

Quarterly Newsletter

Issue 7, June 2014

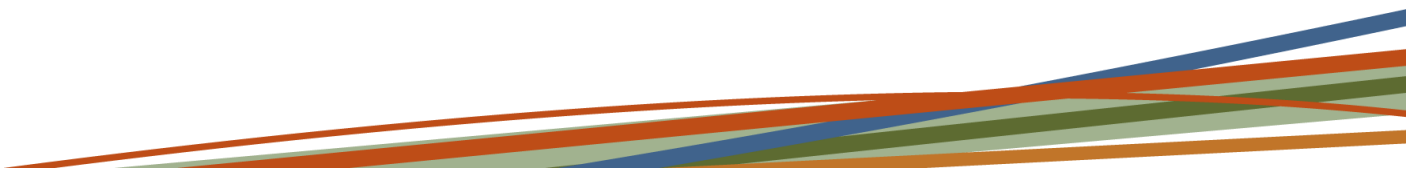
Supersite Central Update

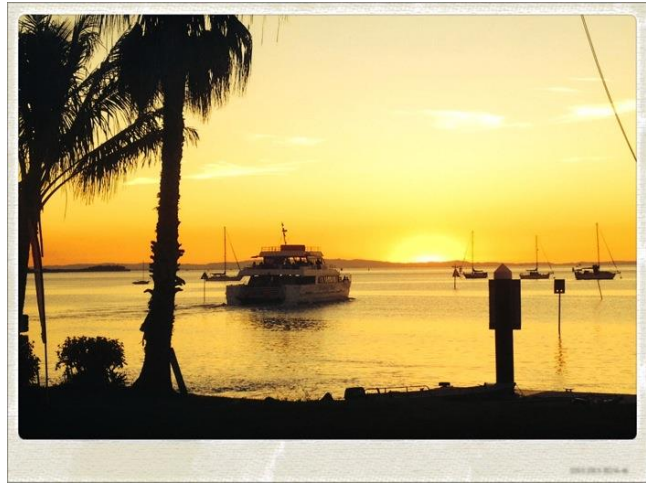
Welcome to Issue #7 of the SuperSites/OzFlux newsletter. Another busy quarter has come and gone with the SuperSites annual face-to-face meeting a highlight. This year we were joined by the LTERN plot leaders on day two to discuss common issues.

The main issue covered in the face-to-face meeting was the NCRIS2013 funding and discussing the objectives and milestones possible with the available funding.



The SuperSites troupe: Mirko Karan, Peter Cale, James Cleverly, Michael Liddell, Jason Beringer, Jean-Marc Hero, Tim Wardlaw, Eva Van Gorsel, Ian McHugh, Suzanne Prober, Matthias Boer, Remke Van Dam

