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## Introduction

The Scheldt-Albert Channel-Meuse River System receives radioactive discharges from four Nuclear Power Plants (NPPs). Doel and Thiang located in Belgium, Chooz at the boundary with France and Borssele at the Dutch Scheldt. This PhD work focuses on developing a reliable model for the prediction of activity levels along the Scheldt-Meuse River system. Later, this model can be used as a decision support tool (DST) for the assessment of possible environmental risks associated with routine or accidental release coming from previously mentioned NPPs. For this purpose, SLIM (UC Louvain, Second generation Louvian-la-Neuve Ice Ocean Model, [www.slim-ocean.be](http://www.slim-ocean.be)) mathematical model is used for the simulation of radionuclide transport in Meuse-Scheldt systems. As part of the Ph.D. framework, the influence of navigation structures and other regulation structures placed along the Albert Canal and the Meuse River on the fate and transport of the radioactive effluents are being integrated in SLIM.

## Objectives

### Hydrodynamic Model



Able to simulate and predict the water flow dynamics in different basins taking in to consideration the influence of hydraulic works and navigational structure.

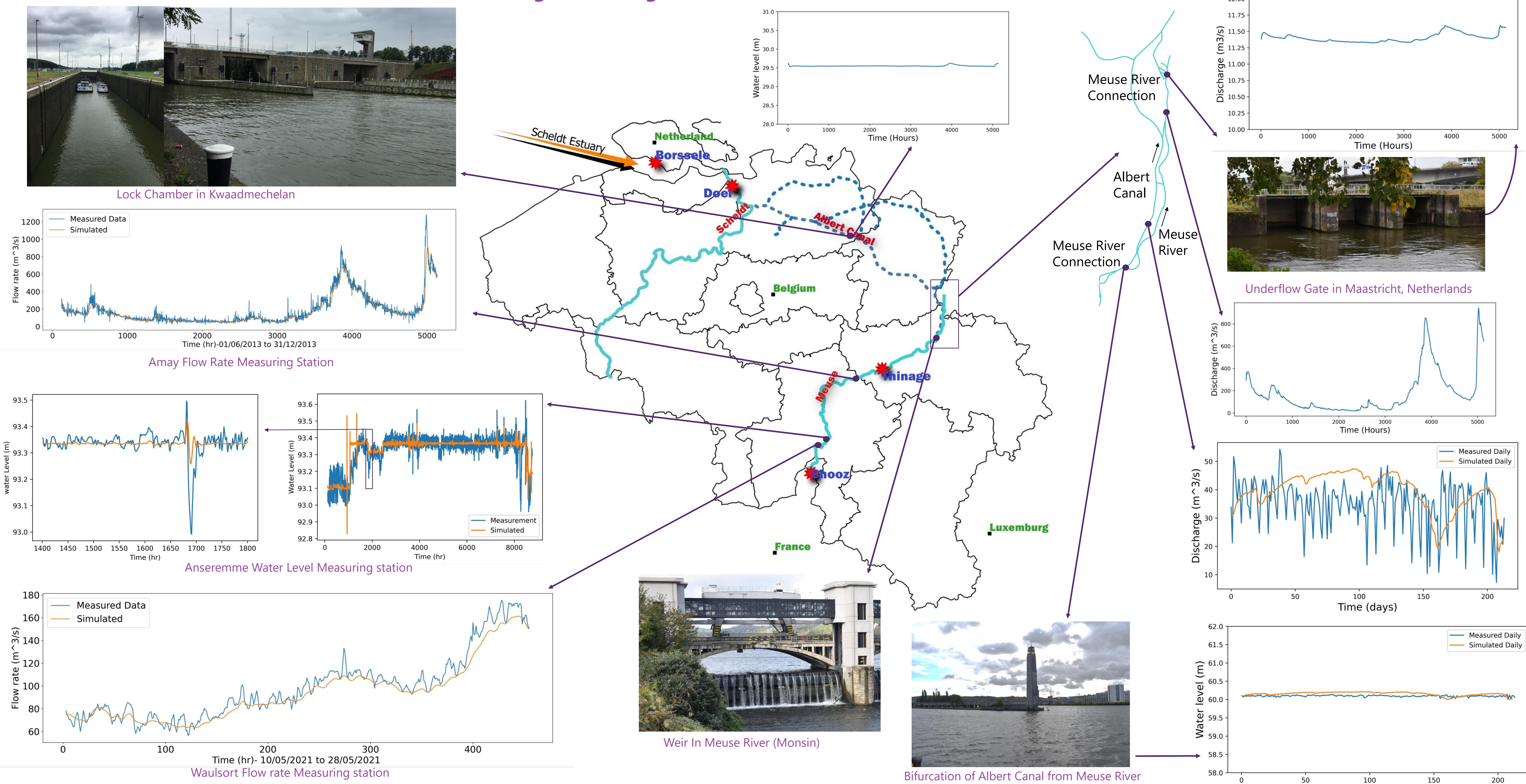
### Transport Model



Able to predict the fate and transport of radioactive elements along the river, canal till the estuary.

