

MSc Thesis Proposal: Analysis and management of a Dutch Subsidence spatial DB in a changing climate.

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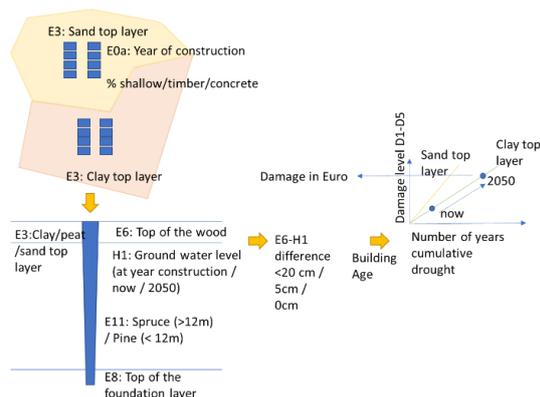
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In the Netherlands, subsidence of peat and clay soils due to (artificial) lowering of the groundwater table and loading of soft soils is commonplace, causing extensive damage to exposed and vulnerable assets. This is a major concern to homeowners and public authorities, but an integrated and systemic risk assessment on regional or national scale is difficult due to the sheer size of the data and the existing interrelations among causative factors.



A database has been setup for the systematic assessment of subsidence risks to buildings, based on spatial data and user input specifications. The database allows the implementation of a modular methodology (Costa et al. 2020 forthcoming) in which new information on individual contributing factors to damages can be updated for the systematic improvement of the damage estimates. Initial results for the Netherlands have been published (<http://www.klimaatschadeschatter.nl/>)

Figure 1 Simplified schematic for the calculation of damages due to timber pile degradation.

Building on the work already developed, the core topics of this thesis are:

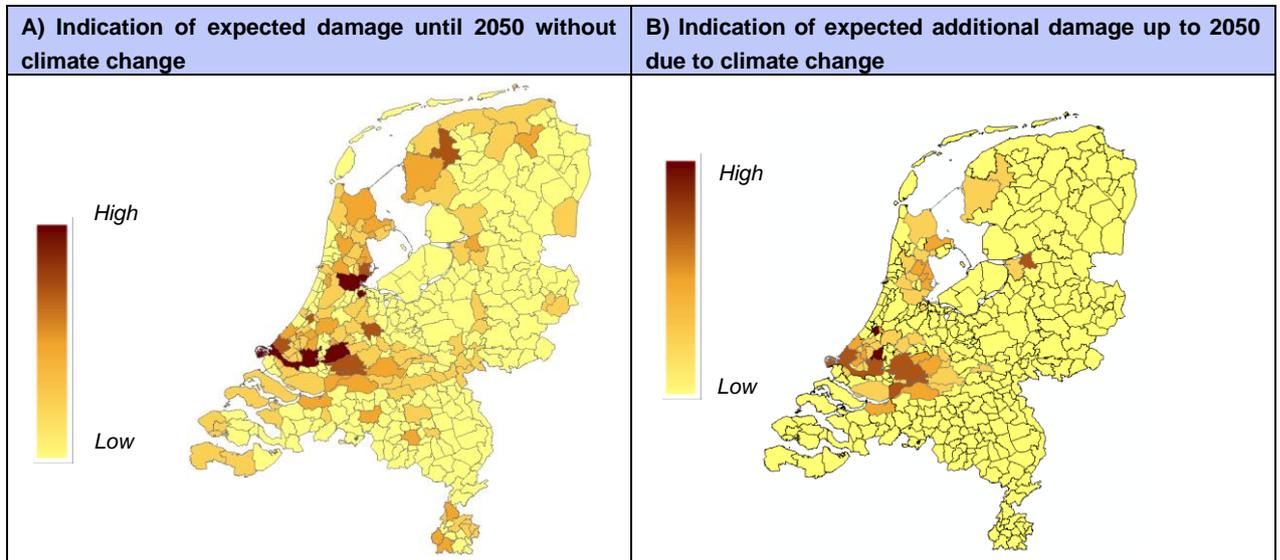
- (i) database management for a plug-and-play type of flexibility;
- (ii) sensitivity/probabilistic analyses on input parameters.

The database includes information on many damage causative factors, for all the buildings in the Netherlands. The causative factors include data such as groundwater and geological 3D models at specific depths, expert judgement and data for validation. Because of uncertainty in these parameters, sensitivity analyses are necessary to evaluate the influence in the results. For key parameters, a probabilistic Monte-Carlo analysis can be set-up.

To be able to accomplish this, it is necessary to automatize the update of the expected damages based on updated data for the causative factors. This requires automatizing relations such as those exemplified in Figure 1.

The duration of the internship is 3-6 month including: DB management, Analysis and post-processing and Writing.

We expect results to be a valuable input for public or private decision making, e.g. in awareness raising and evaluating interventions.



<http://www.klimaatschadeschatter.nl/>