Page 2, lines 26-27: What is meant by "causal relations to inter-annual variations"?
Answer: Better is:„... to understand the causal relationship between indicators and the low frequency variability of simulated primary production."

Page 3, line 21: It is misleading to say that the explicit character of model data make it difficult to find major variability modes. Compared to observational data, only such an explicit character makes it possible to perform a thorough analysis.
Answer: The reviewer is of course right, this is poorly phrased. We will change the text to:" The advantage of model-derived data is their spatially explicit characteristics, which allows resolving the variability on various time and spatial scales. To identify major modes of variability we apply a widely used method in climate and ocean science, the empirical orthogonal function analysis, a statistical method … .

Page 4, lines 7-8: I do not see a general link between spatial and temporal resolution and better chances that EOF modes are related to "real" physical modes. According to my understanding the potential that specific physical processes can be represented by orthogonally arranged EOFs, is not necessarily connected to the resolution. Also, in the cited reference Schrum et al. (2006b), no information could be found, which supports this statement. The reference seems to be misplaced here. Therefore the authors should reconsider this sentence.
Answer: In Schrum et al. (2006b) can be found: "It should be noted that identified modes of variability are by no means automatically related to dynamic processes as the statistical decomposition can fail in providing pattern which are dynamically relevant. However, in the case of a proper adaptation of regional and temporal windows with respect to the variability of the parameter investigated, the problem can be reduced and the separation into statistical modes helps to understand the relation between spatial and temporal variability and gives some hints to the dynamic processes responsible." We agree that the use of the word resolution might be misleading and suggest changing the sentence to: "However, the use of a proper regional and temporal window encompassing the potential scales of variability of the targeted parameter improves the potential for several dynamically relevant modes (Schrum et al. 2006b).

Page 6, line 11: In principle, Fig. 7 already shows the current speed in form of the vector length. Hence, the sentence should be reformulated.
Answer: Although the analysis in Fig. 7 describes the change in current speed through the length of the current vector, it only describes the change for this specific part (EOF_1) of the circulation. The second analysis Fig. 8, in contrast, describes the variability in the scalar current speed and hence gives additional information. We suggest changing the text to: "An additional EOF analysis performed for the scalar current speed further highlights the fact that this strong increase in strength of the northwest current component is connected to a general increase in current speed (Fig. 8c)."

Page 6, lines 15-16: From Fig. 8a, it is not clear, whether fluctuations could not be explained or whether they are not present at all

Answer: The local explained variance shown in figure 8b shows clearly that the first EOF of the analysis is not relevant in these areas. Meaning that this specific pattern of temporal variation, namely the increase in current speed, is not present there. There are of course fluctuations in those areas, but they are different from those explained by the first dominant mode of variability. We suggest adapting the text a bit to make this clearer: "The local explained variance of the first EOF mode (Fig. 8b) shows that this dominant mode of variability (Fig. 8a) is highly relevant in the central and north/north-western parts of the two main areas in the coupled North Sea and Baltic Sea system. However, it does not explain variability in the southern and eastern coastal regions nor in the Bothnian Bay and Gulf of Finland, indicating that the current speed variability in these areas differ substantially from the dominant pattern."

Page 7, lines 2-7: It would be much easier to follow this paragraph, if the specific EOFs, which are referred to and discussed in the text, are mentioned
Answer: Yes, right. We will consider this in a new version of the manuscript.

Pages 7 and 8: Section 3.3: This section should be extended a little in order to make the results more clear. In particular, when mentioning the different scenarios, it would be helpful if the idea behind the specific scenarios is briefly repeated in a half-sentence.
Answer: We suggest inserting another sentence to the text: "Since correlation analysis can identify statistical relations but not causality, we compiled subsequent scenario experiments with the model to identify the role of variations in wind speed, SWR and river nutrient loads for production changes in the North Sea and Baltic Sea. Those parameters were chosen due to the high correlation we found between primary production and dynamic variables related to wind field changes (wind speed, wind components, current speed) and short wave radiation. The latter showed particular high correlation to Baltic Sea production variability. River loads were earlier hypothesized as one of the most relevant factors responsible for Baltic Sea system state changes from the late 1960s onwards (Thurow, 1997) and for production changes in the southern North Sea (Clark and Frid, 2001). **To emphasize the changes in variability rather than magnitude, the temporal variability of the single forcing parameters where modified as described in section 2.3 (see also figure 3).** …"