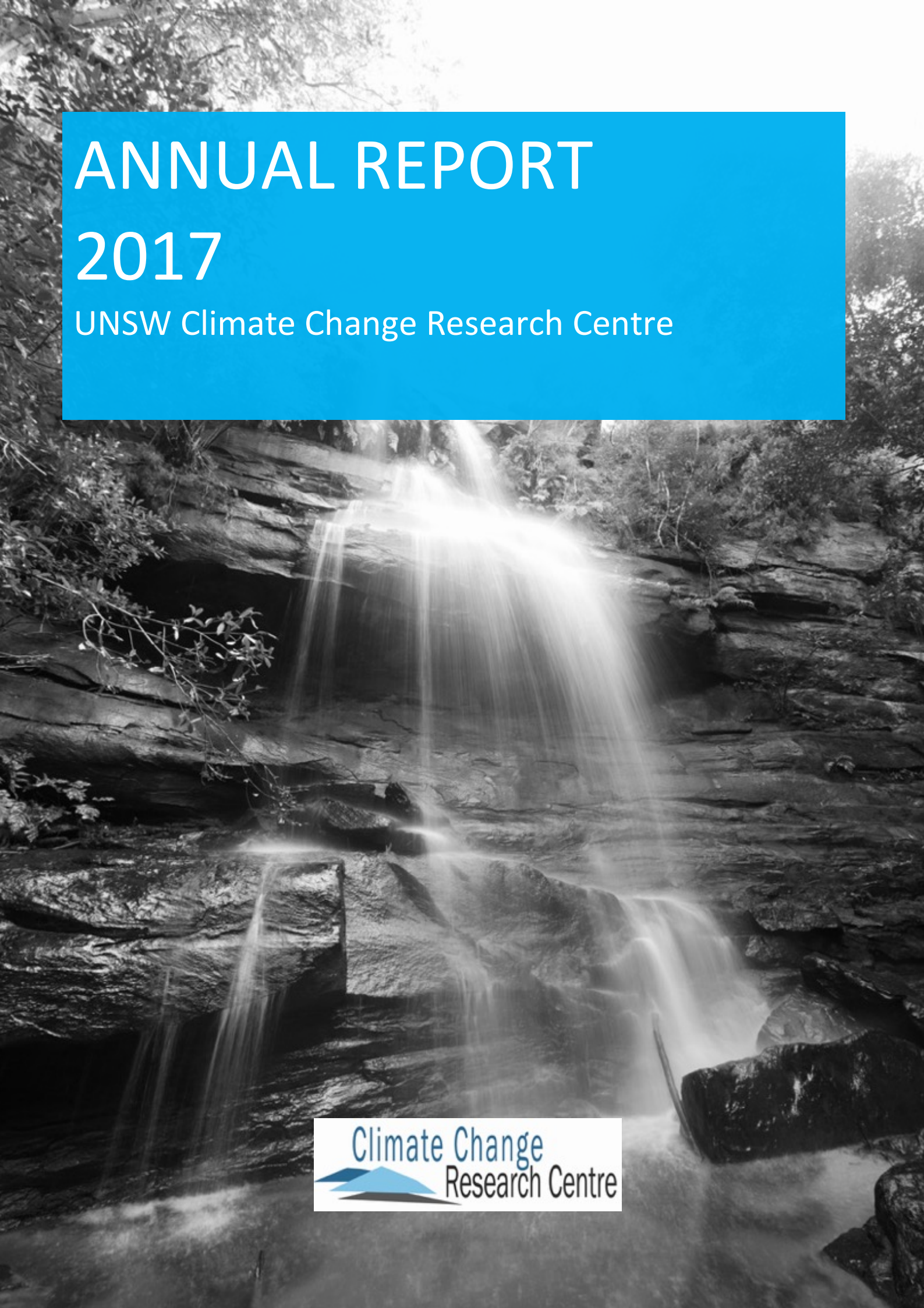
ANNUAL REPORT 2017

UNSW Climate Change Research Centre



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UNSW

Climate Change Research Centre

Our Vision

The CCRC strives to make fundamental contributions to our understanding of the Earth's climate system and be recognised as one of the world's top research programs in physical and biogeochemical climate sciences.

Climate Change Research Centre

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Director's Report

The most exciting news of 2017 was undoubtedly the commencement of the new ARC Centre of Excellence for Climate Extremes, also known as CLEx. CLEx is led by Andy Pitman and began operations in August 2017, with UNSW (and the CCRC) being again the lead institution. This $30M centre is the successor to the ARC Centre of Excellence for Climate System Science, which will continue through mid-2018. The CIs on this new effort besides Andy are Lisa Alexander, Jason Evans, Matt England, Steven Sherwood, and Gab Abramowitz, with Stephen Gray as Chief Operating Officer.

CCRC was fortunate to receive a number of prestigious prizes in 2017. Matt England was awarded the Tinker-Muse Prize for Science and Policy in Antarctica, Jason Evans along with CLEx Chief Investigator Julie Arblaster received the biennial Priestly Medal – a first for this medal to be awarded to two scientists in one year, while Lisa Alexander was awarded the 2017/18 World Meteorological Organisation (WMO) Commission for Climatology Outstanding Service award. This award was in recognition of her outstanding contributions and exceptional service to the Commission of Climatology and is only given to two recipients once every four years. Well done Lisa, Matt and Jason! Nicola Maher won the AMOS's Uwe Radok award for best Ph.D. thesis, and our very own Vilia Co won the Faculty of Science Staff Excellence Award in the research category. Last but not least, Markus Donat was awarded the WCRP/GCOS International Data Prize. Very well deserved, Nicola, Vilia and Markus.

Three centre researchers were awarded prestigious research fellowships in 2017. John Church joined the CCRC as a SHARP Professor, Sarah Kirkpatrick was awarded an ARC Future Fellowship and Laurie Menviel received a UNSW Scientia Fellowship. Furthermore, the centre received three discovery proposals in 2017: Congratulations to Alex Sen Gupta, Alejandro Di Luca, Laurie Menviel and myself. Melissa Hart, Angela Maharaj and Giovanni Di Virgilio were awarded a $500,000 Citizen Science Grant for the The Sydney Schools Weather and Air Quality network (SWAQ network). What a way to involve junior scientists at a very early age and to increase our observational grid!