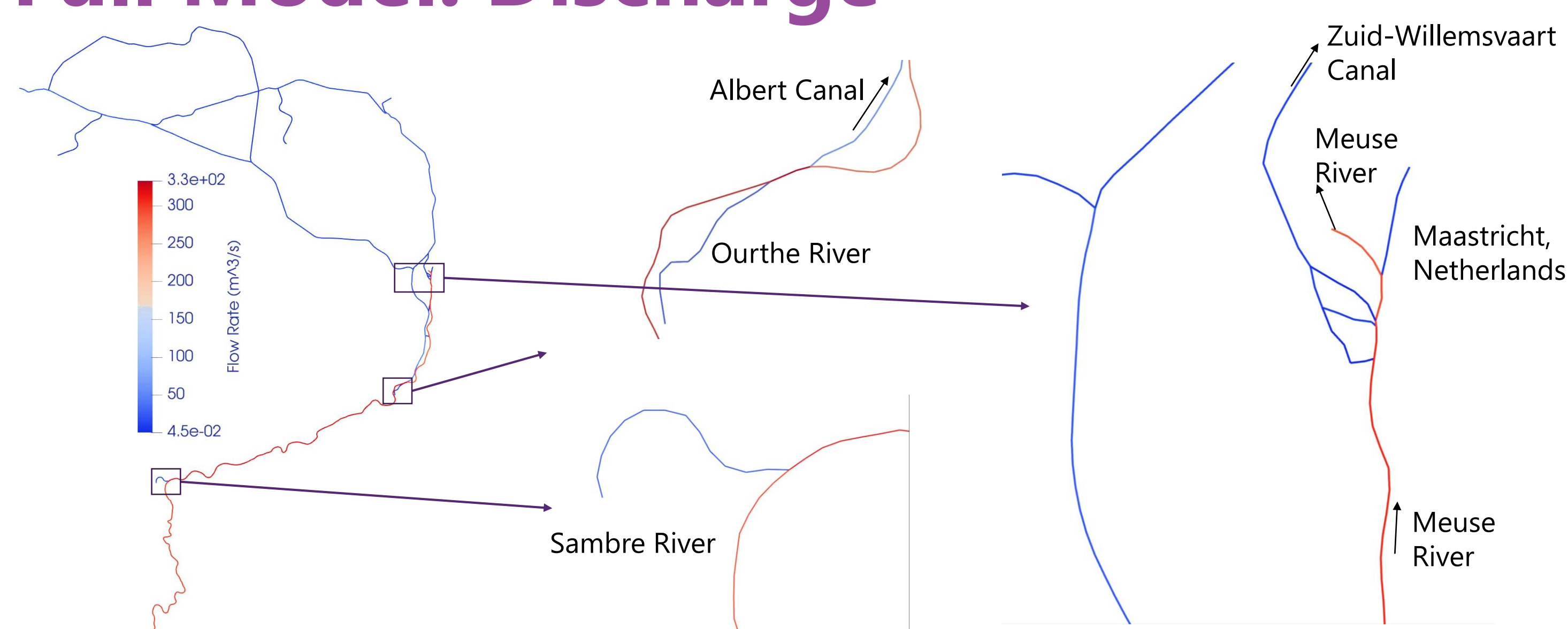
Image Credits: Nasa Earth Observatory ([earthobservatory.nasa.gov](http://earthobservatory.nasa.gov))

## Hydrodynamic Model : Results



- The good agreement between measured and simulated data is confirmed by the NSE criteria with a volume conservation of 96 % at Amay measuring station (87 Km from the start of Meuse river in Belgium) during a six month period.
- The operation of the weir was integrated with the hydrodynamic simulation as seen in results at Anseremme measuring station

## Full Model: Discharge



## Future Work

- Scheldt river and estuary
- Implementation of Advection-diffusion equation
- Sediment sample collection
- Study on sample for radioactivity and analysis
- Sediment transport model

