TERN Terrestrial Ecosystem Research Network

OzFlux Australian and New Zealand Flux Research and Monitoring

Australian SupersiteNetwork

Quarterly Newsletter

Issue 1, December 2012

Welcome to the inaugural ASN/OzFlux newsletter. We hope that this newsletter will help keep everyone informed of recent news and developments that affect our networks.

Supersite Central Update

It has been a busy time since the beginning of the year with highlights including the expansion of the network to 10 Supersites, roll out of the new TERN ASN web site, a revamped ASN Data Portal, the acoustic data portal at www.bush.fm and the developing relationship with the NEON network in the USA. NEON have similar goals and activities to TERN and the ASN, but with a significantly larger budget. The interaction with NEON has come at a time when we are revisiting the ASN monitoring protocols that have been used over the last two years and refining them as a prelude to re-funding applications in 2014. We aim to align protocols with NEON where possible to enhance interoperability between the networks and allow meaningful intercontinental comparisons of ecosystem data (http://www.neoninc.org/news/bridgingdownunder).

We are progressively working through the various ASN monitoring protocols by setting up working groups on the different themes, revising and updating protocols to reflect what we would like to do post-2014 (subject to adequate funding). The initial protocol discussions with NEON were held in early November and focused on vegetation monitoring. Although the approaches to site design were quite different, it was agreed that there was scope for useful alignment of vegetation protocols and we are actively seeking funding to set up bilateral workshops to develop this further.

The next planned protocol meeting will cover soils and water monitoring protocols in late January with the remaining areas progressively addressed through 2013. Those of you that have agreed to take part in protocol working groups will be hearing from Mirko as new meeting dates are established with NEON and deadlines loom, if anyone else wants to join the working groups then please contact Mirko ASAP.

The mid to long-term aim is to develop strong links between the ASN and similar long-term, collaborative, ecosystem, high resolution monitoring networks around the world. We will also be monitoring the development of the EU based ANAEE network to explore how cooperation between our different networks can be used to answer important science questions in new ways, not previously feasible.

The ASN is rapidly developing infrastructure at all ten sites and delivering data to the ASN Database and TERN Portal. This is important as we need to show data from all sites in the ASN Database as soon as possible to highlight to stakeholders and decision makers that the entire network is up and running and delivering what the ecosystem research and management community are looking for.

We will update on further developments in the next quarter.

Mike, Mirko, Marco and Shiela

http://www.tern-supersites.net.au

OzFlux Central Update

Firstly, congratulations to the Supersites and OzFlux Directors for taking the initiative of publishing this newsletter.

There have been some significant developments for the OzFlux Data Portal over the last 6 months. There are now 23 data collections on the portal, each representing an OzFlux site, and a total of 100 registered users. In 2013, we will be continuing to standardise the format of the data on the portal and working to bring the remaining sites on to the portal.

Perhaps the most significant development has been the opening of the TERN Data Discovery Portal and the continued growth of the Research Data Australia portal. There are now 21 OzFlux data collections listed on both the TDDP (http://portal.tern.org.au/) and the Research Data Australia site (http://researchdata.ands.org.au/). OzFlux site operators

who want to register their data sets with both the TDDP and RDA can do this by clicking on the "Public Registration" button in their data collection area of the OzFlux portal.

Other important developments have been the move to a standard naming for data variables collected from the OzFlux towers, adoption of the CF Metadata Conventions for the OzFlux data collections and convergence on a standard set of metadata records to be written as global attributes to each netCDF file. These changes are designed to make the OzFlux data collections more homogeneous and more easily digested by data users. An updated version of the OzFlux QC system (V2.1) has been produced that implements the changes. This is available from the "Public Access" area of the OzFlux Data Portal and from the "OzFlux\Python" Dropbox folder.

The new year will also bring some important progress. In the first half of 2013, OzFlux will introduce a consistent licensing framework for all TERN-funded data and establish a near-real time data feed to the Australian Supersites Network so that meteorological conditions at Supersites locations can be displayed on their web site.

