# High ecological risks of nickel in basalt derived agricultural soil and associated crops

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There is growing awareness and concern about heavy metals accumulated in agricultural soil and crops for their adverse effects on human health. Soils can be contaminated with heavy metals not only through anthropogenic sources, i.e. smelters, mining and fertilizers, but also from geogenic sources, such as ultramafic and basic rocks. Soils, developed from weathering of basalt (basic rock), are widely distributed around the world; however, fewer studies have systematically determined the contents of heavy metals and ecological risks in the basaltic soils and associated crops. In this study, we investigated the distribution of eight heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, and Zn) in basaltic soils and associated crops collected from rice and wheat fields in Xuyi County, a basaltic area in Jiangsu Province, eastern China, to evaluate the bioavailability of heavy metal in soils as well as for demonstrating the health risks in crops. The results show that these soils had higher concentrations of Cr, Ni and Zn. Among them, Ni concentration exceeded the current Chinese Risk Control Standard for Soil Contamination of Agricultural soil (on trial) in 80% of sampling sites. Wheat and rice grains displayed high level of Ni (1.42 and 3.71mg/kg on average, respectively), and presented as the highest values compared with previous studies in other regions of China. Furthermore, the fraction of 0.01 M CaCl2 extractable Ni represented that of directly uptake by wheat and rice, and may be served as a suitable Ni bioavailability index. Our study shows that basalt derived soil has high ecological risks of Ni and should be concerned about food safety.