Preliminary environmental magnetic results of pedogenic processes in mine waste during plant growth.

*川崎 一雄[1]、蒲池 浩之[1]、酒井 英男[1]
*Kazuo Kawasaki[1], Hiroyuki Kamachi[1], Hideo Sakai[1]

1. 富山大学大学院理工学研究部（理学）
1. Graduate School of Science and Engineering for Research, University of Toyama

The historic Kamegai Pb-Zn-Ag deposit at Mt. Hachibuse in Toyama, Japan, was mined between 1567 and 1926, leaving considerable mine waste in the region. This mine waste may generate acidic ground water containing high concentrations of sulphide and metals. Environmental magnetic results are reported here on the changes in magnetic properties of the Kamegai mine’s waste from the growth of the fern, *Athyrium yokoscense*. This fern is known to flourish at sites that are highly polluted with heavy metals such as cadmium, copper, lead and zinc. Six mixtures were prepared from two different soil types, mine waste and synthetic soils of mountain sand, vermiculite and artificial magnetite powder. One mixture of each soil type is a control soil sample without any fern and the other four were planted with *Athyrium yokoscense*. In-field magnetic susceptibility measurements of the soil surfaces were done about once a week for 20 weeks. Overall, the mean magnetic susceptibility of soils with ferns decreased more than the control soils without ferns. However, there is no obvious correlation between the decay rates of susceptibility and plant growth. After 20 weeks the soils were collected for further rock magnetic analyses. Higher mass susceptibilities were observed in soils with the fern, especially near the fern’s roots. More rapid stepwise isothermal remanent magnetization acquisition curves as well as alternating field demagnetization decay curves were observed in the soils with ferns, indicating that more low coercivity magnetic minerals, such as magnetite, were generated in these soils. Therefore, the mass susceptibilities appear to show magnetic enhancement by pedogenic processes. Conversely, the in-field magnetic susceptibility measurements for which the lower magnetic susceptibility were observed in the soils with ferns likely detect the spatial distribution of the fern’s roots.

キーワード：環境磁気、土壌生成、ヘビノネゴザ
Keywords: Environmental magnetism, Pedogenesis, Athyrium yokoscense