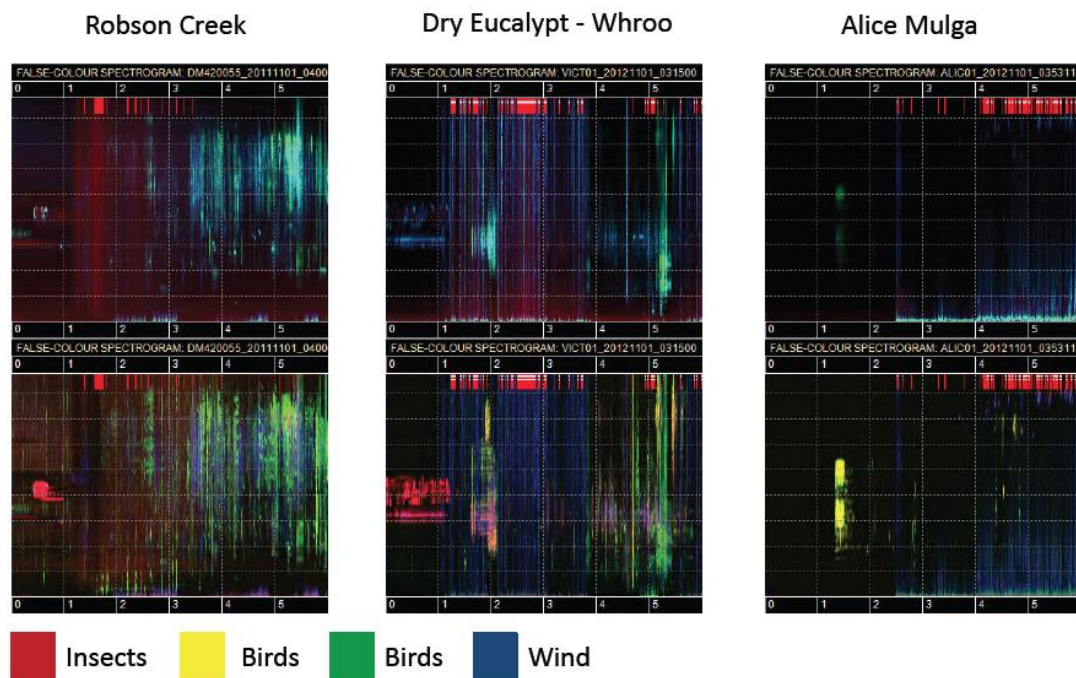




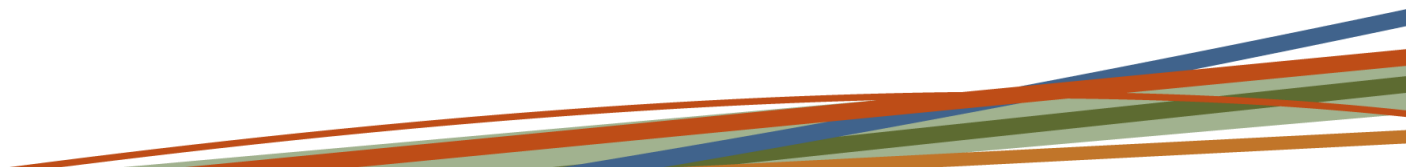
The sunset views available on the evening before the face-to-face meeting. Unfortunately the actual meeting continued into the night and no sunset was to be seen on Monday.

Highlights from the meeting include:

- Strong progress towards defining milestones for NCRIS2013 that include vegetation, avifauna, acoustic data and ensuring SuperSite reporting requirements would be met.
- Standardisation of dataset and file names was agreed to and a start made on standardising data sheet layouts.
- Peter Grace gave a preview of acoustic data complexity index analysis that highlights similar acoustic attributes. The figure below shows false colour spectrograms highlighting insects, birds and wind sounds from different SuperSites.



- The Bioplatforms Australia BASE soil DNA barcoding project is progressing with data to be available to sample suppliers in coming months.
- Bioplatforms is accepting further soil samples for DNA barcoding, subject to the provision of contextual data and soil collection according to their protocol. Proposals (half page) should be submitted in the next few months as the program will wind up when funds are depleted.



- Soil metagenomics proposals will be considered by Bioplatforms Australia. A call will be made to SuperSites researchers and collaborators interested in submitting samples for full metagenomics of soil samples (this include metagenomics on samples already submitted). This will provide an opportunity to collaborate on research that links metagenomics with soil GHG fluxes, productivity etc at different SuperSites. A proposal listing participants and project objectives is required. Mirko will send out a call in due course to the PIs and deputy PIs.
- Education and public outreach have become more important now that TERN sits inside the portfolio of the Department of Education. A collaboration with EarthWATCH will begin later in the year with campaigns started at suitable SuperSites and the potential for custom ClimateWatch trails associated with SuperSites will be explored to get the SuperSites into the citizen science space.

The SuperSites-LTERN meeting highlighted similar issues faced by both networks. It became clear that we need to make more of the potential to increase the spatial extent of observations by coordinating SuperSites and LTERN sites. It was also evident that several SuperSites had LTERN plot networks in proximity which would allow for future collaborative efforts. Discussions were held around new technology used or contemplated and how data collected from both networks may be used by eMAST and others to produce continental scale products.

