

PROJECT INFORMATION

Project title: The challenge of comparing nutrient availability among terrestrial ecosystems – potential of soil-, plant- and remote sensing-based nutrient metrics, and development of a metric for temperate and boreal forests

Project ID: 151

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PROJECT DESCRIPTION

We have been invited to write a review about nutrient availability metrics, to compare the nutrient status among terrestrial ecosystems. We aim to discuss and contrast the potential and limitations of soil-, plant- and remote sensing-based nutrient metrics. The requested soil and productivity data will be used to evaluate and, if necessary, update an existing soil nutrient availability metric for Sweden presented in Van Sundert et al. (2018), with the aim to describe spatial variation in climate-, species- and stand age normalized productivity across European forests. The stoichiometry and productivity data will be used as additional quantitative support for our review on the potential of soil- vs plant-based metrics.

Methods

1. Apply structural equation modeling to 'Normalize' forest productivity for direct effects of climate, stand age and species, such that the influence of nutrient availability remains.
2. Fill in soil parameters in the metric proposed by Van Sundert et al. (2018). Evaluate performance of this metric as follows: Normalized productivity ~ Metric
3. If necessary and possible, adjust the metric by filling in new regression formulae from the ICP Forests DB for 'Normalized productivity ~ soil variable'. Recalculate the metric as in Van Sundert et al. (2018) and evaluate again.
4. Investigate potential of stoichiometry to explain spatial variation in normalized productivity. Method = multiple regression + assess whether stoichiometry is strongly species dependent as we anticipate.

Reference

Van Sundert, K., Horemans, J.A., Stendahl, J., & Vicca, S. (2018). The influence of soil properties and nutrients on conifer forest growth in Sweden, and the first steps in developing a nutrient availability metric. *Biogeosciences*, 15, 3475–3496.