

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION



Initial coordinators:: Dennis Baldocchi, Cove Sturtevant
Collaborators needing access to data: none
Affiliations: Berkeley

DATASET PROPOSED

LaThuile

TITLE OF PAPER AND OUTLINE

How Day and Night Sampling Minimizes Autocorrelation between Canopy Photosynthesis and Ecosystem Respiration

We plan to use data from 92 sites, representing 217 site years. Attached is a list of the datasets to be used in the statistical analysis.

We ask permission to use the data for a global statistical analysis. Since the LaThuile dataset is now 7 years old and this is a theoretical analysis, validated with FLUXNET data, co-authorship is possible if there is significant contributions to overarching ideas, the analysis, and writing.

Abstract

It is important to partition eddy covariance measurements of net carbon dioxide exchange into its offsetting gross fluxes, canopy photosynthesis and ecosystem respiration, to understand the biophysical controls on these fluxes. Yet, there is concern that such partitioning may suffer from spurious correlation because derived values of canopy photosynthesis and ecosystem respiration both contain information on net carbon fluxes.

We hypothesize that self-correlation can be minimized using day-night conditional sampling. We derive explicit equations that quantify self-correlation, using day-night sampling, and apply this theory to ideal measurements of carbon exchange of over a vigorous, irrigated alfalfa field in the sunny and windy region of the California Delta. In this case we find the correlation coefficient between canopy photosynthesis and ecosystem respiration to be less than -0.1 , indicating a high degree of mutual independence from one another.

We then expanded this analysis to the La Thuile FLUXNET database that spans a spectrum of climate and plant functional types. We find, on average, that spurious correlation between derived gross carbon fluxes and net carbon exchange is small and close to zero. But, there are certain climate zones and plant functional types where the correlation factors can either approach negative one (highly seasonal, deciduous forests) or positive one (evergreen, boreal conifer forests).

An ability to produce independent estimates of canopy photosynthesis and ecosystem respiration is needed to validate and parameterized ecosystem carbon cycle models that are used in the current and next generation of coupled carbon cycle-climate models.

PROPOSED SITES TO BE INVOLVED

	Years	PI
'BW-Ma1.2000.synth.hourly.mat'		
'CA-Ca1.1998.synth.hourly.mat'	1998-2005	
'CA-Ca2.2001.synth.hourly.mat'	2001-2005	
'CA-Ca3.2002.synth.hourly.mat'	2002-2005	
'CA-Let.2002.synth.hourly.mat'	2002-2004	
'CA-Mer.1999.synth.hourly.mat'	1999, 2002,2004	
'CA-NS1.2004.synth.hourly.mat'		
'CA-NS3.2002.synth.hourly.mat'		
'CA-NS3.2004.synth.hourly.mat'		
'CA-NS5.2004.synth.hourly.mat'		
'CA-NS6.2003.synth.hourly.mat'		
'CA-NS6.2004.synth.hourly.mat'		
'CA-NS7.2003.synth.hourly.mat'		
'CA-Oas.1997.synth.hourly.mat'	1997-2005	
'CA-Obs.2000.synth.hourly.mat'	2000-2005	
'CA-Ojp.2000.synth.hourly.mat'	2000-2005	
'CA-Qcu.2003.synth.hourly.mat'	2003,2005,2006	
'CA-Qfo.2005.synth.hourly.mat'		
'CA-SJ2.2004.synth.hourly.mat'		
'CA-SJ3.2005.synth.hourly.mat'		
'CA-TP4.2004.synth.hourly.mat'		
'CA-TP4.2005.synth.hourly.mat'		
'CA-WP1.2004.synth.hourly.mat'		
'CA-WP1.2005.synth.hourly.mat'		
'CH-Oe1.2004.synth.hourly.mat'	2004-2006	
'CH-Oe2.2005.synth.hourly.mat'		
'CN-Cha.2003.synth.hourly.mat'		
'CN-Do1.2005.synth.hourly.mat'		
'CN-Do2.2005.synth.hourly.mat'		
'CN-Do3.2005.synth.hourly.mat'		
'CN-HaM.2003.synth.hourly.mat'		
'CN-HaM.2004.synth.hourly.mat'		
'DE-Geb.2004.synth.hourly.mat'		
'DE-Geb.2005.synth.hourly.mat'		
'DE-Gri.2006.synth.hourly.mat'		
'DE-Hai.2003.synth.hourly.mat'		
'DE-Hai.2005.synth.hourly.mat'		
'DE-Har.2005.synth.hourly.mat'		
'DE-Har.2006.synth.hourly.mat'		
'DE-Meh.2004.synth.hourly.mat'		
'DE-Meh.2005.synth.hourly.mat'		
'DE-Meh.2006.synth.hourly.mat'		

