Annual Report 2014

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 biophysical climate sciences.

Climate Change Research Centre
University of New South Wales

ANNUAL REPORT 2014

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1. The Climate Change Research Centre at a Glance

2014 Key Achievements:

- *$1.9 million external research revenue*
- Further $1.9m investment of external research funding for UNSW node of the ARC Centre of Excellence for Climate System Science
- 130 peer reviewed publications, predominantly in top tier (former ERA A/A*) journals.
- CCRC staff extensively quoted and interviewed in the media with over 300 articles, interviews, appearances or quotes
- 19 contributions to *The Conversation* (Op Eds, articles, quotes)
- 35 PhD students and 6 supervised in the Centre
- 7 PhD completions in 2014

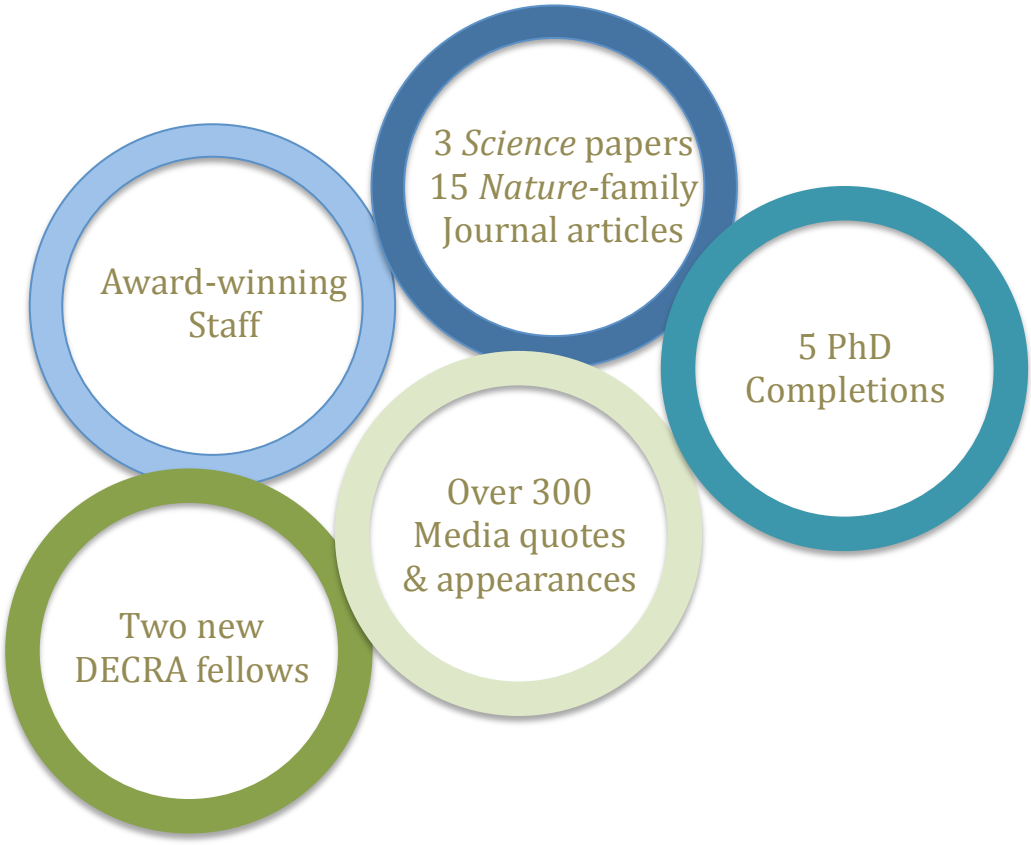
UNSW CCRC is a multi-disciplinary research group comprising one of the largest university research facilities of its kind in Australia.

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, 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 also hosts the UNSW lead node of the Australian Research Council Centre of Excellence for Climate System Science (ARCCSS).

CCRC research focuses on basic climate system science across several core disciplines. The CCRC interacts with numerous schools and Centres on campus. Within the Faculty of Science particularly strong research and teaching synergies exist between the Centre and the Schools of Mathematics and Statistics, Physics and Biological Earth and Environmental Sciences (BEES). Its research focus is innovative and arguably unique among university units worldwide, and it has quickly grown into the largest hub of such research in the Australian region.

2014 saw the CCRC continue its successful track record in attracting grant funding and producing and publishing excellent, world-class research.



2 Director's Report - 2014

2014 was a year of relative peace and stability at the CCRC, with no major moves, physical changes, changes in admin or academic staff, or new programs. Instead it was a year of many accomplishments in the continuing maturation of the Centre.

First, congratulations are due for the promotions of Lisa Alexander to Associate Professor and DECRA fellow Sarah Perkins to Lecturer rank. The year also saw two finalist nominations of staff for Eureka prizes: myself for the Scientific Research prize, and Lisa Alexander and her "Team Extreme" (Sarah, and Markus Donat) for Outstanding Early Career Researcher. Unfortunately we all got beaten by the biologists, but many CCRC'ers had a great time dressing up in black tie and heading downtown for a fine evening.

Research continued to grow at the CCRC in 2014, including an amazing 15 papers in the prestigious *Nature* family journals and three in *Science*. The year kicked off on 1 January with a *Nature* article of mine (see feature p.9) proposing an explanation for what controls Earth's global sensitivity to greenhouse gases (and which implies that the true sensitivity must lie toward the high end of previous estimates). The substantial social and traditional media coverage of this article was soon topped by a *Nature Climate Change* paper led by Matt England explaining the recent "hiatus" in global surface temperature, an emerging focus of climate debate over the last couple of years. There is now a hefty set of papers on this issue including a high-profile contribution from CCRC student Nicola Maher, which all pretty much conclude that the "hiatus" is a temporary (but interesting) bump on the road to higher temperatures. Other important research results that appeared concerned changes in heat transport to the Antarctic ice shelves, remote sensing of vegetation, and increasing frequency of heat waves.

Our staff continued to have a strong media presence, perhaps none more than DECRA Fellow Erik van Sebille, who appeared regularly on media around the world including CNN in the US, commenting on the search for flight MH370, his new rubber ducky tracking web site, garbage patches that form in the centre of the major ocean gyres (which have been known to oceanographers for years but seemed to hit the big-time in 2014), and the transport of ocean microbes. Unfortunately for us, Erik left the CCRC at the end of the year to take a lecturer position at Imperial College London.

Indeed 2014 saw a bit more turnover than usual of our postdoctoral cohort as we passed the three-year mark of the ARC Centre of Excellence, spurring the departure of most of the ARCCSS postdocs and the arrival of several new ones, as well as the graduation of several ARCCSS-affiliated Ph.D. students. The CCRC effectively played host in 2014 for the annual ARCCSS Workshop, held in the Hunter Valley in November.

Our gradual integration into School of Biological, Environmental and Earth Sciences (BEES) continued with the appointment of Alex sen Gupta as co-Postgraduate Research Coordinator for the School, and Donna Green as the second representative to the Science Faculty Academic Board.

Professor Steven Sherwood

3 *Personnel*

2014 Personnel Highlights:

- Dr Sarah Perkins and Dr Yi Liu took up ARC DECRA Fellowships commencing in 2014
- Dr Katrin Meissner and Dr Jason Evans were promoted to Associate Professor commencing 1 January 2014.
- Dr Lisa Alexander's promotion to Associate Professor was announced late 2014, effective 1 January 2015
- We welcomed four new post doctoral researchers in 2014 funded by grants held by CCRC staff as well as three research associates funded by ARCCSS grants.
- The Centre plays regular host to sabbatical visitors, national & international collaborators and seminar speakers

Continuing staff appointed to the CCRC included one Laureate Fellow (England) and two ARC Future Fellows (Meissner and Evans). Fixed term staff included an ARC Australian Research Fellow, an ARC Postdoctoral Fellow and five ARC DECRA Fellows.

