

Earth Syst. Dynam. Discuss., author comment AC1  
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## Reply on RC1

Andreas Lehmann et al.

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Author comment on "Salinity dynamics of the Baltic Sea" by Andreas Lehmann et al.,  
Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2021-15-AC1>, 2021

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## Reply to 'General comments'

Thank you for your the comments.

## Reply to 'Specific comments on sub-chapters'

**LVCs/MBI:** A very good comment. We will give a detailed explanation of the difference between LVCs and MBIs as earliest as possible in the manuscript.

**Smaller barotropic inflows:** The depth level on which smaller barotropic inflows occur depends on the salinity and volume of the inflowing water mass, and on the salinity distribution in and below the halocline. On its way through Arkona, Bornholm and Gotland Basin the water is diluted and mixed by ambient water. If the Bornholm Basin is already filled up by higher saline water due to earlier inflows, the water slip up and pass the Bornholm basin quickly, and enter the Gotland Basin stratified in the halocline. So the water can interleave in or below the halocline in dependency on its initial salinity and mixing conditions. This process is described with respect to oxygenation of the central Baltic Sea deep Basins for example in Holtermann et al. (2017) and Neumann et al. (2017). We will take that up in the revised manuscript.

**The cold intermediate layer:** Sorry, this formulation is unclear. It is the water from the southwest (surface of the Bornholm Basin) which is advected to intermediate layers in the south-east (Baltic Proper). We will clarify this in the revised manuscript.

**Development of the mean salinity:** We will give an estimate of the volume related to the depth range from 150 m to the bottom, and the corresponding area fraction in the revised manuscript.

**The specific role of precipitation and river runoff:** We will discuss the annual cycle of freshwater and its effect on surface salinity. Thank you for the references. We will include them in the revised version.

**The impact of salinity dynamics on the environmental conditions of the marine ecosystem:** Thank you, very good comment. We will introduce a short discussion based on Vuorinen et al. (2015) on ecological consequences to changing salinity conditions in the Baltic Sea.

### **Reply to 'Technical remarks'**

Thank you for the valuable remarks. We will consider them all in the revised version.