

# iLEAPS

## Integrated Land Ecosystem Atmosphere Process Study

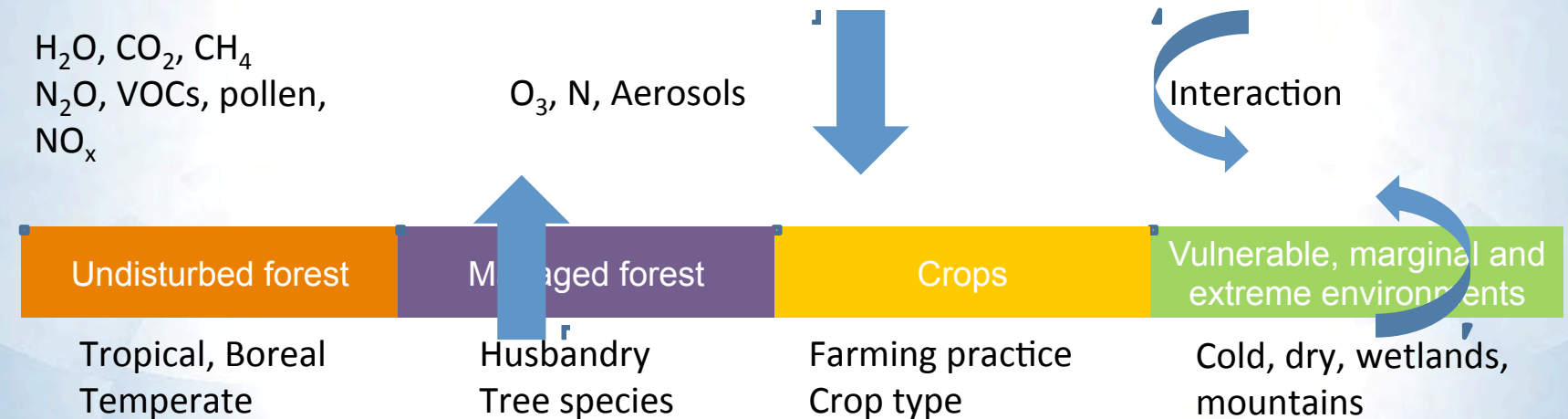
Eleanor Blyth (Co-chair iLEAPS),  
Richard Ellis, CEH, UK

# iLEAPS Scientific Steering Committee

1. **Hans-Christen Hansson (Sweden)– co-chair**
2. **Eleanor Blyth (UK) – co-chair**
3. Hiyama Tetsuya (Japan)
4. Sirkku Juhola (Finland)
5. Sebastian Leuzinger (New Zealand)
6. Meehye Lee (Korea)
7. Vinayak Singh (India)
8. Sally Archibald (S. Africa)
9. Xuemei Wang (China)
10. Aijun Ding (China)
11. Allison Steiner (USA)

Garry Hayman (Program Officer)

# iLEAPS – integrated Land Ecosystem Atmosphere Processes Study



Issues: Human Health, Biodiversity, Climate mitigation, Food and fuel security

1. How **changing land-use and farming and forestry practice** (irrigation, tillage, fire, draining, fertilisers, grazing, forest husbandry, pest and weed control, choice of crops or trees) affects the **atmospheric chemistry, air quality and climate** ( $N_2O$ ,  $CO_2$ ,  $H_2O$ ,  $CH_4$ , VOCs, pollen etc)
2. How anthropogenic changes in **atmospheric chemistry** ( $CO_2$ ,  $O_3$ ) affects **plant productivity** (ozone damage,  $CO_2$  fertilisation)
3. How **vulnerable and marginal ecosystems** (very cold, very dry) will be affected by **changes in climate** (T,  $H_2O$ ,  $CO_2$ )
4. How **ecosystems** (including fire, wetlands and vegetation) emit **short lived carbon**: e.g. isoprenes and methane as well as carbon dioxide and its impact on the **atmospheric chemistry**