The CCRC also houses 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 Professor Robert Marsh (University of Southhampton) and Professor Paul Valdes (Bristol University) who both spent several weeks working closely with CCRC staff.

The Centre is also a sought-out destination for international researchers making shorter visits. We welcomed around 20 research visitors to the CCRC in as well as hosting many seminar speakers from around Australia and overseas; thus demonstrating that the Climate Change Research Centre has critical momentum that enhances UNSW's reputation at the very forefront of Climate Science in Australia.

A full list of personnel associated with the Centre in 2014 appears in Appendix C.

4 Research outputs, Centre impact and grant summary

2014 Impact

- Three papers in *Science.* (Authors: Sherwood & van Sebille). Six papers published in *Nature*. 9 additional papers published in *Nature*-family journals. 8 papers in *Geophysical Research Letters.* 9 papers published in *Journal of Climate.*

- Significant media coverage of Centre research accomplishments in 2014 including:
  - 20 TV appearances/interviews
  - 40 Radio appearances/interviews
  - Over 240 print and online articles, interviews and op eds (before syndication)

The CCRC published 126 individual peer reviewed outputs in 2014 which included a monograph (Turney) and a book chapter (Green). The CCRC continues to publish papers primarily in the highest impact, high-quality journals - those ranked A and A* under the former ERA scheme and those with a high Thomson ISI impact factor. See Appendix A for a full list of publications.

Category	2013 Outputs (non weighted)	2014 Outputs (non weighted)
A1	0	1
B1	3	1
C1	119	128
E1	2	0

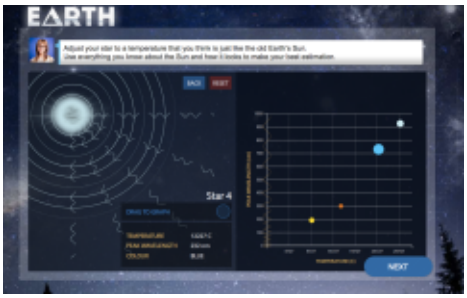
The CCRC has also been the headquarters for the ARC Centre of Excellence for Climate System Science (ARCCSS) since 1 July 2011. In addition to ARCCSS Director Andy Pitman, three CCRC academic staff are Chief Investigators in the Centre of Excellence - Alexander, England and Sherwood. A further 14 CCRC staff were Associate Investigators in 2014. (Abramowitz, Evans, Green, Liu, Maharaj, McGregor, Meissner, Menviel, Perkins, Santoso, Sen Gupta, Taschetto, van Sebille, and Waterman).

The two centres successfully share space and administrative support and there are significant opportunities for collaboration across the research strengths and foci of both groups.

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 the Centre of Excellence. The CCRC graduate student experience further enhanced by ARCCSS 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 Gab Abramowitz) and the ARRCCS Graduate Director, Dr Melissa Hart.

Two highly talented post doctoral researchers were awarded DECRAs in 2014: Dr Sarah Perkins for her project on modelling Australian heat waves and to Dr Yi Liu whose project seeks to detail a long term aboveground vegetation biomass carbon record for Australia using a series of satellite passive microwave instruments.

The research presence of the CCRC and ARCCSS on campus continues to be promoted with Jason Evans taking over as the centres' representative to the Science Faculty Research Management Committee (in addition to continuing his role as IT coordinator).



Centre outreach to undergraduates and high schools was coordinated by Dr. Angela Maharaj, including the completion of the e-learning project "EΔrth 2.0" which was part of the UNSW-led SmartScience initiative. This project, designed to teach physical principles underlying planetary climate at the Year 10 level, was rolled out to a number of high schools in the Sydney region.

A full listing of research projects in progress in 2014 appears in Appendix B.

Below are some highlights of other ***awards, contributions and service*** throughout 2014

- The 2014 CCRC Student Prize for Best Paper was awarded to Annette Hirsch
- The 2014 CCRC Student Prize for Science Communication was awarded to Willem Huiskamp
- Steven Sherwood and Lisa Alexander and her *Extremes Team* were all finalists in the 2014 Eureka Prizes
- PhD Student Marissa Parry was the recipient of the 2014 CASANZ (Clean Air Society of Australia and New Zealand) – Air and Environment Student Award
- Research Associate Ruth Lorenz and PhD students Penny Maher and Annette Hirsch won poster awards at the 2014 GEWEX Conference in The Hague
- Stephen Gray earned his Master of Tertiary Education Management and was also made an Associate Fellow of the Association of Tertiary Education Management
- The Centre's media profile is highlighted in Appendix D

Snapshot 1 - Research: A sensitive paper on clouds

On the very first day of 2014, chief investigator Steve Sherwood produced a paper on cloud formation that is likely to have a profound impact on climate models and the sensitivity of our climate to greenhouse gases.

The paper compared observations of cloud formation in the real world with the way it is represented in models. Observations showed that when water vapour was taken up by the atmosphere through evaporation, updraughts often rose to 15 km where they formed heavy rains. However, other updraughts would also rise just a few kilometres before returning to the surface without forming rain. These smaller updraughts had the additional effect of pulling water vapour away from higher cloud forming regions.

Interestingly, climate models that did not show enough of this low-level process when compared to real-world observations also showed a lower sensitivity to greenhouse gases.

When the processes of cloud formation in climate models were corrected to match these observations it was found that this caused fewer clouds to form in a warmer climate. This increased the amount of sunlight and heat entering the atmosphere and correspondingly increased the sensitivity of the modeled climate to greenhouse gases.

When water vapour processes were correctly represented the sensitivity of climate to a doubling of carbon dioxide – which will occur in the next 50 years if we follow the current emissions pathways - would be towards the middle and higher end of current estimates. With these processes the paper estimated we could see a global temperature increases of 3°C and more likely 4°C by 2100.

Prior to this paper the estimate of climate sensitivity for a doubling of carbon dioxide ranged from 1.5°C – 5°C. The new estimate with the cloud processes included has narrowed this range to 3°C – 5°C.

The paper received significant coverage nationally and internationally across all forms of media and has been extensively used and analysed by climate researchers around the world.

It is particularly significant in what it means for future climate change as Prof. Sherwood himself acknowledged on the paper's release.

"Rises in global average temperatures of this magnitude will have profound effects on the world and the economies of many countries if we don't urgently start to curb our emissions," Prof. Sherwood said.

5 Research supervision and teaching

The Climate Change Research Centre has a growing cohort of postgraduate research students. There were 29 individual students enrolled in the centre's PhD program, and six honours students supervised in 2014. The CCRC has benefited greatly from the ARCCSS summer scholar scheme which provides funding for undergraduate students to undertake small research projects, supervised by an ECR over the summer. Many of our recent honours and PhD applicants have been previous summer scholars.

The CCRC continued its robust annual progress review scheme, led by centre Post Graduate Coordinator Gab Abramowitz who took over the role from Katrin Meissner in 2014. 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. Feedback from students regarding the Centre's review process is overwhelmingly positive. The centre also invites a nominated student representative to join its bi-monthly staff meetings.

As part of BEES, the CCRC aligned its postgraduate review schedule with that of the rest of BEES as of 2014. Also, in late 2014 Dr. Alex Sen Gupta was appointed as the Ph.D. completion coordinator for the School and the BEES representative on the HDR Committee, with Abramowitz continuing to look after the recruitment and progression of Ph.D. students within the CCRC. Dr. Donna Green served on a BEES honours committee in 2014 and continues to look after the growing Honours student cohort of the CCRC.

