



Presentation of the Jouy-en-Josas case study

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In collaboration with SIAVB (H. Cardinal)

Outline

Location and environmental settings

Pluvial flooding and weak points

Current solutions

Monitoring

Rainfall

Rain gauges

C-band radar

X-band radar

Sewer flow

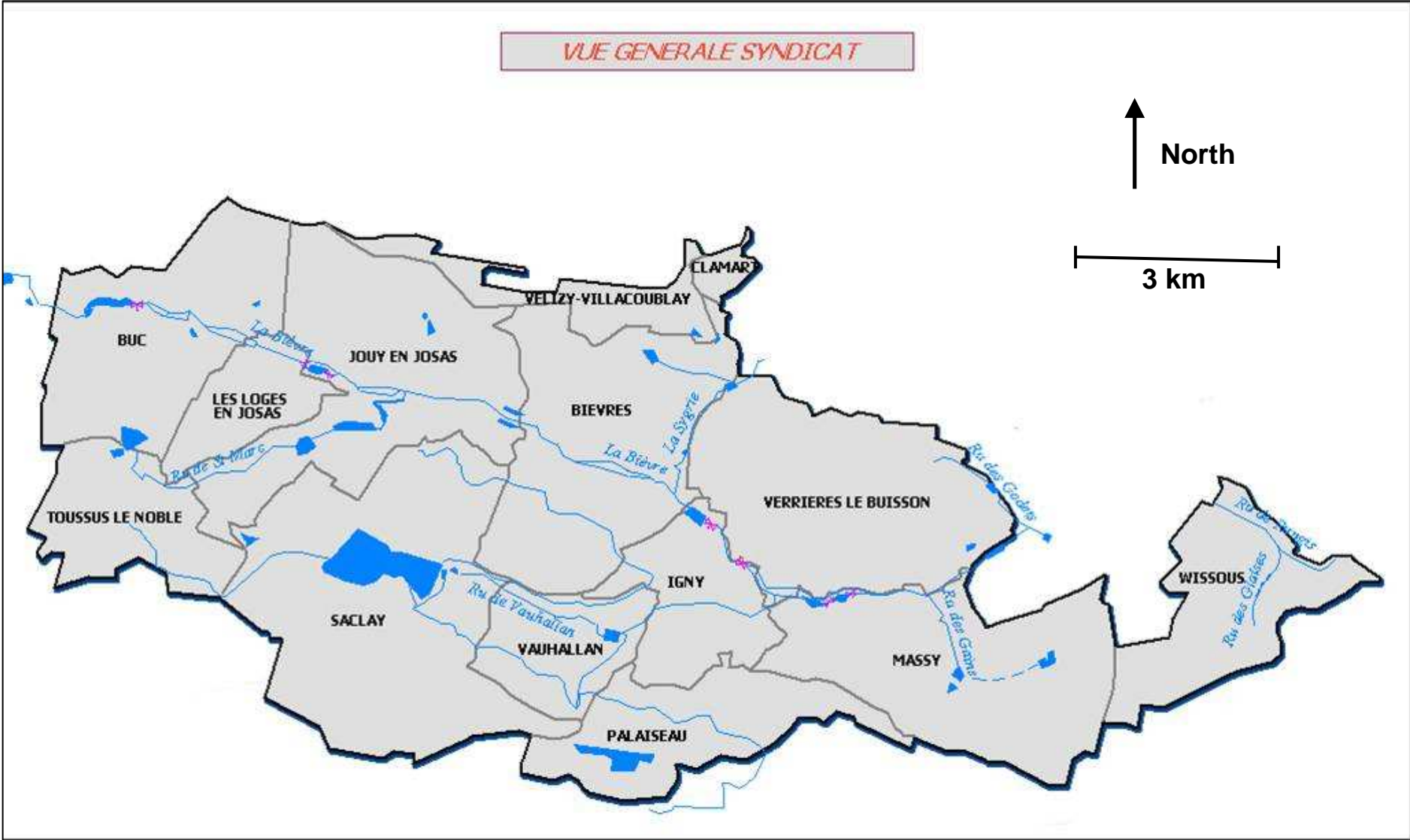
Models and input data

Models description

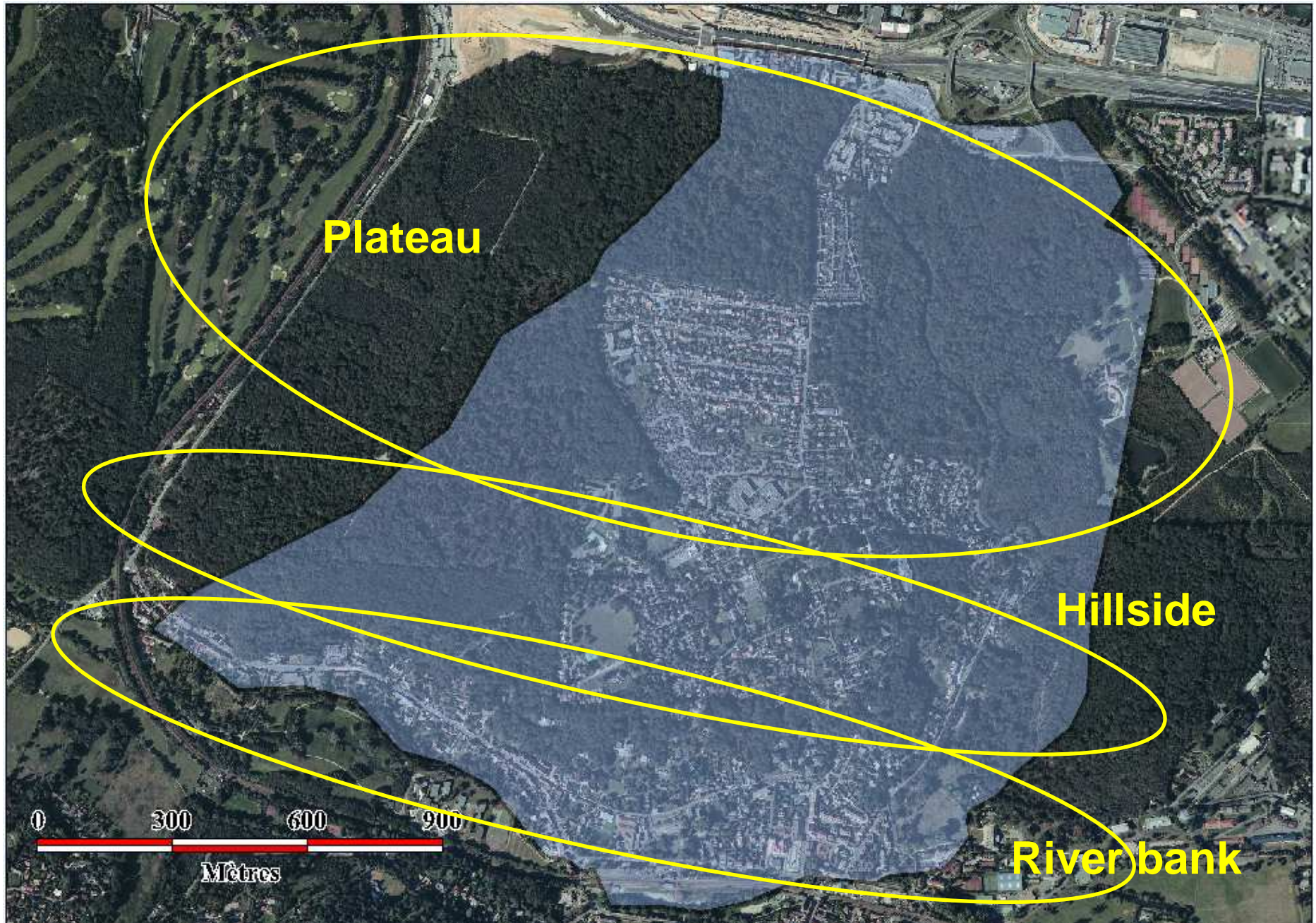
Spatial data

Drainage system

Jouy-en-Josas catchment



Catchment managed by the SIAVB



Plateau

Hillside

River bank



