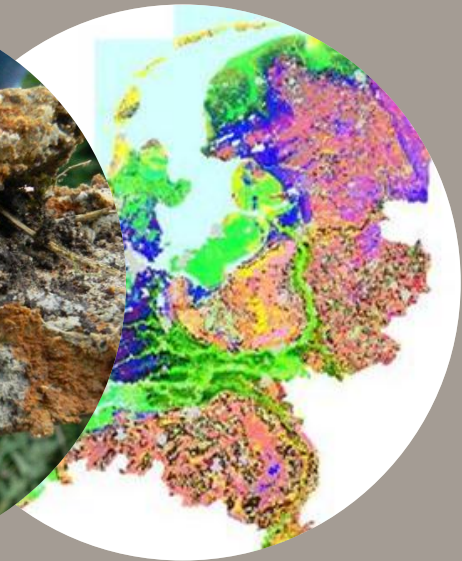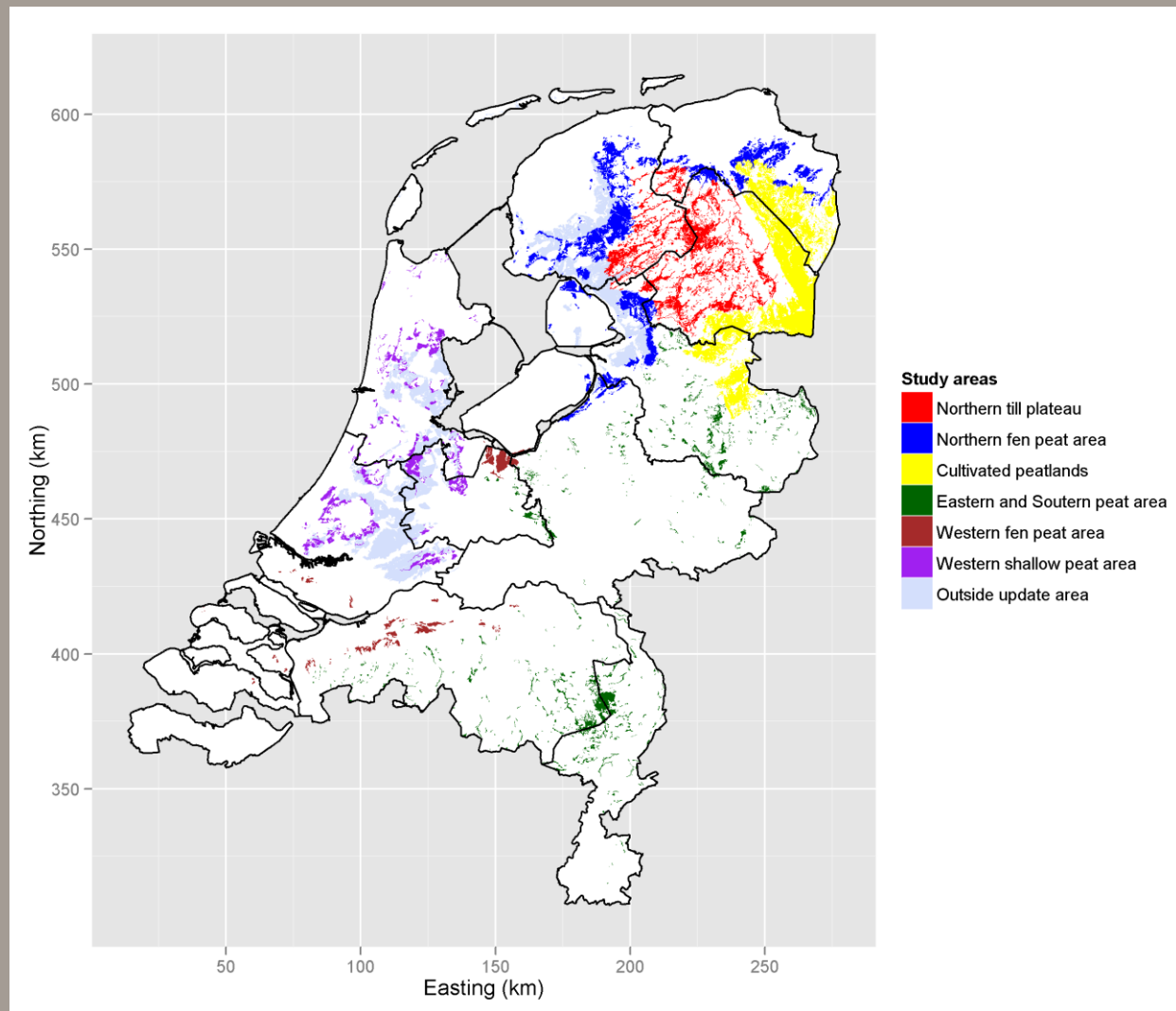# Updating legacy soil data for digital soil mapping

