

# PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION

**Title: Global land surface evaporation estimated from satellite-based observations**

This work was undertaken as part of the European Union (FP6) funded Integrated Project called WATCH (Contract No. 036946).

## Short Outline

The objective of this work is to develop a new methodology to derive global evaporation almost entirely from satellite observations. The approach uses a variety of satellite sensor products to estimate daily evaporation at a global scale, with a 0.25 degree spatial resolution. Central to this approach is the use of the Priestley and Taylor (PT) (1972) evaporation model. Because the PT equation is driven by net radiation, this strategy avoids the need to specify surface fields of variables, such as the surface conductance, which cannot be detected from space. A key distinguishing feature is the use of microwave derived surface soil moisture, land surface temperature and vegetation density. Our goal is to derive a global 30 year, 0.25 degree daily evaporation data set to be used for studies of the global hydrological cycle.

The model considers only four surface types: 1) snow (or ice) covered land, 2) forest, 3) low vegetation, and 4) bare soil. It comprises four modules describing: the soil moisture profile, the vegetation stress and the resultant actual evaporation. A separate module calculates the evaporation of intercepted rainfall from forest canopies. This latter module and its validation against mass balance measurements are described in a separate paper.

Modelled evaporation for the year 2005 is validated against Fluxnet measurements for each station individually. The stations are grouped by IGBP vegetation type, forest, shrub and savannah, and grassland and croplands. The bias in the predicted evaporation as compared to the observation for the year 2005 is also examined grouped by vegetation type. We selected some 80 stations which had good coverage for 2005. Stations which fell into coastal pixels were excluded.

## Initial coordinator and proposing group

Han Dolman VU, Amsterdam, the Netherlands  
Thomas Holmes USDA, Beltsville, MD, USA  
Diego Miralles VU, Amsterdam, the Netherlands  
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John Gash VU, Amsterdam, the Netherlands  
Guojie Wang VU, Amsterdam, the Netherlands

## CVs of initial coordinator and proposing group

**Han Dolman** has more than 20 years experience in land surface atmosphere interaction measurement and modelling research. He is presently head of the Department of Hydrology and Geoenvironmental Science at the VUA - Faculty of

Earth and Life Sciences He has over 70 publications in internationally refereed journals. He is member of various international committees and active in GEWEXISLSCP, and IGBP, IAHS and EGS. He is co-ordinator of the regional component of CarboEurope IP and was chairman of the CarboEurope cluster from 2001 to 2003 and is currently member of the executive board. He is involved several EU and national projects among which the TCOS-Siberia project. In April 2005 he organised a CarboEurope GHG (concerted Action) workshop at the Dutch Royal Academy of Sciences on developing a blueprint for a GHG observing system for Europe.

**Diego Miralles** started as a PhD student in 2008 in the Vrije University of Amsterdam. His research concerns the use of remote sensing information in the estimation of the different components of the global water cycle, and it is especially focussed on the retrieval of actual evaporation. In 2007-08 he worked in the hydrology and remote sensing laboratory of the USDA in Beltsville, MD, participating in the development of different statistical techniques to evaluate microwave soil moisture products at global scale.

### Sites that initially would be involved

<b>Fluxnet Site name</b>	<b>Country</b>
Fogg Dam	Australia
Howard Springs	Australia
Jalhay	Belgium
Lonzee	Belgium
Maun- Mopane Woodland	Botswana
British Columbia- Campbell River - Mature Forest	Canada
British Columbia- Campbell River - Young Plantation	Canada
UCI-1964 burn site wet	Canada
UCI-1981 burn site	Canada
Sask.- SSA Old Aspen	Canada
Sask.- SSA Old Black Spruce	Canada
Sask.- SSA Old Jack Pine	Canada
Quebec Boreal Cutover Site	Canada
Sask.- 2002 Harvested Jack Pine	Canada
Ontario- Turkey Point Mature White Pine	Canada
Oensingen2 crop	Switzerland
Kubuqi_populus forest	China
Bily Kriz- grassland	Czech Republic
Gebesee	Germany
Grillenburg- grass station	Germany
Hainich	Germany
Hartheim	Germany
Klingenberg	Germany
Mehrstedt 1	Germany
Tharandt- Anchor Station	Germany
El Saler-Sueca	Spain
Las Majadas del Tietar	Spain
Vall d'Alinya	Spain
Hyytiala	Finland
Aurade	France
Grignon (after 6/5/2005)	France
Le Bray (after 6/28/1998)	France
Laqueuille	France

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Guyaflox	French Guyana
Bugacpuszta	Hungary
Palangkaraya	Indonesia
Yatir	Israel
Takayama	Japan
Cabauw extension (after 5/25/2004)	Netherlands
Langerak	Netherlands
Lutjewad	Netherlands
Mitra IV Tojal	Portugal
Flakaliden	Sweden
Hertfordshire	UK
OK - ARM Southern Great Plains burn site- Lamont	USA
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AZ - Audubon Research Ranch	USA
SD – Brookings	USA
AK - Bonanza Creek, 1999 Burn site	USA
NC - Duke Forest-hardwoods	USA
MT - Fort Peck	USA
AZ - Flagstaff – Wildfire	USA
MS - Goodwin Creek	USA
IL - Fermi National Accelerator Laboratory- Batavia	USA
FL - Kennedy Space Center (scrub oak)	USA
OR - Metolius - Eyerly burn	USA
IN - Morgan Monroe State Forest	USA
MO - Missouri Ozark Site	USA
CA - Sky Oaks- New Stand	USA
AZ - Santa Rita Mesquite	USA
MI - Sylvania Wilderness Area	USA
CA - Vaira Ranch- lone	USA
WI - Young hardwood clearcut (YHW)	USA
AZ - Walnut Gulch Kendall Grasslands	USA
Skukuza- Kruger National Park	South Africa

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**Rules applied for co-authorship**

Intellectual input will govern co-authorship.