The hydrochemistry and weathering processes of CO_2 in theYarlong Zangbo River Basin

X. W. ZOU[1,2], Y. F. BAO[1,2], Y. C. WANG[1,2], M. M. HU[1,2*]

[1] China Institute of Water Resources and Hydropower Research, Beijing 100038, China ([*]correspondence: humingming@iwhr.com)

[2] State Key Laboratory of Water Cycle Modeling and Controlling, Beijing 100038, China

The Yarlong Zangbo River, a typical plateau river on the Qinghai-Tibetan Plateau, playing an important role in the regional water resources and eco-environment [1]. This research focused on the hydrochemical characteristics and weathering processes of CO_2 in the middle and upper reaches of the Yarlong Zangbo River. Samples were selected in the representative months of different seasons (dry and the flood season in 2017) for laboratory testing.

The results showed that water of the Yarlung Zangbo River was mainly derived from the meteoric precipatation and glacial snowmelt. The hydrochemical characteristic of the Yarlung Zangbo River water was generally alkaline and Ca^{2+}-HCO_3^- type, which mainly influenced by the rock weathering. According to the mass balance method, the contribution of each end-member to river water composition can be arrayed as: carbonate source (56.23%) > silicate source (23.66%) > evaporative source (16.91%), indicating the dominative effect of chemical weathering of the carbonate rock. The contribution of atmospheric precipitation was least. The average rock weathering rate and CO_2 consumption rate of the Yarlung Zangbo River was 42.12 t/km^2/a and 407.16×10^3 mol/km^2/a, repectively, which were realtively higher comparing with that of other large rivers in the world [2,3]. The annual average CO_2 consumption flux of the Yarlung Zangbo River basin accounted for about 0.36% of total CO_2 consumption flux of global rock weathering, showing strong chemical chemical weathering rate and CO_2 consumption in the plateau basin, which is related to the continuous exposure of tresh rocks due to its unique geology and climatic conditions in the plateau [4].

[1] Hu MM *et al*. (2019) *SCI TOTAL ENVIRON* **658**, 132-140. [2] Gaillardet *et al*. (1999) *CHEM GEOL* **159**, 3-30. [3] Wu *et al*. (2008) *CHEM GEOL* **249**, 307-320. [4] Raymo ME *et al*. (1992) *NATURE* **359**, 117-122.