Pre-mining environmental assessment of the Shuteen area, South Mongolia

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Shuteen area is located in South Mongolia and the surrounding region is a highly potential area of porphyry-type copper mineralization [1, 2]. The aim of our research is to carry out pre-mining environmental geochemical assessment in relation to geological setting and mineralization of the Shuteen area. The environmental assessment was based on soil and water geochemistry to identify the background distribution of heavy metals.

Fifty seven soil samples were collected from major dry streams and narrow down stream sediments. Average contents of heavy metals, that cause major pollution in the Shuteen soil are: Cu ~35 ppm, Mo ~1 ppm, As ~16 ppm, Co ~8 ppm, Ni ~24 ppm, Pb ~14 ppm, V ~86 ppm, Zn ~50 ppm, Cd ~0.1 ppm, Sn ~1 ppm, Sr ~351 ppm and Cr ~60 ppm. Heavy metal content in the soil do not exceed the permitted limit [3]. There was no special distribution difference in relation to geological structures, lithology, geomorphology, wind and flow direction. Nine water samples were collected from drinking and livestock watering wells. Theses were at an average temperature 20.2^{o}C, pH 9.14, and electric conductivity 0.13 for the water samples from the Shuteen area. Water samples contain F^- above the permitted limit guided in Mongolian National Standard (MNS) on drinking water quality [4]. Cl^-, NO_2^-, Br^-, NO_3^-, PO_4^{3-}, SO_4^{2-} are within the permitted value. Heavy metals contents of Cu, Cr, Pb and Zn are much lower and Mo, As, Ba and U are close to the limit guided in MNS [4]. The water quality concern is the salinity along with the occasional occurrence of trace elements like As and F. The result of the water and soil geochemistry of the Shuteen area indicates no specific relation to the geological setting and mineralization. The chemical composition of the water is due to the Gobi region. This environmental assessment results are an indication of present day natural baseline.

[1] Batkhishig B., (2005) PhD thesis, Tohoku Univ. Japan. [2] Batkhishig et al., (2010), Jour. Asian Earth Sci. 37, 399–411. [3] MNS 0900:2005 (2005) Drinking water quality, 11 p. [4] MNS 5850:2008 (2008) Soil quality 6 p.