# iLEAPS IPO

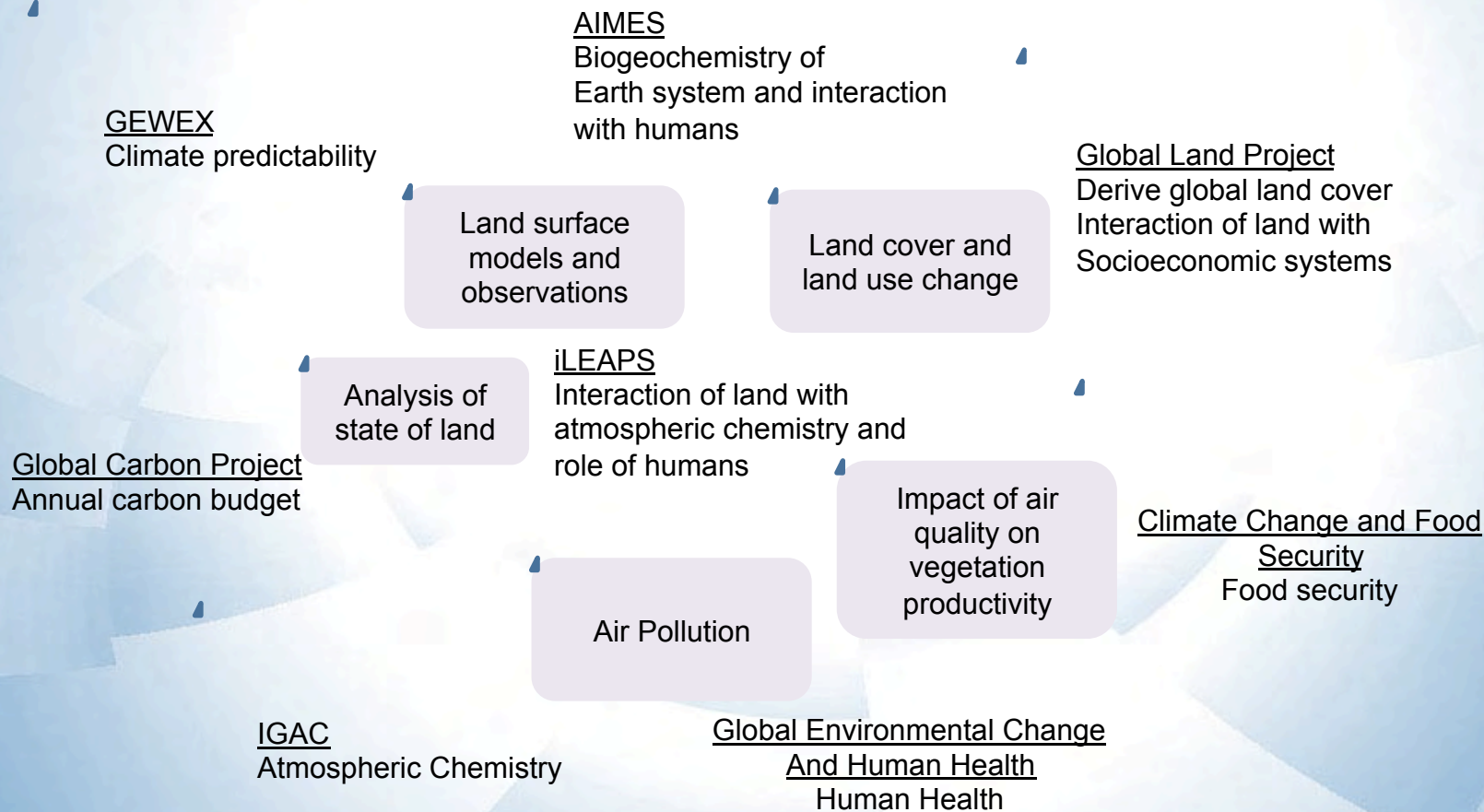
- IPO moved to CEH, UK in January 2017
- MOU with WCRP signed with agreement to work with GEWEX
- National committees continue in China, Korea and Japan
- Node for the MENA region at Cyprus Institute opened 2016
- National committee for India planned
- Regional office for Africa and Europe planned
- New website launched



# New iLEAPS website

The screenshot shows a web browser window displaying the iLEAPS website. The browser tabs include 'New Email', 'Met Office Science Rep...', 'online library.wiley.com...', and 'iLEAPS'. The address bar shows 'www.ileaps.org'. The website header features the iLEAPS logo (Integrated Land Ecosystem Atmosphere Processes Study) and navigation links: 'CONTACT', 'FUTURE EARTH', and a search icon. Below the header is a main navigation menu with links: 'WHO WE ARE', 'PROJECTS', 'GET INVOLVED', 'NEWS & EVENTS', 'ECSN', and 'PUBLICATIONS'. The main content area features a large image of a forest with a green 'iLEAPS' label and the text 'Integrated Land Ecosystem Atmosphere Processes Study'. To the right of the image is a 'SOCIAL MEDIA PROFILES' section with icons for Facebook, Twitter, Google+, and LinkedIn. Below this is a paragraph describing iLEAPS as a Global Research Project of Future Earth, providing understanding of how interacting physical, chemical, and biological processes transport and transform energy and matter through the land-atmosphere interface. Further down is an 'iLEAPS Newsletter' sign-up form with fields for 'Email Address', 'First Name', and 'Last Name', and a 'Signup' button. The footer contains 'CONTACT US', 'HOME', 'ILEAPS NEWSLETTER SIGN UP', the CEH logo (Centre for Ecology & Hydrology, NATURAL ENVIRONMENT RESEARCH COUNCIL), and the futureearth logo (research for global sustainability). The Windows taskbar at the bottom shows various application icons and the system clock displaying 14:49 on 12/05/2017.