Matt England continued to lead the UNSW Grand Challenge in Climate Change. This initiative began in late 2016 and produced a series of thought-provoking lectures and events to get the UNSW community thinking more broadly about climate change.

Research activity in 2017 exceeded the record high levels achieved in 2016, growing to $2.5M in external funding (not counting the ARCCSS and CLEx) and nearly 130 publications.

Our undergraduate student numbers increased significantly in 2017, thanks to a mammoth effort by Gab and Angela to redesign CLIM1001 as an online only course. Lisa was awarded the UNSW outstanding supervisor award by the Arc Postgraduate Council. Our graduate program was led with vigour and enthusiasm by Andréa Taschetto. Thank you, Andréa!

I would like to take this opportunity to thank everyone for making the CCRC such an open, friendly and inclusive workplace. Thanks to the organizers of our GERL lunches, and to the organisers of the various CCRC activities ranging from board games and wine tasting to ocean swims.

And most importantly: A huge thank you to Bronwen Smith, Vilia Co and Stephen Gray who are holding this place together!

To finish, I would like to thank you all for your support during my first year as a Director. It was a steep learning experience made possible and enjoyable with the amazing and positive support that I received from everyone in the centre (and particularly from Steve Sherwood who could not quite escape his Director shoes yet).

Associate Professor Katrin Meissner

Personnel Highlights

- Associate Professor Lisa Alexander awarded the 2017/18 World Meteorological Organisation (WMO) Commission for Climatology Outstanding Service award. This award is only given to two recipients every four years.
- Scientia Professor Matt England honoured with the prestigious Tinker-Muse Prize for Science and Policy in Antarctica.
- Priestly Medal awarded to Professor Jason Evans and Associate Professor Julie Arblaster. This is the first time this biennial award has been received by two recipients in one year.
- Dr Markus Donat awarded the WCRP/GCOS International Data Prize 2017.
- Dr Nicola Maher won AMOS's Uwe Radok award for best Ph.D. thesis.
- Vilia Co received the Faculty of Science Staff Excellence Award – Research. Vilia was also a nominee for UNSW's President's award.
- Professor Andy Pitman Finalist – Eureka Awards
- Professor John Church joined the CCRC as a SHARP Professor
- CCRC welcomed Scientia Fellow Dr Laurie Menviel.
- Dr Sarah Perkins-Kirkpatrick was awarded an ARC Future Fellowship to commence in 2018
- Dr Alex Sen Gupta, Dr Alejandro Di Luca, Dr Laurie Menviel, and A. Professor Katrin Meissner were awarded ARC Discovery Projects, commencing in 2018. Katrin was awarded two!
- CCRC Alumni were also awarded an ARC DECRA Fellowship (Dr Andrew King) and ARC Discovery Projects (Dr Erik Van Sebille, Dr Daniel Argueso, Dr Nico Jourdain) to commence in 2018.
- Dr Melissa Hart, Dr Angela Maharaj and Dr Giovanni Di Virgilio received a $500,000 Citizen Science Grant for the Sydney Schools Weather and Air Quality network (SWAQ network)
- Jason Evans was promoted to Professor

2017 Personnel

The Climate Change Research Centre has a well-established culture of excellence, collegiality and collaboration both within and across traditional disciplinary boundaries. We are strongly committed to effective professional development of our mid and early career researchers. The centre is comprised of a core cohort of 10 permanent faculty, including one Laureate Fellow (Sherwood) and one Scientia Fellow (England), each of whom lead research groups comprised of research associates and HDR students.

2017 saw 3 staff appointed on convertible contracts, ARC Future Fellows (Taschetto, Perkins-Kirkpatrick) and Scientia Fellow (Menviel). The centre also hosts 5 ARC DECRA Fellows (Menviel, Donat, Spence, Di Luca, Frankcombe) and welcomed 2 new fixed term researchers in 2017; Dr Martin De Kauwe and Dr Veronique Lago.

In 2017, the CCRC housed Chris Turney, a Laureate Fellow appointed to BEES. Chris' research group includes Future Fellow Dr. Chris Fogwill.

The centre continued to attract distinguished visitors on sabbatical stays including UNSW Faculty of Science Visiting Research Fellow A. Professor Chris Forest (Penn State University) who spent several months working closely with CCRC staff.

The centre is also a sought-out destination for international researchers making shorter visits. We welcomed around 35 research visitors to the CCRC in 2017 and we hosted 37 seminar speakers from around Australia and overseas.

A full list of personnel associated with the centre in 2017 appears in Appendix C.

CCRC at a Glance

UNSW CCRC is a multi-disciplinary research group comprising one of the largest university research facilities of its kind in Australia. CCRC houses research expertise in the key areas of Earth's climate: atmospheric, oceanic and terrestrial processes. We apply basic scientific principles to pressing questions on climate dynamics, climate impacts, global climate change, and extremes of weather and climate.

The Climate Change Research Centre (CCRC) was formed within the Faculty of Science in 2008 with initial financial support from the DVC Research and the Faculty. The centre and its staff now reside in the School of Biological Earth and Environmental Science (BEES). CCRC currently hosts the UNSW lead node of the Australian Research Council Centre of Excellence for Climate System Science (ARCCSS) as well as the newly awarded Australian Research Council Centre of Excellence for Climate Extremes (CLEx).

2017 saw the CCRC continue its successful track record in attracting grant funding and producing and publishing excellent, world-class research.

6 PhD students submitted 2017

- Esteban Abellan Villardon. (*Supervised by Matt England)*
- Alice Barthel. (*Supervised by Matt England)*
- Chris Bull. (*Supervised by Matt England)*
- Peter Gibson. (*Supervised by Sarah Perkins-Kirkpatrick)*
- Acacia Pepler. (*Supervised by Lisa Alexander)*
- Wasin Chaivaranont. (*Supervised by Jason Evans*

KEY ACHIEVEMENTS

- ARC Centre of Excellence for Climate Extremes, commenced August 4, 2017, led by Prof Andy Pitman
- 2.5 million external research revenue
- Prof Matt England led the UNSW Grand Challenge in Climate Change
- 129 peer reviewed publications, including 4 papers published in *Nature* (Church, Holmes, Meissner, and Turney) and 9 papers published in *Nature family journals* (Green, Pitman, Perkins-Kirkpatrick, Bao, Sherwood, Alexander, Evans).
- 31 papers published by HDRs in 2017 including 9 published in *Journal of Climate*. 25 of these papers had CCRC students listed as lead author in journals including *Nature Climate Change*.
- Since 2008, CCRC has produced 1006 publications.
- Between 2013 and 2017, the CCRC published 61 papers in *Science* and *Nature-family*
- CCRC Staff extensively quoted and interviewed in the media, including 4 TV appearances, 9 radio appearances/interviews, 63 print and online articles, interviews and op eds.

