

PROJECT INFORMATION

Project title: *Model simulations to disentangle the effects of changes in CO₂, climate and deposition on trends in leaf stoichiometry*

Project ID: 135

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PROJECT DESCRIPTION

Increased carbon and nitrogen inputs deriving from human activities seem not to be paralleled by a similar increase in phosphorus. The resulting imbalance in forests stoichiometry is likely to reduce the capacity of terrestrial ecosystems to store carbon during this century (Penuelas et al. – 2013). Various studies have analysed the nutritional status of the main European tree species over the last decades and observed some alarming trends in foliar nutrient concentrations, in particular for phosphorous (Jonard et al. – 2009, Jonard et al. – 2014). The underlying drivers behind the change in foliar nutrient concentrations are not yet identified. This project is aimed to disentangle the effects of increased carbon emissions, climate change, and N deposition on the nutritional status of European forests based on simulations with the land surface model ORCHIDEE. ICP Forests dataset will be used to evaluate the model.

References

- Jonard M, André´ F, Dambrine E, Ponette Q, Ulrich E (2009) *Temporal trends in the foliar nutritional status of the French, Walloon and Luxembourg broad-leaved plots of forest monitoring*. Ann For Sci 66:1–10
- Jonard, M., Fürst, A. Verstraeten, A. Benham, S. et al, (2014) *Tree mineral nutrition is deteriorating in Europe*, Global Change Biology
- Penuelas J, Poulter B, Sardans J, Ciais P, van der Velde M, Bopp L, Boucher O, Godderis Y, et al. (2013). *Human-induced nitrogen-phosphorus imbalances alter natural and managed ecosystems across the globe*. Nature Communications 4: no.2934
- Reed, S., Yang, X., and Thornton, P. (2015). *Incorporating phosphorus cycling into global modeling efforts: A worthwhile, tractable endeavor*. New Phytologist Tansley Insights, 208, 324–329.