TERN
OzFlux
Land-Atmosphere Observatory

Critical Zone Network Australia
The zone that sustains terrestrial life

TERN
SuperSites
Ecosystem Change Observatory

Quarterly Newsletter

Issue 17, March 2018

TERN Ecosystem Processes Update

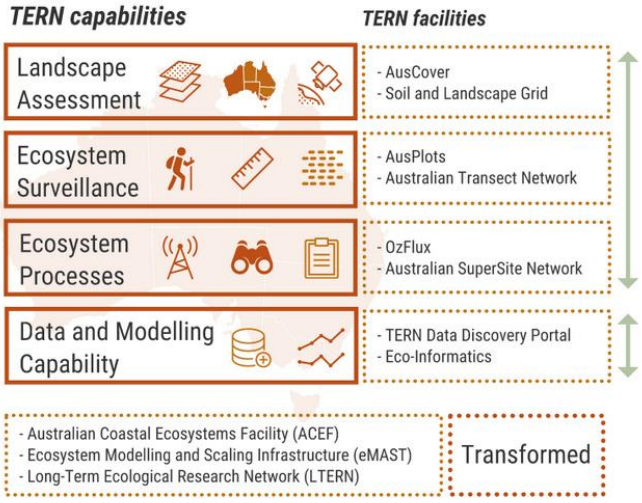
Welcome to the 17th edition of the TERN Ecosystem Processes (SuperSites/OzFlux) and CZO AU Newsletter.

As you may be aware TERN is making some changes to its land observatory. We are re-shaping our structure to place more importance on the way in which data derived from the local, regional and continental scale facilities is integrated and made more accessible for research on variation and change of terrestrial ecosystems in Australia.

Under this transition, the former TERN facilities of SuperSites and OzFlux have come together to form the **TERN Ecosystem Processes capability**. The exact shape of the Processes capability will not be known until the 1st of May.

The other two parts of the TERN observatory are:

TERN Landscape Assessment is delivered primarily by *AusCover's* remote-sensing data streams from technologies which include satellite and airborne platforms operating on a continental scale. Such data streams are used to characterise and detect change relating to vegetation structure and composition, land cover underlying forces, and bushfire dynamics and impacts. *Soil and Landscape Grid of Australia* products are included in this capability.



TERN Ecosystem Surveillance occurs at a regional scale and requires field sampling across a network of hundreds of plots at different scales from the *AusPlots* and *Australian Transect Network* respectively. Standard methodologies for collecting core attributes are used across time and space to detect and quantify change over large areas in vegetation structure and composition, land cover and soil characteristics.

You can read more about the TERN transition here: http://www.tern.org.au/Transitioning-TERN-to-better-meet-user-needs-bgp4304.html

TERN SuperSite Central Update

Face-to-Face meeting (Richmond)

The TERN SuperSites annual face-to-face meeting was held on Nov 15 2017, in conjunction with the TERN OzFlux annual workshop and conference at the Hawkesbury campus of Western Sydney University in Richmond, NSW.

Changes in the TERN SuperSites network

The FNQ Rainforest SuperSite – Daintree, SEQ Peri-urban SuperSite – Samford and Vic Dry Eucalypt SuperSite - Whroo have transitioned to Affiliate SuperSite status. This means that while they will not receive funding from TERN for SuperSite activities they will continue to have the same status in the network and, where possible, will add open data to TERN's database.

This leads to the next change that is in progress. Alvin Sebastian has now moved across to UQ to work inside Guru's expanded TERN Data Capability data team. Alvin is helping with the slow transition of the Metacat data repository across to AEKOS. This is likely to take some time (maybe years) as there is a lot of work to do on AEKOS before it able to be used for this purpose but the process has started.

New SuperSites have been established near Longreach **Mitchell Grass Rangeland SuperSite** and both south and north of Perth, **Boyagin Wandoo Woodland** and **Gingin Banksia Woodland SuperSites**. These new SuperSites have been brought about through the shifts associated with the changes to the three affiliate SuperSites, no additional funding was required.

Also associated with the shifts to affiliate SuperSites have been name changes for the Wombat node of the "Victorian Dry Eucalypt SuperSite" to **Wombat Stringybark Eucalypt SuperSite** and the Robson Creek node of the "FNQ Rainforest SuperSite" to **Robson Creek Rainforest SuperSite.**

TERN SuperSites head agreement

The new TERN SuperSites head agreement with UQ was finalised, and nearly all sub-agreements are completed. Deliverables remain modest as this is the same level of 'standby' funding (inflation adjusted) as the network has operated on for the last 18 months.

