

## ***Interactive comment on “Long-term trends in pH in Japanese coastal waters” by Miho Ishizu et al.***

### **Anonymous Referee #1**

Received and published: 11 June 2019

In this study, the authors estimated the long-term trends of pH in Japanese coastal waters from 1978 to 2009. In 70 to 75 % of the monitored sites, they found acidification trends while they obtained basification trends in 25 to 30 % of the sites. The authors tried to interpret the spatio-temporal patterns in pH based on the in situ pH, temperature and total nitrogen data.

The paper's idea is very important taking into consideration the increasing need of a continuous OA monitoring, particularly in coastal areas where OA effects on marine ecosystems could be exacerbated due to local pressures. However, I do have some major concerns about the pH data and the methodology used to get it:

\*Are the authors calibrating the glass electrode with TRIS solutions for seawater measurements? I'm not against NBS standard buffers for experimental essays or to check the in situ variations of pH in coastal stations to assess the pollu-

C1

tion there or whatsoever, but pH potentiometric measurements with NBS calibrations are strictly not recommended for seawater monitoring, particularly for long-term surveys (climatic survey) where the pH uncertainty should be around 0.003 pH unit. Moreover, this technique's results are not comparable with the ones adopted for seawater elsewhere and mentioned in the entire text (i.e. Bates et al., 2014, etc.). Please check the following useful links for the recommended strategies to better study the OA in open and coastal areas for long or short periods: - [http://goa-on.org/documents/general/GOA-ON\\_Implementation\\_Strategy.pdf](http://goa-on.org/documents/general/GOA-ON_Implementation_Strategy.pdf) - [http://goa-on.org/resources/sdg\\_14.3.1\\_indicator.php](http://goa-on.org/resources/sdg_14.3.1_indicator.php)

\*The authors did not explain why they calculated trends for minimum and maximum pH values? Why didn't you calculate the trends based on the annual average pH instead of doing it for the minimum and maximum values separately?

\*The authors are relying on this methodology: ISO10523 (<https://www.iso.org/standard/51994.html>) mentioned in P7, L135. This method is adopted mainly for freshwater measurements. Could you please provide more information about the JIS Z8802 standard protocol (2011). It is apparently accredited in JIS list (file:///C:/Users/user/Downloads/jis-japanese-industrial-standards.pdf ; p 397) but I couldn't find its details.

\*Any inter-calibration essays have been conducted to compare the pH results between the licensed operators/ labs?

\*How did you correlate the pH trends to biological processes? Did you check the correlation between pH and biological parameters measured in parallel at the monitored sites?

\*How the dominance of heterotrophs or autotrophs might affect the pH in coastal waters? How did you related these to your data? Based on what have you suggested that these waters are oligotrophic? Many statements through the text are so weak and need to be better justified.

C2

Figures: The style of many figures is very confusing, also their captions! For Fig. 6 for example, the same-color lines indicate the pH values taken for the same place and the same operator, but one for the annual maximum and another one for the annual minimum pH? This was understood from the Fig. 6 caption, but not from the text. Please rephrase.

Tables: Table 2: How significant were these correlations? Why you didn't present this table the way you did in Table 3?

Please check the attached document for more specific comments.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2019-150/bg-2019-150-RC1-supplement.pdf>

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Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-150>, 2019.