# Relationship with Future Earth Global Research Programmes and GEWEX



# 2017 Science Conference



Go to 'ileaps.org' and 'News and Events'

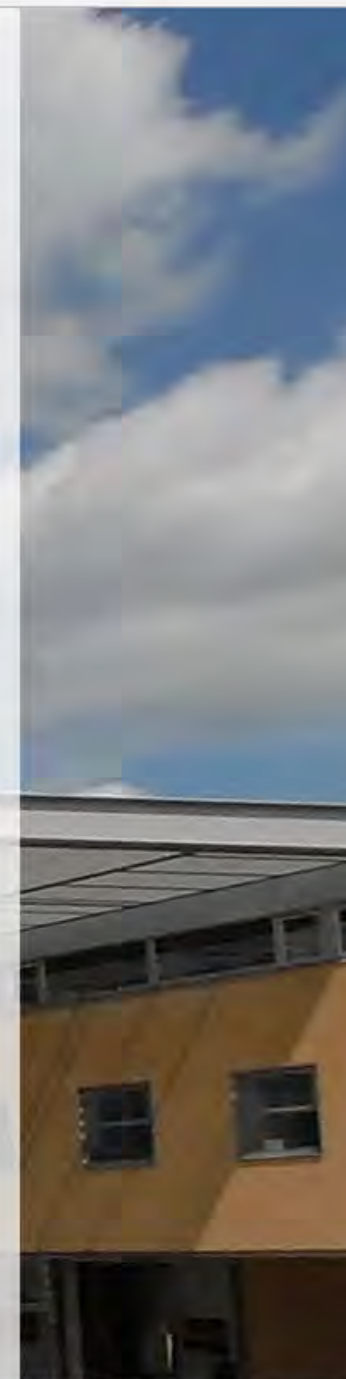
Includes 21 sessions, several collaborative with other Global Research Programmes such as GEWEX

a) Thanks to conveners for helping (Dave Laurence, Gerhard Krinner, Peter van Oevelen, Jan Polcher, Rich Ellis, Anne Verhoef)

b) Please come!



<b>A1:</b> <u>Land-use change in a warming world: interactions between climate and socio-ecological systems, and implications for land-based climate change mitigation.</u>	<b>C4:</b> <u>Dryland ecosystems: New modelling and measurement challenges</u>
<b>A2:</b> <u>The flow of nitrogen through the land-atmosphere system.</u>	<b>D1:</b> <u>Methane from wetlands, lakes and thawing permafrost</u>
<b>A3:</b> <u>The role of soils in global environmental change</u>	<b>D2:</b> <u>Measuring and modelling biogenic volatile organic compounds</u>
<b>A4:</b> <u>Impacts of fire on land and atmosphere</u>	<b>D3:</b> <u>Impact of aerosol emissions on clouds and precipitation</u>
<b>B1:</b> <u>Ozone-vegetation interactions and effects on ecosystems, agriculture and climate</u>	<b>D4:</b> <u>Where are the greatest uncertainties in the Global terrestrial Carbon Budgets?</u>
<b>B2:</b> <u>Changing water cycle in the food baskets of the world (joint session with GEWEX)</u>	<b>E1:</b> <u>Land-atmosphere processes and agricultural transformation in Africa</u>
<b>B3:</b> <u>Canopy Processes and Deposition</u>	<b>E2:</b> <u>Land-atmosphere research in Asia: From air pollution to climate change</u>
<b>B4:</b> <u>Interaction of urban air quality and ecosystems</u>	<b>E3:</b> <u>Confronting land models with data for assessment and verification</u>
<b>C1:</b> <u>Impact of extremes on land biophysical processes and land-atmosphere biogeochemical cycling</u>	<b>E4:</b> <u>Ground-Based observations for ecosystem-atmospheric interactions</u>
<b>C2:</b> <u>Thawing permafrost carbon: a challenge for climate sciences</u>	<b>E5:</b> <u>Using Earth Observation for constraining the ecosystem-atmosphere interactions at a range of scales</u>
<b>C3:</b> <u>Understanding the response of terrestrial ecosystems to climate change and rising atmospheric CO<sub>2</sub> concentrations</u>	





# Connected 2-day workshops: iLEAPS Early Career Scientists Workshop

2-day intensive workshop in Oxford during the weekend before the iLEAPS 5th Science Conference. The theme of this event is “Effective Communication for Effective Science”.