TERN OzFlux Central Update

Workshop, conference, PI meeting (Richmond)

The TERN OzFlux annual workshop and conference was held at Western Sydney University in November. Both workshop and conference were a huge success, and we would like to thank Elise Pendall and Anne Griebel of Cumberland Plain for hosting the event. Up to 29 people attended the workshop, and the conference consisted of two days chocker-block full of inspiring and diverse scientific topics. Presentations which have been released to the public can be viewed at http://www.ozflux.org.au/events/index.html. The conference concluded with a face-to-face PI steering committee meeting.

Sydney AMOS-ICSHMO 2018

TERN OzFlux sponsored a session at the joint 25th AMOS National Conference and 12th International Conference for Southern Hemisphere Meteorology and Oceanography at the University of New South Wales in Sydney (5-9 February 2018). Chairs for the session on land surface processes were James Cleverly and Cacilia Ewenz.

Darwin 2018 OzFlux-AsiaFlux

The TERN OzFlux 2018 workshop and conference has been announced. This year's meeting will be held jointly with AsiaFlux in Darwin NT:

Training Workshop	Mon 20 - Wed 22 Aug (CDU Waterfront Campus Darwin City - free venue)
Meeting	Thurs 23 - Sat 25 Aug (Hilton, Esplanade Darwin City)
Field trip(s)	Sun 26 Aug (The Bush)

Please contact Lindsay Hutley Lindsay.Hutley@cdu.edu.au for further information.

Hamilton 2020 OzFlux-iLEAPS

TERN OzFlux will sponsor a joint conference with the Integrated Land Ecosystem Atmosphere Processes Study http://www.ileaps.org) in 2020, Hamilton, New Zealand. Contact James Cleverly for further information and watch this space for further details.

Climate science capability review, August 2017, OzFlux

The Climate Science capability review (https://www.science.org.au/support/analysis/reports/australian-climate-science-capability-review) was released in August 2017. TERN OzFlux was identified for our contributions to the climate community regarding measurement and understanding of carbon and water fluxes.

BADM submission

Submission of BADM meta-data forms to Fluxnet was completed by the TERN OzFlux central node. These forms were for issuance of DOIs of our Fluxnet datasets and for inclusion in the Fluxnet data paper. BADM files were submitted for all of the sites which contributed data to Fluxnet2015.

Completion of special issue

The special issue was completed with publication of the preface (https://www.biogeosciences.net/special_issue618.html). Altogether, 20 papers including the preface were published (19 peer-reviewed). Wide-ranging topics included eddy covariance theory, climate, agriculture, phenology, methane, modelling, photosynthesis and biomass. See TERN news: http://tern.org.au/New-science-on-carbon-and-water-in-Australian-landscapes-bgp4320.html.

Eucalypt Day 2018

TERN OzFlux initiated production of a 1.5 minute video for TERN Ecosystem Processes (https://vimeo.com/260745357). A contractor was engaged to put together existing footage and images, for release and promotion on Eucalypt Day (March 23rd) and also for wider use. Eucalypt Australia has contributed to its production and Mark Grant and Thea Williams from TERN and CSIRO Communications are on the panel, along with Lindsay, Suzanne, Craig, Stefan and Tim.

Watching over our incredible eucalypt ecosystems: Australi...

This special Eucalypt Day video showcases how scientists are using Australia's land observatory to measure the nation's precious eucalypt ecosystems, detect…

vimeo.com

TERN OzFlux head agreement

The new TERN OzFlux head agreement with UQ was finalised, and sub-agreements are in progress. The new agreement will require that people report the status of their tower/data after each quarter. This can include reporting equipment failure/issues dealt with so we can keep track of challenges.

CZO Central Update

Main Range Critical Zone Observatory

Research from the international collaboration in disentangling the roles of biota and climate in driving weathering and nutrient cycles in shale-derived soils was presented by Dr Ashlee Dere at the American Geophysical Union conference in December 2017. This work included soil chemical, physical, and microbiological data from collaborative field work completed by Dr Dere, Dr Talitha Santini (University of Queensland), and Sara Parcher, a research student at the University of Nebraska-Omaha, in August 2016 in the Appalachian Mountains, USA (including the Shale Hills CZO) and in February 2017 in the Main Range CZO, Australia. This work has revealed distinct differences in short-term and long-term measures of erosion rates across the USA climosequence, and in microbial community composition between the Appalachian and Australian sites. Further work will include analysis of 10Be inventories in soils at the Main Range CZO through a recently awarded ANSTO grant to determine long term erosion rates and compare to those in the USA climosequence, and analysis of microbial community function and contributions to nutrient cycling. Sara Parcher will also present her work on plant root density and microbial community structure at the Geological Society of America North-Central 52nd Annual Meeting in April 2018.