SuperSites at the 51st Annual Meeting of the ATBC, Cairns, July 2014

The 51st Annual Meeting of the Association for Tropical Biology and Conservation will take place in Cairns from 20-24 July. Keynote speakers include Senator Christine Milne, Tim Flannery and Sue Laurance (PI on the drought experiment at the Cape Tribulation node of the FNQ Rainforest SuperSite).

Papers being presented by SuperSite members include:

"What's up is up: vertical stratification of moths is universal"

Louise Ashton

"Leaf photosynthetic and respiratory CO₂ exchange in two thermally-contrasting Australian tropical rainforest ecosystems"

Owen Atkin

"Rapid recovery of rainforest fruit production following severe disturbance"

Matt Bradford

"Monitoring biodiversity using standardized methodology and scale on an international systematic LTER plot network"

Jean-Marc Hero

"Australasian Altitudinal Transects: the Challenge of the Comparative Dimension"

Roger Kitching

"SuperSites - three new ecosystem observatories in the Tropics of Northern Australia"

Mike Liddell

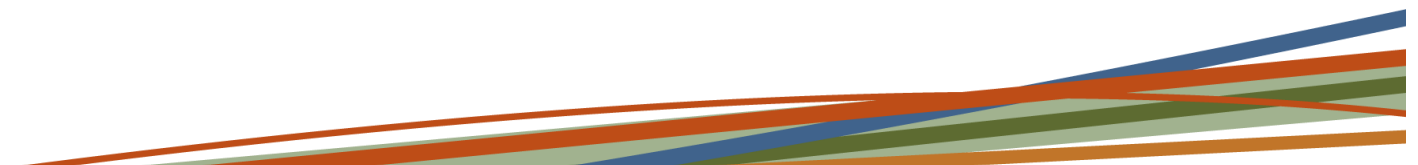
"No evidence for long-term increases in biomass and stem density in the tropical rainforests of Australia"

Dan Metcalfe

Footnote: *If people are presenting at Symposia anywhere and it relates to activities at a SuperSite (in some way or other) could they please let either Mirko or Shiela know so that we can add this to our table of metrics.*

NCRIS-2013 Contracting.

Contracts were sent to all SuperSites at the end of June. Only one is waiting on signatures to be finalised - #1 Tumberumba.



OzFlux Central Update

These were a hectic few weeks with rolling out the contracts and getting invoices paid before the end of financial year. Having contracts in place also has implications for our forward planning.

Technical Staff

All of them are now 'official'. A short sharp and sweet data processing workshop with Peter Isaac has set up the team to help with data processing if needed, and you can get technical assistance in the field. This is a reminder that we have set up a Trello board that allows you to make requests and helps the technical staff to organize their workload (if they get one, that is...). Setting up Trello is pretty painless, once you have done an email to Peter will give you access to the relevant board(s).

In late breaking news, the first technical staff task was a trip to Warra for Caecilia Ewenz (OzFlux), ably assisted by Darren "Clockwise" Hocking (Monash University and OzFlux regular). They spent a day at Warra helping Tim Wardlaw with a tilted CNR4 radiometer, a calibration of the IRGASON on the Warra tower and installing an NRLite net radiometer. Unfortunately, not everything went to plan and a second trip is being planned to clear up some remaining problems with the CNR4 and the IRGASON.

Data Processing Workshop / OzFlux Conference 2014

Another little reminder that you can find (some) information on the upcoming Data Processing Workshop / OzFlux Conference on <http://www.ozflux.org.au/meetings/index.html>. Please sign up early, this will make organizing the day to day activities, excursion and dinners much easier! Thank you

FluxNet Data Submission

The OzFlux contribution to the current FluxNet synthesis is almost complete. Dario Papale from FluxNet has been in contact with several PIs regarding some minor issues found in the data sets from some sites but in general, the quality of the data has been high.

There are now 80 files in the FluxNet collection on the OzFlux Data Portal representing a total of about 65 site-years (not all files contain a full year).

