



Australian and New Zealand Flux Research and Monitoring



Quarterly Newsletter

Issue 5, February 2014

Supersite Central Update

Welcome to Issue #5 of the SuperSites/OzFlux newsletter. We start 2014 as a fully-fledged network of 10 SuperSites. While the NCRIS 2013 funding is modest by any measure it bodes well for the future. Contracts are currently being finalised with NCRIS 2013 funded activities and associated milestones to be conducted from 1 July 2014 to June 30, 2015.

With the NCRIS program now administered by the Department of Education, TERN and SuperSites progress will be assessed under new key performance indicators. Under NCRIS 2013 the Australian SuperSite Network will have to deliver outcomes relating to data delivery (monitoring data, publications), improvements in data communication, website improvements, network governance (holding meetings etc). TERN will also need to report on a range of key performance indicators. As intensive research sites with large amounts of field infrastructure, buildings and research programs the SuperSites are best placed within TERN to deliver outcomes that relate to education (school, under/post graduate) and public outreach activities and so it will be important for us to capture the details of when and where these occur at SuperSites.

The gap-funding (\$900K) under NCRIS 2013 will allow a subset of monitoring activities to happen at the SuperSites which will form part of the milestones. Deliverables include continuing acoustic monitoring data, bird survey data and some vegetation monitoring data (details are yet to be determined).

Despite the announcement at the last SuperSite meeting that the Supersites contract would be with JCU the next week this did not eventuate and only arrived at JCU in January. The TERN directory then went on annual leave and so the minor revisions are only being sorted out at the beginning of February. Even with this delay the SuperSites are likely to be one of the first Facilities to complete the NCRIS 2013 contract with UQ. Once this is in place email correspondence will be used initially to look for a consensus on the subset of measurements in the Vegetation Protocol that will be used for NCRIS 2013 across all SuperSites, if necessary a meeting may be held. Once the details of the vegetation protocol, wording for the acoustic sampling, avian sampling are refined then each institution will be separately contracted.

Current planning is underway for the next face-to-face 'Annual SuperSites Advisory Panel meeting' day, which will be held in concert with a joint SuperSites/LTERN day.



OzFlux Central Update

Special Issue

Those who read the TERN newsletter (<http://www.tern.org.au/Newsletter-2013-Dec-OzFlux-Journal-Feature-pg27554.html>) will have spotted that the special issue on water and carbon coupling has been published in Agricultural and Forest Meteorology.

Ray Leuning

The above mentioned special issue is to honour Ray Leuning and features a range of articles (please check out above link) that are either based on OzFlux measurements or are of relevance to our field.

On the 5th of February the AMS awarded Ray for his outstanding achievement in biometeorology “for significantly advancing our understanding of plant functioning, from stomata to terrestrial biosphere, and outstanding contributions to the global flux network through advancing micrometeorological theory.”

There will further be a special session honouring Ray at the upcoming AMS joint 31st Conference on Agricultural and Forest Meteorology and the 2nd Conference on Atmospheric Biogeosciences in Portland, Oregon.

To cite an email written by Ankur Desai to the Fluxnet community: “Talk about worshipping flux gods!”

OzFlux Meeting and Conference 2014

The dates are known, the location is still under discussion: there were a few more votes in favour of the September slot, so the OzFlux conference will be held from September 29 to October 1. These dates clash with the annual meeting of the ecological society of Australia, which will be held in Alice Springs. Therefore we will move our meeting to Alice Springs, if the logistics allow us to do so.

We offer a data processing workshop in the week leading to the OzFlux conference (September 22-26); Peter Isaac will lead the course as in previous years. LI-COR have kindly agreed to join us again for a refresher on the theory behind our measurements. We know that George Burba will be one of the two scientists making the long travel. With Peter and George this promises to be a great course, so if you would like to register go here:

http://infoenv.licor.com/OzFluxEddyCovarianceTraining2014_OzFluxECTraining2013.html

For registration of the meeting and the conference keep an eye on the <http://www.ozflux.org.au/meetings/> where the registration pages will go online in a couple of weeks.

Science of Extreme Events and TERN Board Meeting

On 10 February TERN researchers presented scientific results and products at a public briefing on the “Science of extreme events: Enabling better management of fire, floods, drought and cyclones in Australia”. Because of the short notice, none of the OzFlux PIs were able to be part of this briefing but many of the talks did cover areas of science directly relevant to OzFlux.

You can read about this public briefing at <http://www.tern.org.au/Science-of-Extreme-Events-public-briefing-bgp2829.html>. And the following day, all TERN Facility Directors, including Helen appearing by video, had an opportunity to brief the TERN Board (<http://www.tern.org.au/Governance-pg17723.html#board>) on achievements to date and future plans.

