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Discussions

Interactive comment on "The cost of ending groundwater overdraft on the North China Plain" *by* C. Davidsen et al.

Anonymous Referee #1

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In this paper, a hydroeconomic modelling approach is used to find cost-optimal sustainable surface water and groundwater allocation strategies for a river basin. A simplified management problem with conjunctive use of scarce surface water and groundwater under inflow and recharge uncertainty is presented. Because of head-dependent groundwater pumping costs the optimization problem is non-linear and non-convex, and a genetic algorithm is used to solve the 1-step-ahead sub-problems with the objective of minimizing the sum of immediate and expected future costs. A real-world application in the Ziya River Basin in northern China is used to demonstrate the model capabilities. It's estimated that the annual cost of ending groundwater overdraft in the basin is estimated to be 5.47 billion CNY/year. Both the methods and the results have reference value.

revision suggests: (1)"Persistent overdraft from the groundwater aquifers on the North China Plain has caused declining groundwater tables, salinization and infiltration of wastewater." Here the expression of "salinization" is confusing. In fact, the lowdown of ground water table has been favorable for the control of salinization and alkalization. Maybe the expression can be changed to "Persistent overdraft from the groundwater aquifers on the North China Plain has caused declining groundwater tables, and infiltration of saline water and wastewater." (2)For table 2: What the meaning of SP E? Why it's the same for different scenarios (before and after SNWTP)? (3)For table 3: What's the meaning of SP SNWTP? Why for LGW, the shadow price is the lowest? Because the initial condition is more severe, the value of water should be higher. Please give an explanation.

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