Geophysical Research Abstracts
Vol. 18, EGU2016-11257, 2016
EGU General Assembly 2016

Characteristics of riverine dissolved organic carbon export in subtropical island, Taiwan

Li-Chin Lee (1), Jr-Chuan Huang (1), Tsung-Yu Lee (2), Chuan-Yao Lin (3), and Shih-Hao Jien (4)

(1) Department of Geography, National Taiwan University, Taipei, Taiwan (d04228001@ntu.edu.tw), (2) Department of Geography, National Taiwan Normal University, Taipei, Taiwan, (3) Research Center for Environmental Changes, Academia Sinica, Taipei, Taiwan, (4) Department of Soil and Water Conservation, National Ping Tung University of Science and Technology, Ping Tung, Taiwan

Carbon transporting from the terrestrial to the marine systems via rivers represents a crucial link in the global carbon cycle. Riverine dissolved organic carbon (DOC) which is responsible for maintaining the estuarine, coastal and marine ecosystems, is one of the main concerns in nutrient flux from land to ocean. Numerous studies have shown that the POC export in small mountainous rivers, like Taiwan, is disproportionally higher compared with global rivers; however, few studies have focused on the contribution of riverine DOC from the small mountainous tropical/sub-tropical islands. In this study, an intensive and extensive sampling scheme of DOC was conducted in Dan-Shui (DS), Chi-Chia-Wan (CJW) and Li-Wu (LW) River in Taiwan, and the characteristics of DOC concentration and flux were investigated. Meanwhile, the regressive estimation of DOC flux based on the landscape setting was applied and compared with research results proposed worldwide.

Our results show that the annual mean DOC concentration in LW is ∼0.51 ppm, thelowest among the three watersheds while the other two, DS and CJW, are ∼0.97 ppm and ∼0.90ppm, respectively. The seasonal variation in DS watershed is significant, yet insignificant for the other two watersheds with higher elevation. In terms of flux, the DOC yield in LW is ∼1.01 ton-C km-2 yr-1, and the DOC yield in DS and CJW are ∼3.01 ton-C km-2 yr-1 and ∼4.28 ton-C km-2 yr-1, respectively. The DOC yield in CJW presents a distinct seasonal variability. Since the DOC concentration in CJW is stable, the seasonal variation in DOC yield is strongly controlled by streamflow, revealing hydrological regulation at work. Besides, the multiple regressive model (Ludwig et al., 1996) which includes the variables of runoff, soil organic carbon and slope was applied. The model gave a good relationship between observation and simulation with a high R2 = 0.72, yet it overestimated the yield by ∼3.5 times. It suggests that the controlling factors in small mountainous rivers may follow the general understanding, but the significance of the factors needs further exploration.