TERN NCRIS-II Funding and Agreement – Update

I am sure all OzFlux site PIs are anxiously awaiting an update on the status of the TERN UQ – CSIRO Agreement; which will enable funds to flow to the OzFlux sites. CSIRO are still working through the Agreement, received late in 2013, with UQ. We are hopeful that in the next few weeks any issues will be resolved. Eva & I are planning an OzFlux PI teleconference for early March to provide further information.

Submission of OzFlux Data to FluxNet

FluxNet (<http://fluxnet.ornl.gov/>) is the global collection of regional networks measuring the exchange of energy, carbon and water between terrestrial ecosystems and the atmosphere. In 2007, FluxNet released the La Thuile data set, a synthesis of ecosystem exchange measurements from sites around the world. Two Australian sites, Tumberumba and Howard Springs, were included in the La Thuile data set with a total of 12 site-years of data.



Recently, work has been progressing on an update to this data set, known informally as the “Berkeley” synthesis. With the expansion of the OzFlux network in recent years, we are now in a position to make a significant contribution to the new synthesis data set. With the recent re-processing effort across OzFlux, we now have 65 site-years of data from 17 sites ready for submission to FluxNet.

Following the re-processing last year, all data intended for submission to FluxNet was given some final quality control checks. Resolution of the issues found as a result of these checks is now almost complete and a sample OzFlux data file has been exchanged with FluxNet. In a change to the original method of transferring data, FluxNet have asked OzFlux to provide CSV files in the FluxNet format. The process of converting the L3 netCDF files to FluxNet CSV files will be completed in the next couple of days and the data uploaded to the “FluxNet data” collection on the OzFlux Data Portal. FluxNet will then harvest the data from this collection. Note that any data that is still restricted access will have the same conditions applied to the CSV files in the “FluxNet data” collection. Access to this data will only be granted with the approval of the site PI.

Respiration Working Group

Estimating ecosystem respiration is a prerequisite for partitioning measured CO₂ fluxes into Gross Primary Productivity (GPP) and ecosystem respiration (Reco). Most work on estimating Reco has concentrated on Northern Hemisphere sites. A small number of OzFlux investigators has now coalesced into a working group to discuss approaches to estimating respiration for Australian ecosystems with a view to including the best available methods into both the Monash Advanced Data system and the OzFluxQC system. Recent work has been directed towards implementing an alternative approach, the change-point detection method, to estimating the friction velocity threshold.

OzFlux Data Portal Phase 3

The OzFlux Data Portal (ODP) has seen 2 phases of development to date. Phase 1 was the initial implementation of the portal and Phase 2, completed in May 2013, saw the introduction of a map view for accessing data, the use of a consistent license model for OzFlux data and the ability to restrict access to data to protect intellectual property.

A proposal to TERN Central is now being prepared to request funding for Phase 3 of the portal development. Phase 3 of the portal development will cover the following work:

1. Migration of the ODP from Monash-based resources to more cloud-centric resources. Physical storage of the data will be moved to VicNode REDS and the virtual machines that run the portal will be moved to NeCTAR. Migration of the ODP will be transparent to users and ensures that the ODP will be independent of resources tied to a single institution. An additional motivation is that Monash eResearch Centre will cease supporting the current physical storage in the next 12 to 24 months.
2. An OPeNDAP/THREDDS server will be added to the ODP. This will allow users to access unrestricted data on the ODP automatically using OPeNDAP enabled programmes without having to log in via their accounts and manually download the data. This feature is expected to be the primary mechanism by which other TERN facilities such as eMAST will access and use OzFlux data. The THREDDS server will also provide some basic abilities to request data across different sites and years.
3. Implementation of portal administration tools to simplify this task when maintenance of the portal passes from Monash eResearch Centre to OzFlux. At present, this maintenance work is done at no cost by the developer of the portal at MeRC.
4. Implementation of statistics-gathering processes with the ODP to count the number of visits to the site and to harvest details of data downloads.
5. Implementation of a Digital Object Identifier (DOI) system for the ODP. DOIs are available from TERN, it is hoped to have the ODP automatically request a DOI from TERN whenever a data set is submitted to the ODP. The DOI will be inserted into the netCDF file stored on the portal.



News from around the SuperSite and OzFlux networks

Alice Mulga

Derek has been awarded an ARC Discovery grant, which will look primarily at water relations but also ecophysiology of the main vegetation types at the Alice SuperSite, this will involve putting up a new flux tower near some *Corymbia* that are hopefully using groundwater.

