C/N and $\delta^{13}C$ in suspended and sedimentary organic matter as evidence for changes of turning ecosystem in karst areas, Southwest China

YONGBIN JIANG[1], HONGBING JI[1]*, XIANFAN ZHU[1] AND SHIJIE WANG[2]

[1]Resource Environmental and GIS Key Laboratory of Beijing City, College of Resource Environment and Tourism, Capital Normal University, Beijing 100037, P.R. China (*correspondence: hbji@mail.cnu.edu.cn)

[2]The State Key Laboratory of Environmental Geochemistry, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550002, China

The Southwest China is the centre of East Asia Karst Area, which is one of the three biggest karst areas around the world. Over the past few decades, land use changes there have brought forth a series of severe ecological and environmental problems. Long-term changes of turning ecosystem would have influence on the chemistry of suspended and sedimentary organic matter. This paper presents data on organic carbon content (OC), C/N ratio and carbon isotopic composition of suspended and sedimentary matter collected from watersheds in middle of Guizhou province, Southwest China to trace its source and transfers as result of the turning ecosystem. We found that the OC content in most sedimentary section (2-60 cm) range from 0.43% to 5.10% and show a downtrend with the depth increasing. This result indicates transfers and decomposition of the previous organic matter and entering of new organic matter contributed from physical erosion and human activities. C/N ratios are in ranges of 3.81-9.73 and 10.28-16.34. The values of OC-$\delta^{13}C$ are between -26.586‰ to -19.713‰, and few overlaps are occurring in several sampling sites suggesting that intrusion of heterogeneous OC $\delta^{13}C$ at certain times. The mean values of OC in surface sediment (0-2 cm) and suspended matter is 3.53% and 13%. C/N ratio is 15.16 and OC-$\delta^{13}C$ is -23.8288‰ for the former; 6.97, -24.7321‰ for the later. According to end-members analysis, the terrestrial plant and phyto- or zoo-plankton are the dominant sources for the sedimentary and suspended organic matters respectively. The $\delta^{13}C$ in sediment section do not show obvious change from C3 vegetation source to C4 plant sources. The collected data of ecosystem changes (forest↔crop or grass) over the past 30 years support the conclusion that C3 plant as the dominant sources for OC $\delta^{13}C$ in sediment section. The values of OC $\delta^{13}C$ in suspended matter, surface sediment, sedimentary section showing uptrend and overlap indicate there would be allochthonous sources such as C4 plant, increasing inorganic fertilizer, Suess effect. All of these sources could be attributed to anthropogenic activities - a feedback to chemistry of suspended and sedimentary organic matter.

This study was funded by 973 Program of China (2006CB403200)

Groundwater geochemistry and As content in the Eastern Pannonian Basin (Romania) – PCA analysis

C. JIMENEZ[1]*, J. MERTENS[2], H.A. ROWLAND[3], C. BACIU[1], M. BERG[3], G. FURRER[2], S. HUG[3] AND E. CORDOS[1]

[1]Babes-Bolyai University, Cluj Napoca, Romania (*correspondence: cjimenez@hotmail.co.uk)

[2]ETH Zurich, 8092 Zurich, Switzerland

[3]Eawag, 8600 Dubendorf, Switzerland

Groundwater geochemistry in the Pannonian Basin has been of interest in the last decades due to its known anomaly on geogenic arsenic, the most important in Europe. However, the Western Romanian Plain has not been extensively investigated up to date. In this environmental investigation, waters from deep artesian aquifers were analyzed for multielement contents (anions, cations, major and minor metals). The collection points were public artesian wells and private pumped wells, both used as source for drinking water in the area (see also [1]).

The results have shown a wide range of geochemical conditions and frequently high concentration of arsenic in comparison with natural values reported for this element. The arsenic concentrations ranged from 0.12 and 223 µg/L, with As(III) as predominant species; pH values varied from 6.26 to 8.81; redox potentials from -246 and +140 mV and O_2 concentrations from 0 to 7.1 mg/L [1].

These high arsenic concentrations significantly exceed the EU parametric value for arsenic in drinking water that is 10µg/L. Moreover, a previous epidemiological study in the area (ASHRAM project) reported that the arsenic-rich groundwater in this region has an impact on human health. This multielement investigation should provide the knowledge needed to understand the geochemistry of these artesian groundwaters, the origin of arsenic and the necessary information for future implementation of remediation units to attenuate the concentration of arsenic in the drinking water of the public wells.

Principal component analyses (PCA) has been applied to the set of data. According to the PCA of the available data from the Pannonian Basin, the most significant processes were (i) anaerobic conditions, (ii) lithological background, and (iii) chemical exchange similarities.

We acknowledge funding from the European Commission (AquaTRAIN MRTN-CT-2006-035420).

[1] Rowland *et al.* (2009) *GCA*, this volume.