

PROJECT INFORMATION

Project title: Nutrient limitation or enrichment in European forests

Project ID: 150

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PROJECT DESCRIPTION

Since the ICP monitoring started, we have seen significant decreases in sulphur deposition while nitrogen deposition has showed varying trends. Data from the ICP-IM network were used to show negative effects on plant diversity from N deposition (Dirnböck et al. 2014), a result supported in later studies (Simkin 2016). However, Jonard et al. (2015) have shown that European forests undergo an increasing nutrient limitation driven by increased tree growth as an effect of increased CO₂ levels. If this true, we hypothesise that increasing tree growth not only lowers nutrient availability for understorey plants but also causes increased shading from a denser canopy, which together withholds major responses in understorey plants. We will use existing data from the ICP-IM and ICP Forests networks on leaf and soil nutrient content and compare the results with trends in understorey vegetation, making use of deposition gradients across relevant sites in Europe. We will also examine how these deposition gradients are reflected in foliar nutrient balances. By utilising longitudinal long term vegetation data in combination with recent and past data on nutrient status, we may explain why few studies have been able to show effects in the understorey from the increased nitrogen deposition over the past half a century.

Dirnböck, T., Grandin, U., Bernhardt-Römermann, M., Beudert, B., Canullo, R., Forsius, M., ... Uzieblo, A. K. (2014). Forest floor vegetation response to nitrogen deposition in Europe. *Global Change Biology*, 20(2), 429–440.
<https://doi.org/10.1111/gcb.12440>

Jonard, M., Fürst, A., Verstraeten, A., Thimonier, A., Timmermann, V., Potočić, N., ... Rautio, P. (2015). Tree mineral nutrition is deteriorating in Europe. *Global Change Biology*, 21(1), 418–430. <https://doi.org/10.1111/gcb.12657>

Simkin, S. M., Allen, E. B., Bowman, W. D., Clark, C. M., Belnap, J., Brooks, M. L., ... Waller, D. M. (2016). Conditional vulnerability of plant diversity to atmospheric nitrogen deposition across the United States. *Proceedings of the National Academy of Sciences*, 113(15), 4086. <https://doi.org/10.1073/pnas.1515241113>
