

# Transnational harmonisation of hydraulic models (River Meuse)



AMICE covers the international Meuse basin

Aim: **Adaptation strategy** to hydrological impacts of climate change, coordinated at the basin scale

This should rely on **risk analysis** (floods and low flows) conducted **consistently throughout the basin**

However, there are now as many

- climate scenarios
- hydrological models and time series
- hydraulic models, schematizations and (risk) modelling procedures

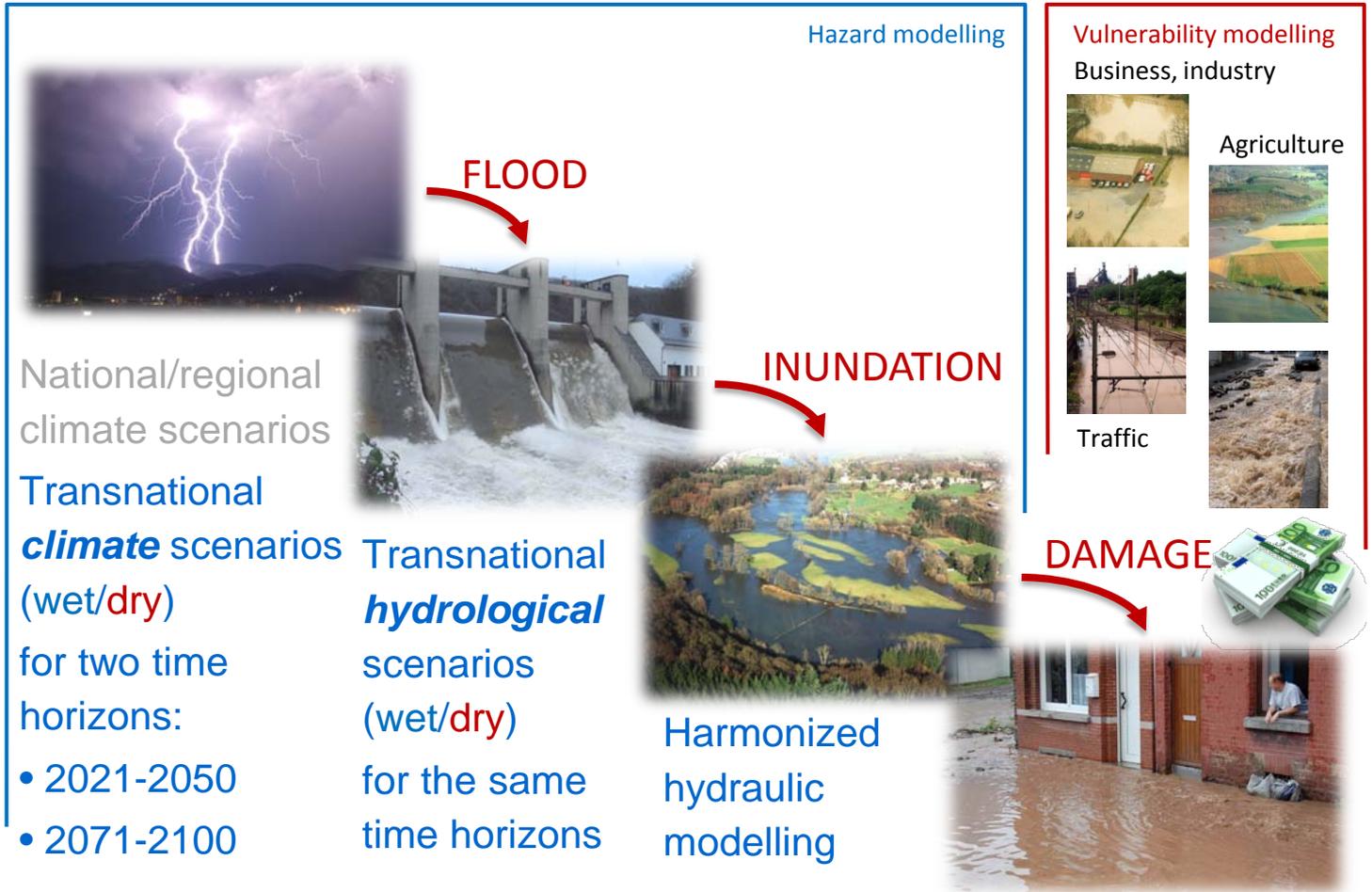
as regions (F, W, FL, NL, GE)