Jouy-en-Josas catchment



Sharp slope



Bièvre river



RER C Station



Kinder garden



Hillside from the valley

- 2.5 km² area / Great slopes (~100m of elevation difference) / various land use

Pluvial flooding and weak points

Hydrological processes at stake

During a heavy rainfall event:



The water fallen on the plateau rapidly runoffs through the hillside to reach the flooded Bièvre river

(response time ~10-20 min)

Bièvre River undersized → flooding

Pluvial flooding and weak points

Examples of recent floods



1973



1982

21st to the 22nd of July 1982

- 96.2 mm during one hour and 115.5 during the 7 hours of this event (nearby rain gauge).
- a 20 cm deep flow of rapid water along the street Jean Bauvinon.
- This event triggered the building of storage basins along the Bièvre river

Pluvial flooding and weak points

Areas that have suffered regular pluvial flooding

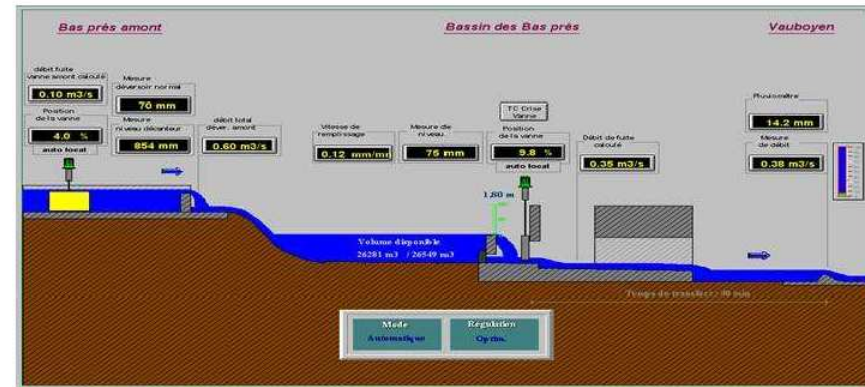


Current solutions

Optimal use of storm water storm water storage basins and river bed

- 15 such basins over the catchment managed by the SIAVB with a total storage capacity of 642 000 m³.

