

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION



Initial coordinators:: Nima Madani, John S. Kimball
Collaborators needing access to data: none
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DATASET PROPOSED

La-Thuile, the complete dataset

TITLE OF PAPER AND OUTLINE

Quantifying North American ecosystems optimal light use efficiency beyond land cover types

Remote sensing based light use efficiency (LUE) models are commonly used for estimating and monitoring vegetation productivity at regional to global scales. These models use spectral vegetation indices and ancillary surface meteorology and land cover inputs to estimate vegetation gross primary production (GPP) and photosynthetic carbon (CO₂) uptake. A common model assumption is that plants in a biome matrix operate at their photosynthetic capacity under optimal climatic conditions. A prescribed biome optimal light use efficiency parameter defines the maximum photosynthetic carbon conversion rate under prevailing climate conditions and is a large source of model uncertainty. The goal of this proposal is using tower eddy covariance measurement based carbon flux data for spatially explicit estimation of optimal LUE and spatial extrapolation and development of optimal LUE maps over a North American domain. We will use these results within a satellite based LUE model to evaluate relative improvement in estimated GPP.

PROPOSED SITES TO BE INVOLVED

The proposal has a North American regional focus. 61 tower site records from the La-Thuile database, and located within Canada, Alaska and the continental USA with at least 1 year of carbon flux data and meteorological fields will be used for model development and validation activities; the proposed tower sites for this study are summarized below.

Site.ID	Name	Country
CA-Ca3	British Columbia- Campbell River - Young Plantation Site	Canada
CA-Gro	Ontario- Groundhog River-Mat. Boreal Mixed Wood	Canada
CA-Let	Lethbridge	Canada
CA-NS2	UCI-1930 burn site	Canada

CA-Qcu	Quebec Boreal Cutover Site	Canada
CA-SF1	Sask.- Fire 1977	Canada
CA-SJ3	Sask.- SSA 1975 Harv. Yng Jack Pine	Canada
CA-TP4	Ontario- Turkey Point Mature White Pine	Canada
CA-WP1	Western Peatland- LaBiche-Black Spruce/Larch Fen	Canada
US-Arc	OK - ARM Southern Great Plains control site- Lamont	USA
US-Aud	AZ - Audubon Research Ranch	USA
US-Bar	NH - Bartlett Experimental Forest	USA
US-Bkg	SD - Brookings	USA
US-Blo	CA - Blodgett Forest	USA
US-Bo1	IL - Bondville	USA
US-Fmf	AZ - Flagstaff - Managed Forest	USA
US-FPe	MT - Fort Peck	USA
US-FR2	TX - Freeman Ranch- Mesquite Juniper	USA
US-Goo	MS - Goodwin Creek	USA
US-Ha1	MA - Harvard Forest EMS Tower (HFR1)	USA
US-Ho1	ME - Howland Forest (main tower)	USA
US-Ho2	ME - Howland Forest (west tower)	USA
US-IB1	IL - Fermi National Accelerator Laboratory- Batavia	USA
US-Ivo	AK - Ivotuk	USA
US-KS2	FL - Kennedy Space Center (scrub oak)	USA
US-Los	WI - Lost Creek	USA
US-LPH	MA - Little Prospect Hill	USA
US-Me1	OR - Metolius - Eyerly burn	USA
US-MMS	IN - Morgan Monroe State Forest	USA
US-MOz	MO - Missouri Ozark Site	USA
US-Ne3	NE - Mead - rainfed maize-soybean rotation site	USA
US-NR1	CO - Niwot Ridge Forest (LTER NWT1)	USA
US-Oho	OH - Oak Openings	USA
US-SO3	CA - Sky Oaks- Young Stand	USA
US-SP3	FL - Slashpine-Donaldson-mid-rot- 12yrs	USA
US-SRM	AZ - Santa Rita Mesquite	USA
US-Syv	MI - Sylvania Wilderness Area	USA
US-Ton	CA - Tonzi Ranch	USA
US-UMB	MI - Univ. of Mich. Biological Station	USA
US-Var	CA - Vaira Ranch- Ione	USA
US-WCr	WI - Willow Creek	USA
US-Wi4	WI - Mature red pine (MRP)	USA
US-Wkg	AZ - Walnut Gulch Kendall Grasslands	USA
US-Wrc	WA - Wind River Crane Site	USA
US-Dk3	NC-Duke Forest Loblolly Pine	USA
CA-Ca2	BC-Campbell River 2000 Douglas-fir	Canada
US-Wi7	Wisconsin Red Pine	USA
US-Wi8	Young hardwood clearcut (YHW)	USA
US-Me4	Metolius Old Pine	USA
CA-TP3	Ontario- Turkey Point Middle-aged White Pine	Canada

US-ARb	OK - ARM Southern Great Plains burn site- Lamont	USA
US-Me3	OR - Metolius-second young aged pine	USA
US-SO2	CA - Sky Oaks- Old Stand	USA
CA-Ca1	British Columbia- Campbell River - Mature Forest Site	Canada
CA-NS3	UCI-1964 burn site	Canada
CA-NS5	UCI-1981 burn site	Canada
CA-Ojp	Sask.- SSA Old Jack Pine	Canada
US-Me2	OR - Metolius-intermediate aged ponderosa pine	USA
US-Ne1	NE - Mead - irrigated continuous maize site	USA
US-Bn1	AK - Bonanza Creek, 1920 Burn site near Delta Junction	USA
CA-SF3	Sask.- Fire 1998	Canada
CA-Obs	Sask.- SSA Old Black Spruce	Canada

PROPOSED RULES FOR CO-AUTHORSHIP

We will follow guidelines of the FLUXNET and La-Thuile data policies and we will be responsive to the needs of the Tower Principal Investigators regarding intellectual property rights of their data. Co-authorship may also be granted to individual PIs who contribute to the intellectual development of the project.