

Interactive comment on “The Coastal Observing System for Northern and Arctic Seas (COSYNA)” by B. Baschek et al.

Anonymous Referee #1

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***** General comments**

The manuscript proposed by B. Baschek et al. aims giving a detailed overview of the COSYNA, an integrated pre-operational observing system in Northern and Arctic Seas.

As we understand, the article introduces the Special Issue dedicated to COSYNA in Ocean Science. Following this aim, no specific scientific question is addressed in the manuscript but it is more dedicated to the description of the COSYNA components.

As a main general comment, the description is too long and confusing to highlight and to describe the successful integration operated in COSYNA. The balance between the

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amount of details and sometimes missing information or imprecisions is harming the main idea. A suggestion could be to shorten the manuscript to emphasize more the strength and coherence of the integrated system.

The description remains also difficult to follow for non-expert readers from the geographical region. A lot of places are mentioned without an illustration on a map. The manuscript will strongly benefit from a general map with zooms and mentioned names in the text (for example: Otzumer Balje, Jade Bay, island of Helgoland, North Frisian, Lena delta, Weser, Ems).

A final general remark is more on the "network" strategy behind COSYNA. The scientific aims and the justifications of geographical extent do not appear clearly from the manuscript.

Considering the needed improvements included in general and specific comments, I recommend this paper for potential publication after minor revisions more related to the shape of the paper.

*** Specific comments

* Abstract

p. 2 / l. 2-3 - Authors mention that COSYNA is designed also to "assess the impact of anthropogenically induced change". This assessment is not directly provided by the network but after complex scientific analysis of the collected data. The sentence should be modified.

* 1. Introduction

p. 3 / l. 28-32 and p.4 / l. 1-7 - The list of contributors could be presented as a table to

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improve the sentence.

p. 4 / l. 9 - The paper does not introduce scientific studies but just illustrate the observation collected.

p. 4 / l. 10 - The "volume", I guess the Special Issue is just mentioned here. It should be mentioned before and more explicitly.

p. 4 / l. 11-15 - The structure of the paper needs to be given more explicitly. At least, different main parts must be linked to the section numbers.

* 2. Coastal focus regions

General comment: This section should be strongly reduced. A map could give an overview of the two regions. Some details in this context are not useful as, for example:

- UNESCO reference - p. 5 / l.4-5
- p. 5 / l.21-26
- p. 6 / l.4-8
- p. 7 / l.4-8

p. 5 / l. 6 - The North Sea should be describe before the German Bight.

* 3. Objectives and Benefits

p. 8 / l. 14-15 - I don't see how numerical model can integrate observations from turbulence (and from minutes) as it is scales which are not taken into account in assimilation (observations are generally degraded to be assimilated). This sentence must be clarified.

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* 4. International context

p. 9 / l. 20-27 - These statements are not necessary for the manuscript.

* 5. Observations

p. 10 / l. 23 - What is the meaning of "(3)" and "(1)" ? Same for "(1)" and "(2)" in p. 11 / l. 8

p. 11 / l. 10-11 - The mention to CDOM, yellow substances, "gelbstoff" should homogenize in the manuscript. I would suggest keeping Coloured Dissolved Organic Matter (CDOM) as it is a name more commonly used.

p. 11 / l. 30 - For the quality control processes, do you have references or standards to refer ?

p. 16 / l. 29-30 - Could the authors explain more clearly the "order of 10m" ?

p. 17 / l. 8 - The notion of "fusion" is not straightforward or I do not understand what is meant here. Authors should detail a bit more here.

p. 18 / l. 2-3 - The statement is already said before in the manuscript.

5.5 Underwater-Node System - It is not clear to me. What is the depth of the system ?

p. 21 / l. 13 - Typical deployments times exceed 25 h but until how much time, it can

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be extended ?

* 6. Sensor and Instrument Development

p. 26 / l. 26 - pH is not only a proxy for phytoplankton and primary production as the water pH is not only driven (even if largely influenced) by biology.

