Removal of Organic Matter using Soil Sample Digestion and its Effects on REEs concentration and their patterns

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Many different digestion methods have been described in the literature for geological and environmental samples. No assessment, however, has been made to date on the potential impact of such aggressive digestion methods on the distribution of REEs and the possible fractionation of their patterns. In this study, we dissolved a series of soil samples using a) concentrated nitric acidic (HNO_3), b) concentrated nitric acidic followed by hydrogen peroxide (H_2O_2), and c) ashing (Loss On Ignition – LOI) followed by concentrated nitric acidic digestion to dissolve shell fragments. All these methods were followed by total digestion using concentrated HF, HCl and HNO_3. Compared with the other two methods, the use of H_2O_2 resulted in a decrease in the concentration of REEs, presumably due to incomplete digestion of organic matter. In contrast, digestion by HNO_3 or LOI was able to completely dissolve the organic matter from these samples and yielded good REEs recovery. LOI yielded slightly higher REE concentrations compared with HNO_3. The REE patterns were not influenced by the digestion procedure.