7 PhD students and five honours students had their awards conferred in 2014.

- Andrew King. PhD (Supervised by Lisa Alexander)
- Penny Maher. PhD (Supervised by Steve Sherwood)
- Nina Ridder. PhD (Supervised by Matt England)
- Karin Kvale. PhD (Supervised by Katrin Meissner)
- Ian Macadam. PhD (Supervised by Andy Pitman)
- Graham Simpkins. PhD (Supervised by Matt England)
- Bevan Warren. PhD (Supervised by Donna Green)
- Ryan Batehup. Honours (Supervised by Shayne McGregor)
- Nicholas Calhau. Honours (Supervised by Erik Van Sebille)
- James Goldie. Honours (Supervised by Lisa Alexander)
- Bethany Ellis. Honours (Supervised by Chris Turney)
- Mathew Lipson. PhD (Supervised by Melissa Hart)

Destinations for our graduates have included the NSW Office of Environment and Heritage, The University of Exeter, Geomar-Germany and the University of Melbourne.

In 2014, Dr. Lisa Alexander took over from Gab Abramowitz as coordinator of CCRC undergraduate teaching and degrees. Courses run by CCRC staff are CLIM1001 – Introduction to Climate Change, 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.

Snapshot 2 – High Impact Science: Extremes

Researchers from the Centre's Extremes group have become prominent contributors to the Bulletin of the American Meteorological Society's (BAMS) annual Special Supplement on Explaining Extreme Events. In this year's supplement CCRC researchers, Lisa Alexander, Markus Donat and Sarah Perkins - along with collaborators from other nodes of the ARC Centre of Excellence for Climate System Science - contributed four out of five Australian papers.

The Centre's papers went on to lead the national and international reporting of the Special Supplement and one was highlighted on the front page of the *New York Times*.

The high profile of the Centre's research in the supplement is a direct result of its international reputation as a world leader in studies into the climate factors causing extreme weather and climate events.

The studies highlighted in this report looked at Australia's hottest year on record in 2013 and were able to conclude that the record-breaking temperature across Australia in 2013 was virtually impossible without the influence of human-caused global warming.

The research papers presented in the BAMS Special Supplement were able to put clear figures on the probabilities around global warming and the significant climatic events of 2013 in Australia. They found in Australia during 2013 that global warming:

- doubled the chance of the most intense heat waves,
- tripled the likelihood of heatwave events,
- made extreme summer temperature across Australia five time more likely
- increased the chance of hot dry drought-like conditions seven times
- made hot spring temperatures across Australia 30 times more likely.

This impressive research follows on from the 2013 BAMS Special Supplement, which also had a number of papers by the extremes group. The continuing prominence of our extremes group in major journals and the media has now firmly established it as an expert voice during times of extraordinary weather events.

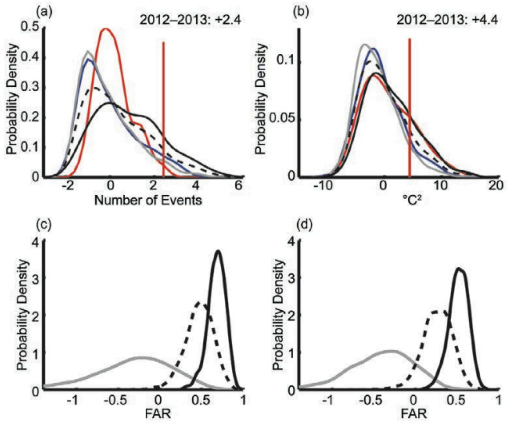
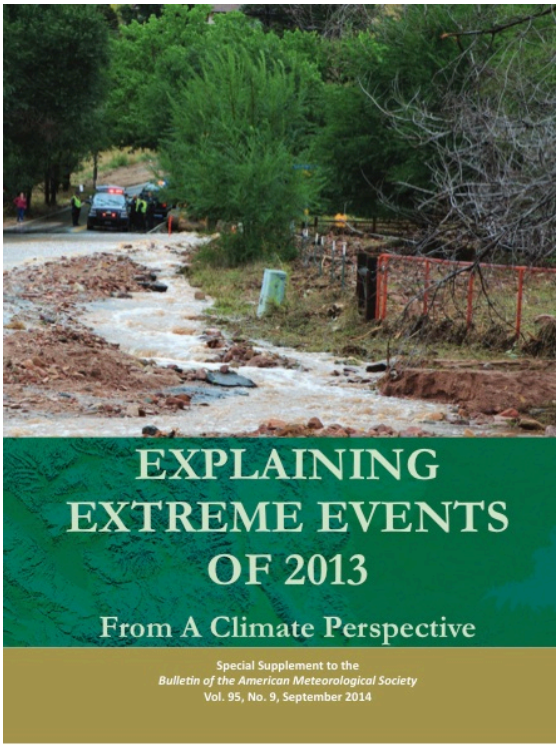


Fig. 10.1. (a), (b) Respective probability density functions (PDFs) of heat wave frequency (number of heat waves) and intensity (peak magnitude) anomalies. Vertical lines reflect the respective anomalies for the 2012/13 Austral summer. (c), (d) Respective PDFs of FAR values from 1000 bootstrapped samples. Red is for the observations, blue is for the control, gray is for 1955–83, black dashed is for 1955–2012, and black solid is for 1984–2012.



6 Statement of financial performance for 2014

Summary of statement of financial performance

The Climate Change Research Centre's total revenue for 2014 was $5,003,108. $1.93mil of this was from external income sources. The remainder was from a combination of Faculty and Central/Strategic funds, including generous co-support associated with Matthew England's Laureate Fellowship, LIEF and MREII grants.

Of the $1,927,437 research revenue earned in 2014, $1.59m (82%) was Category 1 income.

This research income figure does not include the additional funding allocated to the ARC Centre of Excellence for Climate System Science from the ARC, Partner Organisations and UNSW strategic funds.

At 79% of total expenditure, people costs account for by far the largest portion of the centre's expenditure across all fund types.

Total 2014 expenditure was $5,883,899. The CCRC's 2014 opening carry over was $2.26m. The closing carry forward was a surplus of $1.38m.

Full countersigned financial statement follows.

7 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 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.

The CCRC occupies space on Level 4 of the Mathews Building that was purpose-renovated for us to occupy in 2008. This space was slightly expanded in 2013 to accommodate the Centre's growth in student and post-doc numbers.

Climate Change Research Centre - CCRC

Statement of Financial Performance
for the Year Ended 31 December 2014

	Notes	2014 $	2013 $
Funds:			
Research Funds		**1,927,437**	**3,294,682**
ARC Research Funds	1	1,575,978	2,364,701
NHMRC Research Funds		- 5,000	115,494
Other External Research Funds		364,546	783,960
Fundraising Contributions	2	219	30,000
Faculty Contributions	3	**2,191,039**	**1,859,286**
UNSW Contributions		**884,632**	**984,712**
Strategic Funds	4	384,375	342,507
MREII		170,689	85,416
Super Science & LIEF UNSW Contributions		150,000	210,000
EB Gap	5	179,568	346,789
Total Funds:		5,003,108	6,138,679
Costs:			
People Costs	6	4,620,549	4,675,053
Scholarship Stipends		321,821	277,785
Travel	7	372,937	421,259
Equipment		237,396	312,312
Other Non People Costs		331,197	378,723
Total Costs:		5,883,899	6,065,133
Operating result		- 880,791	73,546
Opening Balance: Surplus(Deficit) from Prior Year		2,256,599	2,175,029
Correction of Prior Year Opening Balance		-	8,024
Adjusted Opening Balance		-	-
Closing Balance: Surplus(Deficit)		1,375,808	2,256,599

Notes to the Statement of Financial Performance

1 2014 Category 1 income was $1.6m
2 Final disbursement of funds from Expert Team on Climate Risk and Sector-specific Climate Indices (ET-CRSCI) Research
3 Faculty's 2014 CCRC contribution consist of a 15% increase from 2013
4 Sources of UNSW funding for 2014 included $297K in SIR50 fund, $38k from SIR30 fund, and $50k in SPF04 funds
5 Change in the EB gap process allows identification of EB Gap in 2014
6 77% of the Centre's total 2014 expenditure was on people costs compared to 76% in 2013, 81% in 2012, 82% in 2011, 74% in 2010 and 75% in 2009. In 2014, 48% of people costs came from base operating and strategic (SPF01, SPF02, SIR30, SIR50) funds meaning that more than half of the centre's salaries and on-costs are supported by fellowships or
7 In 2014, 78% was funded by external grants compared to 80% in 2013.
8 Correction of the classification of career advancement fund
9 Closing cash balance agreed to NS financial reports

U. Stamios

Urania Stamios CPA
Science Faculty Finance Manager

13.03.2015

Date

8 CCRC Management and 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

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

The make up of the committee is a reflection of the collaborative ties the Centre has with different Schools and Centres across UNSW. The Steering Committee primarily has a strategic advisory role.

