

Elements of soil in dry evergreen forest of Thailand

M.Sakai¹, K.Sera² and S. Goto³

¹Forestry and Forest Products Research Institute
1 Matsunosato, Tsukuba, Ibaraki 305-8687, Japan

²Cyclotron Research Center, Iwate Medical University
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

³Takizawa Laboratory, Japan Radioisotope Association
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

Abstract

The climate change is emerging as perhaps the greatest environmental topic of the twenty-first century. Forests in tropics have very important roles in climate change. More than a half of global carbon stock is in tropical forests (54.8%), following by boreal (31.5%) and temperate (13.8%) forests. A half of global C is stored in soils, 42% in biomass, and 8% in deadwood. Understanding the decomposition rate and the mechanism of the long-term stabilization of carbon in soils is crucial in order to estimate the carbon cycle in global level. In order to evaluate the relationship between the stabilization of soil organic matter and the behavior of elements in soil, we studied the major and minor elements in soil profiles.

The study site was located at Sakaerat Silvicultural Research station (14°28'06.1"N, 101°54'15.0"E; alt., 420 m), Nakhon Rachasima Province, Northeast Thailand. Meteorological conditions were 26°C, annual mean air temperature and 1,100 mm, annual precipitation with the dry (November–April) and wet (May–October) seasons. The soil type is Orthic Acrisols (FAO/UNESCO).

The element concentrations were determined by the proton-induced X-ray emission (PIXE) method at Nishina Memorial Cyclotron Center. Soil samples were adjusted by the internal reference method.

The contents of major elements, Si, Al, and Fe, are near to the value of the literature. The strong weathering in the tropics causes to the lower contents of major elements, Na, Mg, Ca and K. The contents of Fe, Ti, Mg, Y, As, Cr, Ni, Ga, and Cu are increasing with depth. Conversely, the elements of Ca, Br, S, and Mn show decreasing with depth. The higher contents in top soil show the effect of large input of the organic matter, such as litter and fine root litter.