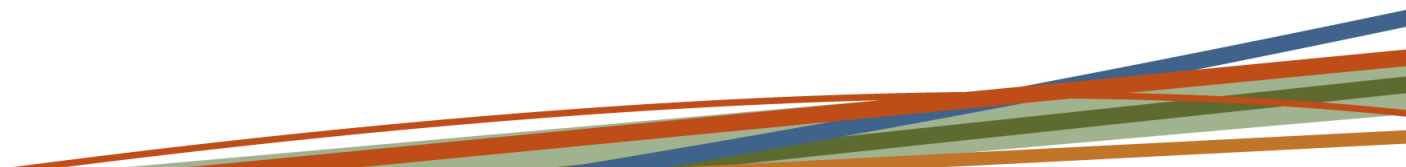
As FluxNet release this synthesis, more and more data from Australian sites will be used by researchers outside Australia. The FluxNet Fair Use data policy recommends any researcher using the data to contact the site PI and this has already happened for 1 OzFlux site. In the event that you are contacted by someone wanting to use data from your site, please send an email to Eva and Peter so that we can keep track of who is using OzFlux data. The number of these requests can be a very useful demonstration of the worth of the OzFlux network and TERN as a whole.

Shared Storage

The OzFlux Central Node has maintained a Dropbox folder available to the OzFlux community for some time, following the example of Jason Beringer and others at Monash University and Charles Darwin University. This has proved to be a convenient method for sharing data files but is limited by the Dropbox business model (only 2 Gb storage is available free). Both the Central Node and Monash have also been troubled by rare and worrying unexplained deletion of files, although this can be mitigated by using the Dropbox "PackRat" file recovery option.

As part of the ongoing development of the OzFluxQC data processing system, the OzFlux Central Node will be making several data sets available to OzFlux site PIs to help with gap filling and interpretation of flux tower data. Examples include data from the Bureau of Meteorology, CAWCR and AusCover. An easy way to make this data available to OzFlux site PIs is via some form of cloud storage.

For some time, Australia's Academic and Research Network (AARNet) has offered its own cloud storage solution, CloudStor+ (<https://cloudstor.aarnet.edu.au/plus/>). The CloudStor+ service is freely available to anyone with an Australian Access Federation enabled user account, this includes CSIRO and all Australian universities. Users are allocated 100 Gb of cloud storage for free and it may be possible to negotiate more through your home institution (for example Monash has arranged 1 Tb of storage). Installation of the ownCloud client provides synchronisation between CloudStor+ and a folder on your computer similar to Dropbox.



The OzFlux Central Node has been trialling CloudStor+ for some months with a view to using this as a way of making auxiliary data available to site PIs. Although, CloudStor+ can suffer from the same file deletion issues as Dropbox, it offers finer-grained control of access rights for shared files which can be used to reduce the chances of accidental deletion. AARNet are also planning to introduce a version system on CloudStor+ which will allow recovery of deleted files.

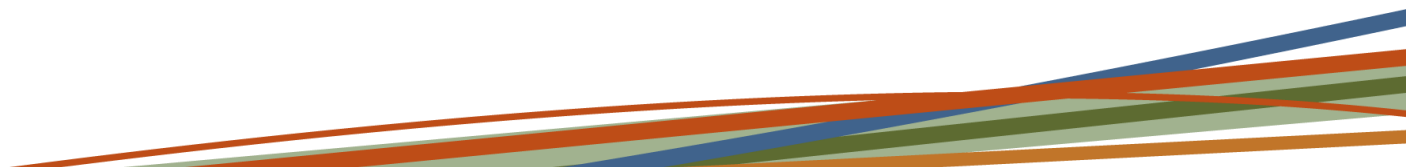
Signing up to CloudStor+ now will give you immediate access to 100 Gb of free cloud storage space. It will also give you access to the OzFlux shared folder. This is currently a mirror of the OzFlux Dropbox folder but if CloudStor+ proves reliable, it may become the primary mechanism for distributing auxiliary data sets to the OzFlux community. If you would like access to the shared OzFlux folder on CloudStor+, please email Peter Isaac.

OzFlux Data Processing

Responsibility for maintaining and developing the OzFlux Data Portal has now moved from the Monash eResearch Centre to OzFlux/CSIRO. TERN has generously made \$50k available to OzFlux to facilitate this shift and Matt Paget and Matt Nethery of CSIRO have taken on the roles for OzFlux. The first tasks are to complete the migration of the OzFlux Data Portal from Monash infrastructure to State and Federally funded infrastructure (RDSI/NeCTAR) and to implement a THREDDS server so that OzFlux data can be accessed via the Internet without having to download the files.

