PhD project: Johan Iwald

Spatial and temporal trends in soil acidity and carbon pools in Swedish forest soils – evaluation of data from the Swedish Forest Soil Inventory

The overall aim of this project is to analyse and explain geographical and temporal trends in soil acidification and soil organic carbon over the last thirty years in forest soils in Sweden. The research will focus on two paradoxical observations (i) the seemingly diverging trends in soil and water acidification after the reduction in acid deposition and (ii) the trend with lower soil carbon amounts in soil profiles towards the north. We hypothesise that the observed changes in soil acidbase status can be explained by soil chemical processes driven by a change in ionic strength and a shift in the acid input from being dominated by deposition to a domination of acid input through biomass growth. Regarding the trend of decreasing soil carbon towards the north we suggest that differences in N input is one key factor but that the increased N input cannot explain the trend alone. Factors like tree species composition and precipitation (water availability) may constitute other factors.

The hypotheses will be tested by combination of process analysis using modelling tools in combination with a statistical analysis of spatial and temporal trends in the data material collected in the Swedish Forest Soil Inventory between 1983 and 2012.