

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

Anonymous Referee #2

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***** General comments**

This paper comes as an introduction about the COSYNA observing system deployed in the Northern and Adriatic Seas by a large consortium, prior to more focused scientific papers in the special issue. COSYNA is presented as an integrated and complete flexible observation system, including remote observation (satellite, radar) and in situ observations, as well as modelling tools and data assimilation techniques.

First, a long description of the areas (Northern Sea and Arctic Sea) and of their circulation and hydrological patterns is given. Then, the objectives and the international context are explained, showing the diversity of potential data users (from the scientific community to operational users) and the links with various initiatives at European and international levels. Third, the different components of the system are described

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in a very detailed way (stations at fixed locations, mobile platforms such as gliders or ferryboxes, satellite products, HF radar data, GPS bird tracking system, models and assimilation tools, oceanographic cruises...). In this section, the authors refer to interesting scientific results of previous papers or papers of this special issue. In the following section, a description of the development of new sensors (Alkalinity sensor, nutrient sensor, molecular observatory, . . .) performed in the framework of COSYNA is given. Then, data management and data products are described, as well as outreach activities and stakeholder interaction, insisting on the public and free access to data collected by COSYNA. The last section deals with the future of COSYNA, in particular its spreading toward new areas, new partners and new scientific products and research associated subjects. Overall, this paper gives a lot of details on the system and on the observed areas. The spatial and temporal coverage, the technical developments, as well as the diversity of the systems that are used, make COSYNA an impressive observing system that a lot of scientists would love to have in their research geographical area.

However, the paper claims to be exhaustive, which sometimes results in long descriptions that make parts of the paper cumbersome to read. My main concern is thus on the form of the document that requires revision. I would recommend to shorten some sections and remove some figures. Reference to other papers of the special issue should also be emphasized. A few suggestions are provided in the following comments below which may help to address this issue. Reference to other papers of the special issue could also be emphasized.

*** Specific comments:

* Section 1 :

The lists of COSYNA's partners sprays over 12 lines, which interrupts the reading. Could this information be shortened and details put in another section or in the ac-

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knowledgments? More could be said about the originality of this system compared to other existing observation systems, and about the research questions underpinning the system. This last point is only approached in Section 3.

* Section 2:

This section is dedicated to the presentation of the area of observation. A general map containing the two areas, both the North Sea and the Arctic coast, is required. It would also be good to have an idea of the bathymetry in the different areas. Figure 3 is a zoom on a particular area, it would be better to have the location of the station on a larger map. On Section 2.2 the reader has to wait until l.24 of p.7 for a figure of the area, although the same area is mentioned before at l.9. Also, the description of the two areas is too long. This section of the paper should be shortened. For example on p.5, at l.31, are the residual currents useful to the purpose of the paper? (and isn't there any tidal current residual?)

p. 5 l.14 Currents are not directly dominated by a tide (replace “M2 lunar tide” by “M2 lunar tidal component”).

* Section 5 “Observations” :

The idea of this paper is to link previous works with the results presented in this special issue. However, more could be made in order to emphasize the new results of the special issue.

The location of the stations are often difficult to assess (for example at l.22 p.10 or l.18 p.10) or repeated ships/gliders routes, as Figures 1 and 2 are not sufficient to locate them. Please add a figure with all the fixed platforms of table 2, and refer the reader to the figure in the text.

P.10 l.24: explain the link between tidal dynamics and matter budgets.

p.11 l. 8-9: Please clarify, as one could understand that it is the viewing angle of one radar that enables getting the surface current vectors from that sentence.

p.12 l.5: add “or trends” after “long term records”

p.14 l. 16: please give examples of research questions

p.15 l. 9-10: The oceanographic sensors described in Section 5.4 are O₂, pH, pCO₂,...are they really standard sensors?

p.17 l.15: “subsurface variables”

p.17 l.22-24: the authors list the measured variables, however among the list some are not directly measured by derived from the measure (it is the case for salinity and especially for Chlorophyll-a with the measure of fluorescence).

p.17 l.27-30: the ferrybox is a very nice system, but the maintenance constrains could be mentioned. Subsection 5.6.3: is there any result obtained yet with the FLUXSO lander?

p.25 l.4: what about glider surveys?

p.25 l.6: if the surveys observations are also used for model and remote sensing systems calibration this could be added.

* Section 6:

p.26 l.26: the reviewer does not agree that the pH is a proxy for phytoplankton and primary production, it has a strong impact on them but it is not directly linked to that quantities.

Subsection 6.7 (p.30): with this passive sampling method, how do you get rid of the influence of the vessel on the measure of metals concentration?

p.35 l.13: “many modelling studies” : please add references.

Figures 7 and 20 (glider and Scanfish pictures) do not have any additional value, I would therefore suggest to remove them. I also suggest to remove Figure 13 (may this figure or the information it contains be found in another paper?)

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*** Technical comments:

The figures quality should be improved.

Replace “publically” by “publicly” wherever you mention the availability of the data (p.2 l.9, p.3 l.20, p.36 l. 13 and 17, p.37 l. 24)

There is an abusive reference to Chlorophyll-a when only fluorescence is measured, please modify.

p.12, Title of subsection 5.1: I suggest to replace “fixed-point” by “fixed station”

p.10, l. 24: “dynamics is”

p. 10 l. 30 : remove comma after “located”

p.11 l. 7: “HF radar arrays are”

p. 13 l. 10 : “and operated for more than a year”

p.13 l. 21 : “at frequency M4”

p14 l.23: “analysis of”

p.18 l.25 : typo, replace “und” by “and”

p.20 l.6-7: “both CTD and ADCP sensors, and with”

p.22 l. 14-15: ”The aim was to”

p.22 l.16: remove comma after “and”

p.23 l.1: “The goal is”

p.24 l. 4: “adaptation”

p.25 l.32: “gliders were”

p.27 l. 9: “was achieved”

p.28 l.4: “analyzed” or “analysed”

p.25 l.16: “depends on factors such as”

p.35 l.2: “accounting for”

p.39 l.32: “partners”

Figure 4: please describe what the underwater unit is.

Figure 5: the labels cannot be read, this figure should be improved.

Figure 8: stratification in the y label should be the same as in the legend (“ θ ”). The time axis on Figure 8.a mentions the month, however it is said in the figure caption that it is for years 2012 and 2014, please explain. Also, what is the legend at the bottom left of the figure about? What is “b”?

Figure 12: Improve image resolution.

Figure 14, lower panel: the colorbar labels range from 32 to 36, which is very dubious for the temperature. . .please check if this is not salinity instead. . .moreover, what is the purpose of this lower panel figure? The text does not mention it so it could be removed.

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