Development work continues on the OzFluxQC data processing system. A recent comparison of data extracted from the Bureau's ACCESS NWP model and data from 11 flux tower sites showed that the ACCESS data could be used to fill gaps in meteorological data in the tower records. Lawrie Rikus of CAWCR is now extracting ACCESS data for 28 OzFlux sites for the period 2010 to current and this data will be made available to OzFlux site PIs, most likely via CloudStor+, in the next 1 to 2 months. A system is also being developed to automatically extract current ACCESS data from the Bureau's own THREDDS server. A new version of OzFluxQC (V2.8.0), in beta-testing now and ready for release in the next couple of weeks, has the ability to use the ACCESS data (or data from any alternate site) for gap filling meteorological data at OzFlux towers. This compliments the gap filling techniques for fluxes that are already a part of the OzFluxQC system.

As mentioned before, the annual OzFlux Data Workshop will be held in September. This year, we hope to extend the material covered from the routine processing of data (L1 to L3) to include gap filling and partitioning (L4 to L5) using the OzFluxQC system. This year, lectures will be given by people from Li-cor (including George Burba), Ray Leuning and Peter Isaac. I would encourage everyone processing data from a flux tower to come to the workshop in September.



News from around the SuperSite and OzFlux networks

Alice Mulga

Jason Barnetson (NT Dept Land Resource Management) has finished surveys for the LiDAR and HyperSpectral flights. LiDAR flights were scheduled for June but unfavourable weather meant the flights have had to be delayed - possibly until August/September. New footings are being installed for the second tower to allow the tower to be raised higher above the tree canopy. Owen Atkin and Keith Bloomfield will run a plant physiology campaign (timing to be determined) to collect hydrology architecture and gas exchange for four species from different vulnerability groups. The ESA conference and OzFlux workshop are in Alice Springs in September with a field trip to the Alice Mulga SuperSite.

Calperum Mallee

Site is now restored to fully operational after the fire earlier this year. Phenocams are monitoring differences between unburnt and burnt areas at the site. Qiaoqi continuing PhD studies on soil respiration with incubated soil samples and has just taken delivery of a Licor 8100 unit to measure soil respiration *in situ*. An Honours student is about to start collating and processing historical bore data (since 1993) from 70 sites across and adjacent to the floodplain. Plans have been shelved for sonic boring of the core 1 ha bore and a contractor employed to drill a standard bore at the site. Bird surveys are continuing and a small mammal survey is underway in burnt and unburned areas (continues a dataset from 1998).

Cumberland Plain

The core 1 ha has been established within the fetch of and 50 m from the flux tower. Vegetation data collection has begun with the assistance of the Sydney Royal Botanical Gardens including Gentry transects of understorey, vascular plant list, DBH, tagging of understorey. Three sensors have been installed for continuous gap fraction and overstorey LAI. Bird surveys will commence soon. A methane sensor (LI-7700) is currently being tested and will be installed on the flux tower later in the year. The SM2+ acoustic sensor will be replaced by four SM3BAT acoustic sensors which will record avifauna as well as bats. Eight night vision camera traps (Bushnell Nature View HD) will also be installed.

FNQ Rainforest

Robson Creek

A new soil pit has been installed at Robson Creek and instrumented and soils characterisation completed in the core 1 ha. Peter Green has completed seedling surveys at Robson Creek. Water chemistry and stream water sonde

data have been collected since mid-2013, the sonde surviving a 'tidal wave' down the creek in the wet season.

Bird surveys, phenology, acoustic data, stream surveys and water chemistry continue to be collected on a monthly basis. Visitors include a team from the University of Tokyo who returned to carry out further terrestrial laser scanner studies using a new scanner with 600m range. Owen Atkins group from ANU lead by Keith Bloomfield on the ground carried out the photosynthesis/respiration work. Also working on plant physiology was Emma Grey and colleagues from Ian Wrights group at Macquarie. Geoff Monteith carried out trapping of dung beetles and the School for Field Studies have carried out their twice year seedling, CWD study.