As always, I am more than happy to help members of the OzFlux community with any problems relating to the collection, analysis or archiving of OzFlux-related data. My contact details are: Email: pisaac.ozflux@gmail.com; Phone: 03 5968-5998; Skype: pisaac.ozflux

Peter Isaac

From Deputy Director Eva's Desk:

OzFlux is happily growing and we will soon have flux data from an amazing 30 sites from Australia and New Zealand. The 29th tower to join is Cumberland Plains in the Hawkesbury (University of Western Sydney) so keep an eye on www.ozflux.org.au, where site information is about to be provided.

I would like to give early notice on the **OzFlux 2013 workshop** which will be held in Cairns. The dates to lock into your calendar are July 8-12, the workshop will likely be for 3 days though. I would further like to point you to the upcoming joint AsiaFlux/HESSS3 meeting which will be held in Seoul, Korea during August 19-24. AsiaFlux is willing to provide a session on Australian/New Zealand ecosystems if there is enough interest/participation from OzFlux. Registry pages for both workshops will be set up in January and you will find them on www.ozflux.org.au.

CMAR/CSIRO is purchasing two new radiation sensors (a pyranometer and a pyrgeometer) that are certified as secondary WMO standards. We are installing these instruments permanently at CSIRO's labs at Black Mountain, Canberra. If you would like to calibrate your instruments against these you are welcome to contact me.

From the TERN Symposium program you can see that my name is listed against two talks. If you have slides that you would like me to show during the talk on upscaling - please let me know!

From Director Helen's Desk:

Registrations for the **2013 TERN Symposium** (http://www.tern.org.au/Symposium-registration-open-now-bgp2021.html) are now open. The Program features 9 OzFlux related talks (some combining with Supersites) and many related science talks that will use OzFlux data. It will be an important Symposium as we enter the final strait for TERN-OzFlux.

OzFlux sites are due for another **Milestone payment** in January 2013 – all OzFlux PIs are reminded to attend to three important details before Xmas, or when they return to work in the New Year:

a) Ensure that they have submitted their latest OzFlux data to the OzFlux Data Management System (DMS); and

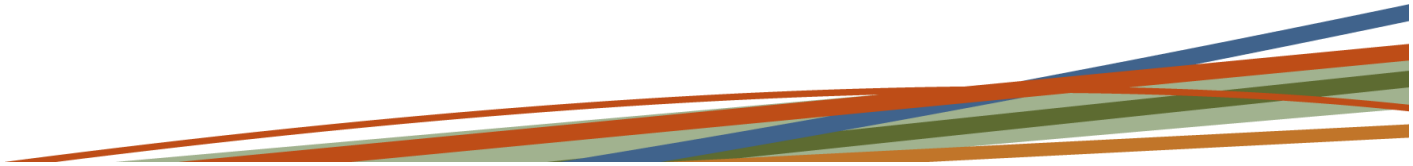
b) Having done this important task, then ask your Administrative Dept to please send an invoice to CMAR (please send it to Helen, Eva or Rowena Smith, CSIRO Marine and Atmospheric Research, GPO Box 3023, Canberra, ACT 2601). We'd prefer these to be emailed; and please ensure you include reference to OzFlux and the Milestone number.

c) Although not part of your deliverables, we are keen to know about your publications – for highlighting here and the OzFlux website. Please send us a list of the 2012 publications related to your OzFlux sites and research – papers (journal and conference, plus reports) that have been accepted for publication or have been published in 2012.

Thank you!

Other science news: if you haven't done so yet, I strongly recommend you read the latest Global Carbon Budget update (http://www.globalcarbonproject.org/carbonbudget/index.htm) and the publication "The challenge to keep global warming below 2ºC" in Nature Climate Change, http://dx.doi.org/10.1038/nclimate1783, DOI:10.1038/nclimate1783.

And lastly, we are keen to hear news from you and your sites, so please send us stories in time for the next newsletter.



