Hydrol. Earth Syst. Sci. Discuss., 8, C4783–C4785, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C4783/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Shallow rainwater lenses in deltaic areas with saline seepage" *by* P. G. B. de Louw et al.

P. G. B. de Louw et al.

perry.delouw@deltares.nl

Received and published: 1 November 2011

We thank Marco Antonellini for the constructive comments and appreciation of our work. Below we respond (indicated by R) to each of the comments (indicated by C) raised by the referee.

C: find this an excellent manuscript and a great contribution to the hydrogeology literature. My following comments are just relative to the form. The paper is a bit too long in the presentation of the results, which makes it a little hard to read. The methods used and analysis done are sound and they show a very nice integration among different datasets. R: We will shorten the description of the results where possible.

C: A point that the authors should address is the apparent confusion between confining layer, aquitard and low permeability layer within the aquitard. Sometimes the authors refer to a confining layer but it is not clear if it is an acquiclude or an aquitard. Given that the concept of aquifer is a relative one, some better explanation (maybe only a better indexing of fig. 1 would suffice. (see pages 7678 lines 21-24). R: We will explain better the geohydrological concepts and terms.

C: Another point to address would be the fact if saline seepage in low-lying polders is only vertical or also lateral, this is not completely clear to me from the paper. I would suggest to the authors to avoid some jargon as "salt loads", which is not clear to all hydrogeologists; also the extensive use of acronyms make the paper difficult to read. R: Regarding groundwater flow on a regional scale, flow paths in the aquifers are mainly lateral. Since we are interested in the flow processes near the surface, i.e. flow into or out of the confining layer, vertical flow will become more dominant and can be divided into an upward (seepage) and a downward (infiltration) component. We will address this in the revised version and the other comments made.

C: Dispersivity values in the models seem to be very small to be realistic. R: We agree that the dispersivity values are small but we think they are realistic for the sediments in the study area. We refer to different studies in which they found these small values for Dutch and Belgian aquifer system. Page 7667, lines 19-21: "These rather small values are based on numerous case studies of Dutch and Belgian aquifer systems with marine and fluvial deposits (e.g. Stuyfzand, 1993; Lebbe, 1999; Oude Essink, 2001-b; Vandenbohede and Lebbe, 2007)."

Some specific comments: C: p. 7672 line 23-26 Is this vertical seepage in the ditch that hinders the infiltration of fresh water or the difference in head? Not clear. R: Upward groundwater flow (seepage) driven by head differences hinders the infiltration.

C: p. 7661 peat cutting –> peat mining? dewatering of land by man âĂŤ> land reclamation? R: We will use 'peat mining' in stead of 'peat cutting'. Dewatering caused

groundwater levels to drop and land to fall dry which resulted in shrinkage of the peaty and clayey soils.

C: p. 7662 line 4 subside –> sink R: 'subside' or 'to sink lower' mean both the same. Subsidence is often used in the context of sinking of the surface or soil.

C: p. 7665 extracted all the water –> flushed the water? R: We extracted the water from the piezometer to get the piezometer refilled with undisturbed water from the surrounding soil.

C: p. 7669 line 5 year 30 –> 30 years R: we analyzed the results for the thirtieth year.

C: p. 7680 lines 19-23 The sentence is not clear, a figure might better explain the processes that the authors would like to describe; the same for p. 7682 lines 3-10. R: We will describe the processes clearer in the revised version.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 7657, 2011.