Mobilization and re-distribution of major and trace elements during extreme weathering of basalt in Guangzhou Province, South China

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Chemical weathering is one of the most important processes that change the chemical composition of the Earth's surface. Weathering products are easily carried out of weathering profiles and deposited in lakes and oceans as the main lithogeneous component in sediments. Therefore, the mobilization and re-distribution of elements during chemical weathering may influence the chemical composition of sediments. Generally, sedimental compositions can be used to trace the provenance of sediments and to reconstruct paleoclimate record [1]. Comprehensive understanding of the behavior of elements during chemical weathering may help to better explain the records found in sediments(Ma et al, 2007; Wei et al, 2004)

Major elements of a laterite profile developed on Neogene basalts in Guangzhou Province, South China were reported in this study. The results indicate that most of the elements have been mobilized and transferred downwards along the profile by aqueous solution. conservative elements during incipient chemical weathering, such as Fe, Ti, Zr, Hf, Nb and Ta, the removals are up to 25–43% in the upper profile. Al, Mn，Ti were significantly enriched in the middle (2-3m) profile, this may indicate there has an paleo-water level. All the REEs are remarkably enriched in the middle and the lower profile.

All the characters of the maior and trace elements are similar as it in the weathering profile of basalt in Hainan island mentioned in Ma *et al*. (2007). These may indicated that the basalt in south China underwent the same process of weathering conditions.

[1] M. Zabel *et al*. Late Quaternary climate changes in central Africa as inferred from terrigenous input to the Niger fan, *Quatern. Res*. **56** (2) (2001), pp. 207–217.

Impact of water-level fluctuations on concentration trends of petroleum contaminants in pipeline leakage area

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Overview of Case Study

Monitored natural attenuation is one of the most commonly used remediation technologies which means that groundwater contamination was reduced to safety range by the effect of natural degradation and dilution. In typical area of certain oilfield of china, after the leakage oil cleaning up□most of the high level contamination areas ofgroundwater are at pipeline leakage site and sewage infiltration area. Detected from continuous 12 months monitoring, the TPH□Total petroleum hydrocarbons□ concentration of groundwater show tow types of correlation with water-level fluctuations. Firstly, at the border of pollution plume, water-level fluctuations are positive correlation with TPH concentrations that as the water level raises, The TPH concentration increases in January to June. Secondly, at the middle of pollution plume, water-level fluctuations were always positive correlation with TPH concentrations during the whole monitoring period.

Discussion of Results

The monitoring results show that attenuation of petroleum hydrocarbon contamination did not show a simple exponential or linear law with water-level fluctuations [1]. These results demonstrate that the TPH concentration at the high level (0.1-0.2mg/l), convection-dispersion is main process of monitored natural attenuation, and it is affected by water-level fluctuations significantly. Meanwhile at the low level (0.1-0.2mg/l),adsorption and biodegradation are the main process, which shows Linear attenuation characteristics. All the results indicate that in the study area, if the petroleum hydrocarbon contamination is higher than threshold (0.1-0.2mg/l), it would be appropriate to apply active remediation projects to local groundwater remediation, when lower than the threshold monitored natural attenuation will be more suitable.

[1] Alan E. Kehew, Patrick M. Lynch. *Environ Earth Sci*. Published on line :08 June, 2010.