PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION

Initial coordinators: Nima Madani, John S. Kimball
Collaborators needing access to data: none
Affiliations: Numerical Terradynamic Simulation Group and Flathead Lake Biological Station, University of Montana, Missoula, MT

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.

<table>
<thead>
<tr>
<th>Site.ID</th>
<th>Name</th>
<th>Country</th>
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</thead>
<tbody>
<tr>
<td>CA-Ca3</td>
<td>British Columbia- Campbell River - Young Plantation Site</td>
<td>Canada</td>
</tr>
<tr>
<td>CA-Gro</td>
<td>Ontario- Groundhog River-Mat. Boreal Mixed Wood</td>
<td>Canada</td>
</tr>
<tr>
<td>CA-Let</td>
<td>Lethbridge</td>
<td>Canada</td>
</tr>
<tr>
<td>CA-NS2</td>
<td>UCI-1930 burn site</td>
<td>Canada</td>
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</tbody>
</table>
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
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Country</th>
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<tbody>
<tr>
<td>US-ARb</td>
<td>OK - ARM Southern Great Plains burn site - Lamont</td>
<td>USA</td>
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<tr>
<td>US-Me3</td>
<td>OR - Metolius-second young aged pine</td>
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<tr>
<td>US-SO2</td>
<td>CA - Sky Oaks- Old Stand</td>
<td>USA</td>
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<tr>
<td>CA-Ca1</td>
<td>British Columbia- Campbell River - Mature Forest Site</td>
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<td>UCI-1964 burn site</td>
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<td>CA-NS5</td>
<td>UCI-1981 burn site</td>
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<td>CA-Ojp</td>
<td>Sask.- SSA Old Jack Pine</td>
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<tr>
<td>US-Me2</td>
<td>OR - Metolius-intermediate aged ponderosa pine</td>
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<td>US-Ne1</td>
<td>NE - Mead - irrigated continuous maize site</td>
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<td>AK - Bonanza Creek, 1920 Burn site near Delta Junction</td>
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<td>CA-SF3</td>
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<td>CA-Obs</td>
<td>Sask.- SSA Old Black Spruce</td>
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</table>

**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.