'DE-Tha.1998.synth.hourly.mat'	1998-2006	
'DE-Wet.2004.synth.hourly.mat'		
'DE-Wet.2006.synth.hourly.mat'		
'DK-Ris.2004.synth.hourly.mat'		
'DK-Ris.2005.synth.hourly.mat'		
'DK-Sor.2001.synth.hourly.mat'		
'DK-Sor.2002.synth.hourly.mat'		
'DK-Sor.2006.synth.hourly.mat'		
'ES-ES1.1999.synth.hourly.mat'		
'ES-ES1.2005.synth.hourly.mat'		
'ES-ES2.2005.synth.hourly.mat'		
'ES-LMa.2005.synth.hourly.mat'		
'FI-Hyy.1997.synth.hourly.mat'		
'FI-Hyy.1998.synth.hourly.mat'		
'FI-Kaa.2000.synth.hourly.mat'		
'FI-Kaa.2001.synth.hourly.mat'		
'FI-Sod.2004.synth.hourly.mat'		
'FI-Sod.2005.synth.hourly.mat'		
'FI-Sod.2006.synth.hourly.mat'		
'FR-Gri.2005.synth.hourly.mat'		
'FR-Gri.2006.synth.hourly.mat'		
'FR-Hes.1998.synth.hourly.mat'		
'FR-Hes.1999.synth.hourly.mat'		
'FR-Hes.2001.synth.hourly.mat'		
'FR-Hes.2002.synth.hourly.mat'		
'FR-Hes.2003.synth.hourly.mat'		
'FR-Hes.2004.synth.hourly.mat'		
'FR-Hes.2006.synth.hourly.mat'		
'FR-LBr.2005.synth.hourly.mat'		
'FR-LBr.2006.synth.hourly.mat'		
'FR-Lq1.2004.synth.hourly.mat'		
'FR-Lq1.2006.synth.hourly.mat'		
'FR-Lq2.2004.synth.hourly.mat'		
'FR-Lq2.2006.synth.hourly.mat'		
'FR-Pue.2001.synth.hourly.mat'		
'FR-Pue.2002.synth.hourly.mat'		
'FR-Pue.2003.synth.hourly.mat'		
'FR-Pue.2005.synth.hourly.mat'		
'FR-Pue.2006.synth.hourly.mat'		
'GF-Guy.2004.synth.hourly.mat'		
'HU-Bug.2006.synth.hourly.mat'		
'IE-Dri.2004.synth.hourly.mat'		
'IT-Cpz.2004.synth.hourly.mat'		
'IT-Lav.2004.synth.hourly.mat'		
'IT-Lav.2006.synth.hourly.mat'		
'IT-MBo.2004.synth.hourly.mat'		