Cape Tribulation: Daintree Rainforest Observatory

The DRO drought experiment pilot has started with the main drought commencing mid-year with the aim of extending the dry season by 2 months. Despite losing several trees during Cyclone Ita all soil pits, xylem and phloem sensors, flux station and 2 weather stations remained operational.

Isoprene emissions have been collected over the last year by researchers from Macquarie University.

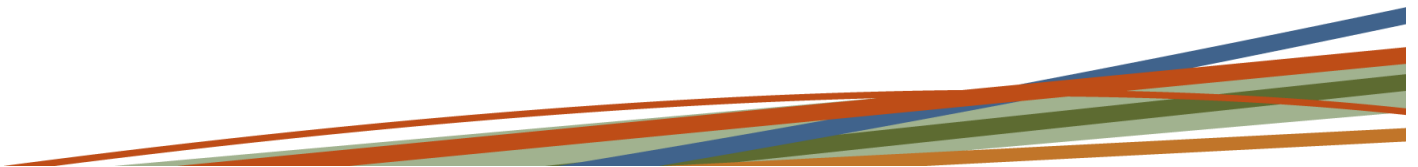
The new building facilities have commenced operation at the DRO providing excellent accommodation, laboratory research and teaching spaces – along with a better 'golf' buggy. An official opening is planned in the coming months.

Two students from Imperial College have completed their research projects. Skipping the balmy UK summer for the torrential downpours of a very extended Daintree wet season the students worked on avifauna measurements along the edges of the forest and revegetation in the adjacent Australian Rainforest Foundation land.

Daintree Discovery Centre wins United Nations Sustainability Award 2014

The Daintree Discovery Centre (DDC) is an ecotourism venture and a part of the FNQ Rainforest SuperSite hosting a 1 ha vegetation plot, micrometeorological station and a flux tower. The DDC has won the United Nations World Environment Day Awards 2014 for Sustainability Leadership (<http://www.daintree-rec.com.au/winner-of-the-united-nations-sustainability-award-2014/>).

The DDC is a visitor information Centre with interpretative displays about the area, a 23 m canopy tower and aerial mid-canopy walk way through the rainforest.



Great Western Woodlands

Accommodation at Credo has been increased to 20 and DPaW is likely to add more accommodation soon. Downwelling radiation sensors were replaced during the field trip in April. Soil moisture sensors have been added at different depths and Litter traps and Dendrometers have also been installed.

Application has been made to CSIRO to install a second flux tower for the understorey. Birds Australia continue to carry out bird survey as part of a wider study. Tree ring analysis will be done at the Gimlet plot for better age estimation of trees. Masters study has been completed on floristics of salmon gum woodlands and wheat belt woodlands. Waiting to see AusPlots data, TERN Transect (SWATT) plots halfway through data collection.

Tumbarumba Wet Eucalypt

Selective logging within flux tower footprint began in mid May. The team has decided on a location of the core 1 ha plot, which is yet to be established.

The hyperspectral / thermal scanner has been installed on the tower and has taken good imagery for about 6 weeks. In the frost period the pan-tilt table has jammed and we will have to find out how to keep the system going through the weather.

Two LiDAR VEGNET sensors have been installed to provide in-canopy data and plans to have the Dual-Wavelength ECHIDNA LiDAR (DWEL) tested soon at the site are being planned.

SEQ Peri-urban

Samford: SERF

Greenhouse gas, water quality, soil and atmospheric flux monitoring continues. Monthly avian point counts and acoustic sensing also continues. Acoustic indices are now being generated automatically, and random samples of dawn periods from acoustic sensors are being manually analysed to estimate species richness. Comparisons of monthly acoustic sensing and traditional avian surveys will be compared over a 12 months period to evaluate the effectiveness of both methods.

PhD student Lona Van Delden is continuing her greenhouse gas monitoring in eucalypt woodland and pasture at SERF. A fully automated chamber system measures the main greenhouse gases CO₂, CH₄, and N₂O in this peri-urban ecosystem 24/7. The land uses under examination include forest and pasture, which when transformed into smaller residential properties during urbanisation are often replaced by turf grass.