Research Supervision & Teaching

The Climate Change Research Centre welcomed 5 new HDR students in 2017, including 2 who were awarded Scientia Scholarships. There were 39 students enrolled in the centre's PhD program in 2017.

The CCRC continued its robust annual progress review scheme, led by the centre's Postgraduate Coordinator, Dr Andréa Taschetto. In addition to the stipulated annual reviews and presentations for all students, the centre runs half-yearly "informal" committee meetings for all enrolled students where progress can be discussed and students can raise any concerns they may have. The centre also invites a nominated student representative to join its quarterly staff meetings.

The CCRC graduate student experience is further enhanced by ARCCSS and CLEx activities such as winter schools, writing workshops, visits to Australian partner universities and opportunities for travel to overseas labs, summer schools and workshops and the mentorship and pastoral care provided by both the CCRC Postgraduate Coordinator (Dr Andréa Taschetto) and the ARCCSS Graduate Director, Dr Melissa Hart.

The CCRC has benefited greatly from the ARCCSS summer scholar scheme which provides funding for undergraduate students to undertake small research projects over the summer. Many of our recent honours and PhD applicants have been previous summer scholars.

CCRC continued to align its postgraduate review schedule with that of BEES. Dr Alex Sen Gupta continues as the PhD completion coordinator for the whole School as well as the BEES representative on the HDR Committee. Dr Taschetto continues to look after the recruitment and progression of PhD students within the CCRC. Dr Donna Green served on the BEES Honours committee in 2017 and continues to look after the CCRC Honours student cohort as well as the sole nominated BEES staff member on the Science Faculty Board.

2017 saw CLIM1001 move online. The move has been a huge success, increasing annual student numbers by over 400%. Additional courses run by CCRC staff are MSCI0501 – The Marine Environment (with the School of BEES), CLIM2001 – Fundamentals of Atmospheric Science (with the School of Physics), GEOS2241 – Peak Carbon: Climate Change and Energy Policy and CLIM3001 – Climate Systems Science.

CCRC Staff also regularly give guest lectures in courses taught by a number of other schools and contribute sections to courses in the BEES, GEOS, PHYS and MATH streams.

Statement of Financial Performance

Summary of statement of financial performance

The Climate Change Research Centre's total revenue for 2017 was $5.95 million. $2.5 million of this came from external income sources. The remainder was from a combination of Faculty and Central/Strategic funds, LIEF and MREII grants.

Of the $2.5 million research revenue earned in 2017, $1.9 million (76%) was Category 1 income. This research income figure does not include the additional funding allocated to the ARC Centre's of Excellence for Climate System Science and Climate Extremes from the ARC, Partner Organisations and UNSW strategic funds.

At 85% of total expenditure, people costs account for by far the largest portion of the centre's expenditure across all fund types. Total 2017 expenditure was $5.8m. The CCRC's 2017 opening carry over was $1.2 million. The closing carryforward was a surplus of $1.1 million.

Full financial statement follows.

Climate Change Research Centre

Statement of Financial Performance

For the Year Ended December 2017

	Note	2017 $'000	2016 $'000	Difference $'000	Difference %
REVENUE					
Research Revenue:	1	2,506	1,929	577	30%
Donations & Bequest - Draw downs		-	-	-	-
UNSW Contributions		1,441	1,620	(178)	-11%
Faculty Contributions	2	1,979	1,915	64	3%
Other Restricted Revenue	3	29	83	(55)	-66%
Commercial Activity - Fees for Service		-	-	-	-
Sundry Other Revenue		-	-	-	-
Total Revenue		**5,954**	**5,547**	**407**	**7%**
EXPENSE					
Salaries, Oncosts and other staff costs		**4,984**	**4,492**	**491**	**11%**
Scholarship Stipends		271	340	(69)	-20%
Contract & Consulting Services		34	3	31	1108%
Repairs and Maintenance		2	11	(10)	-84%
Consumables		43	50	(8)	-16%
Travel		257	272	(15)	-6%
Equipment Non Capitalised		62	44	19	43%
Entertainment		13	10	3	30%
Marketing		2	0	1	705%
Miscellaneous Expenses		178	204	(26)	-13%
Total Non-People Costs		**861**	**934**	**(73)**	**-8%**
Total Expenses		**5,845**	**5,426**	**418**	**8%**
TOTAL CONTRIBUTION - SURPLUS/(DEFICIT)		**$ 110**	**$ 120**	**(11)**	**-9%**
Depreciation		75	124	(50)	-40%
SURPLUS / (DEFICIT) after Depreciation		**$ 35**	**$ (4)**	**39**	**-989%**
Cashflow Funded Capital Expenditure (CAPEX)		**-**	**185**	**(185)**	**-100%**

NOTES:

1 Revenue in Advance will be noted in Creditors & Other Liabilities.

Research Revenue generated (cash basis).	$ 2,465	$ 1,835	630
Category 1 Research Revenue therein	1,900	1,471	428

2 UNSW Budget model includes other revenue items

Teaching Revenue	$ 975	$ 675	300	44%
Block Grants	$ 1,819	$ 1,623	196	12%
Indirect Cost Recoveries	$ 44	$ 69	(25)	-36%

3 Other Research Revenue includes internal fund transfers.

4 Restricted Funds - Cash at year end	$ 1,466	$ 1,237	229
5 Funds available in Division of Advancement			-

Statement of in-kind contributions including academic and other salaries, infrastructure and other resources provided to the Centre

The centre gratefully acknowledges support provided by UG student administrative staff in the Schools of BEES and Physics as well as assistance from the Science Student Centre, Faculty of Science Finance team, the Graduate Research School, Research Strategy Office and significant support from the Grants Management Office. We acknowledge also the invaluable expertise and support provided by the Faculty's IT staff from desktop support to assistance with major computational infrastructure. CCRC staff have also benefited from the work of the ARCCSS/CLEx Computational Modelling Support (CMS) team whose work has saved many person-hours that used to be spent by students and staff in setting up and trouble-shooting climate model runs and managing data.