News from around the Sites

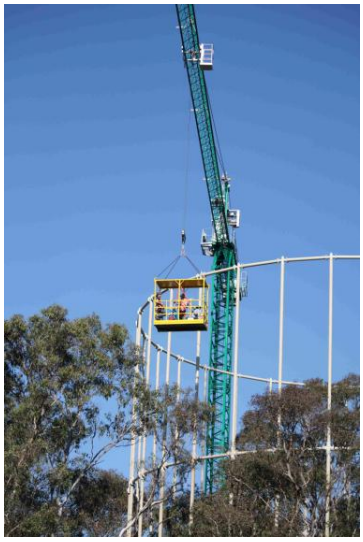
Alice Mulga

The first of two acoustic sensors has been installed and operational. There has been a lot work on a ground water transportation study at the site with numerous piezometers installed between a few metres to 50 m below the water table. The uptake of water by trees will be monitored by two sap flow sensors and piezometers 1-2 m below the water table equipped with high resolution depth sensors capable of detecting sub-millimetre changes. Flights have recorded LiDAR data for both plots and Woodford river site. The second flux tower is now operational.

Calperum Mallee

Baseline AusPlots vegetation surveys have been completed at six sites representing three vegetation associations, including vouchering, soil sampling and cover. A bird survey has been completed and sites selected for acoustic monitor deployment.

Cumberland Plains EucFACE



Cumberland Plains recently hosted Andrew Thompson from the JCU DRO to drive cranes and train local personnel. The eddy covariance tower and soil CO_2 flux instrumentation were activated in late August. Recent campaigns were completed on canopy physiology, water relations measurements and remote sensing by AusCover. On 18th Sept the CO_2 was turned on at the FACE experiment and we now have CO_2 concentration increased incrementally.

FNQ Rainforest

By the publication date of this newsletter, the vegetation at the 25 ha plot at Robson creek will have been completely surveyed by Matt Bradford and helpers. A mighty effort, deserving a premium lager or two. The water monitoring experiment in Robson Creek will be started before the beginning of the wet season. Acoustic sampling is occurring at both sites with some damage occurring to the Robson Creek sensor by white-tail rats. The contract has been signed for Flux tower installation. A large concrete foundation will be installed before tower erection early in the New Year. An AusCover campaign was completed at the Robson Creek node in October and made front page headlines of the Cairns Post.

Great Western Woodlands

An AusPlots workshop was held at Credo in early October with about 30 people taking part. All instrumentation has been attached to the flux tower and is operational. The Field Study Centre has the slab in place; frames erected and will be finished by end December. Gimlet plots establishment paper has been accepted for publication and a second paper is in progress. The Ngadju people fire knowledge project is underway. Drilling for piezometers and isotope sampling has been delayed as a custom drill bit needs to be manufactured

There has been a joint effort with South-Western Australian Transitional Transect (SWATT) group to establish a series of sand plain country plots (using AusPlots guidelines) along a climate gradient (yellow to white and red sand plains) within the Transect and the GWW Supersite Plots over the next 12-18 months. The aim is to look at species turnover at different spatial scales.

A workshop to begin developing the 'Flames' model for Great Western Woodlands ecosystems was held at Credo on 13-16 August. The model will help to guide development of monitoring programs at the Supersite and to better understand woodland dynamics in relation to climate and fire.

Magen Petit, working with Alan Andersen (CSIRO Darwin) lead a trip to sample ants across the *Eucalyptus salubris* woodland plots in the GWW Supersite on October 15-25. These data will complement data on floristic and structural changes in gimlet woodland with time-since-fire.

Litchfield Savanna

AusCover plans to fly the Litchfield site between 27 May and 2 June 2013. The location for the Flux tower has been decided and relevant applications made before geo-testing on the site can begin. Canopy LAI, digital camera array and litterfall monitoring are ongoing.

SEQ Peri-urban

All monitoring at Samford is working well with new water sampler installed and two phenocams to be installed soon.

Bird surveys have been completed at 32 plots at Karawatha with two weeks of acoustic data collected. Initial analysis suggests that reliable population estimates are possible using acoustic data with enough replication.

Logan and Albert River monitoring is working well. New collaborations in progress with eREEFs to test what may be achievable with real-time monitoring data streams from estuarine sites compared to traditional monthly monitoring programs, also looking at delivering data streams to clients who are developing models.

