The Laboratory of Tree-Ring Research

presents a talk by

Isabel Dorado

(Technical University of Madrid, Spain)

Coupling between summer North Atlantic jet variability and European forest productivity and growth

Wednesday, November 24, 2021 - 12:00pm to 1:00pm
Room: Zoom Only

Dynamically-driven extreme weather events have large ecological, social and economic consequences including large tree-growth reductions and forest mortality. These events are likely to become globally more frequent and intense under increased anthropogenic forcing and associated changes in coupled atmosphere-ocean circulation. The jet stream latitude (JSL) over the North Atlantic-European domain provides a synthetic and robust physical framework that integrates climate variability not accounted for by atmospheric circulation patterns. Problematically, we lack a quantitative perspective on the dynamic drivers of summer climate extremes, and particularly JSL variability, in relation to forest productivity. The assessment of the physical coupling between summer North Atlantic-European JSL variability and anomalies in temperate European beech (Fagus sylvatica L.) forest radial growth and productivity over Europe reveals not uniform impact across Europe. Surface climate impacts of north-south summer JSL displacements create a northwestern-southeastern dipole in forest productivity and radial-growth anomalies. Summer JSL variability over the eastern part of the North Atlantic-European domain (5-40E) exerts the strongest impact on European beech forests, inducing anomalies in carbon uptake and radial growth of up to 30% and 50%. The net effects of JSL movements on terrestrial carbon fluxes will depend on forest density, carbon stocks, and productivity imbalances across biogeographic regions.

The University of Arizona