

## ***Interactive comment on “Mechanisms of variability of decadal sea-level trends in the Baltic Sea over the 20th century” by Sitar Karabil et al.***

### **Anonymous Referee #3**

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The paper is devoted to decadal trends of sea-level in the Baltic Sea over the twentieth century. Due to global climate change the question of sea level trends and their reasons is vital also for the Baltic Sea. Former studies about the inter-annual to decadal variations of the sea-level of the Baltic Sea have shown that an important part of variability in these time scales results from atmospheric forcing, that could be described through NAO index, mostly in winter. But it has been shown also that in summer the influence of precipitation and temperature has a strong effect on sea-level variations. In this article, a statistical model is used to capture the simultaneous link between atmospheric circulation and sea-level for seasonal means, and later residuals of statistical model are researched to reveal other reasons of sea-level variability. The paper is in many places unclear and I think that several points should be better addressed before considering it for a final publication.

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1) The novelty of the paper is not clearly stated. 2) It is not clearly written out what is the consideration of using 11-year gliding trends. Why to correlate the speeds of change of various climatic variables? 3) There is no discussion part and the conclusions are very general. 4) The overall presentation is well structured, but in the section 2, there are too many subtitles, not every dataset needs a subtitle. 5) The methodology section needs improvements. It is not clearly written what is the period under consideration, various data sets have various periods of availability. NAO indices are available from different sites. There is no reference to dataset used. Were the gridded data used in the original grid, or were computed into a common grid? What is the study area? Page 7 line 3 “Y is time series of gliding trend anomaly”. Anomaly against what? It is not explained.

Specific comments:

1) Typing errors in references 2) The quality of the figures should be improved to add readability to this work. In Fig 1 the numbers of stations are partly covered by the colour point. Would be better to present the names of the stations in Fig 2, then is seen easily how long are the time series in separate stations. Knowing of names of stations in Fig 1 is not crucial. In figure caption of Fig 10 the blue and red line are not explained. What are units of trend?

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