Responsibility for day-to-day management and operation of the centre is shared between the Director, Centre Manager and staff with delegated portfolios (such as the PG Coordinator, IT coordinator, UG Coordinator, Honours Coordination, Marketing/outreach coordinator, etc). The centre leadership team works closely and cooperatively with the Faculty of Science executive group and faculty committees. The Centre Director meets regularly with the Head of School of BEES as the two organisations come together more closely through finding shared synergies and alignment of processes and roles. Bi-monthly 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), as well as administration relating to postgraduate student applications, enrolment and scholarships and the formal postgraduate review process.

Appendix A – 2014 Publications

Book

Turney, C., M. Canti, N. Branch, and P. U. Clark, 2014: *Environmental Archaeology : Theoretical and Practical Approaches*. *Key Issues in Environmental Change*, Taylor and Francis.

Book Section

Green, D. L. and V. Barros, 2014: Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. *Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 1133-1197.

Journal Articles

Abram, N., R. Mulvaney, F. Vimeux, S. J. Phipps, J. Turner, and M. H. England, 2014: Strengthening of the Southern Annular Mode over the past six centuries. *Nature Climate Change*, **4,** 564-569.

Abram, N. J., R. Mulvaney, F. Vimeux, S. J. Phipps, J. Turner, and M. H. England, 2014: Evolution of the Southern Annular Mode during the past millennium. *Nature Climate Change*, **4,** 564-569.

Abramowitz, G., J. F. Exbrayat, and A. Pitman, 2014: Disentangling residence time and temperature sensitivity of microbial decomposition in a global soil carbon model. *Biogeosciences*, **11,** 6999-7008.

Aiken, C., A. Santoso, S. McGregor, and M. England, 2014: Optimal forcing of ENSO either side of the 1970's climate shift and its implications for predictability. *Climate Dynamics*, 1-19.

Ajami, H., E. JP, M. F. McCabe, and S. Stisen, 2014: Technical Note: Reducing the spin-up time of integrated surface water-groundwater models. *Hydrology and Earth System Sciences* **18,** 5169-5179.

Ajami, H., M. F. McCabe, E. JP, and S. Stisen, 2014: Assessing the impact of model spin-up on surface water-groundwater interactions using an integrated hydrologic model. *Water Resources Research*, **50**.

Andersen, A., J. Beringer, C. M. Bull, M. Byrne, H. Cleugh, R. Christensen, K. French, B. Harch, A. Hoffmann, A. J. Lowe, T. Moltmann, A. Nicotra, A. Pitman, S. Phinn, and M. Westoby, 2014: Foundations for the future: A long-term plan for Australian ecosystem science. *Austral Ecology*, **39,** 739-748.

Argueso Barriga, D., J. P. Evans, L. Fita Borrell, and K. Bormann, 2014: Temperature response to future urbanization and climate change. *Climate Dynamics* **42,** 2183-2199.

Ashok, K., c. Nagaraju, and A. Sen Gupta, 2014: Decadal changes in the relationship between the Indian and Australian summer monsoons. *Climate Dynamics* **42**.

Bakker, P., V. Masson-Delmotte, B. Martrat, S. Charbit, H. Renssen, M. Gröger, U. Krebs-Kanzow, G. Lohman, D. J. Lunt, M. Pfeiffer, S. J. Phipps, et. al., 2014: Temperature trends during the Present and Last interglacial periods - A multi-model-data comparison. *Quaternary Science Reviews*, **99,** 224-243.

Bentley, M., C. Ó Cofaigh, J. Anderson, H. Conway, B. Davies, A. Graham, C.-D. Hillenbrand, D. Hodgson, S. Jamieson, R. Larter, A. Mackintosh, J. Smith, E. Verleyen, R. Ackert, P. Bart, S. Berg, D. Brunstein, M. Canals, E. Colhoun, X. Crosta, W. Dickens, E. Domack, J. Dowdeswell, R. Dunbar, W. Ehrmann, J. P. Evans, V. Favier, D. Fink, C. J. Fogwill, et. al, 2014: A community-based geological reconstruction of Antarctic Ice Sheet deglaciation since the Last Glacial Maximum. *Quaternary Science Reviews*, **100,** 1-9.

Borlace, S., A. Santoso, W. Cai, and M. Collins, 2014: Extreme swings of the South Pacific Convergence Zone and the different types of El Nì±o events. *Geophysical Research Letters*, **41,** 4695–4703.

Bormann, K., E. JP, and M. F. McCabe, 2014: Constraining snowmelt in a temperature-index model using simulated snow densities. *Journal of Hydrology*, **517**.

Boswijk G, Fowler AM, Palmer JG, Fenwick P, Hogg A, Lorrey A, and W. J, 2014: The late Holocene kauri chronology: assessing the potential of a 4500-year record for palaeoclimate reconstruction. *Quaternary Science Reviews*, **90,** 128-142.

Bralower, T. J., K. J. Meissner, K. Alexander, and D. J. Thomas, 2014: The dynamics of global change at the Paleocene-Eocene thermal maximum: A data-model comparison. *Geochemistry, Geophysics, Geosystems*, **15,** 3830-3848.

Brookman, T., G. Steward, J. Palmer, P. Fenwick, A. Banks, and T. W. Horton, 2014: Raised in the wild south: a dendrochronological and dendrochemical profile of a far-southern stand of kauri (Agathis australis) on the Taieri Plain, Otago. *New Zealand Journal of Forestry Science*, **44,** 14-14.

Cai, W., S. Borlace, M. Lengaigne, P. Van Rensch, M. Collins, G. Vecchi, A. Timmerman, A. Santoso, M. McPhaden, M. H. England, G. Wang, E. Guilyardi, and F. F. Jin, 2014: Increasing frequency of extreme El Niño events due to greenhouse warming. *Nature Climate Change*, **4**.

Cai, W., A. Santoso, G. Wang, E. Weller, L. Wu, K. Ashok, Y. Masumoto, and T. Yamagata, 2014: Increased frequency of extreme Indian Ocean Dipole events due to greenhouse warming. *Nature*
, **510,** 254-258.

Caley, T., F. J. C. Peeters, A. Biastoch, L. Rossignol, E. van Sebille, J. Durgadoo, B. Malaizé, J. Giraudeau, K. Arthur, and R. Zahn, 2014: Quantitative estimate of the paleo-Agulhas leakage. *Geophysical Research Letters* **41**.

Cetina-Heredia, P., M. Roughan, E. Van Sebille, and M. A. Coleman, 2014: Long-term trends in the East Australian Current separation latitude and eddy driven transport. *Journal of Geophysical Research*, **119,** 4351-4366.

Chakraborty, J. and D. L. Green, 2014: Australia's first national level quantitative environmental justice assessment of industrial air pollution. *Environmental Research Letters*, **9**.