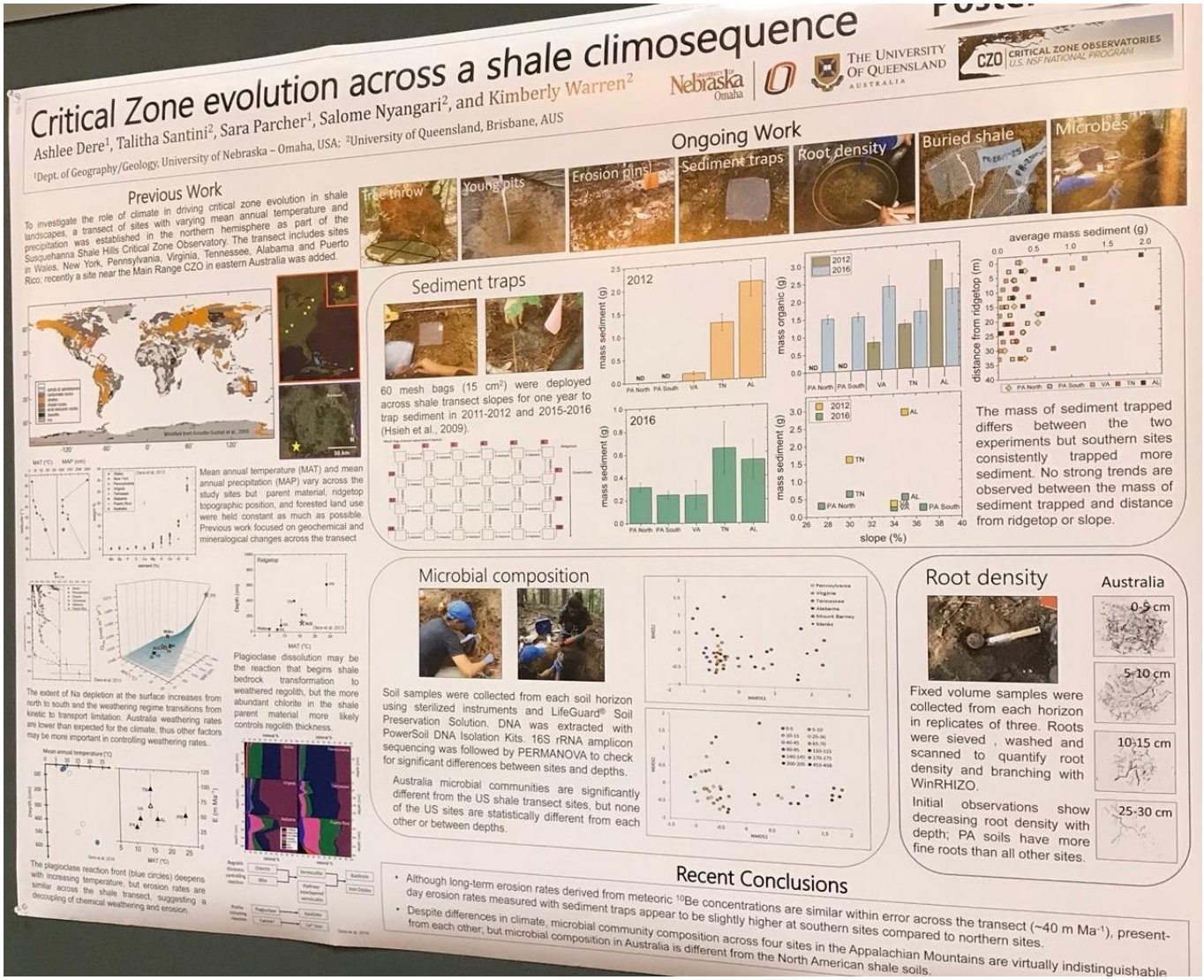


Photo caption: Poster summarising recent work from the international CZO shale climosequence collaboration presented by Dr Ashlee Dere at the 2017 AGU conference.