UNSW and the CCRC particularly benefit from access to supercomputing resources at NCI as well as increased collaboration with overseas partners via the linkages formally established by the Centres' of Excellence.

Management & Oversight

Until the end of 2012 CCRC stood as an autonomous staffing unit within the Faculty. From 2013, the CCRC became a centre situated within The School of Biological, Earth and Environmental Sciences (BEES), although remaining separately budgeted by the Faculty of Science.

In 2017, the CCRC was overseen by a Steering Committee chaired by Professor Chris Tinney (AD-R, Faculty of Science). The other members of the Committee were: Michael Ashley (Physics), Rob Brooks (EERC/BEES), Mark Holzer (Mathematics and Statistics) and Richard Stuetz (WRC/Civil and Environmental Engineering).

Responsibility for day-to-day management and operation of the centre is shared between the Director, the Deputy Director, the Centre Manager and staff with delegated portfolios (such as the PG coordinator, IT coordinator, UG coordinator, Honours coordinator, Marketing/outreach coordinator, etc.). Quarterly staff meetings are held to reflect UNSW's school governance structure of regular board meetings.

The CCRC's PhD and undergraduate programs are officially administered by BEES, but the centre manages its own finances, teaching development, administration and IT (including an investment of 0.5 EFT in the Faculty IT unit in 2017), as well as administration relating to postgraduate student applications, enrolment and scholarships and the formal postgraduate review process.

Appendix A – 2017 Publications

Book Chapters

1. Holifield, R., Chakraborty, J., Walker, G., 2017. The Routledge Handbook of Environmental Justice. 41 Environmental injustice in resource-rich Aboriginal Australia, Green, D., Sullivan, M., Nolan, K.

Journal Articles

2. Abellán, E., McGregor, S., England, M.H., 2017a. Analysis of the Southward Wind Shift of ENSO in CMIP5 Models. Journal of Climate 30, 2415–2435. https://doi.org/10.1175/JCLI-D-16-0326.1
3. Abellán, E., McGregor, S., England, M.H., Santoso, A., 2017b. Distinctive role of ocean advection anomalies in the development of the extreme 2015–16 El Niño. Climate Dynamics. https://doi.org/10.1007/s00382-017-4007-0
4. Ajami, H., Sharma, A., Band, L.E., Evans, J.P., Tuteja, N.K., Amirthanathan, G.E., Bari, M.A., 2017. On the non-stationarity of hydrological response in anthropogenically unaffected catchments: an Australian perspective. Hydrology and Earth System Sciences 21, 281–294. https://doi.org/10.5194/hess-21-281-2017
5. Angélil, O., Stone, D., Perkins-Kirkpatrick, S., Alexander, L.V., Wehner, M., Shiogama, H., Wolski, P., Ciavarella, A., Christidis, N., 2017. On the nonlinearity of spatial scales in extreme weather attribution statements. ClimateDynamics.https://doi.org/10.1007/s00382-017-3768-9
6. Bador, M., Terray, L., Boé, J., Somot, S., Alias, A., Gibelin, A.-L., Dubuisson, B., 2017. Future summer mega-heatwave and record-breaking temperatures in a warmer France climate. Environmental Research Letters 12, 074025. https://doi.org/10.1088/1748-9326/aa751c
7. Bagniewski, W., Meissner, K.J., Menviel, L., 2017. Exploring the oxygen isotope fingerprint of Dansgaard-Oeschger variability and Heinrich events. Quaternary Science Reviews 159, 1–14. https://doi.org/10.1016/j.quascirev.2017.01.007
8. Bao, J., Sherwood, S.C., Alexander, L.V., Evans, J.P., 2017a. Future increases in extreme precipitation exceed observed scaling rates. Nature Climate Change 7, 128–132. https://doi.org/10.1038/nclimate3201
9. Bao, J., Sherwood, S.C., Colin, M., Dixit, V., 2017b. The Robust Relationship Between Extreme Precipitation and Convective Organization in Idealized Numerical Modeling Simulations: EXTREME RAIN AND CONVECTIVE ORGANIZATION. Journal of Advances in Modeling Earth Systems 9, 2291–2303. https://doi.org/10.1002/2017MS001125
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11. Bull, C.Y.S., Kiss, A.E., Jourdain, N.C., England, M.H., van Sebille, E., 2017. Wind Forced Variability in Eddy Formation, Eddy Shedding, and the Separation of the East Australian Current: WIND FORCED VARIABILITY IN THE EAC. Journal of Geophysical Research: Oceans 122, 9980–9998. https://doi.org/10.1002/2017JC01331
12. Burrell, A.L., Evans, J.P., Liu, Y., 2017. Detecting dryland degradation using Time Series Segmentation and Residual Trend analysis (TSS-RESTREND). Remote Sensing of Environment 197, 43–57. https://doi.org/10.1016/j.rse.2017.05.018
13. Carson, M., Köhl, A., Stammer, D., Meyssignac, B., Church, J., Schröter, J., Wenzel, M., Hamlington, B., 2017. Regional Sea Level Variability and Trends, 1960-2007: A Comparison of Sea Level Reconstructions and Ocean Syntheses: SEA LEVEL RECONSTRUCTION COMPARISON. Journal of Geophysical Research: Oceans 122, 9068–9091. https://doi.org/10.1002/2017JC012992
14. Chaivaranont, W., Evans, J.P., Liu, Y.Y., Sharples, J.J., 2017. Estimating Grassland Curing with Remotely Sensed Data. Natural Hazards and Earth System Sciences Discussions 1–25. https://doi.org/10.5194/nhess-2017-101
15. Chen, X., Zhang, X., Church, J.A., Watson, C.S., King, M.A., Monselesan, D., Legresy, B., Harig, C., 2017. The increasing rate of global mean sea-level rise during 1993–2014. Nature Climate Change 7, 492–495. https://doi.org/10.1038/nclimate3325
16. Cheung, A.H., Mann, M.E., Steinman, B.A., Frankcombe, L.M., England, M.H., Miller, S.K., 2017a. Comparison of Low-Frequency Internal Climate Variability in CMIP5 Models and Observations. Journal of Climate 30, 4763–4776. https://doi.org/10.1175/JCLI-D-16-0712.1
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18. Choudhury, D., Sen Gupta, A., Sharma, A., Mehrotra, R., Sivakumar, B., 2017a. An Assessment of Drift Correction Alternatives for CMIP5 Decadal Predictions: DRIFT CORRECTION OF DECADAL PREDICTIONS. Journal of Geophysical Research: Atmospheres 122, 10,282-10,296. https://doi.org/10.1002/2017JD026900
19. Choudhury, D., Sen Gupta, A., Sharma, A., Taschetto, A.S., Mehrotra, R., Sivakumar, B., 2017b. Impacts of the tropical trans-basin variability on Australian rainfall. Climate Dynamics 49, 1617–1629. https://doi.org/10.1007/s00382-016-3405-z
20. Coleman, M.A., Cetina-Heredia, P., Roughan, M., Feng, M., van Sebille, E., Kelaher, B.P., 2017. Anticipating changes to future connectivity within a network of marine protected areas. Global Change Biology 23, 3533–3542. https://doi.org/10.1111/gcb.13634
21. Cooper, N., Green, D., Meissner, K., 2017. The Australian National Pollutant Inventory Fails to Fulfil Its Legislated Goals. International Journal of Environmental Research and Public Health 14, 478. https://doi.org/10.3390/ijerph14050478
22. Courtois, P., Hu, X., Pennelly, C., Spence, P., Myers, P.G., 2017. Mixed layer depth calculation in deep convection regions in ocean numerical models. Ocean Modelling 120, 60–78. https://doi.org/10.1016/j.ocemod.2017.10.007
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24. Decker, M., Ma, S., Pitman, A., 2017a. Local land–atmosphere feedbacks limit irrigation demand. Environmental Research Letters 12, 054003. https://doi.org/10.1088/1748-9326/aa65a6
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26. Di Virgilio, G., Laffan, S.W., Nielsen, S.V., Chapple, D.G., 2017. Does range-restricted evolutionary history predict extinction risk? A case study in lizards. Journal of Biogeography 44, 605–614. https://doi.org/10.1111/jbi.12875
27. Donat, M.G., Lowry, A.L., Alexander, L.V., O'Gorman, P.A., Maher, N., 2017. Erratum: More extreme precipitation in the world's dry and wet regions. Nature Climate Change 7, 154–158. https://doi.org/10.1038/nclimate3160
28. Donat, M.G., Pitman, A.J., Seneviratne, S.I., 2017. Regional warming of hot extremes accelerated by surface energy fluxes: Accelerated Warming of Hot Extremes. Geophysical Research Letters 44, 7011–7019. https://doi.org/10.1002/2017GL073733
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CCRC - 2017 Active Research Projects