The workshop will be highly interactive with topics to include:

- Who?** Identifying your audience
- What?** Focusing on your message
- How?** Crafting your oral or written narrative for maximum impact

Special Guest: Joshua Schimel. Author of ‘Writing Science: how to write papers that get cited and proposals that get funded’

£50 fee

## Arctic Terrestrial Modelling Workshop

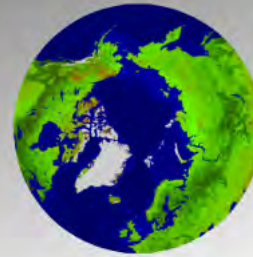
Organised by the Canadian Network for Regional Climate and Weather Prediction: CNRCWP

- Modelling the water budgets using land surface and hydrology models of the Arctic region
- Planetary Boundary Layer processes and land-atmosphere interactions
- Representation of Carbon and nitrogen cycling in the Arctic in models
- Data issues in Arctic terrestrial modelling

Link in the iLEAPS conference webpage. Or <http://www.cnrctp.uqam.ca/arctemw>

# Arctic Terrestrial Modelling Workshop

14-15 September 2017



About Registration

## St Anne's College — University of Oxford


Sponsored by the Canadian Network for Regional Climate and Weather Processes (CNRCWP) – Natural Sciences and Engineering Research Council of Canada (NSERC) and Next-Generation Ecosystem Experiments-Arctic (NGEE-Arctic).

### Overview

This workshop will bring together senior and early career scientists to gain insight into the rapidly changing pan-Arctic land surface and boundary layer. The workshop will review current representation of Arctic ecosystem, carbon, water and energy balance processes in the land model component of Earth System Models, including land-atmosphere interactions, and the next steps to address knowledge gaps. The workshop will also focus on developing a pan-Arctic land model assessment that includes a broader range of models, and engage the data community to provide new validation products for the Arctic and sub-Arctic.

### Core focus

- ✓ Representation of Arctic terrestrial ecosystems in models
- ✓ Role of observations: calibration, validation, assimilation
- ✓ Water, nitrogen, carbon, and energy dynamics
- ✓ Land-atmosphere interactions and feedbacks across spatial and temporal scales
- ✓ Pan-Arctic land model assessment
- ✓ Arctic boundary layer processes
- ✓ Extreme/disturbance events
- ✓ Knowledge gaps

 Add to Calendar

### Scientific committee

Laxmi Sushama  
(University of Quebec at Montreal)

Stan Wullschleger  
(Oak Ridge National Laboratory)

Cathy Wilson  
(Los Alamos National Laboratory)

Eleanor Blyth  
(Natural Environment Research Council)

Benjamin Smith  
(Lund University)

David Lawrence  
(National Center for Atmospheric Research)

Gerhard Krinner  
(Centre National de la Recherche Scientifique)

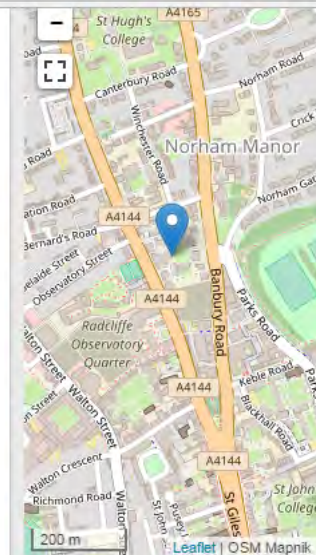
Patrick Samuelsson  
(Swedish Meteorological and Hydrological Institute)

Paul Miller  
(Lund University)

Joe Melton  
(Environment and Climate Change Canada)

Charles Miller  
(Jet Propulsion Laboratory, NASA)

Please, [register](#) to be able to attend.



Blue markers (balloons) represent locations relevant to the event. Please click them to see the address and details.