'IT-MBo.2005.synth.hourly.mat'		
'IT-MBo.2006.synth.hourly.mat'		
'IT-Noe.2005.synth.hourly.mat'		
'IT-PT1.2003.synth.hourly.mat'		
'IT-Ro1.2002.synth.hourly.mat'		
'IT-Ro1.2003.synth.hourly.mat'		
'IT-Ro1.2006.synth.hourly.mat'		
'IT-Ro2.2002.synth.hourly.mat'		
'IT-Ro2.2003.synth.hourly.mat'		
'IT-SRo.2001.synth.hourly.mat'		
'IT-SRo.2003.synth.hourly.mat'		
'IT-SRo.2006.synth.hourly.mat'		
'JP-Tom.2002.synth.hourly.mat'		
'JP-Tom.2003.synth.hourly.mat'		
'NL-Ca1.2006.synth.hourly.mat'		
'NL-Hor.2006.synth.hourly.mat'		
'NL-Loo.2001.synth.hourly.mat'		
'NL-Loo.2002.synth.hourly.mat'		
'NL-Loo.2003.synth.hourly.mat'		
'NL-Loo.2005.synth.hourly.mat'		
'NL-Loo.2006.synth.hourly.mat'		
'PT-Mi2.2005.synth.hourly.mat'		
'RU-Fyo.1999.synth.hourly.mat'		
'RU-Fyo.2004.synth.hourly.mat'		
'RU-Fyo.2005.synth.hourly.mat'		
'RU-Fyo.2006.synth.hourly.mat'		
'SE-Abi.2005.synth.hourly.mat'		
'SE-Deg.2002.synth.hourly.mat'		
'SE-Fla.1997.synth.hourly.mat'		
'SE-Fla.2002.synth.hourly.mat'		
'SE-Nor.1996.synth.hourly.mat'		
'SE-Nor.1997.synth.hourly.mat'		
'SE-Nor.1999.synth.hourly.mat'		
'US-ARM.2003.synth.hourly.mat'		
'US-ARM.2004.synth.hourly.mat'		
'US-Aud.2004.synth.hourly.mat'		
'US-Aud.2005.synth.hourly.mat'		
'US-Bo1.1999.synth.hourly.mat'		
'US-Ho1.1996.synth.hourly.mat'		
'US-Ho1.1998.synth.hourly.mat'		
'US-Ho1.1999.synth.hourly.mat'		
'US-Ho1.2000.synth.hourly.mat'		
'US-Ho1.2001.synth.hourly.mat'		
'US-Ho1.2002.synth.hourly.mat'		
'US-Ho1.2003.synth.hourly.mat'		
'US-Ho1.2004.synth.hourly.mat'		

'US-Ho2.1999.synth.hourly.mat'		
'US-Ho2.2000.synth.hourly.mat'		
'US-Ho2.2001.synth.hourly.mat'		
'US-Ho2.2003.synth.hourly.mat'		
'US-Ho2.2004.synth.hourly.mat'		
'US-IB2.2005.synth.hourly.mat'		
'US-KS2.2004.synth.hourly.mat'		
'US-KS2.2005.synth.hourly.mat'		
'US-KS2.2006.synth.hourly.mat'		
'US-MMS.2001.synth.hourly.mat'		
'US-MMS.2002.synth.hourly.mat'		
'US-MMS.2003.synth.hourly.mat'		
'US-MMS.2004.synth.hourly.mat'		
'US-MMS.2005.synth.hourly.mat'		
'US-MOz.2005.synth.hourly.mat'		
'US-MOz.2006.synth.hourly.mat'		
'US-Me3.2004.synth.hourly.mat'		
'US-Me3.2005.synth.hourly.mat'		
'US-NC2.2006.synth.hourly.mat'		
'US-NR1.1999.synth.hourly.mat'		
'US-NR1.2000.synth.hourly.mat'		
'US-NR1.2002.synth.hourly.mat'		
'US-NR1.2003.synth.hourly.mat'		
'US-SO2.2004.synth.hourly.mat'		
'US-SO2.2006.synth.hourly.mat'		
'US-SO3.2006.synth.hourly.mat'		
'US-SO4.2006.synth.hourly.mat'		
'US-SP2.2001.synth.hourly.mat'		
'US-SP3.2001.synth.hourly.mat'		
'US-SRM.2004.synth.hourly.mat'		
'US-SRM.2005.synth.hourly.mat'		
'US-SRM.2006.synth.hourly.mat'		
'US-Ton.2002.synth.hourly.mat'	2002, 2003, 2005, 2006	D. Baldocchi
'US-UMB.2002.synth.hourly.mat'		
'US-UMB.2003.synth.hourly.mat'		
'US-Var.2002.synth.hourly.mat'	2002, 2003, 2006	D. Baldocchi
'US-WBW.1995.synth.hourly.mat'	1995, 1996, 1997, 1999	D. Baldocchi
'US-Wkg.2005.synth.hourly.mat'		
'US-Wkg.2006.synth.hourly.mat'		
'US-Wrc.2004.synth.hourly.mat'		

PROPOSED RULES FOR CO-AUTHORSHIP

We will follow guidelines of the La Thuile data policy.