Avon River Critical Zone Observatory (AR-CZO)

Professor Kamini Singha, USA, visits the Avon River Critical Zone Observatory on the Ridgefield farm

Kamini Singha, Professor of Hydrology in the Department of Geology and Geological Engineering and Associate Director of the Hydrologic Science and Engineering Program at the Colorado School of Mines, USA, visited the University of Western Australia in August 2017 as part of her world tour with the Darcy Lecture Series in Groundwater Science. Singha presented a fascinating talk about 'The Critical Role of Trees in Critical Zone Science: An Exploration of Water Fluxes in the Earth's Permeable Skin' - a topic that is also highly relevant in Australian ecosystems and its various land uses. Dr Matthias Leopold (UWA School of Agriculture and Environment) and Dr Sarah Bourke (UWA School of Earth Sciences) organized a field trip for Singha to the Avon River Critical Zone Observatory (AR-CZO), which is currently developed on the UWA farm Ridgefield near Pingelly. The AR-CZO serves as a platform for national and international collaboration in the space of ancient soils and modern land use as part of the international critical zone exploration network (CZEN). During the field day various questions around water use, water residence time in ancient sediment storages and nutrient depletion in soils as part of a modern agricultural land use system were introduced and future collaboration possibilities were discussed. The team was joined by Rachel Hamilton and colleagues from Rockwater PTY LTD Perth, who provided additional valuable information from a groundwater industry perspective.

The visit of Professor Singha was inspirational and showed once more the great potential for targeting cross-disciplinary questions within the critical zone science framework. Collaborative projects are currently being developed with first proposals submitted.

Right to left: Kamini Singha, Sarah Bourke, Paul Drake and Matthias Leopold discuss aspects of laterite formation and current weathering and its influence on the hydrology.

New wireless moisture sensors tested at Avon River Critical Zone Observatory

Since the Avon River Critical Zone Observatory (AR-CZO) largely focusses on processes within a managed landscape, infrastructure has to align with day to day practices of the farming business. Soil moisture plays a crucial role, both in natural ecosystems and agricultural business decisions. Deploying moisture sensors in cropping paddocks is important but often restricted to the boundaries of these fields to not interfere with cropping treatments such as seeding, cultivating or even plowing.

The group of the AR-CZO collaborates with Prof Christof Truebner, who is an adjunct of UWA, and Prof Dennis Trebbels from the University of Applied Sciences in Mannheim, Germany, who are the founders of the Truebner GmbH (www.truebner.de). In December 2017 the group visited the AR-CZO in order to test prototypes on newly developed signal transmitters which work below ground. Transmitter were buried 30 cm deep, a depth where it wouldn't interfere with most agricultural cultivation techniques. Sending distances of over 1.2 km were positively tested. The new prototype will be deployed during this year's growing season and field tested under different moisture contents throughout the year.

Christof Huebner und Dennis Trebbels testing their new prototype of below ground signal transmitter at the Avon River CZO.

News from around the TERN SuperSite and OzFlux networks

Across the SuperSites network.

The Termite Fungi – Wood Decomposition Monitoring Program

The Wood Termite Fungi decomposition monitoring program is well under way and is contributing to the Wood Termite Fungi experiment run by Amy Zanne (George Washington University) with over 90 sites around the world taking part. SuperSites samples are starting to come in for the 12 month mass loss and microbial analyses. So far samples from Cape Tribulation, Cumberland Plain, Great Western Woodlands, Samford, Tumbarumba and Warra have been assessed.

Termite damage has been fairly rare so far with the exception being Great Western Woodlands where 9 of 20 baits showed termite damage. Litchfield, which is due to arrive in a few days for sorting, appears to be the standout as even one of the controls got hammered and turned to 'Pinus Radiata sand'. A second set of termite baits are sent to Jeff Powell at Western Sydney University for microbial analysis.

Alice Mulga

The new record monthly rainfall record from January 2017 (*ca*. 550 mm, breaking the previous record of *ca*. 350 mm/month) which was reported previously resulted in exceptional productivity at the Alice Mulga SuperSite. Productivity was the highest on record at AU-ASM (2010–2017), with both GPP and NEP exceeding rates during the 2010–2011 global land C sink anomaly. This year (2016–2017) is also notable in that AU-TTE was a net carbon sink for the first time in its measurement record (2012–2017).