Investigator	England,Matthew
Grant Scheme	Discovery Project
Grant title	Remote Forcing Of Pacific Ocean Variability And Impacts On Global Climate
Duration	2015 - 2017
Awarded Budget	621,400

Investigator	Sherwood,Steven
Grant Scheme	Discovery Project
Grant title	Testing A New Explanation Of Cloud Feedback On Global Climate
Duration	2014 - 2017
Awarded Budget	360,000

Investigator	Alexander,Lisa
Grant Scheme	Discovery Project
Grant title	Has Rainfall Become More Variable Or Extreme?
Duration	2016 -2018
Awarded Budget	339,000

Investigator	Sen Gupta,Alexander
Grant Scheme	Linkage Project
Grant title	Understanding The Effect Of Small-Scale Ocean Process On Tuna Populations - A New Tool To Forecast Tuna Distributions For Use In Fisheries Management
Duration	2015 - 2018
Awarded Budget	160,518

Investigator	Sherwood,Steve
Grant Scheme	Australian Laureate Fellowship
Grant title	PDRA 1 - Revisiting the Physics of Clouds - Abhnil Prasad
Duration	2015 - 2020
Awarded Budget	462,190

Investigator	Sherwood,Steve
Grant Scheme	Australian Laureate Fellowship
Grant title	ALF Salary Support - Revisiting the Physics of Clouds
Duration	2015 - 2020
Awarded Budget	752,770

Investigator	Sherwood,Steve
Grant Scheme	Australian Laureate Fellowship
Grant title	PDRA 2 - Revisiting the Physics of Clouds - Damianos Mantsis
Duration	2015 - 2020
Awarded Budget	452,190

Investigator	Sherwood,Steve
Grant Scheme	Australian Laureate Fellowship
Grant title	PGRA 2 - Revisiting The Physics of Clouds - Ying Sun
Duration	2015 - 2020
Awarded Budget	101,624

Investigator	Sherwood,Steve
Grant Scheme	Australian Laureate Fellowship
Grant title	Revisiting The Physics Of Clouds
Duration	2015 - 2020
Awarded Budget	884,883

Investigator	Sherwood,Steve
Grant Scheme	Australian Laureate Fellowship
Grant title	PGRA 1 - Revisiting The Physics of Clouds - Jiawei Bao
Duration	2015 - 2020
Awarded Budget	101,624

Investigator	England,Matthew
Grant Scheme	ARC Discovery Early Career Researcher Award(DECRA) Shared Grant
Grant title	Understanding The Termination Of El Nino-Southern Oscillation events - Phd student Esteban Abellan
Duration	2015 - 2017
Awarded Budget	41,001

Investigator	England,Matthew
Grant Scheme	Postgraduate Studentship
Grant title	Global Atmospheric And Oceanic Influences On Changes In Southern Hemisphere Extratropical Climate - Scholarship For Ariaan Purich
Duration	2014 - 2017
Awarded Budget	33,000

Investigator	Santoso,Agus
Grant Scheme	Commonwealth Government Contract
Grant title	Tropical Variability In A Warming World 2015
Duration	2015 - 2017
Awarded Budget	150,000

Investigator	Santoso,Agus
Grant Scheme	Commonwealth Government Contract
Grant title	Tropical Variability In A Warming World 2013
Duration	2013 - 2017
Awarded Budget	190,909

Investigator	Church,John
Grant Scheme	National University of Malaysia (UKM PAKARUNDING) Subcontract
Grant title	Technical And Financial Proposals For Sea Levels Rise Projections For Malaysia Stage 1 - 2016
Duration	2017 - 2017
Awarded Budget	30,000

Investigator	England,Matthew
Grant Scheme	Dept of Environment - National Environmental Science Programme (NESP) Shared Grant
Grant title	Project 2.2 Enhancing Australia's Capacity To Manage Climate Variability And Climate Extremes In A Changing Climate
Duration	2016 - 2019
Awarded Budget	217,500