Contact:  
Bernardo Touzel (touzel@ccc.oxam.ox)

Sponsors

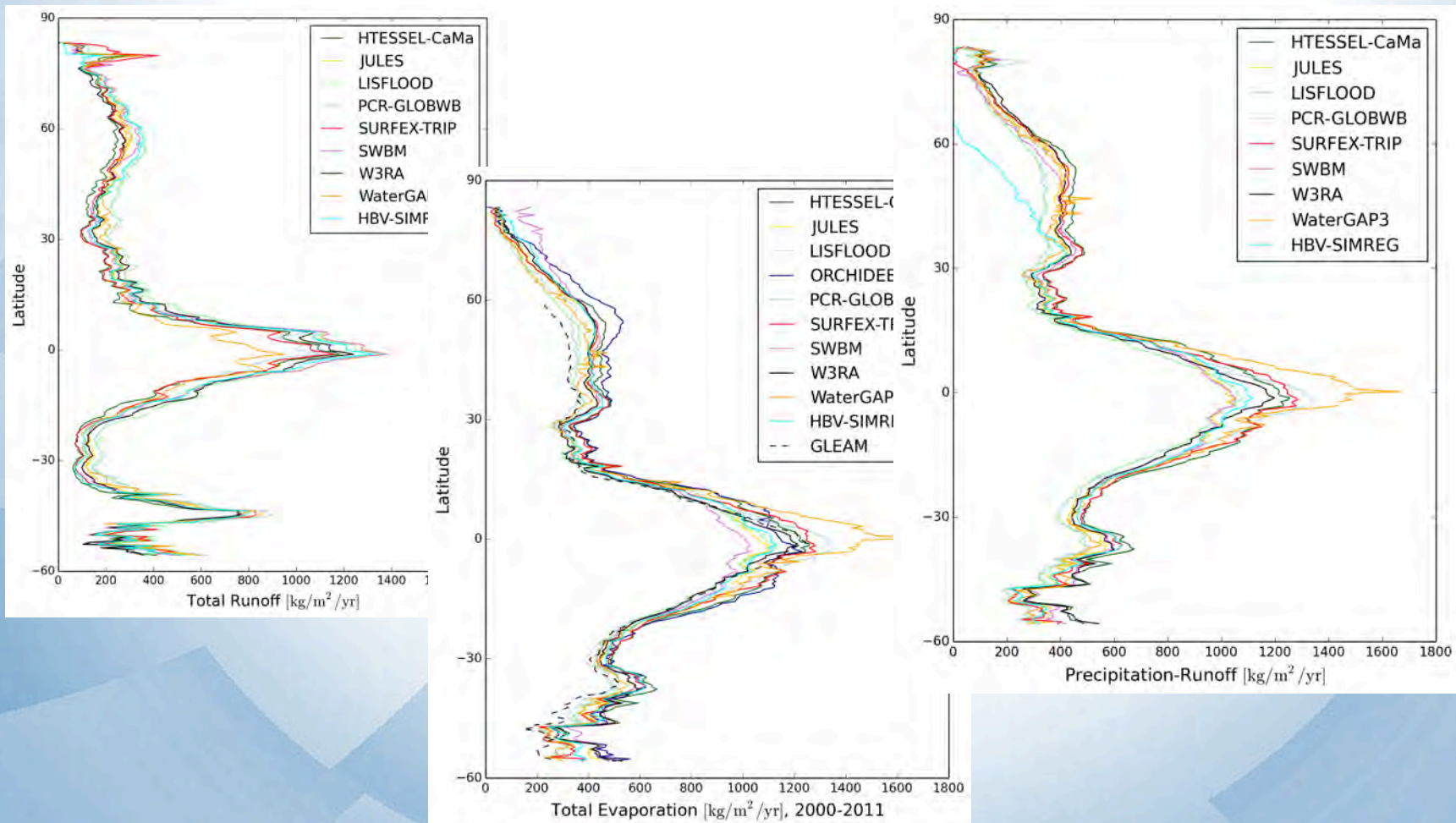
# ArcticMIP – iLEAPS-GEWEX collaborative project

- Use outputs from the earth2Observe multi-model ensemble (10 models: 5 LSMs, 5 GHMs. All run with WFDEI. Outputs on easy-access portal)
- Add two new models: CLASS and CLM?
- Use iLAMB package to evaluate models against key water-cycle metrics (Fekete runoff, Globsnow, Soil moisture)
- Meet at the Arctic Modeling Workshop to discuss results
- Eleanor leading on half day session on modeling hydrology in the Arctic (see next slides for a rough plan)
- CEH will then lead on an iLEAPS-GEWEX review paper on the Land Surface Models and Global Hydrology Models performance in the northern latitudes



# Example output from iLAMB applied to earthH2Observe models

- ArcticMIP will add new models and focus on 50 N+
- Science missions: compare LSMs with GHMs to identify strengths and weaknesses of the different approaches
- Joe Melton (CLASS) has agreed to add their model
- Can we add CLM? CABLE?



## Other collaborations between iLEAPS and GEWEX/GLASS?

Using existing model ensemble:

- Tropics study focusing on Interception
  - Semi-arid study focusing on sparse vegetation
  - Temperate study focusing on managed land
  - Other?
- ... to be discussed