



Availability of goethite-associated phosphorus to beeches (*Fagus sylvatica*)

Anika Klotzbücher, Florian Schunck, Klaus Kaiser, Thimo Klotzbücher, Bruno Glaser, and Robert Mikutta
Martin-Luther-University Halle-Wittenberg, Agricultural and Nutritional Sciences, Soil Science and Soil Protection, Halle,
Germany (anika.klotzbuecher@landw.uni-halle.de)

The beech forest Löss is classified as P-recycling system, i.e. it is supposed to have a very tight P cycle in order to sustain the vegetation's P demand. Accordingly, previous soil profile analyses demonstrated that P concentrations are several times higher in the forest floor than in the mineral soil horizons. However, considering P stocks, only 6 % of total P within the upper 106 cm of the soil profile is stored in the forest floor. As the ecosystem is limited in P, beeches possibly acquire additional P from subsoil horizons. The quantitatively most important sorption sites for P are surfaces of hydrous Fe oxides. There is evidence that plants and microorganisms can mobilize and utilize this P at least to some extent. In order to investigate these processes in more detail, we conducted a mesocosm experiment. Beeches were grown on Löss subsoil (Bw horizon) with added goethite-associated P, either in organic (phytate) or inorganic (phosphate) form. Additionally, controls with pure phytate, phosphate, goethite, and soil only were run. Immediately before harvest of trees, a ^{13}C pulse labelling experiment was conducted in order to quantify photosynthate production and possible translocation into soil, in particular the rhizosphere. Plant P uptake and shifts in different soil P fractions will be quantified. Analyses are still ongoing and will be presented at the conference.