XXXVIII
IAH Congress

Groundwater Quality Sustainability
Krakow, 12–17 September 2010

Extended Abstracts

Editors:
Andrzej Zuber
Jarosław Kania
Ewa Kmiecik

University of Silesia Press 2010

abstract id: **484**

topic: **2**
Groundwater and dependent ecosystems

2.6
Groundwater in eco-hydrology

Impacts of litter on soil physical and chemical properties and its karst effect in epikarst dynamic system in China

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keywords: epikarst dynamic system, litter, soil physical and chemical properties, epikarst spring, karst effect

In forest ecosystems, the effects of litter on soil properties are far from being fully understood. We conducted a study in 60a mature forest (S1), 20a earlier arbor forest (S2) and 10a shrub (S3) in Nongla epikarst dynamic system, Guangxi, China. Litter and soil physical and chemical properties was conducted to understand the effects of litter on soil properties. Our data showed that: The reserves of litters in S1, S2 and S3 were 18.4 t/hm^2, 16.85 t/hm^2, 1.84 t/hm^2,the total amounts of nutrient elements (N, P, K, Ca, Mg, Si, Al, Fe, Zn, Cu, Na, Mn) returning to soil from the litters were: S1 (4.657 t/hm^2) > S2 (4.068 t/hm^2) > S3 (0.193 t/hm^2), respectively. The reserves of litters in S1 were ten times than that in S3. The effective retaining content of litter layer in S1 were 11 times than that in S3, which enhanced the eco-hydrological function of forest soil. When the soil depth became large, soil properties influenced by litters become weaken gradually. Properties in deep soil was decided by parent rock, which content were stable, however, properties in top soil was controlled by litters. Nutrient in top soil, such as contents of organic matter (OM), available N, P, K, available Mn and Zn were controlled by litter's reserves, decomposition rate and component. Element's available state was inversely proportional to soil Ph usually. Litters can speed up the formation and evolvement of limestone soil in karst area. The preserve of litter layer prolonged the time of interaction of water/rock, at the same time, it can provide more contents of organic matter and CO_2 to karst ecosystem, and then accelerate its running.

International Association of Hydrogeologists

AGH University of Science and Technology

2-vol. set + CD
ISSN 0208-6336
ISBN 978-83-226-1979-0