Investigator	Evans,Jason
Grant Scheme	Dept of Environment - National Environmental Science Programme (NESP) Shared Grant
Grant title	Project 2.8 Extreme Weather Projections
Duration	2016 - 2019
Awarded Budget	108,750

Investigator	Evans,Jason
Grant Scheme	Dept of Environment - National Environmental Science Programme (NESP) Shared Grant
Grant title	Project 2.6 Regional Climate Projections Science, Information And Services
Duration	2016 - 2019
Awarded Budget	108,750

Investigator	Sherwood,Steve
Grant Scheme	Dept of Environment - National Environmental Science Programme (NESP) Shared Grant
Grant title	Earth Systems And Climate Change Hub
Duration	2015 - 2021
Awarded Budget	10,000

Investigator	Pitman,Andrew
Grant Scheme	State Government Contract
Grant title	Medium Term Seasonal-Weather And Climate Forecasts
Duration	2016 - 2017
Awarded Budget	150,000

Investigator	Evans,Jason
Grant Scheme	State Government Contract
Grant title	Feasibility Of Running 150 Year Regional Climate Simulations
Duration	2016 - 2017
Awarded Budget	130,000

Investigator	Hart,Melissa
Grant Scheme	State Government Contract
Grant title	Forecasting Air Pollution Impacts From Hazard Reduction Burns
Duration	2015 - 2018
Awarded Budget	50,000

Investigator	Hart,Melissa
Grant Scheme	Environmental Research Program
Grant title	Forecasting Air Pollution Impacts From Hazard Reduction Burns
Duration	2015 - 2018
Awarded Budget	149,900

Investigator	Evans,Jason
Grant Scheme	State Government Contract
Grant title	Testing Of WRF Model Physics And Domain Configurations
Duration	2017 - 2018
Awarded Budget	130,000

Investigator	Taschetto,Andréa
Grant Scheme	Future Fellowship
Grant title	Tropical Ocean Interactions And Implications For Regional Climate
Duration	2017 - 2021
Awarded Budget	60,552

Investigator	Taschetto,Andréa
Grant Scheme	Future Fellowship
Grant title	Salary - Tropical Ocean Interactions And Implications For Regional Climate
Duration	2017 - 2021
Awarded Budget	591,448

Investigator	Menviel,Laurie
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	What Is The Impact Of Abrupt Climate Change On The Global Carbon Cycle?
Duration	2015 - 2018
Awarded Budget	369,536

Investigator	Donat,Markus
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	How Far In Advance Can We Predict Extreme Temperature And Rainfall Events?
Duration	2015 - 2018
Awarded Budget	371,236

Investigator	Di Luca,Alejandro
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	Salary: The Future Intensity Of Extreme East Coast Lows
Duration	2017 - 2020
Awarded Budget	293,124

Investigator	Frankcombe,Leela
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	Salary: Decadal Climate Variability: Mechanisms, Interactions And Impacts
Duration	2017 - 2019
Awarded Budget	293,124

Investigator	Frankcombe,Leela
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	Decadal Climate Variability: Mechanisms, Interactions And Impacts
Duration	2017 - 2019
Awarded Budget	49,800

Investigator	Spence,John
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	Dynamics, Variability And Change In Southern Ocean Abyssal Flows.
Duration	2015 - 2018
Awarded Budget	357,024

Investigator	Di Luca,Alejandro
Grant Scheme	Discovery Early Career Researcher Award (DECRA)
Grant title	The Future Intensity Of Extreme East Coast Lows
Duration	2017 - 2020
Awarded Budget	66,876

Investigator	Evans,Jason
Grant Scheme	Contract Research
Grant title	Better Data-Driven Decision Making Under Future Climate Uncertainty
Duration	2016 - 2018
Awarded Budget	26,400

Investigator	Sen Gupta,Alexander
Grant Scheme	ARC Linkage Project Industry Partner Contribution
Grant title	Understanding The Effect Of Small-Scale Ocean Process On Tuna Populations - A New Tool To Forecast Tuna Distributions For Use In Fisheries Management
Duration	2015 - 2018
Awarded Budget	60,000

Appendix C – 2017 Centre Personnel

Professors

Scientia Prof Matthew England
Prof Andy Pitman (ARCCSS Director)
Prof Steven Sherwood (CCRC Deputy Director)
Prof Chris Turney
Prof Jason Evans
Prof John Church (Scientia Fellow)

Faculty

Dr Gab Abramowitz
A/Prof Lisa Alexander
A/Prof Donna Green
Dr Melissa Hart (ARCCSS Graduate Director)
Dr Sarah Perkins-Kirkpatrick
Dr Angela Maharaj
Dr Ben McNeil
Dr Laurie Menviel (Scientia Fellow)
A/Prof Katrin Meissner (CCRC Director)
Dr Alex Sen Gupta
Dr Andréa Taschetto (CCRC Postgraduate Coordinator)

Post-Doctoral Research Fellows, Research Associates and Research Assistants (including ARCCSS funded positions)

Dr Margot Bador
Dr Claire Carouge
Dr Martin De Kauwe
Dr Mark Decker
Dr Alejandro Di Luca
Dr Giovanni Di Virgilio
Dr Vishal Dixit
Dr Markus Donat
Mr Daniel Eisenberg
Dr Chris Fogwill
Dr Leela Frankcombe
Dr David Fuchs
Dr Olivier Geoffroy
Dr Nicholas Hannah
Dr Nicolas Herold
Dr Ryan Holmes
Dr Veronique Lago
Dr Yi Liu
Dr Shaoxiu Ma
Dr Damianos Mantsis
Dr Abhnil Prasad
Dr Agus Santoso
Dr Joe Scutt Phillips
Dr Paul Spence
Dr Zoe Thomas
Dr Anna Ukkola
Dr Yue Zheng

Professional Staff (including ARCCSS funded positions)

Vilia Co
Stephen Gray
Jenny Rislund
Bronwen Smith
Alvin Stone

Higher Degree Research Students (and their primary supervisor)

