Preliminary environmetal magnetic results of pedogenic processes at mine tailings in the historic Kamegai deposit, Toyama, Japan

K. KAWASAKI[1]* AND K. HORIKAWA[1]

[1]Univeristy of Toyama, Toyama-shi, Toyama, 930-85555 Japan. (*correspondence: kkawasak@sci.u-toyama.ac.jp)

Background

Environmental magnetic results are reported for the mine tailings of the historic Kamegai Pb-Zn-Ag deposit at Mt. Hachibuse in Toyama, Japan. The Kamegai deposits were mined between 1567 and 1926, leaving a great amount of mine tailings in the region. These tailings may generate acidic waters containin high concentrations of suphide and metals. The areas where the mine tailings were discaded at Mt. Hachimuse are eailisy recognized by the little vegetation. The fern *Athyrium yokoscense* is the most common species in the area and it is known to to flourish at sites that are highly polluted with heavy metals such as cadmium, copper, lead and zinc [1]. Also this fern is well known to accumulate a large amount of metals in the tissues, particularly in its roots.

Discussion of Results

Environmental anaylyses have been used to charactrize the pedogenic processes resulting from fern growth in the tailings. In-field and in-laboratory magnetic susceptibility measurements show that the closer to the fern, the lower the observed suscetpbility. In addtion, the rock magnetic analyses of auger core soil samples that were taken at 0 m, 0.15 m, 0.6 m from the fern indicate an increase in the relative amounts of low coercivity minerals at a depth of ~0.15 m at the 0 and 0.15 m locations. Conversely, an increase in the relative amounts of high coervitiy minerals are observed at the same ~0.15 m depths at the 0.6 m location. The results indicate that the changes of the rock magnetic properites of the subsurface are reflected either by the physicochemical conditions caused by the growth of the *Athyrium yokoscense* or by the effecst of the fern's metal uptake although a variety of geologic, biologic, meteorologic and anthropogneic factors need to be considred to interprete the subsrface pedogenic processes.

[1] Kamachi *et al*. (2005) *J. Plant. Res*. **118**, 137-145.