Calperum Mallee

At the ASN quarterly meeting we heard of plans for more detailed surveys in the 1 ha plots of soils and LAI over the next six months.

There is a new PhD student looking at soil respiration and carbon turnover at the floodplain and the Mallee sites.

Peter Cale will carry out fauna and bird surveys at subplots at the three sites over the next six months.

Looking at putting in some test wells and piezometers in the Mallee and Floodplain sites in late January/early February.

It is likely an Honours student will come on board in mid-2014 to compile the historical groundwater data (something like 15 years' worth) then carry out some surveys between the Floodplains and the Mallee to determine what the current situation is with the groundwater.

And then in early January.....



Fire at Calperum

The Calperum Mallee SuperSite flux tower site has suffered considerable damage from a wildfire event. The area leading to the site was variably scorched and in parts barely affected.

However, around the tower site looks like a moonscape. The spinifex burns fiercely and fuels the burning of the mallee canopy.

Essentially, the tower, cabinet and few bits within it are OK. The condition of the IR 7500, sonic anemometer and radiometer at the top of the tower is unknown – physically they are intact but there is no way of knowing the functionality until they are taken down, re-cabled, checked and recalibrated, if that is possible.

The instruments at 2m and 7m height are destroyed, as is one of the songmeter stations. All 3 phenocams are physically intact with front covers buckled, but we are unsure whether they will still be recording.



There is a TERN [newsletter](#) item on this event.

(<http://www.tern.org.au/Newsletter-2014-Jan-Flux-Tower-Fire-pg27904.html>)

Cumberland Plains EucFACE

Soil metagenomics sampling has been completed in the two core hectare sites.

As a new SuperSite, Cumberland Plains is still in the process of setting up teams to undertake several of the sampling activities with groups now aligned to undertake animal and bird surveys.

A team will conduct vegetation surveys over the summer in both of the core hectare plots. To date there been a single 1 ha plot within the EucFACE sector, but have now started to establish a SuperSite core 1 ha plot next to the flux tower which is about 1.5 km away.

Plant physiology survey is scheduled for 13-24 January 2014.

FNQ Rainforest

Robson Creek

Researchers from a number of institutions, as well as visitors from Stockholm Herbarium and a couple of local school groups have all been on site recently. Researchers from the University of Tokyo will visit within the next month or two.



Standard fortnightly bird survey, monthly fruit phenology survey and collection of fertile voucher specimens are ongoing. It has been a very good flowering and fruiting season.

There has been some media coverage of the plot through ABC National Radio.

The flux tower is going well. The replacement soil pit has been installed and is operational. The replacement bore will be installed soon.

Cape Tribulation: Daintree Rainforest Observatory

Work has advanced quickly on the construction of the new buildings with all buildings established, roofs and exterior walls in place.

The instrumentation for the drought experiment at the Crane 1Ha is proceeding rapidly with installation of sap flow sensors, phloem sensors and 6 soil pits so far.

Plant physiology campaigns are scheduled around Easter 2014 for both Robson Creek and DRO.

Great Western Woodlands

The new [Field Study Centre](#) at the Credo former pastoral lease homestead was officially opened on 22 October. See [Kalgoorlie Miner](#) article.

Flux tower and weather stations are running as normal.

Soil metagenomics, soil chemistry, LAI and vegetation structure assessments have been undertaken on four of the 1 ha plots.

Salmon Gum floristic plots have been resurveyed.

AusPlots completed six plots at Credo station site.

Birds Australia are continuing bird surveys across Credo.

Three publications from the Gimlet fire age plots and one Honours project have been completed this year.

The Nadju fire knowledge and aspirations project is completed.

Litchfield Savanna

Weather and other factors have resulted in delays to getting the SuperSite off the ground. Core 1Ha has been installed. Hopeful that the tower will be up and running by April/May.

SEQ Peri-urban

Samford: SERF

Landscape scale soil, atmospheric flux, water and water quality monitoring continues. Acoustic monitoring in the core vegetation plot, along with monthly avian point count surveys are also continuing. PhD student Lona Van Delden is conducting research into land use intensification effects on the carbon and nitrogen cycle – examining greenhouse

gas emissions in Samford's peri-urban ecosystems. Researchers from Cornell University have also recently completed their annual three month migration to SERF, monitoring fairy wren species.