► **NEED FOR HARMONIZATION !**



# Transnational harmonisation of hydrological and hydraulic modelling ...



# Harmonizing hydraulic models from spring to mouth of river Meuse



## The Netherlands

- Model “Sobek”
- Mainstream: 1D
- Floodplains: 1D
- Unsteady modelling

## Belgium (Flanders)

- Model “Mike 11”
- Mainstream: 1D
- Floodplains: storage cells
- Unsteady modelling



## Germany

- Academic code “Promaides”
- Mainstream: 1D
- Floodplains: storage cells
- Unsteady modelling

## Belgium (Wallonia)

- Academic code “WOLF”
- Mainstream: 2D ( $\Delta x = 5m$ )
- Floodplains: 2D ( $\Delta x = 5m$ )
- Model run in steady mode

## France

- Model “Stream”
- Mainstream: 1D
- Floodplains: storage cells
- Unsteady modelling

## Across borders, consistency ensured for

- bathymetry (including latest dredging)
- statistical discharges ( $\Delta < 2-3\%$ )
- computed water depth, *iteratively* in 2 runs



# Higher sensitivity of water depth to climate change revealed in the Meuse central part



Lower part  
*Downstream of  
Monsin*

2021-2050

+ 0.3 m

2071-2100

+ 0.7 m



Central part  
*Sedan → Monsin*

+ 0.6 m

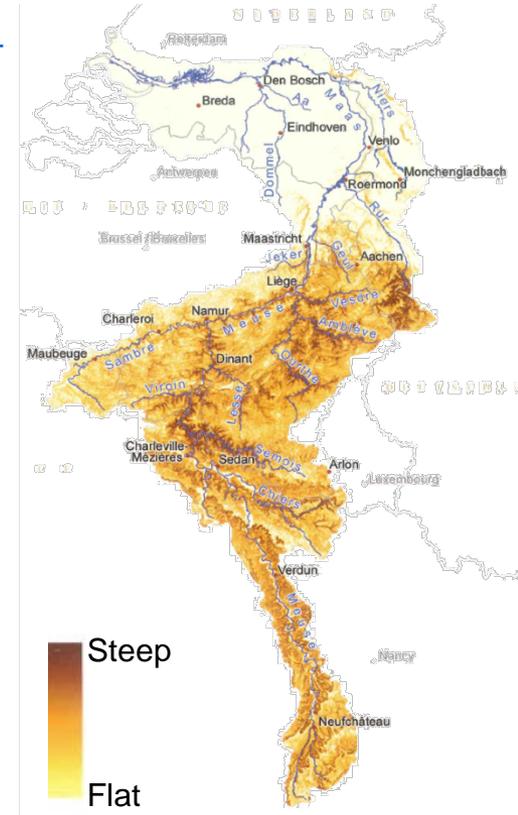
+ 1.3 m



Upper part  
*Upstream of Sedan*

+ 0.3 m

+ 0.5 m



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(M. de Wit 2008)



# Transnational harmonisation of hydraulic models (River Meuse)



Set up of a transnational modelling methodology

Max. 2 runs of each model necessary to achieve consistency of results across the borders

Hydraulic simulations run for two time horizons, corresponding to a transnational wet scenario agreed upon throughout the basin

The harmonized hydraulic modelling procedure has revealed a significant spatial pattern in the sensitivity of water elevations with respect to hydrological scenarios

Tool transferable to other river basins

## Reference

Detrembleur S., Dewals B., et al. (2011). *Effects of climate change on river Meuse: hydraulic modelling from spring to mouth*. Technical report of the AMICE project.