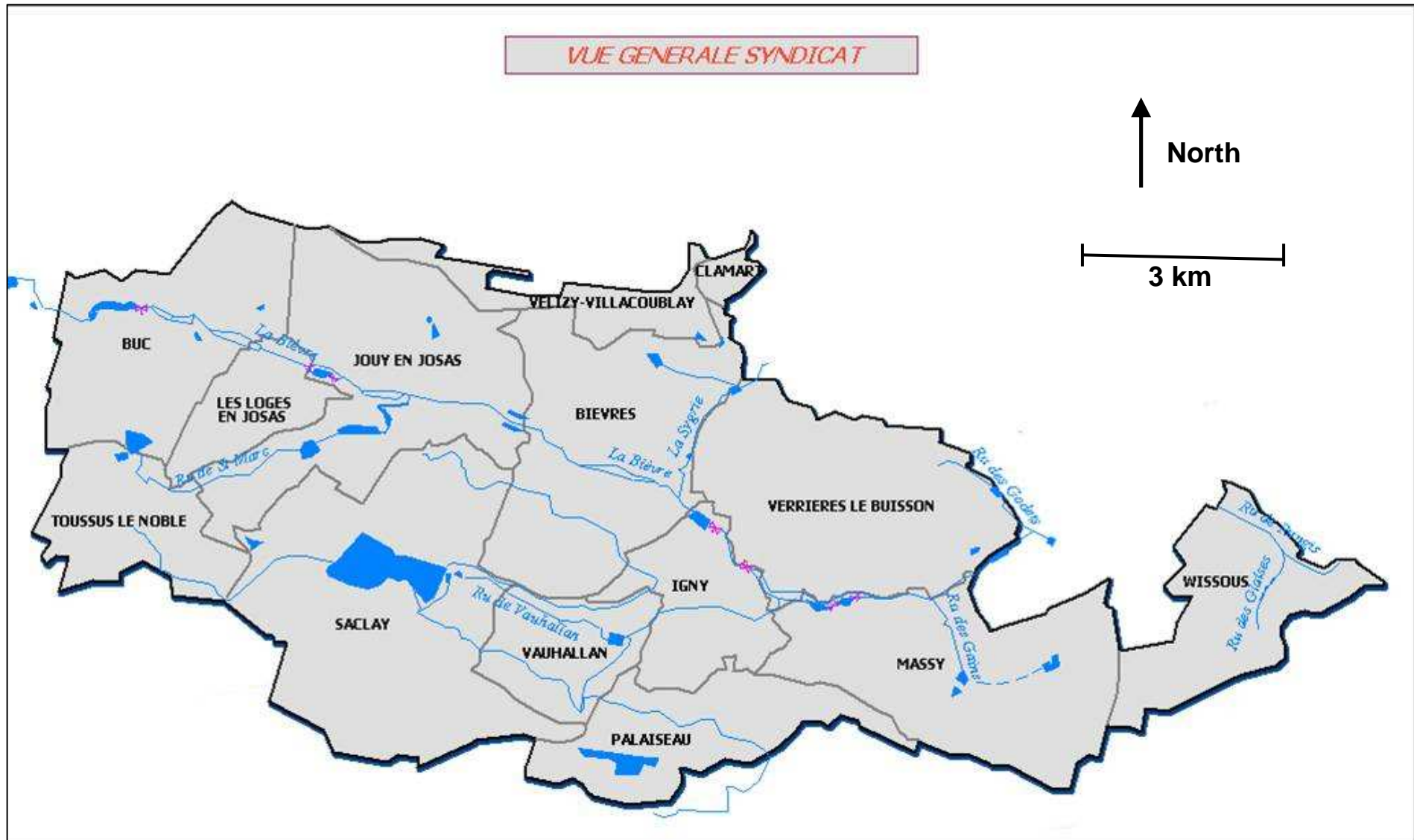
- Real time control relying on observed water level at strategic point in the network, rainfall radar estimates and nowcasts (mainly expected intensity and direction of next storm), and a hydraulic representation of the river behaviour.



AFFICHAGE EN CONTINU DES VALEURS SUR LE POSTE DE TELEGESTION DANS LES BUREAUX DU SIAVB

Current solutions

Storm water basins



Current solutions

Storm water basins

Example of a remotely controlled basin



Current solutions

Storm water basins

Bassin des Bas-Près (upstream Jouy-en-Josas)



