

Heavy metal distribution in the Erdenet Mine area, North Mongolia

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Main goal of this study is to assess a change of heavy metal distribution in the Erdenet Mine area based on soil and river water geochemistry. Based on a geochemical study of more than 100 rock samples, 109 soil samples, 14 water samples, a geology based environmental study of the Erdenet Mine area has been done by our research ten years ago [1,2].

Result shows that elements, such as Cu, Mo, Pb, Co, As and Zn are much more accumulated in soils in area close to open pit mine and tailing (within ca. 5 km vicinity of the mine). General enrichment of heavy metals observed in eastern side of open pit and tailings could be explained by dominant wind direction from west to east and river stream direction. Heavy metals pollute only soil surface depending on dry climate with low annual precipitation (~250 mm). Cu and Mo show a correlation in rocks of Erdenet Porphyry Association ($r=0.59$) indicating their magmatic source. Their correlation coefficient increased in soil ($r=0.83$) than rock signifying later effect, e.g. mining activity.

We assess a decade change of heavy metal distribution in the Erdenet Mine area based on soil and river water samples collected from the same positions as collected 10 years ago.

Heavy metals such as Cu, Mo, As, Co, Ni and V contents in soil samples collected in 2016 show increased values when compared to samples of 10 years ago. Some samples close to tailings lake and dam show Cu and Mo contents higher than standard limit by MNS [3], some even at the level of hazardous limit in samples along the Erdenet river valley. Mo, As, F⁻ and NO₂⁻ content is high compared to drinking water standard [4] in some water samples from Erdenet River and tailing lake.

Compared result of soil and river water samples collected in 2006 and 2016 from the Erdenet Mine area suggest that environmental assessment is required every year at the same season. Main reason of pollution is tailing lake which requires more careful monitoring and remediation technology.

- [1] Munkhtsengel B. (2007) PhD thesis, Tohoku Univ. Japan.
[2] Ohara M. et al., (2006). *Proc. of 9th Intern. Symp. on Min. Explor.*, 19-21. [3] MNS 5850:2008 (2008) Soil quality 6 p.
[4] MNS 0900:2005 (2005) Drinking water quality, 11 p.