Geophysical Research Abstracts
Vol. 13, EGU2011-5400, 2011
EGU General Assembly 2011

The Sensitivity of Nitrate Export in Subtropical Mountainous Catchments

Jr-Chuan Huang (1), Tsung-Yu Lee (1), Shuh-Ji Kao (2), and Shih-Chieh Hsu (2)

(1) National Taiwan University, Department of Geography, Taipei, Taiwan (riverhuang@ntu.edu.tw), (2) Research Center for Environmental Changes, Academia Sinica, Taipei, Taiwan

Since Haber-Bosch invented the way to transform the nitrogen gas into industrial ammonia (source of synthetic fertilizer), incredibly huge artificial ammonia has been made to increase the agricultural productivity to support population growth and to enter ecosystems eventually. However, such human-made ammonia is the dominant factor affecting water quality and nitrate export, which causes eutrophication and episodic acidification in downstream water bodies (e.g., reservoirs, lakes, and coastal zones). However, in subtropical mountainous areas such environmental impact due to the land use change was rarely documented. In this study, we investigated 16 sub-catchments during 2007 and 2008 in the Chi-Chia-Wan catchment where is the sole habitat for the endemic species, Formosan landlocked salmon (*Oncorhynchus masou formosanus*). The results revealed that the NO3-N concentration in pristine catchments varied from 0.144 to 0.151mg/L without significant seasonal variation. This concentration was comparable with other forestry catchments around the world. However, the annual nitrate export was around 375.3–677.1 kg/km2/yr, much higher than other catchments due to the greater amount of rainfall. This is an important baseline for comparisons with other climate areas. As for the impact of agricultural activities, the catchments with some human disturbance ($\sim$5.2% area) might yield 5947.2 kg N/km2/yr – over 10-floder higher than that of pristine catchment. Such high export caused by such a low level of disturbance might indicate that subtropical mountainous area is highly sensitive to agricultural activities. Modeling result suggested the forestry land might yield 488.5$\pm$325.1 kg/km2/yr and the vegetable farm could yield 298,465.4$\pm$3347.2 kg/km2/yr, roughly 1000-times greater than the forestry. The estimated nitrate yields for land use classes were a crucial basis and useful for the land manager to assess the possible impacts (e.g., non-point source pollution evaluation and the recovery of land expropriation).