Current solutions

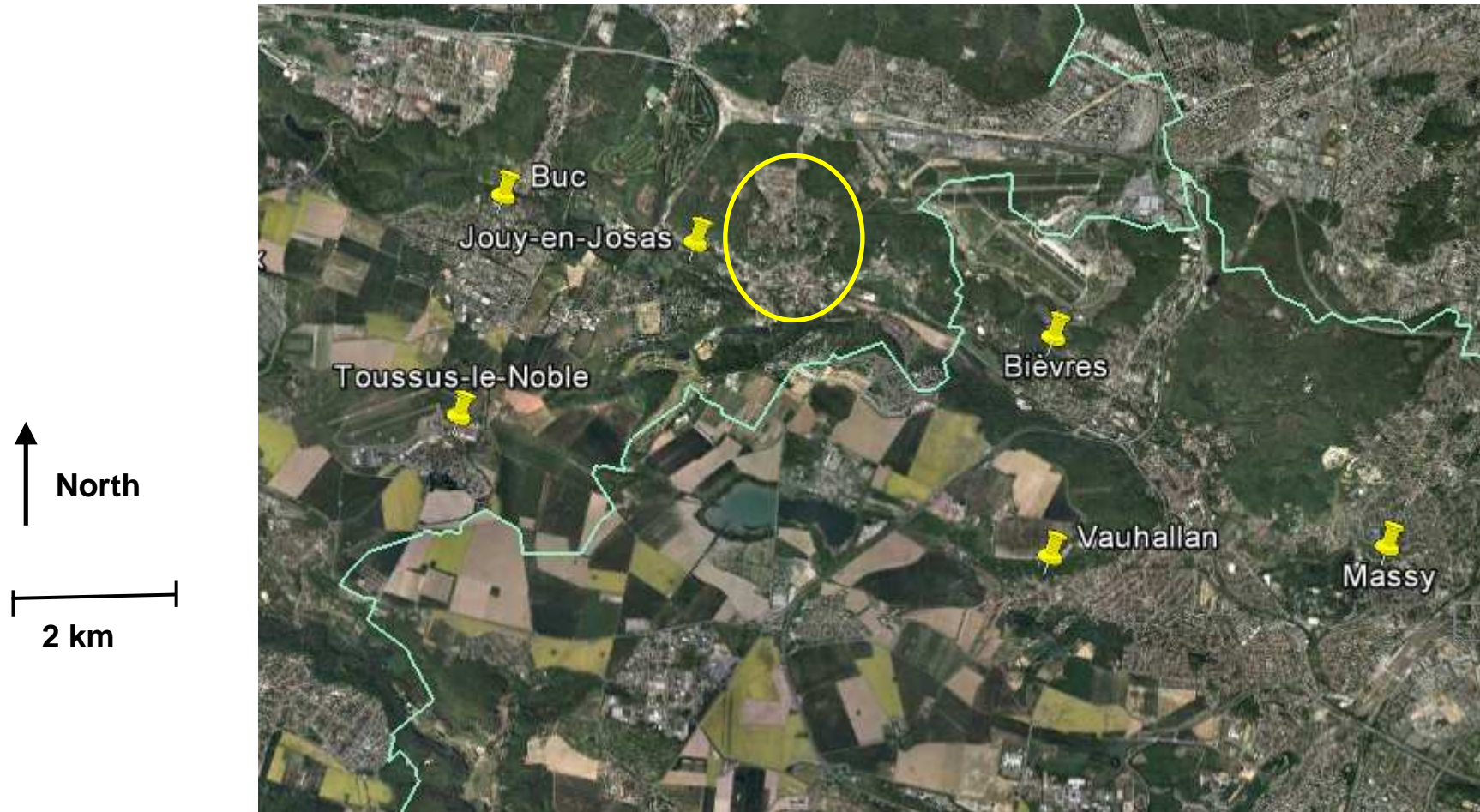
Use of the river bed



Monitoring

Rainfall

Rain gauges

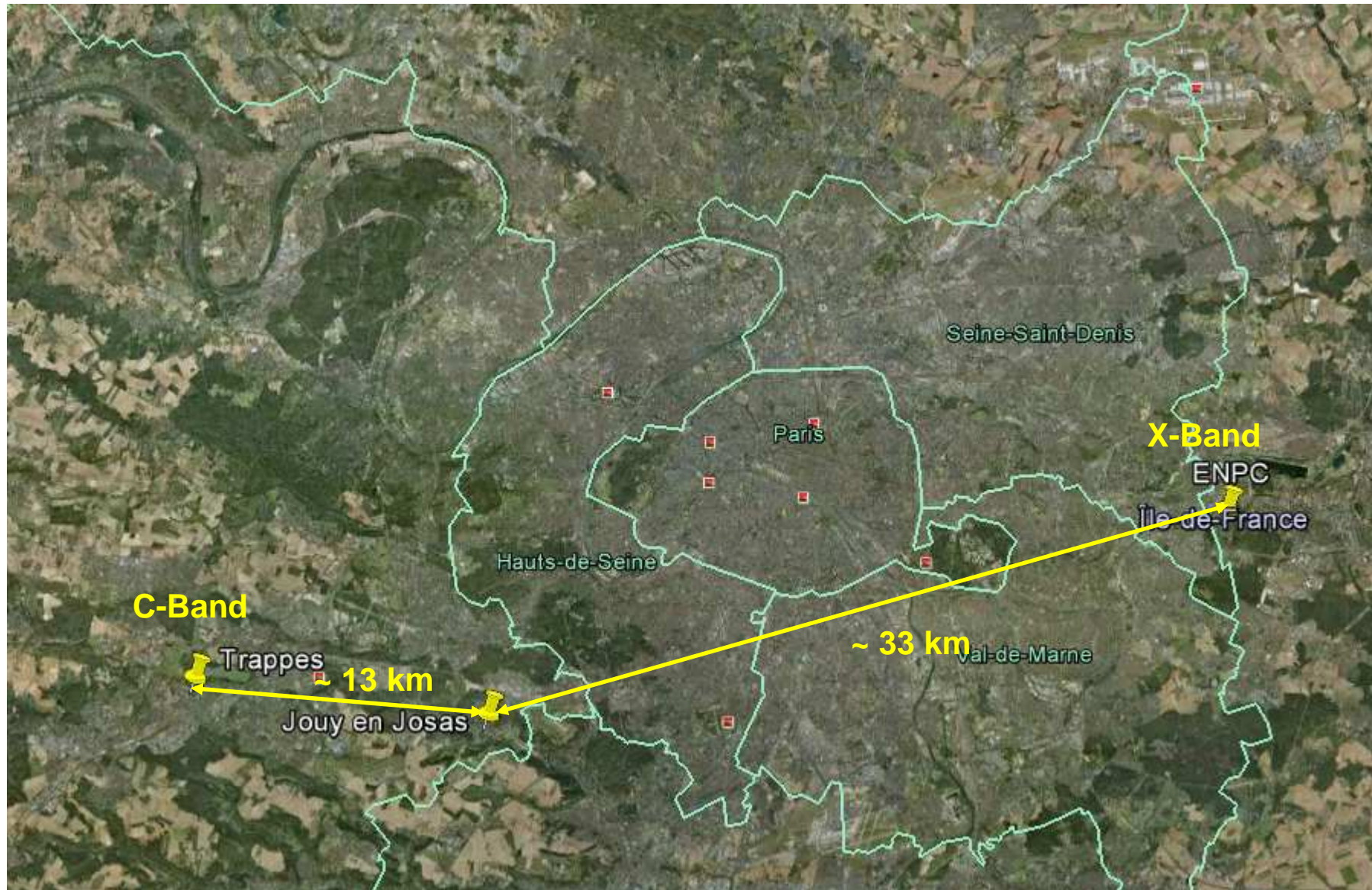


→ 6 rain gauges operated in real time

Monitoring

Rainfall

Radars



Monitoring

Sewer flow monitoring



**Height (and flow) measurement
(Outlet Bas-Près basin)**