Bas Kempen

Updating the 1:50,000 national soil map for the areas with peat soils (365,000 ha)
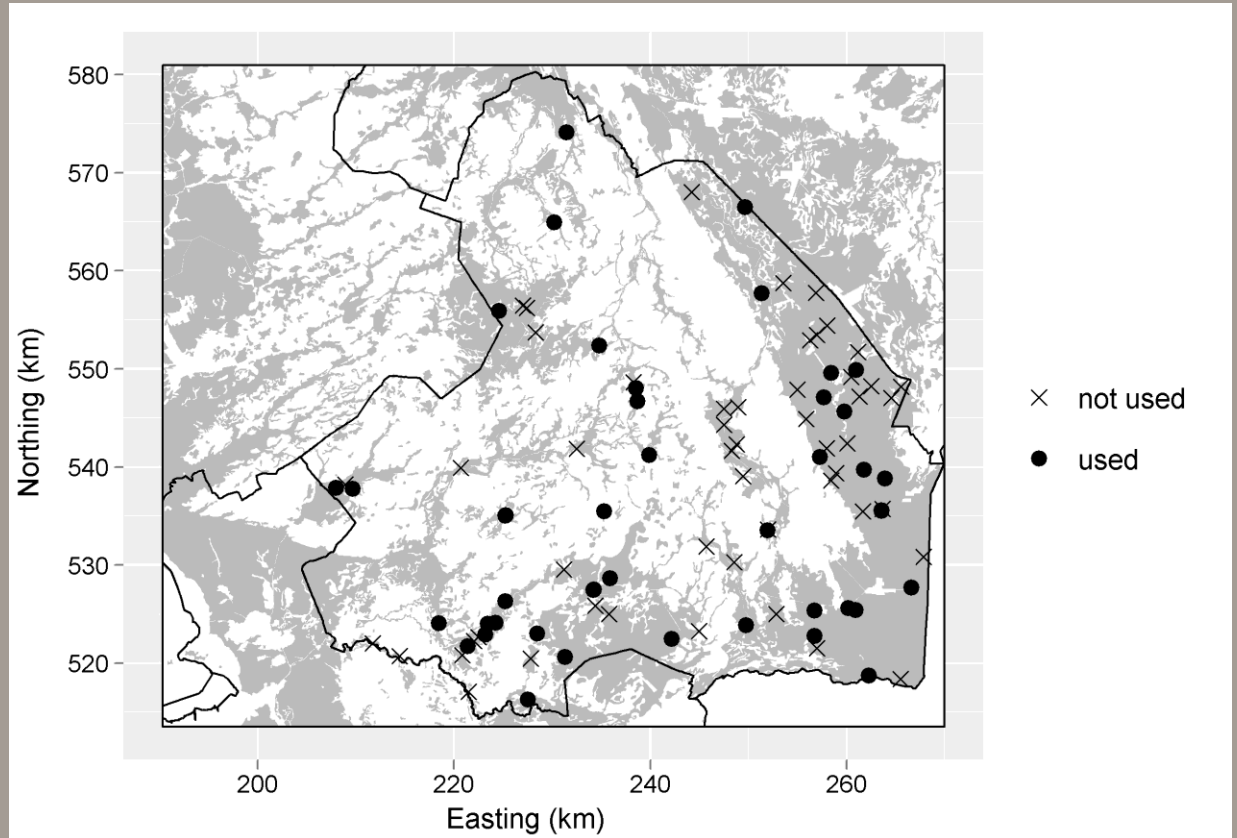
Legacy soil data