Alice Barthel (Waterman
Shannon Bengtson (Meissner)
Chris Bull (England)
Arden Burrell (Evans)
Wasin Chaivaranont (Evans)
Xi Chen (Liu)
Hamish Clarke (Pitman)
Maxime Colin (Sherwood)
Steefan Contractor (Alexander)
Nathan Cooper (Green)
Shreya Dhame (Meissner)
Earl Duran (England)
Shaun Filer (Green)
Peter Gibson (Perkins)
James Goldie (Alexander)
Rishav Goyal (England)
Mia Gross (Alexander)
Ned Haughton (Abramowitz)
Nadja Herger (Abramowitz)
Sanaa Hobeichi (Abramowitz)
Chiara Holgate (Liu)
Carlo Jamandre (Hart)
Yue Li (Sen Gupta)
Yiling Liu (Donat)
Mat Lipson (Hart)
Tammas Loughran (Perkins-Kirkpatrick)
Helen Millman (Fogwill)
Nidhi Nishant (Sherwood)
Kaitlin Naughten (Meissner)
Marissa Parry (Green)
Valeria Prando (Spence)
Acacia Pepler (Alexander)
Sarah Perry (McGregor)
Ariaan Purich (England)
Ying Sun (Sherwood)
David Webb (England)

Adjuncts, Visiting Fellows and Visiting Researchers

Dr Liang Chang
Prof Alan Dupont
Prof Chris Forest
Prof Michael Goldstein
Prof Hoshin Gupta
Dr Fei Ji
Dr Nicolas Jourdain
Dr Joseph Kidston
Dr De Li
Dr Ian Macadam
Dr Shayne McGregor
Dr Michael Molitor
Dr Ruby Leung
Prof Paul O'Gorman
Prof Stefan Rahmstorf
Dr Vincent Rossi
Dr Oleg Saenko
Prof Roger Smith
Dr Milton Speer
Dr Caroline Ummenhofer

Affiliated UNSW Staff

Prof Mike Archer
A/Prof Jeremy Bailey
Prof Andy Baker
A/Prof Gary Froyland
A/Prof Mark Holzer
Dr Fiona Johnson
Prof Jane McAdam

Visiting Students and Research Interns

Pa Matthew Armstrong
Afzal Ahmad
Piero Bernardo
Scott Clarke
Felippe Galdino-Silva
Jun Ge
Maurice Huguenin-Virchaux
Gideon Kwok
Josephine Larrieu
Gurinder Nagra
Patrick Nicolle
Monique Marais
Ines Richter
Ethan Ryan
Chryseis Salomez
Tomas Steele
Hu Hsin Su

Appendix D – 2017 Media & Publicity

NAME	MEDIA OUTLET	MEDIA ACTIVITY	ARTICLE PROGRAM NAME
Alexander, L.	Radio	2ESR	Editor of new "sham journal" is climate science denier with ties to Heartland Institute
England, M.	News article	SMH	'Huge experiment': The continent that climate change has not forgotten
England, M.	News article	SBS News	'What BS': Experts slam Trump's 'absurd' reasons for quitting Paris climate deal
England, M.	News article	The Australian	Climate Sceptics: The Project
England, M.	News article	The Guardian	Hang ten (decades): Walter Munk, inventor of surf forecast, turns 100
England, M.	News article	SMH	More rain on the horizon as climate change affects Australia, study finds
England, M.	News article	Inhabitat	Tony Abbott dares us to reject the evidence on climate, but reveals a coward.
England, M.	News article	Business Green	UNSW climate scientist awarded international prize for Antarctic research
England, M.	News article	The Guardian	Urban heat islands: cooling things down with trees, green roads and fewer cars
England, M.	News article	Financial Tribune	Warming had clear hand in record Australian heat
England, M.	News article	COSMOS Magazine	What do we tell kids about the climate change future we created for them?
Goldie, J.	Radio	2ser	Three questions climate science must answer
Hale, M. Kirkpatrick, S.	News article	The Conversation	Climate models over-estimated warming
Hart, M.	News article	Guardian	What is the Pacific shadow zone?
Hart, M., Lipson, M.	News article	The Conversation	World's 'oldest water' to be found in the deep blue sea
Herold, N.	News article	SMH	Graham Readfearn

Holmes, R.	News article	SMH, Camden Advertiser, Redland City Bulletin, Liverpool Champion, Ballarat Courier, Mudgee Guardian, The Age, Lithgow Mercury, Macarthur Advertiser, Northern Daily Leader, South Coast Register, St Marys star, Hawkesbury Gazette, Bendigo Advertiser, Newcastle Herald, Bathurst Western Advocate, Blacktown Sun, illawarra Mercury, Fairfield Champion, Port Macquarie News, Bega District News, Blue Mountains Gazette, Latrobe Valley Express, Warnambool Standard, Central Western Daily, Sunraysia Daily, Parramatta Sun, St George & Sutherland Shire Leader, Midland Express, WA Today, Canberra Times	Answers to the world's 'oldest water' found in the deep blue north Pacific
Holmes, R.	News article	The Hindi	Why Antarctic ice shelves the size of small countries are breaking off
Kirkpatrick, S	News article	NoFibs	"#Heatwave is noting short of horrifying" says climate scientist reports @takvera.
Kirkpatrick, S	News article	SMH	"Really awful": 50-dgree days possible for Sydney, Melbourne, as warming worsens.
Kirkpatrick, S	News article	New Scientist, TVN	Australia's treasurer takes lump of coal into parliament as country braces for more crippling heatwaves
Kirkpatrick, S	News article	DeSmog	Australian heat wave raises concern for country's new sizzling normal
Kirkpatrick, S	News article	Inside Climate News	Climate and weather warming together.
Kirkpatrick, S	News article	Weatherzone	Climate change doubled the likelihood of the New South Wales heatwave
Kirkpatrick, S	News article	The Guardian	Drive
Kirkpatrick, S	TV program	Channel 9 Sydney, NBN Gold Coast, Channel 9 Brisbane, Channel 9 Melbourne, NBN Newcastle, NBN Coffs Harbour, NBN Lismore, NBN Tamworth, NBN Central Coast	Global warming scientists learn lessons from the pause that never was
Kirkpatrick, S	News article	Huffington Post	How motherhood is impacting motherhood in the climate science community
Kirkpatrick, S	Radio	Life Matters, Radio National, ABC	MAPS: A 'horrifying' three-day heat wave continues on Australia's east coast today.
Kirkpatrick, S	News article	Business Insider.	More rain on the horizon as climate change affects Australia, study says
Kirkpatrick, S	News article	Daily Liberal	Science Friday with Robyn Williams

