sewer system is a separate one and storm water is routed to the Marne River, that is one of the two main rivers of the Paris Region. The General Council of Val-de-Marne manages and controls the main sewer system and is in charge of protecting people and facilities against flooding, as well as of protecting the natural environment from pollution sources. According to the topography, three areas can be identified in the Sucy-en-Brie catchment: a plateau in the upstream with an elevation of approximately 100 m, an alluvial plain in the downstream near the Marne river with an elevation of 32 m and between them there is a hillside with a steep slope. The plateau and the hillside are housing areas (collective at 10% and individual at 90%) surrounded by green spaces, the plain is occupied by an industrial area and some sports fields.

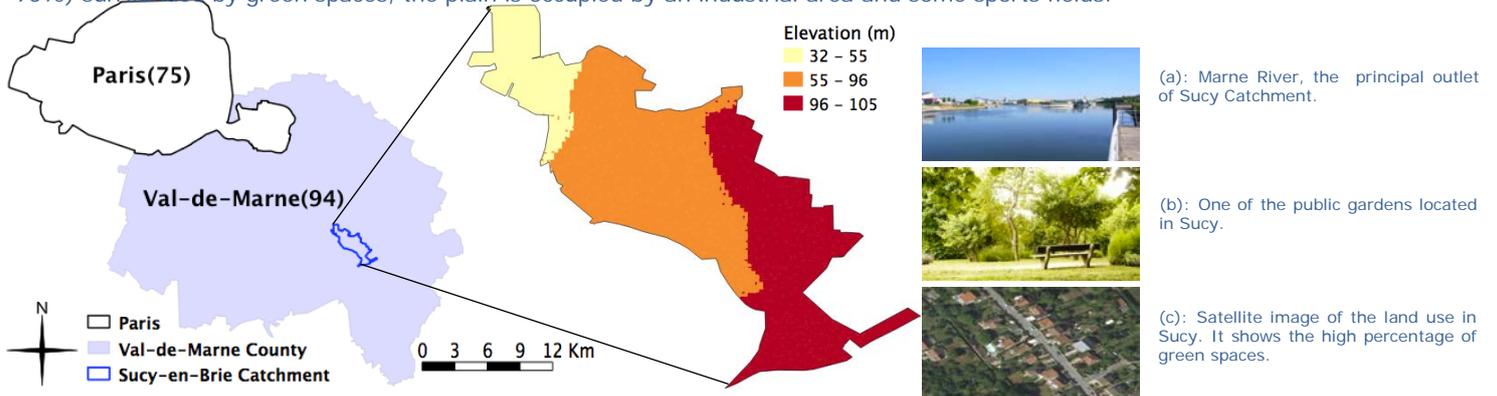


Figure 1: Location, topography and pictures of the Sucy-en-Brie catchment.

Urban pluvial flood risk problems and management objectives

Flooding mechanisms:

Sucy-en-Brie catchment has suffered from several flooding events in the past as a consequence of:

- 1) The very steep slope in the hillside ($\approx 34\text{m/km}$) that increases water speed and causes overflows in the downstream pluvial network. Hence the plain (the area near the train station) is historically known as a flood zone.
- 2) The increase of imperviousness areas, however limited in this catchment.

Current Solution:

After the flooding of the 7th of July 2000, the General Council of Val-de-Marne decided to build a retention basin near the Sucy train station. This basin has two compartments that carry out two functions: (1) the protection against flooding by storing water during the peak flow events and (2) the depollution (through settling) of water before it is released into the natural environment.

The basin is operated with the objective of increasing the amount of treated water by using both compartments and of having the basin empty in case of a flood risk. Since these two management modes are contradictory, it is necessary to know when to switch between the two modes. As a response to this question, a forecasting system was set up in early 2008: this system was built by a private company that uses the data from a C-band radar (operated by Météo-France, the French national meteorological service). The C-band radar is calibrated in real time with rain gauges. The forecasting system indicates to an operator if there is a flooding risk so that the operator can empty the basin before the coming event.

Urban flood problems:

The last major event occurred on the 7th of July 2000, the study area was flooded because of a rain event, during which a nearby gauge recorded 84 mm of rainfall. Some houses and streets were flooded; the Sucy train station was also flooded and it remained closed for few days. This affected a significant portion of the population especially the commuters who had to use other means of transportation to reach Paris.

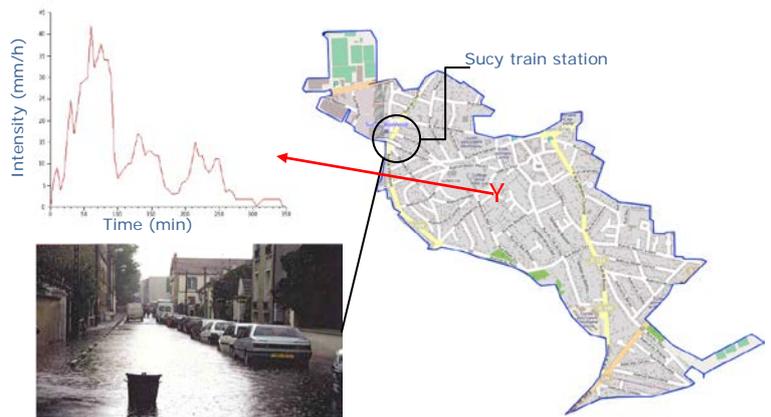


Figure 2: The hyetograph recorded in the center of Sucy catchment (above) on the 07th of July 2000 and a photo of one of the streets located near the train station.

Management objectives:

According the feedbacks on the events of the last four years, it appears that the system is not fully reliable because of two technical malfunctions: (1) during storm events, the transmission of rain gauges data in real time may become impossible and the calibration of radar data does not work; (2) the forecasting algorithm used overestimates rainfall rate, which explains why many early warnings and no actual warnings are triggered.

Within the Interreg RainGain Project we plan to use a X-band radar – that provides data with 100m-space resolution and 2.5 min time resolution – to set up another forecasting system for Sucy basin and to use this data for managing the whole sewer system of this area.

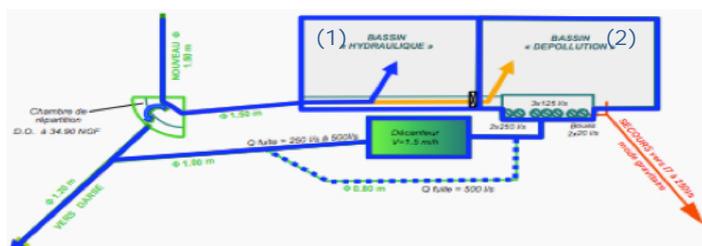


Figure 3: General view of the Sucy retention basin, the total volume is about 9350 m³.