- Dutch SIS: >300,000 point observations (1955-2012)

- Older observations might not properly represent current field conditions for dynamic soil properties

  - soil organic matter, thickness of the peat layer

- Updating legacy data for DSM can be an attractive alternative to collecting new field data

- **<u>Aim:</u>**

  - to update the peat layer thickness for 3,000 soil profile descriptions in the peatlands of the northern till plateau

  - to quantify the uncertainty associated to the updated values

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Modelling

- 95 sampling sites were revisited in 2007

- 44 could be used to calibrate a statistical model to update soil profile descriptions

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- Model the proportionate annual decrease

  - $z_{ti} = z_{0i} * p_i^t$

  - $p_i = \pi_i + \epsilon_i$

  - $logit(\pi_i) = \mathbf{x}_i^{\mathrm{T}} \boldsymbol{\beta}$

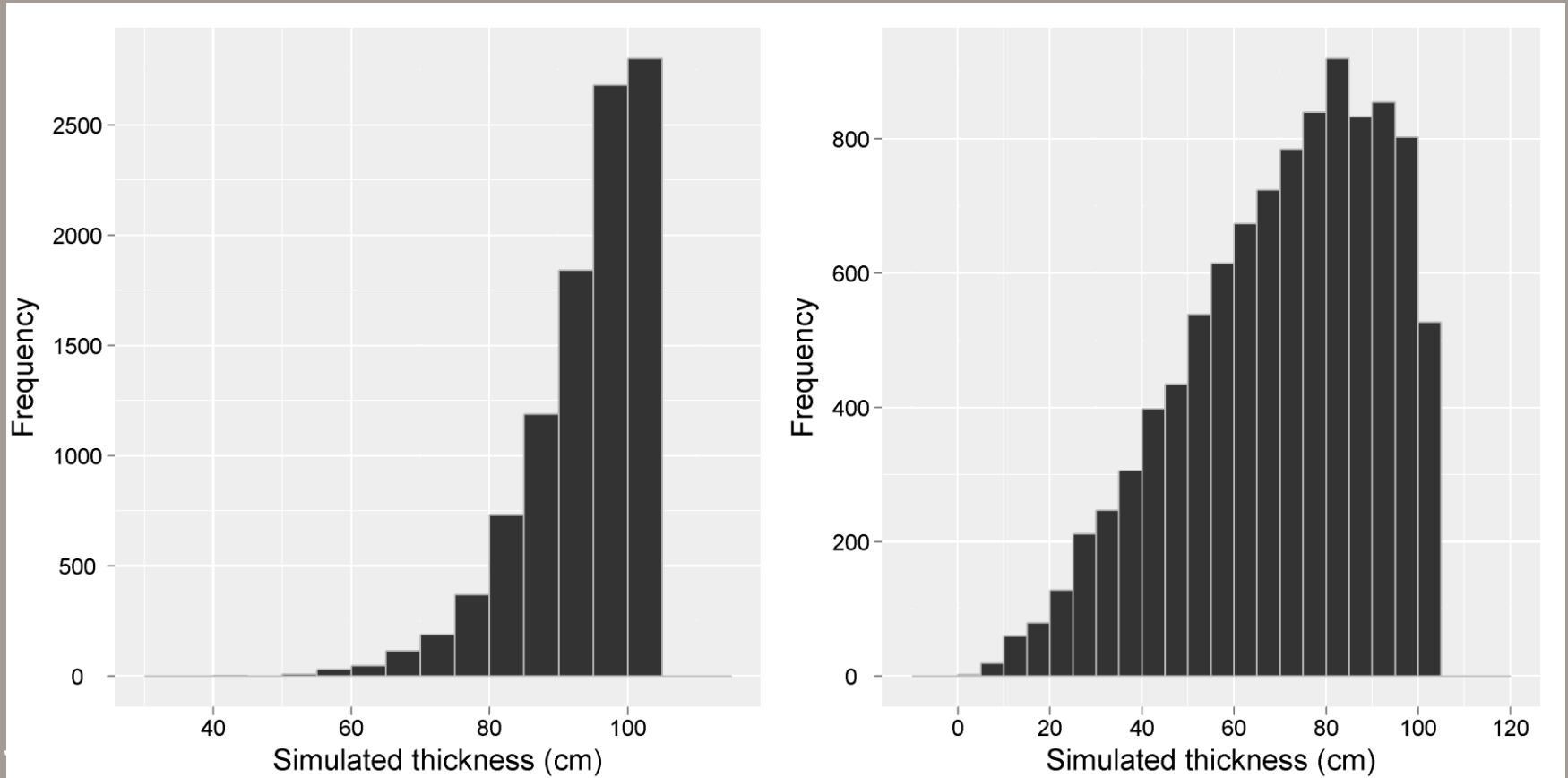- No significant predictors; intercept-only; constant π_i