AusCover has planned flights (hyper-spectral only) for SEQ (Samford, Karawatha Forest, some mangrove sites) for the 29 Jan - 2 Feb 2013.

Tumbarumba Wet Eucalypt

We had a lightning strike at the tower, which damaged the power supply (generator) and a few instruments, including the sonic anemometer and CO_2 profile sensors. All tower equipment is operational again with just some residual issues with the soil chamber system.

An airborne remote sensing data capture is planned before Christmas. The measurements are financed through the LOCAT project but will be aligned with AusCover guidelines. ARA will fly the LiDAR, Eagle (VNIR) and Hawk (SWIR). We will spend a week in the field, collect leaf samples (chlorophylla+b, anthocyanins, carbon, nitrogen and water content), will do leaf spectral measurements and leaf level carbon and water exchange measurements in collaboration with Lucas Cernusak from ANU. We have received the core samplers from Derek Eamus at UTS and hope to be able to sample the leaves for the stable carbon isotope analysis and get a few tree cores during this campaign.

An LED sensor has been installed on the tower, if you are interested in the instrument please see Ryu, Y. et al. (2010). Testing the performance of a novel spectral reflectance sensor, built with light emitting diodes (LEDs), to monitor ecosystem metabolism, structure and function. *Agricultural and Forest Meteorology*, **150**(12), 1597–1606.

Two acoustic sensors have been installed.

Victorian Dry Eucalypt

Monitoring activities at the Whroo site are working well except for some problems with soil sensors that will require replacement when permission is granted by the National Park land managers. Acoustic sensors have been installed. Annual and more frequent LAI, leaf litter and leaf level measures are ongoing.

Warra Tall Eucalypt

Flux tower components have been delivered to the site and made ready for tower erection in December. Instrument mounts and platform modifications are in the final stages of completion with communications and power requirements being addressed. One acoustic sensor has been deployed and annual bird surveys completed. A report on the functioning of the Regional Forestry Agreement between the Commonwealth and State governments has been published (http://www.fwpa.com.au/Contribution-of-CAR-reserves-to-mature-forest-biodiversity-in-production-forest-landscapes) with several high impact papers expected to result from this work.

A workshop on forest landscapes and managing biodiversity is planned for February with several international visitors (USA, Germany, South America).

Australian Supersite Network – Annual Face-to-Face meeting

The annual Supersite leaders meeting will be held on the 18th Feb 2013 in Canberra, just prior to the TERN Symposium. Details of location and agenda are yet to be finalised.

Travel expenses will either be covered by TERN central for those that are presenting at the TERN Symposium or the ASN will cover remaining PIs as well as any extra accommodation expenses incurred by attending the ASN face-to-face meeting.

We expect the meeting will be an all-day affair as has occurred previously. A suitable starting time will be determined by polling PIs. We are likely to host Dave Tazik, Director of Biology from NEON during the meeting so will have an opportunity to discuss our efforts at inter-continental networking and direction of protocols discussions.

Agenda items will include:

Supersite updates
End user engagement
Interactions within TERN
International interactions
USA; NEON MOU, protocol discussions, grand questions, workshop funding opportunities
EU; ANAEE

Future Funding
CRIS update
post 2014 funding

ASN/OzFlux at the TERN 4th Annual Symposium

Prof Owen Atkin, ANU
Plant ecophysiological measurements at TERN Supersites: a crucial link between vegetation modelling, biodiversity and ecosystem function

Matt Bradford, CSIRO
Error and precision in rainforest biomass estimations

Arantxa Cabello-Leblic, CSIRO
Analysis of Landsat Imagery to Determine Extent and Duration of Insect Disturbance in a Native Managed Eucalyptus Forest

Geoff Carlin, CSIRO
TERN Coastal and Supersite facilities working together to provide real-time water quality data displays

Dr Helen Cleugh, CSIRO
(1) OzFlux: hard and soft infrastructure for ecosystem research and earth system science

(2) Near-real-time measurement of CO_2, water and energy fluxes: determining the best available estimates of ecosystem carbon and water fluxes at continental scales

Prof David Ellsworth, University of Western Sydney
Spatial variability in leaf N and detecting the elevated CO_2 response in a Eucalyptus woodland ecosystem in the Cumberland Plain ('EucFACE')

Marco Fahmi, QUT
Data management improvements in the ASN data repository and web portal.

