

# Role of hydrated oceanic lithosphere on global water cycle in the Earth

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Recent geophysical observations indicate extensive hydration of oceanic lithosphere even at mantle depths through water infiltration along the outer-rise faults (e.g., Ranero et al. 2003; Fujie et al. 2013; Obana et al. 2019). This has a large impact on the water budget carried by the subducting plate, although most previous estimates on the global water budget assume a hydrated oceanic crust but not include oceanic mantle. In this study, we reevaluate the extent and degree of hydration of the oceanic lithosphere based on recent experimental data that include the influences of porosity and anisotropy (Hatakeyama and Katayama 2020). Our preliminary calculation indicates that the global water flux carried by hydrated oceanic mantle is comparable or even higher than the water flux of hydrated oceanic crust. This results in a large regassing rate (water input) relative to degassing rate (water output), suggesting a decreasing ocean volume that is trapped in the Earth's interior.

Keywords: global water budget, mantle hydration, subducting plate