Karawatha

A paper on biomass estimation for 32 plots in the Karawatha node of the SEQ SuperSite was published recently:

Hero, J-M., Castley, J.G., Butler, S.A. & Lollback, G.W. (2013) Biomass estimation within an Australian eucalypt forest: Meso-scale spatial arrangement and the influence of sampling intensity. *Forest Ecology and Management* **310**: 547-554. doi: [10.1016/j.foreco.2013.08.062](https://doi.org/10.1016/j.foreco.2013.08.062)

Tumbarumba Wet Eucalypt

Flux tower is running smoothly, we have changed over computer acquisition systems without bigger hiccups.

AusCover have installed hyperspectral sensors and data from the in-canopy phenocam is now available.

Victorian Dry Eucalypt

Whroo

Skye light sensor has been installed which will give a ground based estimate of NDVI, using the same channels as the MODIS system, so it becomes possible to tie our tower measurements to satellite measurements.

Three monthly campaigns of LAI using hemispherical cameras and an LAI200 have been completed.

Wombat

In process of progressing with vegetation dynamics research with VEGNET sensors, automated dendrometers, manual dendrometer bands, litter traps, regular LAI measurements with a Hemipix and sap flow sensors.

Warra Tall Eucalypt

In discussions with DPI to get separate management plan for Warra site, particularly the flux site, following recent inclusion of the area in the Tasmanian Wilderness World Heritage Area.

Flux tower running mostly okay. A second radiometer will be installed, as well as soil sensors, and possibly a phenocam.

1 ha plot is now 1.6 ha, extended 0.6 ha into the prevailing wind direction to get away from some of the highly disturbed area around tower where we had the guy wires. All stems on additional 0.6 ha have been mapped, in process of doing point intercept survey for vegetative cover.

Installed another two acoustic recorders, and carrying out a study with our ornithologists to compare species



accumulation doing traditional surveys with those with the acoustic sensors, that will also let us test what the effective acoustic survey distance is with the sensors in our wet forest.

Four flight intercept traps have been installed at ground level to sample flight of insects on the flux site. Evaluating the method, looking at monthly sample of insect biomass at the moment, may do some DNA work on them in the future.

New Faces



Alvin Sebastian has joined the Team as Software Developer of the Australian SuperSite Network (SuperSites) and Long-Term Ecological Research Facilities (LTERN). The role involves creating and establishing new services and tools for the management of research data as well as providing technical guidance, maintenance, and support of existing research data services. The main development tasks include designing and implementing new software and applications, enhancing existing tools by developing new features and components, and improving overall the user interface of the data portals. Support-related responsibilities are to ensure data portals are fully functional, to assist data librarians in generating good quality metadata, and to fix errors or bugs identified in the software systems. Alvin has a background in Computer Science and has worked at Queensland University of Technology in a similar role before moving to James Cook University. He is based at James Cook University in Brisbane.

Ivan Hanigan (Portal Project Manager). Ivan's new role entails coordinating the delivery of research data systems for the TERN Australian SuperSite Network (SuperSites) and the Long-Term Ecological Research Network (LTERN) Facilities. As a Data Analyst his role brings programming skills such as Reproducible Reports, scripted workflows, version control systems and Exploratory Data Analysis techniques to support data publication. Ivan trained in Human Ecology and has been working as a data manager and analyst in a multidisciplinary research centre at the ANU since 2001. Ivan has primarily worked in Environmental Epidemiology where he honed his skills in manipulation of large databases and multivariate regression modelling.



Upcoming Events

Australian Ecosystem Science Long-Term Plan - Town Hall Workshops 2014

Perth - date TBD

Sydney - 13 March

Canberra - 27 March

For more information, see [website](#).

19–21 March 2014

2014 Global Land Project 2nd Open Science Meeting, Berlin, Germany. Details at [Conference Website](#).

24–27 March 2014

Soil Change Matters International Workshop. Bendigo, Australia. Details at [Workshop Website](#).

10–12 April 2014

Critical zone observatories in the southern hemisphere - An international workshop. Perth, Australia. Details [here](#).

29 August 2014

7th Annual South Australian Spatial Information Day, Adelaide, Australia. Details at [Conference Website](#)

28 Sept - 3 Oct 2014

Ecological Society of Australia 2014 Annual Conference, Alice Springs, Australia. Details at [Conference Website](#)

29 Sept - 2 Oct 2014

TERENO International Conference 2014 - From observation to prediction in terrestrial systems. Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany. Details at [Conference website](#).

4–7 November 2014

2014 ForestSAT Conference, Riva del Garda, Italy. Details at [forestsat2014.com](#).

The next issue of the Newsletter will be published in Month 2014. If you have any news articles, photos, upcoming events, etc that you would like included please email shiela.lloyd@jcu.edu.au