Dr Carl Gosper, WA Department of Environment and Conservation
Mature Eucalyptus salubris woodlands in the Great Western Woodlands of Western Australia: an infrequently burnt and diverse community

Prof Jean-Marc Hero, Griffith University
Variation in biomass estimation among replicated PPBio PTER plots at the TERN SEQ Peri---urban Supersite

Dr John Hunt, Landcare Research
KiwiFlux: different problems but similar solutions

Assoc Prof Mike Liddell, James Cook University
A new approach to intensive ecosystem research: introducing the Australian Supersite Network

Dr Stefan Maier, Charles Darwin University
New, freely available remote sensing tools to better describe fire in Australia

Dr Dan Metcalfe, CSIRO
Long-term monitoring of tropical rainforests of eastern Australia

Dr Suzanne Prober, CSIRO
The Great Western Woodlands Supersite in Western Australia

Dr Natalia Restrepo-Coupe, University of Technology Sydney
Remotely-sensed photosynthetic phenology and ecosystem productivity studies informed by tower eddy covariance CO_2 fluxes

Dr David Rowlings, Queensland University of Technology
Influence of land-use change on greenhouse gas fluxes from subtropical ecosystems

Prof Arturo Sanchez-Azofeifa, University of Alberta
Challenges and opportunities in the implementation of wireless sensor networks for environmental monitoring: carbon fluxes at the Victorian Dry Eucalypt Supersite

Dr Richard Silberstein, CSIRO
Water and carbon fluxes from a Banksia woodland at the Gingin OzFlux site in Western Australia

Dr Eva van Gorsel, CSIRO
(1) From plant canopy to ecosystem to the globe: Upscaling OzFlux data using AusCover remote sensing data, eMAST modelling and integration

(2) The role of climate, disturbance and land management on water use and carbon uptake in a managed subalpine forest ecosystem

Dr Tim Wardlaw, Forestry Tasmania
A gradient study at the Warra Supersite provides new knowledge to support the management of production forests to sustain biodiversity

New Faces

Josh Phillips has joined the Calperum Mallee Supersite as the new OzFlux Technical Officer in Wayne Meyer's group based at the University of Adelaide. He is a chemical engineering graduate from the University of Canterbury, New Zealand and has experience in an engineering consultancy and a fertiliser and sulphuric acid manufacturing facility as a process engineer and asset manager. Josh has interests in forestry, earth and environmental sciences. His new role in the Landscape Futures Program is sure to keep him engaged as he works on soil, water and atmospheric variables in the Mallee ecosystem.

Alison Phillips has taken over the TERN (OzFlux) - funded Technical Officer position at the Warra Supersite. Alison has been with Forestry Tasmania for the past nine years providing technical support for the Biology and Conservation Research Branch. She knows Warra very well having been responsible for managing the invertebrate surveys done in many of the long-term studies.

Upcoming Events

18-21 February 2013
4th Annual TERN Symposium TERN, Old Parliament House, Canberra. Further details on Symposium Website

22–26 April 2013
Earth Observation and Global Environmental Change: 50 years of Remote Sensing—Progress and Prospects. 35th International Symposium on Remote Sensing of Environment, Beijing, China. Details at ISRSE35.

8-12 July 2013
OzFlux meeting, Cairns. Further details to be announced

18–23 August 2013
INTECOL 2013 - the 13th International Congress of Ecology, London. Details at INTECOL 2013.

19-24 August 2013
Joint AsiaFlux/HESSS3 meeting, Seoul, Korea. Further details to be announced.

8–11 October 2013
Greenhouse 2013, Adelaide. Conference on climate change science, communication and policy. Details at Greenhouse 2013.

19–21 March 2014
Global Land Project 2nd Open Science Meeting, Berlin, Germany. Details at Conference Website.

The next issue of the Newsletter will be published in March 2013. If you have any news articles, photos, upcoming events, etc that you would like included please email shiela.lloyd@jcu.edu.au