**Height measurement
(Pont de pierre)**

Models and input data

Multi-Hydro

Surface module

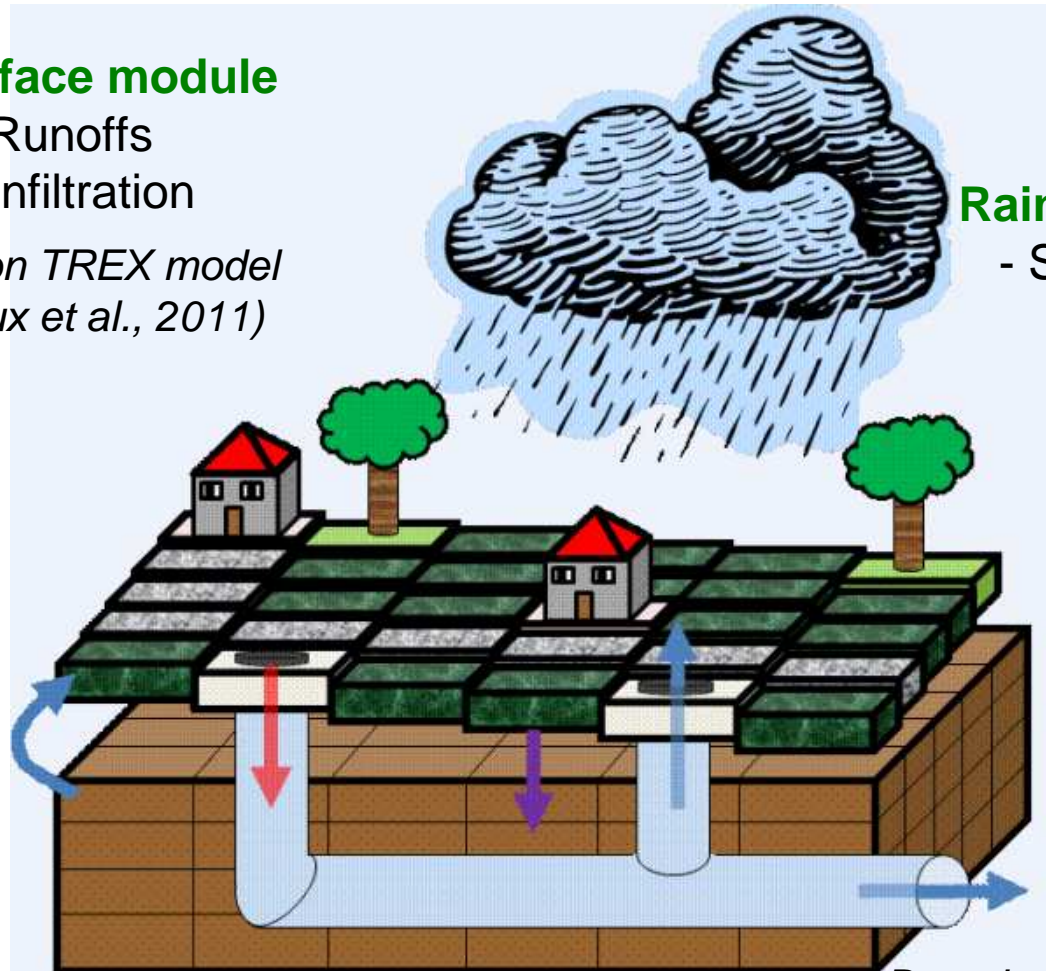
- Runoffs
- Infiltration

*Based on TREX model
(Velleux et al., 2011)*

Rainfall module

- Spatio-temporal rainfall

*Based on Multifractal cascades
(Schertzer and Lovejoy, 1987)*



Drainage module

- Sewer flow
(free surface, and loaded)
- Overflow

Based on SWMM model (Rossman, 2005)

Soil module

- Vertical flow in the non-saturated area
- Saturation during a rainfall event

Based on VS2DT model (Lapalla et al., 1987)

*For more details, meeting here next year for
Agathe Giangola-Murzyn's PhD defence !*

