

## Distribution of native selenium in Yutangba of China and its environmental implications

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Yutangba, where a sudden incidence of human Se poisoning occurred in 1963 (Yang et al. 1983), is located in the northern part of the town of Shuanghe, about 81km SE of Enshi City, Hubei Province, China. In Yutangba, selenium is present mainly in the carbonaceous chert and carbonaceous shale (locally known as "stone coal") of the Upper Permian Maokou Formation. The rock samples have a maximum Se content of 3.0% (Zhu et al. 2004), but little is known about the possible relationships between the sudden human Se poisoning and distribution of native Se in Yutangba.

The result of our studies by using SEM-EDX, XANES shows that native Se exists extensively within abandoned stone coal spoils, other carbonaceous rocks and nearby high-Se soils. The areal distribution of native Se is mainly consistent with the outcrop locations of Se-rich carbonaceous rocks stria with about 20m thick, which form an oval-shaped belt approximately 25km long. XANES results suggest native Se is probably the dominant primary species in fresh Se-rich carbonaceous rocks. The currently geochemical condition in Yutangba, however, is favorable for its mobilization and re-deposition as secondary native Se, perhaps at the top of the saturated zone. This redistribution is probably responsible for the extremely high Se concentrations.

If these rocks are mined as a fuel or fertilizer, or when abandoned stone coal spoils and high-Se soils are reclaimed for cropland, a great amount of native Se will be quickly oxidized and transformed to soluble Se, which accumulates rapidly in local food chains via irrigation systems. Thus, soluble Se may once again accumulate to such an extent that Se poisoning will occur again in Yutangba, and even in other high-Se places in Enshi prefecture where human Se poisoning was not reported previously.

### References

- Yang G.Q. et al., (1983), *Am. J. Clin. Nutr.* 37, 872-881.  
Zhu, J.M. et al., (2004), *Applied Geochemistry.* 19,461-467.

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## Flour pollution in drinking water in Makoo City of West Azarbaijan, Northwest Iran

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Basaltic lava flows related to Ararat volcanoes in Southeast Turkey covered Quaternary Alluvium in Makoo Area of west Azarbaijan, Northwest Iran. Lava flows include pahoehoe fabrics and mineralogically characterised by low  $K^{+1}$  and high  $Al_2O_3$ . High porosity and permeability due to strong fracturing throughout the lava bodies has formed considerable water reservoirs in the area. Water analysis indicates that Fluor content is directly proportional to  $(K+Na) / Ca$  ratio, and reaches the maximum of 3.5 ppm along the down-stream currents (fig.1). It is concluded that drinking water in the area is polluted by high F. content due to water-rock interaction in the underground water reservoirs. This has been testified by brownish spots on the teeth and bone sclerosis in majority of the native people and animals (fig 2).

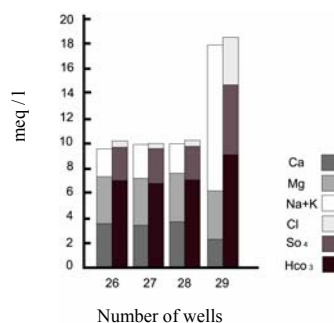


Fig (1): Correlation of major Ion concentrations in the water wells in Makoo city, West Azarbaijan, NW Iran



Fig (2): Basaltic Spring, 12 Km to NW Makoo