Data-sharing:

- Flux data shared on portal through October 2017
- NASA SMAP, updated through August 2017 for AU-TTE and AU-ASM
- 398 downloads from FLUXNET2015 since 5 March 2017 (as of 4 December 2017)
- 6 direct requests for data or ancillary information (including one from Bill Anderegg)

Visitors to the SuperSite:

- Cacilia Ewenz

Infrastructure/monitoring status:

- AU-ASM ticking over, delivering data for processing to L6
- AU-TTE ticking over, delivering data for processing to L5

Calperum Mallee

Monitoring

Phenocams: 2 of 3 phenocams continue to work – the angle view from the tower and the 2 m surface view. The nadir view on the tower is not functioning.

Acoustic sensors: The centre of the 1 ha Mallee plot continues as does the sensor located in a swale setting about 1 km from the Mallee plot.

Surveys

Mallee Bird Surveys: Completed for 2017. Now have 7 years of data; 3 years pre-fire and 4 years post-fire.

Floodplain Surveys carried out at end of November/early December.

Termite Stations: Are now set up.

Mallee Seedling Mortality Survey: Was carried out for the 3rd year as part of Earthwatch program in December.

Pitfall Trapping: Annual pitfall trapping for small mammals and reptiles in burnt and unburnt sites were conducted for the third year as part of the Earthwatch program in December. We are also collecting invertebrate predator abundance data from these pits.

Research

Ian Potter Foundation Research Fellowship: Australian Landscape Trust (ALT) was successful in getting a 3 year research fellowship grant that will fund a post-doc level position. This position will be involved in a range of current research at Calperum, including Supersite programs. The funding is intended to be long-term and so once Supersite's new structure is finalised opportunities to use this position for projects looking across Supersites can be considered.

Adelaide Uni Research on Black Box: There is currently a 12-month intensive study of Black Box Ecophysiology in relation to environmental watering being conducted at Calperum by Adelaide University in collaboration with CSIRO and Flinders Uni. This is hopefully a precursor to a longer-term Black Box Recovery program for the Calperum Floodplain run by ALT in collaboration with this research team. This program would include integrated management and research. Outcomes for Supersite programs is the potential for more detailed hydrology/soil monitoring associated with Black Box tree condition monitoring that could be incorporated into Supersite data sets.

Engagement

Earthwatch Student Challenge: ALT is running two programs, one in December and one in April. These will include work on SuperSite Pitfall trapping, Mallee Seedling Survival, and Wayne's leaf area and biomass research.

The SA Premier's NRM Excellence Award has been awarded to the Australian Landscape Trust (ALT) for its management of Calperum and Taylorville Stations in the Riverland (https://www.premier.sa.gov.au/index.php/ian-hunters-news-releases/8022-nrm-excellence-award-to-non-profit-managing-calperum-and-taylorville-stations).

Cumberland Plain

Infrastructure / monitoring status

A fire in September moved close to the flux tower, but no problems were incurred.

SuperSite monitoring continues as normal, with vegetation survey being conducted in November.

Anne Griebel is currently studying mistletoe/water relations with the mobile flux tower at the Melaleuca stand.

Daintree Rainforest

Daintree Rainforest Observatory

Drought experiment continues with surprisingly few tree mortalities to date. Water quality data (full chemistry) for 1 year has been collected and is currently being analysed alongside the results from Robson Creek. The site YSI-Sonde was damaged by lightning, it was repaired and has now failed again… Dr Lim's Doppler sensor washed away in a wet season flood event that went over the weir with some vigour. A few issues with the netbook running the OzFlux station but so far data loss has been minimal.

Recent visitors included Nate McDowell, Los Alamos National Laboratory, working with Lucas Cernusak and Stephen Sitch, Exeter University who conducted an ozone experiment. Amy Zanne also returned to plan their new NSF funded litter decomposition Program across northern Australia which will use the Daintree site.

Daintree Discovery Centre

Cow Bay flux tower running well. Some issues with the soil pit due a failed multiplexer that have been resolved.

Robson Creek Rainforest

SuperSite monitoring proceeding as normal. There have been a few issues with the OzFlux system but mostly these have been communications related.

Bird survey and phenology surveys continue on a monthly basis.

Great Western Woodlands

Credo conditions and update:

The area was hit by a large storm in Nov 2017 as well as 14-18 fires burning in the Goldfields. The homestead remained intact in cyclonic winds and received 18 mm rain in half an hour.

Flux tower, weather station, plant physiology:

- Both understorey and overstorey tower functioning. Data processing on overstorey tower up to date as of end of October 2017.
- Cleaned instruments, changed chemicals in both LI-7500A IRGAs.
- Installed new Datamax+ ethernet modem and successfully connected it to both OS and US loggers.
- Installed a larger solar panel on the understorey power supply.
- Overstorey tower was inspected by Ray Maarsen from Access Infrastructure. The tower is in excellent

condition and Access Infrastructure recommend five-yearly inspections of the tower.

