

Interactive comment on “How significant is submarine groundwater discharge and its associated dissolved inorganic carbon in a river-dominated shelf system-the northern South China Sea?” by Q. Liu et al.

Anonymous Referee #1

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The submarine groundwater discharge(SGD) may be an important source of nutrients to the South China Sea but it has never been quantified rigorously. The only known reference to my knowledge is that of Chen et al.(2001, Marine Chemistry). In that paper the SGD nutrient flux was assumed to be 10% of the riverine flux. This manuscript gave a much higher ratio of 49-96% for nitrate and 50-99% for phosphate. I have trouble accepting such high values because there is no indication of such wide-spread nutrient-rich waters near the Guangdong coast. Besides, Peng et al.(2008, JO) have pointed out that SGD outflow from Taiwan may be dominated by a few fault lines. Since

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there is little karst and probably few fault lines in the Guangdong coast it is difficult to imagine high SGD outflows there. Note Taiwan and the Pearl River Basin are all traversed by the Tropic of Cancer with high rainfalls.

This leads to my concern about the methodology although I have no question about the quality of the data. To start with, upwelling was ignored in the model which is a no-no. The authors should measure more samples or get literature data to obtain the end member for the source of the upwelled water. My second concern is the widespread end members for well water and river water. The authors should make a plot of the 3 end member mixing so that it is clear whether their assumption of the end member values are valid. This must be done as the result is very sensitive to the choice of end members. Of course, the fourth end member MUST be included.

Lastly, what does it mean "the age of water"? It should be clearly defined.

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