

## Seawater radiocarbon and stable oxygen and hydrogen isotope profiles from the Mariana Trench

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Most of the investigations on the Mariana Trench have been directed towards understanding its tectonics and evolution, petrology and geochemistry of rocks, hadal biocommunities and their physiological adaptations as well as deep-water currents and circulations. By contrast, research on geochemistry of seawater is limited. Here we report new data of radiocarbon of dissolved inorganic carbon (DIC) and stable oxygen and hydrogen isotope obtained from seawater samples collected from the southern portion of the Mariana Trench during a spring cruise in 2017 with R/V Dongfanghong 2. Sampling was conducted using Niskin bottles deployed via the ship's CTD rosette.

Stable oxygen and hydrogen isotopes were simultaneously analyzed with the technique of wavelength scan-cavity ring-down laser spectroscopy using a Picarro L2130-i water isotope analyzer at Peking University. The precision for  $\delta^{18}\text{O}$  and  $\delta\text{D}$  is better than 0.03‰ and 0.06‰ respectively. Both oxygen and hydrogen isotopes of densely sampled surface seawater vary in a wide range of 0.023‰-0.346‰ and 0.227‰-2.067‰ respectively. The majority of our samples taken from the depths between 200m and 6000m show  $\delta^{18}\text{O}$  and  $\delta\text{D}$  values in the range of -0.131‰-0.166‰ and -1.316‰-0.880‰ with a clear decreasing trend with depth. One sample collected at 8000m gives a  $\delta^{18}\text{O}$  and  $\delta\text{D}$  value of  $-0.111\pm 0.02\%$  and  $-1.226\pm 0.04\%$  respectively. The  $\delta^{18}\text{O}$  value is indistinguishable from that at the depth of 6000m at the site and compares well with one of the  $\delta^{18}\text{O}$  values (-0.12‰) obtained previously at a depth range of 6781-8792m at an adjacent site in Craig and Gordon (1965, *Mar. Geochem*). Radiocarbon in DIC of seawater samples was measured using the AMS in the Institute of Heavy Ion Physics at Peking University. The precision of  $\Delta^{14}\text{C}$  is typically better than 3‰.  $\text{CO}_2$  was extracted using the headspace-extraction method of Gao et al (2014, *Limnol. Oceanogr.: Methods*) from 30ml seawater after acidifying with  $\text{H}_3\text{PO}_4$ , then purified and graphitized with the Zn reduction method of Xu et al (2007, *Nucl. Instrum. Methods Phys. Res. B*). Radiocarbon measurements are in progress and the results will be reported and discussed along with the stable isotope data hopefully to gain some insight about deep circulation around the Challenger Deep in the Mariana Trench.