Biological monitoring:

- Salmon gum plot LAI photos, floristics, five-point photos collected.
- Acoustic bird monitors downloaded.
- One dendrometer has malfunctioned.
- Litter traps emptied. Replaced 12 litter traps with new traps, making 12 more new litter traps to replace on next trip.
- Groundwater depth measured at both sites with replacement instrument.
- Phenocams: OS-oblique and US-oblique phenocams SD cards swapped. TERN phenocam returned to TERN for improvements.
- Gimlet sapflow gear re-installed on new trees north of SG plot with new power supply.
- Termite stations collected.
- Tea bag data submitted.

Nutrient Network and Drought Net:

- All plot photos collected at DroughtNet sites.
- Missing roof panel replaced on one plot.
- HOBO logger at DroughtNet substantially damaged by cattle. The weather station has been removed; suggest obtaining any needed met data from OzFlux tower or Kalgoorlie BoM station.
- Floristic, soil moisture and biomass data collected as per protocols.
- Nutrient Network floristics, light and biomass data collected

Additional projects:

Several visiting scientists used the site facilities in the past 6 months:

- Bats – Diana Prada - Veterinary Sciences, Murdoch University. Infectious disease threats and population genomics of insectivorous bats; mapping the virome against distribution of insectivorous bats in Australia's global biodiversity hotspot.
- Birds – Leo Joseph, CSIRO - A Systematic Program of Avifaunal Surveys in Western Australia

Litchfield Savanna

Tower running well, lost 30 days from lightning strike. Phenocams, acoustic sensors and termite baits are all operational. Ground-based Lidar scan was conducted in June and LAI was conducted in August and December.

Fire protective burning, weed management spraying and lightning protection will all be undertaken.

Recent visitors to the site included: Ian Marrang, PhD student, Univ of Sydney undertaking soil moisture measurements; Jennifer Peters working on water relations and hydraulic vulnerability with Brendan Choat, WSU.

New Staff/Collaborations

Shaun Levick is a landscape ecologist who integrates remote sensing and GIS modelling with field experiments to better understand the structure and dynamics of savanna ecosystems.

Earlier this year Assoc. Prof. Shaun Levick joined the Research Institute for the Environment and Livelihoods (RIEL), at Charles Darwin University, as an Associate Professor of Remote Sensing. He holds a joint appointment at CSIRO Land and Water, Darwin. Shaun's research will include work at Litchfield, merges cutting-edge advances in satellite, airborne, and terrestrial remote sensing with emerging tools in computer vision and machine learning to address environmental challenges. Key focus areas include high precision carbon accounting, fire ecology and management, sustainable agriculture, 3D visualisation and qualification of 3D dynamics, and the modelling of future trajectories of ecosystem change.

Shaun obtained his PhD in 2008 from the University of the Witwatersrand (South Africa) before moving on to a postdoctoral position with the Carnegie Airborne Observatory (CAO) at Stanford University, CA (USA). For the last five years he has led a small research group at the Max Planck Institute for Biogeochemistry in Jena (Germany), where he has expanded his research on vegetation structure and dynamics to savannas regions across the globe.

Mitchell Grass Rangeland

The Mitchell Grass Rangeland SuperSite is located on the site of a decommissioned Queensland Department of Agriculture and Forestry research station near Longreach.

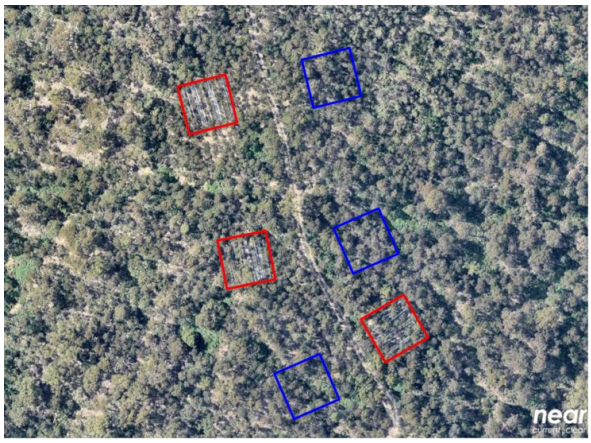
Tumbarumba Wet Eucalypt

SuperSite monitoring going well.

