

Interactive comment on “GIS analysis of effects of future Baltic Sea level rise on the island of Gotland, Sweden” by Karin Ebert et al.

Anonymous Referee #1

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General comments:

The paper deals with effects of increased sea level on the island of Gotland in the Baltic Sea. The paper is based on a GIS overlay analysis and tries to do a multi-criteria risk analysis. For future scenarios a multi-criteria risk analysis is necessary. I find the aspect of sea water intrusion to coastal aquifers due to increased sea level, and risk of saline contamination of wells as the most interesting contribution. The paper aims to fill knowledge gaps, and link the study to non-developed countries, though I find the global comparison a bit vague.

Specific comments:

Part 2. Study area description – Why Gotland? The second island of the country, Öland, is less elevated and possibly at higher risk to be flooded. I think Gotland is a

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good choice but it should be elaborated. For example, the present situation on Gotland where the ground water situation is already problematic. The study should have included that the quantity of ground water is found unsatisfactory in the classification related to the EU water framework directive. Already today there is a risk of fresh water scarcity in some areas of Gotland during summer month. The lowest area, and most vulnerable parts in the study correspond to areas in the southeastern part of Gotland where the ground water quantity is unsatisfactory already according to Water Information System Sweden (<http://www.viss.lansstyrelsen.se/>). I think the article should have addressed this question, and the present risk of Sea water intrusion.

Part 5. Discussion – The structure of the discussion is not clear. I find it more confusing than informative with too many sub titles, some parts is also repeated (birds 5.3, 5.5). Economic values are mentioned but could be elaborated more, considering an ecosystem service view. Now, the economic and societal consequences relate to infrastructure, movement of housing, decreasing tourism, and wells. I think the life quality, bird life (5.5; 5.6) could be discussed together. The decrease of natural values ends up as economic consequences.

Technical corrections:

Line 104. County should be country. Gotland is the largest island of Sweden.

Line 365. Is it possible to say “never before”, I think the wording is not correct. Settlements situated in river mouths on delta sediments are rebuilt during history. In the Hanö bay area of the Baltic Sea transgression have been studied by quaternary geologist for a long time, and there is also an ongoing archeologic project studying settlements from 11000 year ago found on the sea bed in the same area. Björn Nilsson (project leader) also published a paper with the title: Flooded Stone Age: Towards an Overview of Submerged Settlements and Landscapes on the Continental Shelf, *The European Archaeologist*, 2012(38), pp.84-85.

Line 531, Figure 1. A – The location map is too small, it is difficult to read the text

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Sweden, Gotland etc. C – It is not possible to see the cities/towns on the map, and the electricity line is almost not visible

Line 547, Figure 3. A – It is not possible to see the difference of colors for the wells elevation 0-2; 2-5; 5-10 m.a.s.l.

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