A high definition camera is now continuously monitoring the Samford creek bordering SERF. The camera is being used to experimentally monitor stream height, flow rate and turbidity. YSI water quality sondes continues to

monitor Samford creek in the same location. Physico-chemical parameters include Ph, electrical conductivity, dissolved oxygen and turbidity. In addition the SonTek Argonaut continues to monitor stream flow and levels.

SERF is currently the test site for a portable field based Isotope Ratio Mass Spectrometer (IR-MS). This study by PhD student Daniel Warner will be used to provide vital data on the partitioning of N₂O/N₂ to the National Agricultural Nitrous Oxide Research Program (NANORP). During the testing and calibration phase at SERF the IR-MS will be connected to an automated chamber greenhouse gas monitoring system, developed by QUT. With this study it is hoped that the portable field IR-MS in conjunction with the automated chamber system will allow the continuous monitoring of N₂O/N₂ emissions in-situ.

Masters student James Taylor is continuing his research relating to creating spatial models to estimate RF signal degradation for WiFi networks within vegetation. This research is important to enable the transfer of data from remote sensor locations. As part of a project to Model RF link quality, a point cloud map of several areas of SERF was generated. This map was created using the CSIRO Zebedee. Zebedee is a LiDAR (Light Detection and Ranging) device attached to a sprung handle that captures environmental objects in 3D. This data set is much like aerial LiDAR but captures larger amounts of below canopy points. The point cloud captured of the homestead inside and out can be viewed from any angle using 3D software and light rendering tools.

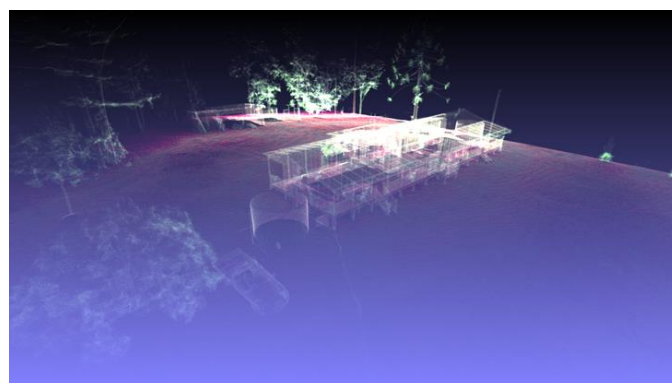


Figure 1. 3D Visualisation of SERF Barracks using Zebedee LiDAR Data

The Healthy Environment Ecosystems and Environmental Monitoring team from the Institute for Future Environments at QUT held an all-day strategy and planning workshop at SERF during June. The workshop was aimed at identifying research opportunities at SERF and to share information on current and planned research.

Karawatha

Recent publications:

"Biomass estimation within an Australian eucalypt forest: meso-scale spatial arrangement and the influence of sampling intensity"

"Biodiversity and Integrated Environmental Monitoring"

AusCover TLS and aerial Lidar campaigns have been completed.



Biodiversidade e Monitoramento Ambiental Integrado

Biodiversity and Integrated Environmental Monitoring

William Magnusson
Ricardo Braga-Neto • Flávia Pezzini
Fabrício Baccaro • Helena Bergallo
Jerry Penha • Domingos Rodrigues
Luciano M. Verdade • Albertina Lima
Ana Luisa Albermaz • Jean-Marc Hero
Ben Lawson • Carolina Castilho
Débora Druckler • Elisabeth Franklin
Fernando Mendonça • Flávia Costa
Graciliano Galdino • Guy Castley
Jansen Zuanon • Júlio do Vale
Laurindo Campos • Regina Luizão
Renato Cintra • Reinaldo I. Barbosa
Antônio Lisboa • Rodrigo V. Koblitz
Antônio R. Mendes-Pontes
Cátia Nunes da Cunha

