Remote sensing data assimilation in modelling of urban dynamics

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Introduction

» **ASIMUD** is a *spin-off* of the **MAMUD** project
» Duration: 2 years, started April 1\textsuperscript{st} 2011

» Consortium:
  » VITO
  » Vrije Universiteit Brussel
  » Universiteit Utrecht
Land use models: tools for planners
**Historic calibration**

» Land-use change models are typically calibrated using a **historic calibration**

- **Model initialisation**
- **Hindcast**
- **Forecast**

![Images showing model calibration in 1990, 2000, and 2030](chart)

- Actual map 1990: not Ok
- Actual map 2000: Ok

**Courtesy of EC JRC**
Remote sensing data for calibration

Model initialisation

1994

RS Data

1997

RS Data

New image

1994

New RS Data

1997

New image

2000

New image

2030

Source: MAMUD project
Spatial metrics for calibration

Masks 1997

Reference

Remote sensing

Extreme

Landscape Shape Index

Year

LSI (−)

Reference scenario

Extreme scenario

Remote sensing

LSI = 1.4

LSI = 2.5
Uncertainties in predicted land use

- A major shortcoming in the calibration of land-use change models is that uncertainties are neglected. Uncertainties mostly exist in:
  - Model parameters
  - Reference data used for calibration of the model
- This leads to uncertainties in the prediction of land use
Objectives ASIMUD

» Main objectives of ASIMUD:
  » Improving the quality of predictions of future land use by reducing the uncertainty in land-use simulations
  » Provide end users with robust and reliable tools for land-use change modelling and calibration, based on the best available scientific knowledge and data
Anticipated results

» Improved land-use simulations with lower uncertainties compared to other automatic calibration methods

» An automatic calibration method based on methods developed in the MAMUD project combined with an innovative data-assimilation approach

» Robust and reliable tools for land-use change modelling and calibration for use in policy contexts will be facilitated and promoted

» The probability maps of simulated land use will be valuable additional data for end users to assess planning policies

» Website: http://www.asimud.be