Vanadium Distribution in Environmental Samples Surrounding the Slag Dump in Panzhihua, Sichuan province, P.R.China

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Million tons of metallurgical slag bearing abundant vanadium (V) was piled outside along Jinshajiang river, upstream of Yangtze river. Vanadium distribution in water, sediment and soil samples sur-rounding the slag dump was studied. The results showed that from the slag dump to the downstream of the Baguanhe river, vanadium content and the pH value gradually decreased for water samples, and also vanadium content of sediment samples gradually decreased. Soil vanadium near the slag dump is usually higher than the background value of soil in Sichuan province, and the soil with the highest value was collected from the slag dump area. It is apparent that slag piling has brought a certain degree of pollution to the surrounding environment.

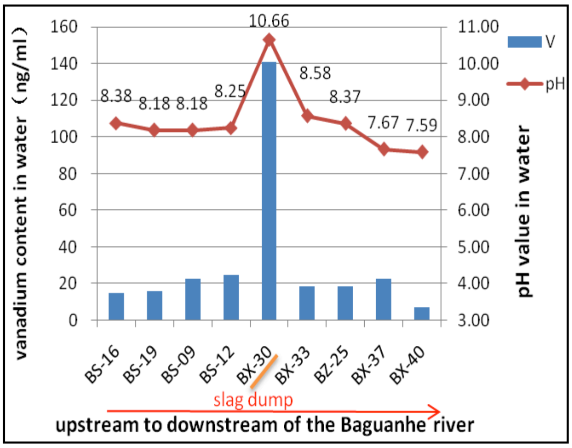

Figure 1. Vanadium concentration and pH values of water samples along the Baguanhe river

A reference Earth model for the heat producing elements and associated geoneutrino flux

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Geoneutrinos are electron antineutrinos emitted by beta-minus decays of naturally occurring radionuclides (e.g., heat producing element (HPEs), namely U, Th and K). The recent geoneutrino experimental results from KamLand [1] and Borexino [2] detectors reveal the usefulness of analyzing the Earth's geoneutrino flux, as it provides a constraint on the strength of the radiogenic heat power and this, in turn, provides a test of compositional models of the bulk silicate Earth (BSE). This flux is dependent on the amount and distribution of HPEs in the Earth's interior.

We have developed a geophysically-based, three-dimensional global reference model for the abundances and distributions of HPEs in the BSE [3]. The structure and composition of the outermost portion of the Earth, the crust and underlying lithospheric mantle, is detailed in the reference model, this portion of the Earth has the greatest influence on the geoneutrino fluxes. The reference model combines three existing geophysical models of the global crust and yields an average crustal thickness of 34.4±4.1 km in the continents and 8.0±2.7 km in the oceans, and the total mass (in 10^{22} kg) of oceanic, continental and bulk crust is 0.67±0.23, 2.06±0.25 and 2.73±0.48, respectively. *In situ* seismic velocity provided by CRUST 2.0 allows estimates of the average composition of the deep continental crust by using new and updated compositional databases for amphibolite and granulite facies rocks, in combination with laboratory ultrasonic velocities measurements. An updated xenolithic peridotite database is used to represent the average composition of continental lithospheric mantle. Monte Carlo simulation is used to predict the geoneutrino flux at selected locations and to track the asymmetrical uncertainties of radiogenic heat power due to the log-normal distributions of HPE concentrations in crustal rocks.

[1] Gando *et al* (2013) arXiv: 1303.4667. [2] Bellini *et al* (2013) arXiv: 1303.2571. [3] Huang *et al* (2013) G-Cubed, doi: 10.1002/ggge.20129.

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