



Disentangling shallow causes of subsidence

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The surface movement in the Krimpenerwaard polder in The Netherlands results from primary or hydrodynamic settlement or swelling, secondary or creep settlement or swelling, and peat oxidation. We used surface movement measurements in a Bayesian inversion scheme to disentangle the contribution of these three processes to the subsidence. The prior information, including spatial correlations, appeared to be crucial in our procedure. This prior information was derived from geological modeling incorporating the most important uncertainties. The inversion procedure allowed us to quantify the contributions of the three processes with unprecedented accuracy. Surface rise in the data was related to swelling of the clay layers, even though swelling was considered infeasible in the prior information. Despite this, the irreversible nature of peat oxidation was preserved. The improved subsurface description offers prospects for better assessments of the effects of water management.