

Thanks for the constructive comments. Since this is a model evaluation paper (not model development paper), we only provide a brief description on OGCM and biogeochemical model. But, we could add some details particularly for the biogeochemical model if space is allowed. Oxygen has been a state variable (just like carbon and nitrogen) in the basin-scale biogeochemical model. Most parameters used to compute the sources/sinks of oxygen are the same as those for nitrogen and carbon cycles. We analyzed/validated many biogeochemical variables in our previous studies, e.g., chlorophyll (Wang *et al.*, 2009a; Wang *et al.*, 2013), nitrogen uptake and regeneration (Wang *et al.*, 2009b) and carbon cycling (Wang *et al.*, 2006b; Wang *et al.*, 2015). In addition, we reported/validated PP & NCP (Wang *et al.*, 2006b), new production (Wang *et al.*, 2006a), and nitrate, iron, POC/detritus and export production below 200 m (Yu *et al.*, 2021). Although this is the first manuscript reporting mode calibration and validation for oxygen cycle, we have presented some findings on oxygen cycle modeling at a few international conferences, e.g., AGU Fall Meeting 2016, AOGS Annual Meeting 2016, SFB754 (2018) and 2018 Climate Change Symposium.

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