Wombat Stringybark Eucalypt

Infrastructure/monitoring status

- **Teabags and Termite baits** were installed late but are out now.
- **Avifauna surveys** were completed twice in 2017 for both Wombat and Whroo.
- **Infrastructure at Wombat Flux tower** has been repaired last year and is working again. Instruments have been moved higher up the tower. Tower had a safety inspection. The FTIR GhG monitoring equipment is operational but is currently switched off. We have set up camera traps at Wombat Flux and the drought site for security purposes.
- **New instrumentation:** We are planning to instrument trees of different size classes at the flux site with sapflow sensors and psychrometers again next year to assess water relations of different tree cohorts.
- **The DroughtNet experiment** at Leonards Hill (10 km from Wombat Flux, part of Supersite) is going in its second year. It will be part of DroughtNet (http://wp.natsci.colostate.edu/droughtnet/). The rainfall reduction setup consists of 3 x 15 x 15 m control plots and 3 x 15 x 15 m rainfall reduction plots, where plastic troughs underneath the canopy are intercepting 50% of the throughfall. We monitor soil moisture status in one central location in each plot and water relations traits every 3 months.



Rainfall reduction troughs that are suspended underneath the tree canopy and a Nearmap image of the rainfall reduction experiment (rainfall interception plots in red and control plots in blue).

- **Re-measurement of forest inventory plots**. We set up 30 forest inventory plots within the footprint of the flux tower. These standard 0.04 ha inventory plots were measured once in April 2015 as part of Alison Bennett's Master thesis to validate the NEP from flux tower data in conjunction with 3 years of band dendrometer data from Anne Griebel's PhD work. This was a useful exercise that confirmed that the flux tower is overestimating NEP at Wombat. It also confirmed that the inventory validation was able to pick up seasonal variation in tree NPP and the yearly change agreed with ecosystem NEP. Hence, the underestimation of NEP at Wombat seems systematic. It will be useful to continue the annual tree NPP validation at the inventory plots to obtain more data and get more consistency in the flux tower error estimation.

New project:

We are currently working with the Murray Goulburn CMA to assist with a citizen science project to monitor tree health and forest decline in the Strathbogie Ranges. The CMA has developed a mobile phone app that allows citizens to send in information about tree health and we try to supplement that with more intensive measures of tree health in "sentinel trees" that will be more intensively monitored (dendrometer bands and canopy photographs).

New staff/students

Alison Bennett started her PhD this year. She will focus her research on modelling carbon sequestration of forest ecosystems in Australia.

Warra Tall Eucalypt

Infrastructure / monitoring status

- Flux tower – Power failure in May-June. Complete upgrade of power supply – new battery bank and automatic diesel generator installed. Continuous data from 22nd June. Manual calibration of IRGA done.
- Profile data processed - all good.
- Second tipping bucket raingauge installed.
- Laf-Saf inspection done in June.
- Obtained winter 2017 LAI photographs (DHP) and photo-point photos. DHP photos still to be processed.
- Acoustic recorder operated mostly continuously over period (gap in May-June when power supply failed).
- Warra Hydrology –big problems with turbidity measurement from sondes after refurbishing - $15k to fix – FT not willing to proceed with post-harvest monitoring.
- Rebuilding of Warra web page done but not yet public.
- Year-1 sample retrieval from Termite experiment and year-2 retrieval for Global Wood Invertebrate Decomposition Experiment scheduled for early 2018.

- Bird surveys for 2017 not yet done – will do in autumn 2018 if funds are available.

Industry engagement

- Parks, Fire Service, FT, BOM – fuel moisture sensors, SDI parameterisation
- Forestry (FT, VicForests, Forico) – climate change threats and adaptations – NIFPI funds being sought
- Hydro – carbon cycle of tall, wet euc forests

New projects planned or started include:

- In discussion with Tim Brodribb and Mark Hovenden (UTas School of Biological Sciences) to develop a funding proposal for studies examining temperature effects in southern wet eucalypt forests (target funding body is National Institute for Forest Products Innovation)
- Earthwatch Institute – keen to do field campaign in 2018 similar to one at Calperum.

New staff/students

- Edward Perkins (University of Tasmania – School of Mathematics) commenced an Honours study examining the acoustic properties of bird calls made within tall, dense forest canopy at Warra.

