Deltares
Enabling Delta Life

VU University Amsterdam

KvK Projectendag - HSGR06
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Philip Ward (philip.ward@ivm.vu.nl)

IVM Institute for Environmental Studies

Structure of presentation

1. HSGR06 – Aims and objectives
2. Model setup and calibration
3. Floodscanner (simple inundation model)
4. First scenario results (Dutch Limburg)
5. Next steps

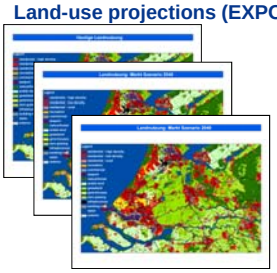
HSGR06: Adaptation to Meuse flood risk

- **Objective:**
  - Assess sensitivity of Meuse flood risk to changes in climate, land use, and socioeconomic changes, and assess effectiveness of selected adaptation measures in terms of flood risk reduction

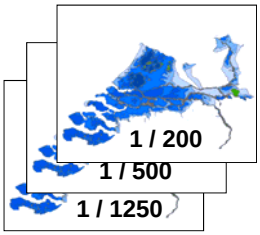
- **Research questions:**
  1. Can flood damage model developed for the Rhine be easily transferred to the Meuse basin?
  2. What are the effects of climate & socioeconomic development on Meuse flood risk?
  3. What are the effects, in terms of flood risk reduction, of selected adaptation measures designed to reduce the consequences of flooding?

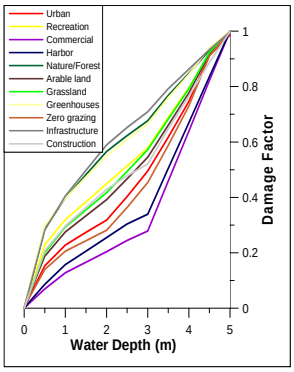
Model setup and calibration - Damagescanner

Land-use projections (EXPOSURE)



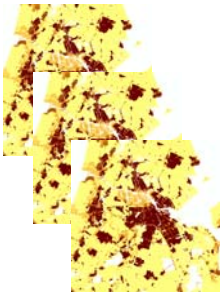
Inundation Map (HAZARD)





Stage-damage functions (VULNERABILITY)

Damage maps per scenario

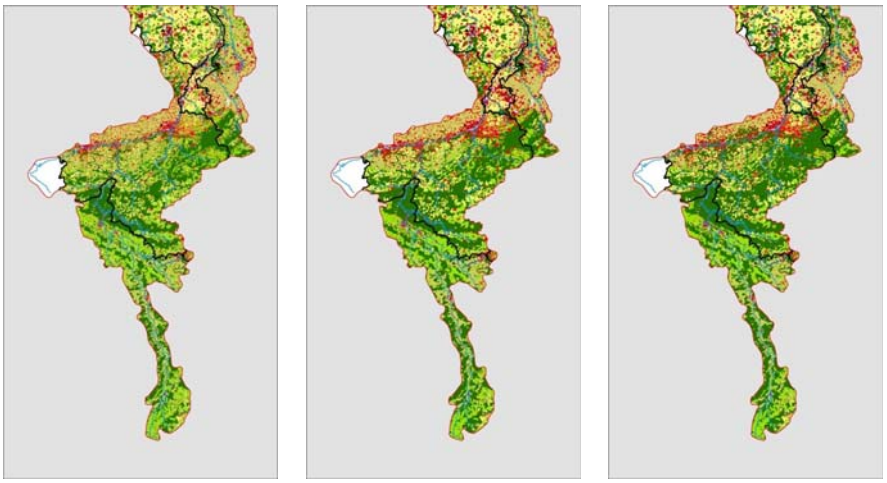


Model setup and calibration - Damagescanner

- **Input requirements**
  - Stage-damage functions (vulnerability)
  - Land use maps (exposure)
  - Inundation maps (hazard)

Data: Land use maps

2000 | 2030 GE | 2030 RC



Ruimtescanner: Meuse

	% total land area per land use class		
Land use class	2000	2030 GE	2030 RC
Residential – high density	1.1	1.5	1.1
Residential – low density	8.2	10.8	9.0
Commerical	1.3	1.7	1.3
Port areas	0.0	0.0	0.0
Infrastructure	0.4	0.4	0.4
Mines / construction	0.5	0.5	0.5
Recreation	0.6	0.6	0.5
Nature	30.6	32.9	40.7
Arable land and cultivation	37.3	33.2	30.5
Pasture	20.1	18.3	16.0