* 7. Modelling and Data Assimilation

Are FerryBox data assimilated in COSYNA modelling system ?

What are the forecast periods for hydrodynamics ? It is detailed for waves but not for transport.

p. 35 / l. 4 - I do not agree that it is "reproduced to a remarkable degree". The model is able to reproduce a deep chlorophyll maximum but its intensity and extent is not similar with observations.

*** Minor and technical corrections

* 2. Coastal focus regions

p. 4 / l.25 - 26 - Sentences could be rephrased ... "It is It is".

p. 6 / l.24-25 - "a-1" needs to be placed by "y-1".

* 3. Objectives and Benefits

p. 8 / l. 30 - "radar" has to be replaced by "HF radar".

* 4. International Context

p. 9 / l. 31-32 - "to providing ... and carrying" to be replaced by "to provide ... and carry"

* 5. Observations

p. 11 / l. 30 - CODM website could be given.

p. 12 / l. 2 - The number (4 or 5) of fixed stations can be explicitly written.

p. 12 / l. 22-23 - Please homogenize the writing. In this part we find back past verb when present is used in other parts.

p. 13 / l. 4-6 - The maintenance frequency could be given.

p. 16 / l. 14 - "The measurements taken with COSYNA gliders is" => " ... gliders are ...".

p. 16 / l. 17 - "The data was ..." => "The data were ...".

p. 17 / l. 1 - "The Systems ..." => "The systems ...".

p. 18 / l. 25 - "und ..." => "and ...".

p. 21 / l. 15 - The acronym ADCP should be mentioned in brackets before to be used.

p. 21 / l. 21 + p. 22 / l. 14 - The way of writing in situ (in situ, in-situ) must be homogeneous in the manuscript.

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p. 23 / l. 21 - "chlorophyll"-a concentration.

p. 24 / l. 29 - "chlorophyll-a" => "chlorophyll-a concentration".

p. 25 / l. 28 - PSICAM is not defined at this stage in the manuscript.

* 6. Sensor and Instrument Development

p. 28 / l. 15-16 - "phytoplankton fluorescence" => "fluorescence".

p. 28 / l. 16 - "dependents" => "depends".

p. 30 / l. 4 - "Fig. 22" => "Fig. 22e".

* Tables

Table 1:

+ "current vector" => "current" or "current velocity"

+ "oxygen" => "dissolved oxygen"

Table 2:

+ the level/depth of measurement is missing.

+ For FINO-3, is it 2016 or now ?

* Figures

General comment: There is a gap between this manuscript and figures ready for

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publication because they are often blurred and some are even not readable.

+ Figure 1 is blurred in the pdf.

+ Figure 4, reference (left/right) to the pictures is missing in the caption.

+ Figure 5 is blurred and we do not distinguish axes label with the corresponding curves.

+ Figure 6, the x-axis is not enough detailed; a number from 1 to 12 months could be helpful.

The colours red and brown are not distinguishable. A reference to "DO" is missing in caption.

+ Figure 7 and Figure 20 can be removed, as it is a classical view of well-known systems.

+ In Figure 8 the caption and the information on the figure are incomplete: the meaning of the curve colour is not given on the left plot (is it the months represented on the right panel ?), is the θ in the caption different with the ϕ in the y-axis label ?, where is represented 2014 as mentioned in the caption ?

+ In Figure 9, the white-blue colorbar does not allow distinguishing current velocity classes. Please consider changing the colormap.

+ Figure 12 is blurred and impossible to read. Then, we can't connect numbers in the caption with the diagram.

+ The Figure 13 can be removed, as it does not give major information for the paper purpose.

+ On Figure 14, which year is represented and what is the depth of measurements ? The meaning of CPUE could be explicitly called back in the caption.

+ Figure 15. (a) and (b) must be added on the photo or (left) and (right) has to be added in the caption.

+ Figure 17. "chlorophyll concentration" => "chlorophyll-a concentration"

+ Figure 25 is blurred.

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