Kirkpatrick, S	News article	Thomson Reuters	Science shows that humans are primarily responsible for climate change, counter to EPA Administrator Scott Pruitt's claim
Kirkpatrick, S	News article	SMH	The Link
Kirkpatrick, S	News article	New York Times	Think: Sustainability
Kirkpatrick, S	Radio	AM, Radio National, ABC	Tony Abbott dares us to reject evidence on climate, but reveals a coward
Kirkpatrick, S	News article	Phys. Org.	Trump calls for some 'good old global warming' as US experiences bad weather
Kirkpatrick, S	News article	Climate Central	When the heat is on we need city-wide plans to keep cool
Kirkpatrick, S	News article	The Conversation	When the heat is on, we need city-wide plans to keep cool
Kirkpatrick, S, Hale, M.	News article	The Conversation, The Guardian, Sydney Morning Herald, Brisbane Times, Canberra Times, Australian Geographic, Public Now, Insurance News	Climate change forecasts: more intense deluges, downpours Down Under
Meissner, K., Kirkpatrick, S.	TV program	Lateline ABC1	Climate scientists say likelihood of extreme summers surging due to global warming
Naughten-Alexander, K.	Radio	ABC The World Today	Stronger winds heat up West Antarctic ice melt
Naughten, K., Sen Gupta, A.	News article	The World Today, RN, ABC.	Sydney weather: soggy end to summer masks a season of heat records
Perkins, S.	News article	The Conversation	Rising heat: Can we cool the risks of an invisible disaster?
Perkins, S.	News article	Sydney Morning Herald	The uninhabitable Earth: the annotated edition
Pitman, A.	News article	Stock News USA	2017 might be the hottest year in history
Pitman, A.	News article	The Guardian	Australia's deadly relationship with heat
Pitman, A.	News article	BBC	Australia's heatwave is a preview of things to come
Pitman, A.	News article	Climate Feedback	Sea ice melting opens prospect of more ship traffic through Arctic
Pitman, A.	News article	SMH	Sea ice melting opens prospect of more ship traffic through Arctic.
Pitman, A., Sherwood, S.	News article	DeSmog	Climate scientists reveal their fears for the future.
Pitman, A., Sherwood, S.	Radio	The Science Show, Radio National, ABC	How Distant Winds May Be Causing Antarctic Meltdown
Pitman, A., Sherwood, S.	News article	The Guardian	Trump's Climate Tweet Irks Science Community
Santoso, A.	News article	ABC Online	Drift bottle experiment started near Fiji ends on NSW mid north coast
Santoso, A.	News article	ABC News	Drive w/Richard Glover

Santoso, A.	News article	Climate Feedback	Experts warn of more intense rainfall as mercury continues to climb
Sherwood, S.	News article	The new Daily	A surge in 'extreme rainstorms' is coming, new report warns
Sherwood, S.	TV program	Channel 10	Climate scientists attack Tony Abbot's 'misleading' speech to Global Warming Policy Foundation.
Sherwood, S.	Radio	ABC radio	Energy Secretary Rick Perry incorrectly claims CO_2 is not primary cause of climate change
Sherwood, S.	News article	DeSmog	Experts destroy Tony Abbott's stance on climate change.
Sherwood, S.	News article	Gizmodo	Extreme heatwave days already hitting poorer nations more than rich
Sherwood, S.	News article	The Guardian	Has denying won?
Sherwood, S.	News article	Sydney Morning Herald	morning program (name??) at 7:10am
Sherwood, S.	Radio	ABC NSW regional	Our Say: Time to cut the hot air and find the answers
Sherwood, S.	Radio	ABC	Scientists blast lack of NHMRC funding on climate.
Sherwood, S.	TV program	ABC	This is what the future will look like: climate scientist
Sherwood, S.	News article	New York Times	This map shows how uninformed Trump's global warming tweet is.
Sherwood, S.	News article	The Guardian	Trump's call for 'good old global warming' ridiculed by experts
Sherwood, S., Bao, J.	News article	Phys.Org.	A hard rain to fall in Australia with climate change
Sherwood, S., Bao, J.	News article	The New Daily	A surge in "extreme rainstorms" is coming, says new report.
Sherwood, S., Bao, J.	News article	Rdmag	Climate change's signature was writ large on Australia's crazy summer of 2017

Sherwood, S., Bao, J.	News article	Sydney Morning Herald, Canberra Times, The Singleton Argus, St George & Sutherland Shire Leader, Newcastle Herald, Fairfield Champion, Northern Daily Leader, The Young Witness, Central Western Daily, Daily Liberal, South Coast Register, Great Lakes Advocate, Illawarra Mercury, Hills News, Yass Tribune, Lithgow Mercury, The Armidale Express, Nambucca Guardian Express, Gloucester Advocate, Eden Magnet, The Bellingen Shire Courier-Sun, Forbes Advocate, Camden Advertiser, Parramatta Sun, Canowindra, News, Blayney Chronicle, Port Macquarie News, Dungog Chronicle, Wollondilly Advertiser, Parkes Champion-Post, Harden Express, St Mary's Star, Cootamundra Herald, Maitland Mercury, Mooree Champion, The Area News, Camden Haven Courier, Liverpool Champion, The Queanbeyan Age, Guyra Argus, Goulburn Post, Braidwood Times, Eastern Riverina Chronicle, Cowra Guardian, Town and Country Magazine, Southern Weekly, Bega District News, Macarthur Advertiser, The Border Mail, Glen Innes Examiner, Penrith Star, Namoi Valley Independent, Riverina Rural, Boorowa News, Southern Highland News, Bathurst Western Advocate, Grenfell Record, Mudgee Guardian, Wagga Wagga Daily Advertiser, Cessnock Advertiser, Hawkesbury Gazette	Natural disasters are affecting some of Australia's most disadvantaged communities
Spence, P.	News article	Gizmodo	700km winds are melting Antarctica
Spence, P.	News article	Sydney Morning Herald	Antarctic coastal warming
Spence, P.	News article	Daily News	Australia faces potentially disastrous consequences of climate change, inquiry told
Spence, P.	News article	The Conversation, Time Magazine	Heatwaves: Australia to the North Pole.
Spence, P.	News article	Climate Central	Huge experiment: the continent that climate change has not forgotten
Spence, P.	News article	Science Daily	Sydney's swelter has a climate change link, scientists say.


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