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- No significant predictors; intercept-only; constant π_i

- Updated soil profile descriptions are not error-free

- Account for the uncertainty through simulations

- beta (a,b) distribution to simulate values for p_i

Simulated peat thickness

- Initial peat thickness: 105 cm
- Year of observation: 2004 (left), 1983 (right)
- Year of simulation: 2011

Concluding remarks

- Presented a simple model for updating soil profile descriptions and a method to quantify the uncertainty associated to the updated values.

- Relocating sampling sites with acceptable precision was difficult.

- Proportionate annual decrease constant in space; thickness cannot become 0 (realistic?).

- No validation.

- Recommend to install a soil monitoring network:

  - relocate sampling sites

  - quantify temporal change

  - enables validation
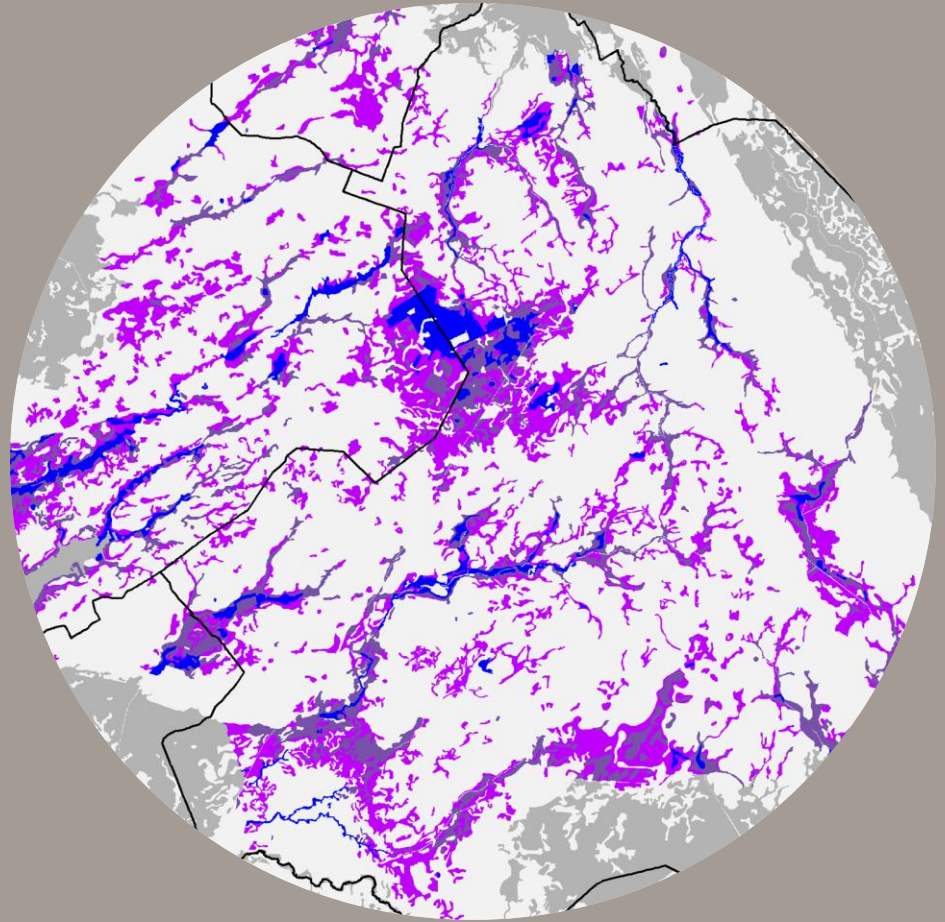
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Thanks!

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