**Inferences on the nitrogen cycle: coupled isotopic and hyperspectral approaches to assess forest retention and responses to nitrogen additions**

Human alterations to the global nitrogen (N) cycle have dramatically increased both acute (e.g., fertilization) and chronic (e.g., atmospheric deposition) rates of N input into terrestrial environments. Forest ecosystem retention of this added N has important implications on terrestrial productivity and adjacent aquatic ecosystem health. Traditionally, site-specific, labor-intensive, mass balance approaches have been required to quantify ecosystem N retention or loss, but recent evidence suggest the potential use of N stable isotope signatures (δ15N) as integrative indicators of the degree of openness or closedness of the N cycle in forests. Here we discuss the potential of using hyperspectral remote sensing to assess foliar δ15N as a static assessment of historical N cycling rates and using those inferences to predict future forest ecosystem responses to added N across the managed forests of the southeastern (loblolly pine) and Pacific Northwest (Douglas-fir) Unites States as well as New Zealand (radiata pine).