Chakraborty, J. and D. L. Green, 2014: The relationship between industrial air pollution and social disadvantage in Australia: national and regional inequities. *Air Quality and Climate Change Journal*, **48**.

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CCRC - Active Research Projects

Investigators	Abramowitz, G.
GrantScheme	EIF Subcontract
GrantTitle	Development of research infrastructure to support the protocol for the analysis of land surface models (pals) online web application.
Duration	2012 -- 2014
Award Budget:	$285,000

Investigators	England, M.
GrantScheme	ARC Laureate Fellowships
GrantTitle	Future risks associated with ocean surface warming: impacts on climate, rainfall, carbon, and circulation
Duration	2011 -- 2016
Award Budget:	$1,250,252

Investigators	England, M.
GrantScheme	Contract Research
GrantTitle	Science advisory panel for the Climate Commission.
Duration	2011 -- 2014
Award Budget:	$4,545

Investigators	Evans, J.
GrantScheme	ARC Linkage Grants
GrantTitle	Will East Coast Lows change in frequency or intensity in the future?
Duration	2012 -- 2015
Award Budget:	$240,000

Investigators	Evans, J.
GrantScheme	ARC Linkage Grants (Industry portion)
GrantTitle	Will East Coast Lows change in frequency or intensity in the future?
Duration	2012 -- 2015
Award Budget:	$150,000

Investigators	Evans, J.
GrantScheme	Contract Research
GrantTitle	Narclim (NSW and ACT regional climate model).
Duration	2011 -- 2014
Award Budget:	$683,027

Investigators	Evans, J.
GrantScheme	State Government Contract
GrantTitle	Powp: Narclim (NSW and ACT regional climate model).
Duration	2011 -- 2014
Award Budget:	$56,973

Investigators Evans, J.
GrantScheme ARC Future Fellowships
GrantTitle How will climate change affect sub-daily precipitation? (project costs)
Duration 2011 -- 2015 **Award Budget:** $67,369

Investigators Evans, J.
GrantScheme ARC Future Fellowships
GrantTitle How will climate change affect sub-daily precipitation? (Salary support)
Duration 2011 -- 2015 **Award Budget:** $514,528

Investigators Evans, J.
GrantScheme Contract Research - Institute of Engineers Australia
GrantTitle Phase 1 – Modelling and Analysis of rainfall extremes in the Greater Sydney region
Duration 2013 -- 2014 **Award Budget:** $163,538

Investigators Evans, J.
GrantScheme MREII
GrantTitle Online disk based storage system (MREII)
Duration 2014 -- 2014 **Award Budget:** $170,689

Investigators Green, D. Bambrock, H. Alexander, L.
GrantScheme NHMRC Project Grant
GrantTitle Health impacts of climate change on indigenous Australians: identifying climate thresholds to enable the development of informed adaptation strategies
Duration 2011 -- 2014 **Award Budget:** $358,749

Investigators Hart, M.
GrantScheme Government Grants (other cat 1)
GrantTitle Forecasting air pollution impacts from hazard reduction burns
Duration 2015 -- 2018 **Award Budget:** $149,900

Investigators McGregor, S.
GrantScheme ARC DECRA Fellowships
GrantTitle Understanding the termination of el nino-southern oscillation events
Duration 2013 -- 2015 **Award Budget:** $375,000

Investigators McNeil, B.
GrantScheme ARC Goldstar
GrantTitle Is Australia's coastal ocean a source or sink for atmospheric CO2?
Duration 2014 -- 2014 **Award Budget:** $30,000

Investigators Pitman, A.
GrantScheme ARC LIEF Shared Grant
GrantTitle Strengthening merit-based access and support at the new NCI petascale supercomputing facility
Duration 2012 -- 2016 **Award Budget:** $600,000

Investigators Pitman, A. Sherwood, S Alexander, L England, M.
GrantScheme ARC Centres of Excellence
GrantTitle ARC Centre of Excellence for Climate System Science
Duration 2011 -- 2017 **Award Budget:** $21,400,000

Investigators Pitman, A.
GrantScheme NSW Environmental Trust Research Program
GrantTitle Dynamically downscaled climate projections for the Eastern Seaboard.
Duration 2011 -- 2014 **Award Budget:** $199,856

Investigators Pitman, A. Abramowitz, G. Leunig, R.
GrantScheme ARC Discovery Grants
GrantTitle Are proposed land-based sinks for greenhouse gases resilient to climate change and natural variability?
Duration 2011 -- 2014 **Award Budget:** $300,000

Investigators Pitman, A.
GrantScheme Contract Research
GrantTitle Science advisory panel for the Climate Commission
Duration 2011 -- 2014 **Award Budget:** $4,545

Investigators Pitman, A. Hirsch, A.
GrantScheme CSIRO Scholarship
GrantTitle OCE PhD scholarship for Annette Hirsch. Earth system science. Role of land surface dynamics in climate processes.
Duration 2012 -- 2015 **Award Budget:** $21,000

CCRC - Active Research Projects

Investigators Sherwood, S.

GrantScheme ARC Discovery Grants

GrantTitle Testing a new explanation of cloud feedback on global climate

Duration 2014 -- 2016 **Award Budget:** $958,044

Investigators Sherwood, S.

GrantScheme DIICCSRTE - Australian Maths and Science Partnerships Program

GrantTitle Smart Science Initiative

Duration 2013 -- 2014 **Award Budget:** $149,700

Investigators Sijp, W.

GrantScheme ARC ARF

GrantTitle ARF The equable climate conundrum: the role of the global ocean in multiple climate regimes.

Duration 2010 -- 2014 **Award Budget:** $502,830

Investigators Taschetto, A.

GrantScheme ARC ARF

GrantTitle Modes of Pacific Ocean variability and their relationship to regional Southern Hemisphere climate

Duration 2010 -- 2014 **Award Budget:** $240,548

Investigators van Sebille, E.

GrantScheme ARC DECRA Fellowships

GrantTitle Inter-ocean exchange around Australia and its relation to regional and global climate

Duration 2013 -- 2015 **Award Budget:** $374,394

Appendix C – Centre Personnel 2014

Professors

Prof Matthew England (Australian Laureate Fellow, CCRC Deputy Director)
Prof Andy Pitman (ARCCSS Director)
Prof Steven Sherwood (CCRC Director)
Prof Chris Turney (ARC Laureate Fellow)

Faculty

Dr Gab Abramowitz
Dr Lisa Alexander
A/Prof Jason Evans (ARC Future Fellow)
Dr Donna Green
Dr Melissa Hart (ARCCSS Graduate director)
Dr Angela Maharaj
Dr Ben McNeil
A/Prof Katrin Meissner (ARC Future Fellow)
Dr Alex Sen Gupta

Post Doctoral Research Fellows, Research Associates and Research Assistants

Dr Christopher Aiken
Dr Joe Andersen
Dr Daniel Argueso
Dr Simon Borlace
Dr Julien Boucharel
Dr Claire Carouge
Dr Mark Decker
Dr Alejandro di Luca
Dr Markus Donat
Mr Eden Duthie
Dr Chris Fogwill
Dr Leela Frankcombe
Mr David Fuchs
Dr Olivier Geoffroy
Dr Nicholas Hannah
Dr Daniel Hernandez-Deckers
Dr Nicolas Jourdain
Dr Jules Kajtar
Dr Jatin Kala
Dr Yi Liu
Dr Ruth Lorenz
Dr Shaoxiu Ma
Dr Shayne McGregor
Dr Laurie Menviel
Dr Roman Olson
Dr Sarah Perkins
Dr Steven Phipps
Dr Agus Santoso
Dr Willem Sijp
Dr Paul Spence
Dr Andrea Taschetto
Dr Erik van Sebille
Dr Stephanie Waterman
Dr Leanne Webb
Dr Kirien Whan

