

## **Author's response to reviewers' comments (bg-2022-148-RC2)**

On behalf of the authors, I thank Reviewer #2 for the positive assessment of our manuscript, as well as the constructive comments and suggestions. On the following we provide a point-by-point response to the issues raised during the review process, and list/discuss the changes done to the revised version:

*This article provides a summary of the important roles, ideas, and prospects of groundwater as an important link between land and sea. In particular, the authors classify meteoric groundwater into coastal runoff FSGD and offshore freshened OFG, and emphasize the role of each and the connectivity between the two. This manuscript is very timely and necessary as the definitions scattered in several papers were arranged, the latest research from around the world were cited, as well as a perspective or direction for groundwater study is provided. Nevertheless, some suggestions are annotated in the attached pdf to help the reader understand.*

Reply by authors:

Many thanks, we are glad to see that the relevance of our contribution comes across clearly and that the manuscript is seen as useful for researchers from a wide range of expertise.

*l. 147 ( $1 \cdot 10^6 \text{ km}^3$ ) Readers may not know what this number means and whether it is important or not. It would be better if a suitable metaphorical example could be provided to give the reader an idea of this quantity.*

Reply by authors:

Thanks for the suggestion. To offer the reader a point of comparison for this number, we added the percentage it would represent in with respect to the estimated total fresh water sources on Earth. The revised sentence reads: "*Recent estimates report OFG to comprise a volume of approximately  $1 \cdot 10^6 \text{ km}^3$  (Micallef et al., 2021), which is about 10% of the Earth's liquid fresh water (Shklomanov, 1993).*" (l. 146–148 of revised manuscript). We added the corresponding entry to the list of references.

*l. 218 also in Jeju Island, Korea (Kwon et al., 2017 Scientific reports; Cho et al., 2019 Science of the total environment)*

Reply by authors:

Thanks for the suggestion. We adjusted the sentence to accommodate the additional case studies. The revised sentence reads: "*For example, large outbreaks of the macroalgae *Ulva* spp. (so-called "green tides"), which occur regularly in eutrophic coasts off China and Korea, are attributed to the nutrient supply by FSGD (Kwon et al., 2017; Liu et al., 2017; Cho et al., 2019; Zhao et al., 2021).*" (l. 218–220 of revised manuscript). We added the corresponding entries to the list of references.

*l. 241–249 For readers support I suggest this part to include some references.*

Reply by authors:

Thanks for the suggestion. We added three references of papers which present comprehensive overviews on the methodologies used for geophysical, hydrological, biogeochemical and microbial approaches to investigate FSGD/OFG (l. 251–252 of revised manuscript). We added an entry to the list of references, since one of the publications was not originally cited in our manuscript:

*Clara Ruiz-González, Valentí Rodellas, Jordi Garcia-Orellana, The microbial dimension of submarine groundwater discharge: current challenges and future directions, FEMS Microbiology Reviews, Volume 45, Issue 5, September 2021, fuab010, <https://doi.org/10.1093/femsre/fuab010>*

We are thankful to Dr. Ruiz-González, who made us aware of the paper as part of her community comment to our manuscript.

*l. 995 How about displaying it as "FSGD site" rather than FSGD for uniformity?*

Reply by authors:

Thanks for the suggestion. However, in our manuscript we are trying to convey the point that when we refer to FSGD we are talking about fluxes, whereas when we refer to OFG we talk about reservoirs. Adding a reference to "FSGD sites" in this context might lead to confusion. Moreover, the spatial distribution of FSGD occurrences can be seen in Figure 2.

*l. 995 How about additionally displaying the distance scales corresponding to the FSGD site and OFG site?*

Reply by authors:

Thanks for the suggestion. However, we don't see an added value in including the scale distances in this context, since our manuscript is focused on the conceptual aspects of both fields of research, rather than the details of the methodological needs that might arise due to different scales of variability. Thus, adding the scales might unnecessarily complicate the figure for the reader. The different scales of variability are included in some of the review papers which we cited in our manuscript (e.g., Bratton, 2010).

Kind regards,

Damian L. Arévalo-Martínez