Visitors to the site included:

- August 2017 – Andrew Hughes ran the Tree House Challenge (part of the Expedition Class series) – an online course for schools. One of the trees was a tall *E. regnans* in the Warra Experimental Landscape.
- August 2017 – Gave Warra science update to tourism guides from Airwalk
- September 2017 – Hosted a class of year 12 Environmental Science students from Elizabeth College at the flux site (through Forest Education Foundation).
- November 2017 – Hosted a delegation of about 20 Chinese meteorologists and climate change researchers at the flux site (organised by CSIRO Global).

Recent Publications

Drake JE, Power SA, Duursma RA, Medlyn BE, Aspinwall MJ, Choat B, Creek D, Eamus D, Maier C, Pfautsch S, Smith RA, Tjoelker MG, Tissue DT. (2017) Stomatal and non-stomatal limitations of photosynthesis for four tree species under drought: A comparison of model formulations. *Agricultural and Forest Meteorology* **247**: 454-466. DOI: https://doi.org/10.1016/j.agrformet.2017.08.026.

Edwards W, Liddell MJ, Franks P, Nichols C, Laurance SGW. (2017) Seasonal patterns in rainforest litterfall: Detecting endogenous and environmental influences from long-term sampling. *Austral Ecology* DOI: 10.1111/aec.12559

Farrell C, Szota C, Arndt SK (2017) Does the turgor loss point characterise drought response in dryland plants? *Plant, Cell and Environment* **40**: 1500-1511.

Fest BJ, Hinko-Najera N, von Fischer JC, Livesley SJ, Arndt SK (2017) Soil methane uptake increases under continuous throughfall reduction in a temperate evergreen, broadleaved eucalypt forest *Ecosystems* 20: 368-379.

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Gagné RJ, Jaschhof M (2017) A Catalog of Cecidomyiidae (Diptera) of the World. 4th Edition. Digital. 762 pp.

Greenslade P, Slatyer R (2017) Montane Collembola at risk from climate change in Australia. *European Journal of Soil Biology*, **80**:85-91.

Griebel A, Bennett LT, Arndt SK (2017) Evergreen and ever growing – stem and canopy growth dynamics of a temperate eucalypt forest. *Forest Ecology and Management* **389**: 417-426

Grove SJ, Wardlaw TJ, Forster LG (2018) A megadiverse beetle fauna showing an inordinate fondness for Tasmanian forests. *Tasmanian Naturalist* (in review).

Hingston AB, Wardlaw TJ, Baker SC, Jordan GJ (2018) Data obtained from acoustic recording units and field observer point counts of Tasmanian forest birds are similar but not the same. *Field Ornithology* (in review).

Hinko-Najera N, Isaac P, Beringer J, van Gorsel E, Ewenz C, McHugh I, Exbrayat JF, Livesley SJ, Arndt SK (2017) Net ecosystem carbon exchange of a dry temperate eucalypt forest. *Biogeosciences* **14**: 3781-3800.

Jones LA, Kimball JS, Reichle RH, Madani N, Glassy J, Ardizzone J, Colliander A, Cleverly J, Desai AR, Eamus D, Euskirchen E, Hutley L, Macfarlane C, Scott R. (2017) The SMAP level 4 carbon product for monitoring ecosystem land-atmosphere CO_2 exchange. *IEEE Transactions on Geoscience and Remote Sensing* **55**: 6517-6532. DOI: 10.1109/TGRS.2017.2729343.

Li L, Wang Y-P, Beringer J, Shi H, Cleverly J, Cheng L, Eamus D, Huete A, Hutley L, Lu X, Piao S, Zhang L, Zhang Y, Yu Q. (2017) Responses of LAI to rainfall explain contrasting sensitivities to carbon uptake between forest and non-forest ecosystems in Australia. *Scientific Reports* **7**: 11720. DOI: 10.1038/s41598-017-11063-w.

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Upcoming Events

23 March 2018
National Eucalypt Day. Australia wide. See website for details.

8-13 April 2018
European Geosciences Union (EGU) General Assembly 2018. Vienna, Austria. See website for details.

16-21 April 2018
International Long Term Ecological Research Network (ILTER) Next Generation Workshop. Zhaoqing, China.

17-19 April 2018
7th Digital Earth Summit (DES-2018). El Jadida, Morocco. See website for details.

20-26 August 2018
Joint TERN OzFlux -AsiaFlux Conference 2018. Darwin, NT. See website for details.

The next issue of the Newsletter will be published in July 2018. If you have any news articles, photos, upcoming events, etc that you would like included please email shiela.lloyd@jcu.edu.au

TERN is supported by the Australian Government through the National Collaborative Research Infrastructure Strategy(NCRIS).

NCRIS National Research Infrastructure for Australia
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