Professional Staff

Vilia Co
Stephen Gray
Simone Purdon
Swa Rath
Bronwen Smith
Alvin Stone

Higher Degree Research Students (and their primary supervisor)

Esteban Abellan Villardon (McGregor)
Kaitlin Alexander (Meissner)
Witold Bagniewski (Meissner)
Alice Barthel (Waterman)
Chris Bull (Van Sebille)
Cameron Cairns (Sherwood)
Wasin Chaivaranont (Evans)
Hamish Clarke (Pitman)
Maxime Colin (Sherwood)
Timothy Cowan (England)
Annika Dean (Green)
David Fuchs (Sherwood)

Peter Gibson (Perkins)
James Goldie (Alexander)
Ned Haughton (Abramowitz)
Annette Hirsch (Pitman)
Willem Huiskamp (Turney)
David Hutchinson (England)
Carlo Jamandre (Hart)
Andrew King (Alexander)
Karin Kvale (Meissner)
Yue Li (Sen Gupta)
Tammas Loughran (Perkins)
Ian Macadam (Pitman)
Nicola Maher (England)
Penny Maher (Sherwood)
Nidhi Nishant (Sherwood)
Marissa Parry (Green)
Acacia Pepler (Alexander)
Ariaan Purich (England)
Shirley Qin (Sen Gupta)
Jessica Roe (Turney)
Litty Thomas (Pitman)
Bevan Warren (Green)
Christopher Wright (Green)

Honours Students (and their primary supervisor)

Ryan Batehup (McGregor)
Nicholas Calhau (van Sebille)
Betany Ellis (Turney)
Mia Gross (Alexander)
Matthew Hale (Abramowitz)
Keith Huang (Maharaj)

Adjuncts, Visiting Fellows and Visiting Researchers

Dr Martin Best
Dr Faye Cruz
Dr Marc Dorgeville
Dr Nicolas Jourdain
Dr Joseph Kidston
Prof Robert Marsh
Prof Lance Leslie
Dr Di Liu
Dr Oleg Saenko
Dr Milton Speer
Dr Caroline Ummenhofer
Paul Valdes

Affiliated UNSW Staff

Prof Mike Archer
A/Prof Jeremy Bailey
A/Prof Gary Froyland
A/Prof Mark Holzer
Dr Fiona Johnson
Dr Andrew Kiss
Prof Jane McAdam
Dr Robin Robertson
A/Prof Scott Sisson
Prof Ashish Sharma
Dr Krishna Shrestha
Amelia Thorpe

Visiting Students and Research Interns

Daisy Ambach
Lionel Arteaga
Tomas Beuzen
Mollie Burns
Jacqueline Fenwick
Jennifer Halstead
Ryan Holes
Alex Lin
Anika Rohde
James Roberts
Hillary Scannell
Francis Torok
Georgia Tsambos
Chole Vandervord
Steffie Ypma

Appendix D – 2014 Media and publicity

Name	MediaType	MediaOutlet	MediaActivity	ArticleProgramName
Alexander, L.	Online	Environmenal Research Web	Feature article	Debate heating up over changes in climate variability
Alexander, L.	Newspaper	Courier Mail	Interview	Hot weekend tipped as rain looms for west's drought hit farmers
Alexander, L.	Magazine	New Scientist	Journalist backgrounding	
Alexander, L.	Radio	2MCE Orange	Recorded interview	National Radio News
Alexander, L.	Newspaper	The Guardian	Phone interview	Climate sceptics see a conspiracy in Australia's record breaking heat
Alexander, L.	Online	The Conversation	Op-Ed	No, the Bureau of Meteorology is not fiddling its weather data
Alexander, L.	Online	Youtube	Recorded interview	Australian Academy of Science - Brain box interview
Alexander, L.	Newspaper	Daily Telegraph	AusSMC briefing	South Australia's rural towns cop a drenching after Adelaide's hottest day in 25 years.
Alexander, L.	Newspaper	Courier Mail	AusSMC briefing	Hot weekend tipped as rain looms for west's drought-hit farmers
Argueso, D.	Newspaper	Sydney Morning Herald	Ref to CoE research	Treeless suburbs, concrete canyons increase city heat
Donat, M.	Online	Carbonbrief.org	Recorded Interview	Hotter and wetter extremes: How scientists know our weather's getting more erratic as climate change bites
Donat, M.	Newspaper	The Wall Street Journal	providing data, journalist backgrounding	Researchers Show Measuring Climate Change Needn't Go to Extremes
England, M.	Online	The Guardian	Interview	What will happen to global warming when we get the next big El Nino
England, M.	Newspaper	The Australian	From media release	Warming "pause" due to winds
England, M.	Newspaper	Sydney Morning Herald	Interview	Stronger Pacific trade winds linked to stable air temperatures
England, M.	Online	ABC Online	Interview and MR	Global warming: Australian scientists find explanation for pause in rising temperatures
England, M.	Online	The Conversation	News report	Global warming stalled by strong winds driving heat into the oceans
England, M.	Online	ABC Science	AusSMC and MR	Warming slowdown caused by Pacific winds
England, M.	Newspaper	Washington Post	MR and Nature paper	Global-warmign slowdown is result of Pacific winds, study shows
England, M.	Online	Climate Spectator	Interview and MR	Hiatus explained: winds driving heat into the oceans
England, M.	Online	The Guardian	Interview and MR	Global warming 'pause' due to unusual trade winds in the Pacific ocean, study finds
England, M.	Online	Financial Times	MR	Pacific trade winds are stalling global warming, scientists say
England, M.	Online	NBC News	MR	Global warming pause? The answer is blowing in the wind.
England, M.	Online	Reporting Climate Science	MR and Nature paper	Research suggests Pacific trade winds cause pause
England, M.	Online	International Science Times	MR	Pacific trade winds delay global warming as they pull heat into the ocean
England, M.	Newspaper	The Times (UK)	MR	No pause in climate change as sea soaks up extra heat
England, M.	Online	Science Codex	MR	Pacific trade winds stall global warming - for now
England, M.	Online	Phys Org	MR and Nature paper	Pacific trade winds stall global warming - for now
England, M.	Online	Science Daily	MR and Nature paper	Pacific trade winds stall global warming - for now
England, M.	Online	Examiner	MR	Scientists attribute lower than expected temperatures to Pacific trade winds
England, M.	Online	Huffington Post	MR and paper	Global warming speed bump? The answer may be blowing in the wind!
England, M.	Online	New Scientist	MR and AusSMC	Climate Slowdown? Just wait until the wind changes
England, M.	Online	Bloomberg Businessweek	MR and Nature paper	Global-warming slowdown attributed to Pacific winds in study
England, M.	Online	Climate Spectator	MR and paper	Another scientific dagger to the deniers
England, M.	Newspaper	Sydney Morning	Interview	Climate change: opinions are affected by the weather