Models and input data

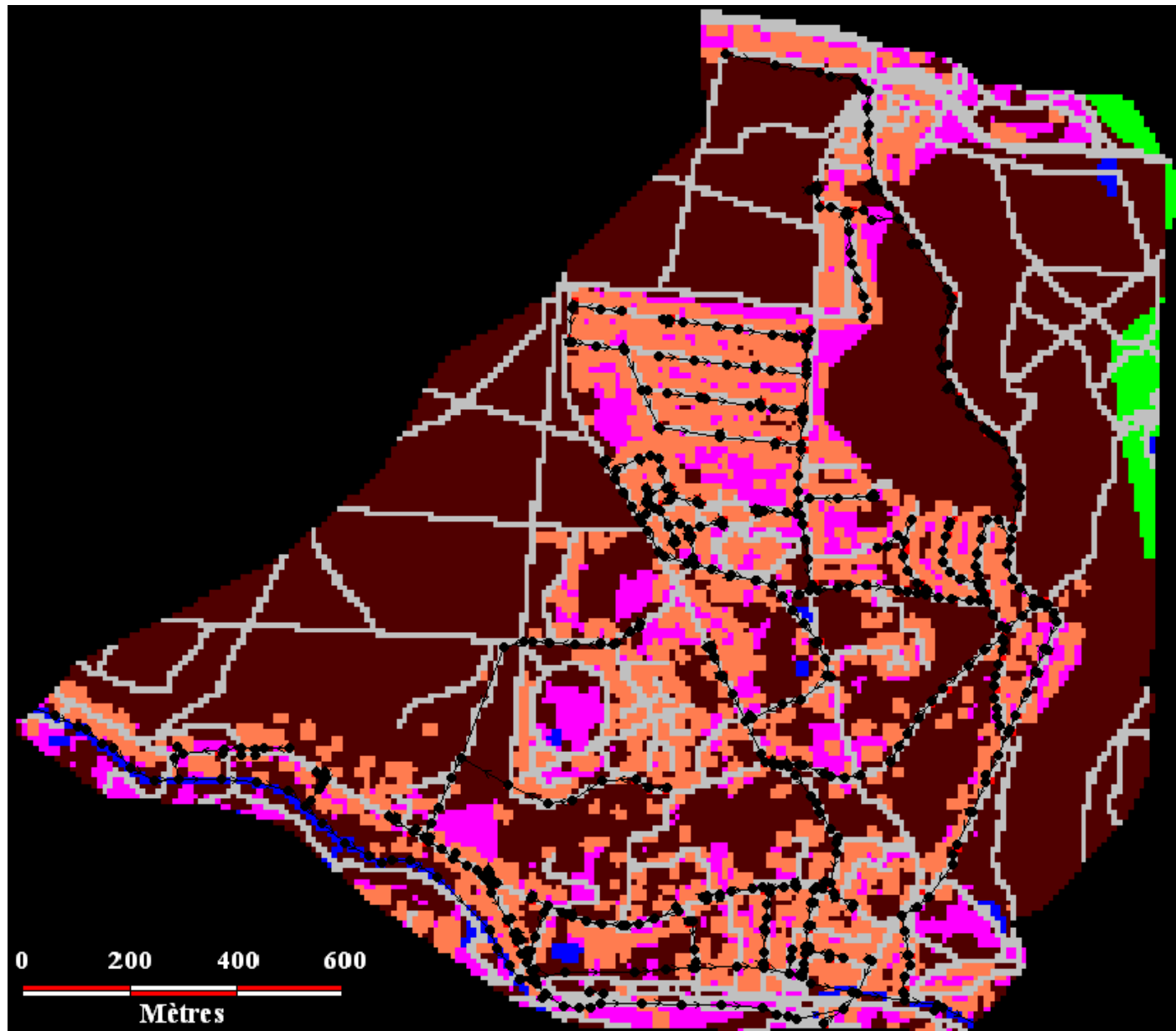
Spatial data

The spatial data inputted to the fully distributed and physically based Multi-Hydro model, which is used for the Kodak catchment, comes from the French National Institute of Geography:

- Land use cover: the spatial resolution is 50 cm x 50 cm
- Digital elevation model: the current spatial resolution is of 25 m x 25 m with a vertical precision of 1 m. An improved DEM with a spatial resolution of 1 m x 1 m with a vertical precision of 10 cm is currently being developed and will soon be available for this area

Models and input data

Spatial data



Models and input data

Drainage system

- 539 conduits of total length 15.3 km.
- 257 manholes

