Methods

The Multiple Element Limitation in Northern Hardwood Ecosystems (MELNHE) experiment has been adding 30 kg/ha/yr of N (NH₄NO₃) and 10 kg/ha/yr P (NaH₂PO₄) in a factorial combination by hand each spring since 2011. In August of 2017, the National Ecological Observatory Network Airborne Observatory Platform flew over 9 forest stands in the MELNHE experiment, collecting hyperspectral canopy reflectance at 400+ bands per 1 m², high-resolution RGB images, and LiDAR data.

Results:

- Canopy reflectance was lowest in young stands (p < 0.01).
- Trees that received P reflected more light at 705 nm compared to trees that did not receive P (p < 0.01).
- Trees that received N reflected less light at 705 nm compared to trees that did not receive N (p = 0.01).

Discussion:

- Treatment effect was detected at the plot level without accounting for species-level differences.
- Trees that received N may reflect less because they have more chlorophyll.
- Young forests reflected less light than old forests.
- After decades of anthropogenic N deposition, P availability likely decreased relative to that of N.