		Herald		
England, M.	Online	The Telegraph (UK)	From paper	Is this why global warming seems - falsely - to have stopped
England, M.	Newspaper	Global Economist	From MR	The oceans and climate change: A welcome pause
England, M.	Radio	ABC	Radio	The full story... Australia under pressure on climate deal
England, M.	Radio	ABC	Radio interview	ABC Drive 702
England, M.	Online	climatecentral.org	Papers	An Ill Wind Blows in Antarctica, Threatens Global Flooding
England, M.	Other (Specify below in "Details")	carbonbrief.org	Blog	Probing the deep: An in-depth look at the oceans, climate change and the hiatus
England, M.	Online	theweathernetwork.com	Quote	97 Hours of Consensus
England, M.	Newspaper	the guardian.com	interview - paper	Research shows surprise global warming 'hiatus' could have been forecast
England, M.	Newspaper	SMH	Nicola Maher Paper	Temperature hiatus periods to become a 'thing of the past' as emissions soar
England, M.	Online	New Scientist	Paper	No more pause: Warming will be non-stop from now on
England, M.	Online	Moneycab.com	Paper	Letztes Aussetzen bei Klimaerwärmung befürchtet
England, M.	Online	HypeScience	Paper	A partir de agora, aquecimento global não para mais
England, M.	Online	The Huffington Post	Photography and quote	Photographer Captures Scientists' Frightened Responses To Climate Change Discussions
England, M.	Online	http://www.scaredscientists.com	Photography project	Scared Scientists
England, M.	Online	https://www.businessspectator.com.au	Paper press	An Atlantic alternative to deep ocean warming?
England, M.	Online	The guardian.com	Paper press	Unpacking unpaused global warming – climate models got it right
England, M.	Online	carbonbrief.org	Paper press	Surface warming 'hiatus' could stick around for another decade, say scientists
England, M.	Online	The Huffington Post	Paper press	Atlantic Ocean Responsible For Recent Slowdown In Surface Warming, Study Suggests
England, M.	Online	The Christian Science Monitor	Paper press	Global warming's 'pause': Where did the heat go? (+video)
England, M.	Online	ABC Science	Press for Paper	Atlantic warming kicks up record Pacific trade winds, Discovery News
England, M.	Online	businessspectator.com.au	Paper press	Atlantic warming driving 'turbocharged' Pacific winds: study
England, M.	Online	http://www.reportingclimatescience.com	Paper Press	Atlantic Warming Turbocharges Pacific Trade Winds
England, M.	Online	Guardian.com	Comments	Tony Abbott adviser warns of threat of 'global cooling' Opponents label comments 'terrifying' after Maurice Newman writes opinion piece in the Australian newspaper
England, M.	Online	Escapistmagazine.com	Comments	Global Cooling Is Imminent, Thinks Australian PM Advisor
England, M.	Online	Escapistmagazine.com	Comments	Global Cooling Is Imminent, Thinks Australian PM Advisor
England, M.	Online	The Conversation	Interview	Study vindicates climate models accused of 'missing the pause'
England, M.	Other (Specify below in "Details")	Nature	Journalist backgrounding	Frequency of extreme El Niños to double as globe warms News with Jeff Tollefson
England, M.	Online	SMH	Interview	Major El Nino events likely to double in next century
England, M.	Online	New Scientist - Environment	Interview	Devastating El Niño events to double this century
England, M.	Online	ABC	Online Interview	Extreme El Nino events set to double Extreme El Nino events set to double Extreme El Nino events set to doubleExtreme El Nino events set to doubleExtreme El Nino events set to double

				Extreme El Nino events set to double
England, M.	Online	DNA - Science and Technology	Online Interview	Extreme El Nino events set to double as Earth warms
England, M.	Online	Newsroom America	Online Interview	Heat Waves Set To Increase With Extreme El Nino Events
England, M.	Online	National Monitor	Online Interview	Global-warming-will-double-our-el-nino-misery
England, M.	Online	Click Green	Online Interview	Scientists warn extreme weather events will likely double in number
England, M.	Online	Daily Mail: Sciencetech	Online Interview	Scientists warn extreme weather events will likely double in number
England, M.	Radio	Radio National interview	Radio Interview	Radio National Interview on Cai et al. El Nino (NCC) paper
England, M.	Online	ABC News in Science	Online Interview	Southern stormy weather comes in waves
England, M.	Online	SMH Environment	Online Interview	Climate change: Opinions are affected by the weather
England, M.	TV	ABC NEWS 24 Live Interview	Live interview	ABC NEWS 24 Live Interview
England, M.	Radio	RadioAdelaide 101.5FM	Radio interview	RadioAdelaide 101.5FM
England, M.	Radio	2SER Radio	Radio interview	2SER Radio
England, M.	Radio	ABC News Radio	Radio interview	ABC News Radio
England, M.	Radio	ABC Radio Australia (Melbourne)	Radio interview	Pacific Beat
England, M.	TV	SBS TV	Televised Inteview	Trade wings spur hiatus in global warming: Study
England, M.	Radio	ABC Radio	Radio interview	ABC Radio with Jake Sturmer
England, M.	Online	ABC: The World Today	Online	Australian-led research team finds Pacific winds are behind climate change slowdown
England, M.	Online	SciLogs	Online interview	Vom Winde verweht
England, M.	Online	Deutschlandfunk	online interview	Westpazifik könnte Klimaerwärmung drosseln
England, M.	Online	Alaska Dispatch News	Online Interview	Some scientists say volcanoes may be putting brakes on global warming trend
England, M.	Online	The Economist	Online Interview	Who pressed the pause button?
England, M.	Online	CBC News		Surface global warming hiatus blamed on Pacific winds
England, M.	Online	The Guardian	Online Interview	Unprecedented trade wind strength is shifting global warming to the oceans, but for how much longer?
England, M.	Online	SMH	Online Interview	Stronger Pacific trade winds linked to stable air temperatures
England, M.	Online	SBS	Online Interview	Trade wings spur hiatus in global warming: Study
England, M.	Online	News 24	Online Interview	Our warming oceans
England, M.	Online	SMH	Online Interview	Pacific weather watch gets urgent funds as El Nino prospects grow
England, M.	Online	NBC News	Online Interview	Global Warming Pause? The Answer Is Blowin' Into the Ocean
England, M.	Online	The Street	Online interview	Global Warming Science Is Not Overheated
England, M.	Online	The Christian Science Monitor	Online Interview	Volcanoes, trade winds may be behind 'pause' in global warming
England, M.	Online	Real Climate	Online interview	Going with the wind
England, M.	Online	Reuters	Online Interview	Stronger Pacific winds explain global warming hiatus: study
England, M.	Online	Huffington Post	Online Interview	Global Warming Speed Bump? The Answer May Be Blowing in the Wind!
England, M.	Online	New Scientist	Online Interview	Climate slowdown? Just wait until the wind changes
England, M.	Other (Specify below in "Details")	Youtube	Recorded Interview	Why winds explain earth's surface warming slowdown
England, M.	Online	SBS	Online Interview	Trade wings spur hiatus in global warming: Study
England, M.	Online	FAZ	Online Interview	Packeistiefstand, Passatkälte, Wärmebilanz
England, M.	Online	Scinexx	Online Interview	Passatwinde schuld an Klimawandel - Pause