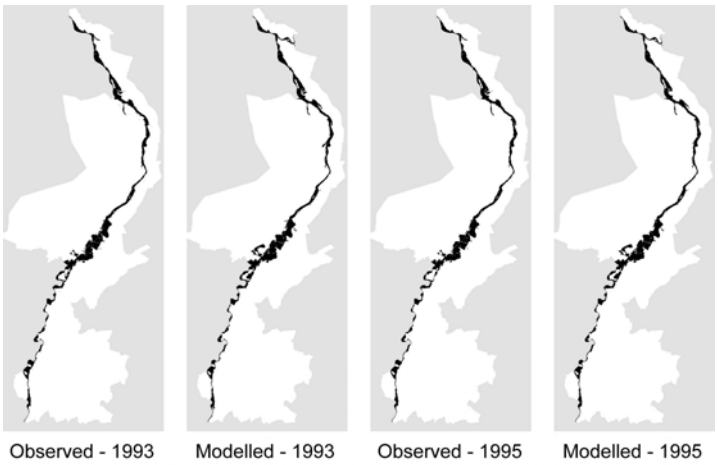
Model setup and calibration - Damagescanner

- **Input requirements**
  - Stage-damage functions (vulnerability)
  - Land use maps (exposure)
  - Inundation maps (hazard)

Data: Inundation maps

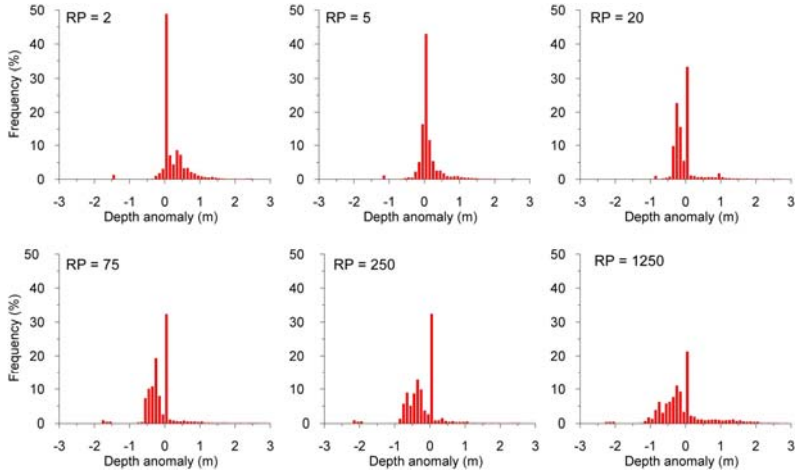
- **Basin wide maps required:**
  - No maps available for entire basin
  - Only national maps available, but not always shared
  - **Option 1**: Maps being created within AMICE project: links sought (ongoing)
  - **Option 2**: Simple inundation model for main Meuse (Wallonia to Cuijk) → Floodscanner

Simple (planar) inundation model – *Floodscanner*



Flood extents: observed (aerial photographs) vs. Floodscanner

Floodscanner: validation



- Floodscanner vs. WAQUA: depth anomalies

Floodscanner: validation

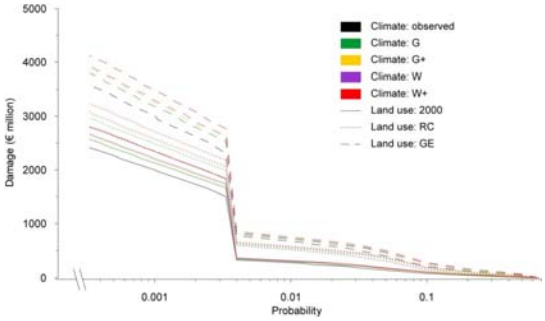
Flood damage estimates using Damagescanner

Input inundation maps = Floodscanner and 'Risicokaart'

	Total damage (€ million)			Average damage per hectare (€)		
Return period:	*RP 100*	*RP 945*	*RP 1250*	*RP 100*	*RP 945*	*RP 1250*
Floodscanner	441	2234	2575	0.12	0.23	0.24
Risicokaart	306	2171	2304	0.09	0.19	0.20

First scenario results: Limburgse Meuse

Figure (right): Risk curves for climate and land use change scenarios



	Land cover		
Climate	**2000**	**2030 RC**	**2030 GE**
Observed	N/A	83.0	159.7
G	22.1	119.7	207.3
G+	19.8	115.4	200.8
W	35.2	141.3	237.1
W+	38.1	145.0	242.4

Table (above): Change in *risk* (%) between 2000 & 2030 due to changes in climate and land use

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Next steps

- **Extend simple inundation model for section Wallonia to Cuijk**
- **Continue to seek synergy with AMICE**
- **Flood risk calculations for Wallonia to Cuijk**
- **Assess effects of adaptation options on flood risk**
- **Project end date: end 2012**

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