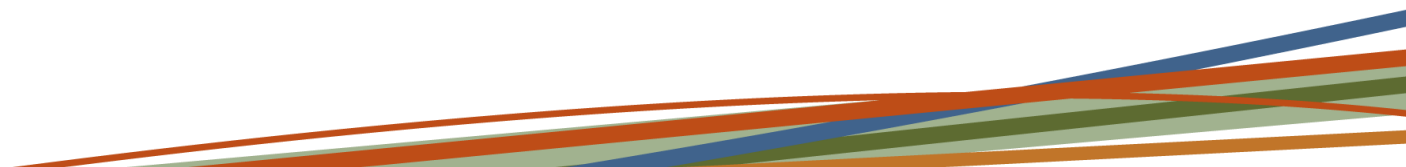
Litchfield Savanna



The flux tower will be erected when the weather allows, this will mark the most northern tower of the NATT (with Alice the most southern tower). Concrete will be poured late June/early July with the tower construction and instrumentation planned for Aug-Sep 2014.



Three channel VIS-NIR spectrometers will be installed, as well as phenocams and WiFi for the site. The aim is to create remote sensing products and models using SuperSite and OzFlux networks along NATT.



Victorian Dry Eucalypt

Whroo

Ongoing seasonal LAI (LI-2200 and DHP), litter traps, leaf level photosynthesis. New ranger in charge of area, which will aide in site management and allows new soil probes to be installed.

Wombat

Flux measures indicate Wombat is a strong and consistent carbon sink. The drought experiment (40% through fall reduction) has been completed and two manuscripts have been submitted on the data. Over the last 18 months manual band and automated point dendrometers, 3 ground based LiDAR VEGNET sensors, sap flux sensors, litter traps have been deployed. Hemispherical photos have been taken once a month. These instruments will support a PhD project evaluating the fine scale growth dynamics and processes of a dry sclerophyll eucalyptus forest. The site also houses an automated soil greenhouse gas measurements system with an FTIR gas analyser, that measures soil based fluxes of carbon dioxide, nitrous oxide and methane.

The Department of Environment and Primary Industries is considering a planned burn in late 2014 or early 2015 in the flux tower footprint, which would allow a quantification of the impact of planned burns on ecosystem processes.

Warra Tall Eucalypt

Tim, in collaboration with colleagues from UTas has been awarded an ARC Linkage grant. This is a particularly useful grant for the SuperSites network as the ARC funded project will be relying on data from the Warra SuperSite and will be testing next-generation methods for doing broad-scale biodiversity assessments - lidar/hyperspectral as a surrogate for floristics; acoustic recorders for birds (120 sites using a network of 40 recorders!); DNA metagenomics for insects.

Lidar of the 5 x 5 km area around the Warra core 1ha plot was acquired in early June. The flux tower was serviced in late June with the assistance of Caecilia Ewenz and Darren Hocking. A new radiation sensor was installed together with two new soil heat flux plates / thermocouples.

An Austrian intern will spend 5 months installing dendrometers on eucalypt, stringy bark and blackwood trees. Starting insect biomass survey using four flight intercept traps to assess dry weight monthly. Collecting samples for the University of Guelph Global Malaise Trap monitoring experiment.

Upcoming Events

20-24 July 2014

ATBC 2014: The Future of Tropical Biology and Conservation. Cairns. Australia. [Details](#)

21-30 July 2014

MICMoR Summer School 2014: Examining Mountain Ecosystems in Regional to Global Environments of Carbon-cycling and Climate (EMERGE-CC). KIT/IMK-IFU, Garmisch-Partenkirchen, Germany. [Details](#)

29 August 2014

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

22 Sept – 26 Sept 2012

OzFlux data processing workshop. Registration is [here](#). Please register early and pass information on! This workshop will be held in conjunction with LI-COR and we strongly suggest to also [register](#) for the companion course.

29 Sept – 1 Oct 2012

OzFlux meeting/conference. Registration (with deadline Sept 1) is [here](#). Please register early and pass information on!

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](#).

1-3 December 2014

AAA/ASHA 2014 Joint Conference, Culture, Climate, Change: Archaeology in the Tropics, Cairns, Queensland. Details at: [Conference website](#).

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

