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Evaluating oxygen and oxygen minimum zones in global biogeochemical models

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Global biogeochemical ocean models are used to predict the future evolution of so-called oxygen minimum zones (OMZ), and the associated environmental and possible socio-economic impacts. Different models give different results and vary largely in their biogeochemical, physical and numerical setup. In order to assess the ability of the models to describe the present state as a necessary condition for skillful predictions into the future, they are usually compared against observed distributions of oxygen and other variables, such as thickness of oxygen minimum zones, nutrients, tracers for circulation and/or water mass age. We here examine different metrics for skill evaluation particularly of model representations of oxygen (and OMZs), for a wide range of global biogeochemical models. Among the metrics considered are Taylor plots, volume distributions of oxygen, volume of OMZ, preformed oxygen, and metrics that combine various diagnostic biogeochemical tracers. We finally investigate the impact these metrics may have for the "choice" of any best model, and discuss their applicability for different research or societal questions.