England, M.	Online	The Guardian	Online Interview	Global warming 'pause' due to unusual trade winds in Pacific ocean, study finds
England, M.	Online	F. World	Online Interview	Stronger Pacific winds explain global warming hiatus - study
England, M.	Online	ABC	Online Interview	Warming slowdown caused by Pacific winds
England, M.	Online	ABC Science	Online Interview	Warming slowdown caused by Pacific winds
England, M.	Online	Mercury	Online Interview	Science on show, warts and all
England, M.	Online	The Globe and Mail	Online Interview	study-stronger-pacific-winds-explain-global-warming-hiatus
England, M.	Online	New Scientist	Online Interview	Climate slowdown? Just wait until the wind changes
England, M.	Online	Phys.Org	Online interview	Pacific trade winds stall global surface warming—for now
England, M.	Online	RawStory	Online Interview	Study finds global warming 'pause' comes from unusual Pacific Ocean trade winds
England, M.	Online	Science News	Online Interview	Strong winds may have waylaid global warming
England, M.	Online	The Conversation	Online Interview	Global warming stalled by strong winds driving heat into oceans
England, M.	Online	Sceptical Science	Online Interview	Unprecedented trade wind strength is shifting global warming to the oceans, but for how much longer?
England, M.	Online	The Telegraph	Online Interview	Global warming pause due to Pacific winds, study finds
England, M.	Online	ATMOS NEWS	Online Interview	STRONGER TRADE WINDS STALL CLIMATE CHANGE
England, M.	Online	SMH	online interview	Stronger Pacific trade winds linked to stable air temperatures
England, M.	TV	ABC News	TV Interview	Global warming: Australian scientists say strong winds in Pacific behind pause in rising temperature
England, M.	Radio	ABC	Radio Interview	http://mpegmedia.abc.net.au/newsradio/audio/201402/r1234844_16314693.mp3
England, M.	Online	International New York Times	online interview	New Study Sees Atlantic Warming Behind a Host of Recent Climate Shifts
England, M.	Online	ABC Science	online interview	Atlantic warming kicks up record Pacific trade winds
England, M.	Online	Vice	online interview	How Atlantic Warming Brings Pacific Devastation
England, M.	TV	Lateline	tv interview	Warm water melting Antarctic ice
England, M.	Online	Planet Earth Online	online interview	Strong winds are keeping East Antarctica cool
England, M.	Radio	EcoShock Radio	radio	El Nino Storms the World?
England, M.	Online	The Australian	online interview	no sure bets in the climate debate
England, M.	Online	The Telegraph	online interview	Malaysia Airlines MH370: March 23 as it happened
England, M.	Online	The Globe and Mail	online interview	Debris sighting boosts search for missing Malaysia plane
England, M.	Online	The Washington Post	online interview	Plane search has a window of mild weather in 'pretty rough part of the world'
England, M.	Online	The Globe and Mail	online interview	Lawyers advise distraught families as search presses on for traces of Flight 370
England, M.	Online	The Globe and Mail	online interview	Malaysia says no confirmation yet of suspected jet debris
England, M.	Online	The Star	online interview	The worst place in the world. Expert describes southern Indian Ocean as a cauldron of foam and white
England, M.	TV	Channel 10 News	tv interview	
England, M.	Newspaper	SMH	interview	Climate shift in the Pacific may accelerate global warming
Green, D.	Online	The Conversation	Op-ed	How heat can make your body melt from the inside out.
McGregor, S.	Online	The Conversation	Co-authored article	Science and technology
McGregor, S.	Radio	720 abc Perth	live interview	Afternoons
McGregor, S.	Radio	ABC Radio National	Live interview	Bush telegraph
McGregor, S.	TV	ABC	Live panel interview	Weekend Breakfast
McGregor, S.	Radio	Radio Ecoshock	Recorded interview	
McGregor, S.	TV	ABC News24	Live interview	weekend breakfast
McGregor, S.	Online	SMH	online interview	Atlantic warming causing stronger Pacific trade winds

McGregor, S.	Newspaper	SMH	Journalist backgrounding and looking for quotes	Climate shift in the Pacific may accelerate global warming
Menviel, L.	Online	ABC Science		Study shows Antarctica's impact on sea
Perkins, S.	Newspaper	Sydney Morning Herald	Interview with Peter Hannam	Scorchers: the reality of a sunburnt country
Perkins, S.	Online	The Guardian	Interview	Is the Australian Open tennis feeling the heat of climate change?
Perkins, S.	Newspaper	The Land	Interview	Heatwave heads north
Perkins, S.	Online	Environmental Research Web	Feature article	Debate heating up over changes in climate variability
Perkins, S.	Newspaper	The Land	Interview	Heatwave conditions yet to peak
Perkins, S.	Online	Business Insider	Interview	More extremes of heat, wind, floods, bushfires to follow Australia's hottest year
Perkins, S.	Magazine	Australian Geographic	Interview	Australia experiences hottest year on record
Perkins, S.	Online	Yahood 7 News	Interview	2013 was hottest year on record in Australia, Bureau of Meteorology
Perkins, S.	Online	Adelaide Now	Interviews from AMOS	First Adelaide, now country towns cop a drenching
Perkins, S.	Radio	Radio Adelaide	Live interview	Winter Heatwaves
Perkins, S.	TV	TVBS	journalist backgrounding	NEWS
Perkins, S.	Newspaper	The Telegraph	photo shoot	NA
Perkins, S.	Online	NA	photo shoot	Scared scientists
Perkins, S.	Online	thisishowyoufeel	letter writing	Joe Douggan
Perkins, S.	Online	International Council for Science	interview with Alice Bell	Climate optimism
Perkins, S.	TV	ABC24	interview	News - australia's hottest year on record
Perkins, S.	TV	channel 10	interview	Wake up!
Perkins, S.	Radio	ABC radio nationl	interview	AM
Perkins, S.	Radio	ABC radio national	interview	AM
Perkins, S.	TV	Channel 7	interview	news
Perkins, S.	TV	channel 10	interview	the project
Perkins, S.	Radio	2SER	interview	
Perkins, S.	Film/Documentary	SBS/BBC	interview	Inferno
Perkins, S.	Radio	ABC radio national	interview	mornings
Perkins, S.	Radio	ABC 774 melbourne	interview	
Perkins, S.	Radio	ABC Newcastle	interview	
Perkins, S.	Online	The Guardian	interview	Australian open tennis feeling the heat of climate change?
Perkins, S.	Online	SMH	interview	scorchers - the reality of living in a sunburnt country
Perkins, S.	Online	The Conversation	op ed	heatwaves are getting hotter and more frequency
Perkins, S.	Online	Science	interview	heatwave forecasting debut in Australia
Perkins, S.	Online	The Conversation	op ed	winter heatwaves are nice, as far as extremes go
Perkins, S.	Online	SMH	interview	Sydney's balmy autumn breaks records
Perkins, S.	Online	The Conversation	interview	Australia has warmed, with more in store
Perkins, S.	Online	The New Idealist	op ed	Australian heatwave - the new normal
Perkins, S.	Online	news.com.au	invterview	records melt across country
Perkins, S.	Online	ninemsn	interview	extreme summer warming as may heat continues
Perkins, S.	Online	The New Daily	interview	heat records blitzed as summer continues
Perkins, S.	Online	The Conversation	op ed	global meteorology report puts yet more heat on politics
Perkins, S.	Online	Road to Paris	interview	the new climate optimists

Perkins, S.	Online	The Conversation	oped	human hands are all over Australia's hottest ever year
Perkins, S.	Online	BBC	interview	Australia sweats over extreme hot weather
Perkins, S.	Online	The Conversation	interview	2014 was Australia's 3rd hottest year on record
Perkins, S.	Other (Specify below in "Details")	Daily Telegraph	AusSMC briefing	AusSMC briefing
Phipps, S.	Radio	2SER-FM	Live interview	
Phipps, S.	Online	National Computational Facility News	Online news article	CHANGING WINDS SEND AUSTRALIA'S RAIN TO ANTARCTICA
Pitman, A.	Radio	ABC Radio	Interview	Increasing heatwaves threaten farming
Pitman, A.	Newspaper	Sydney Morning Herald	Interview	IPCC dispute simmers over economic costs of climate change
Pitman, A.	Newspaper	Sydney Morning Herald	Interview	Climate angst rises with record temperatures
Pitman, A.	Online	Insurance News	Quotes taken from risk seminar	Heatwaves 'growing more intense'
Pitman, A.	Online	Physics Today	Quoted from article	News disaptches form the climate wars.
Pitman, A.	Online	Citylab	Quoted from website	Instead of data, scientists shre their feelings on climate change
Pitman, A.	Online	The Conversation	Opinion editorial	No, the Bureau of Meteorology is not fiddling its weather date.
Pitman, A.	Newspaper	The Australian	Quoted from op-ed	bureau of Meteorology defended over temperature records by climate scientists
Pitman, A.	Online	The Drum / ABC Online	Quote from op-ed	Government goes cold on global warming.
Pitman, A.	Newspaper	The Australian	The Conversation op-ed referred to in story	Bureau of Meteorology 'adding mistakes' with data modelling.
Pitman, A.	Newspaper	Sydney Morning Herald	Interviewed	Soil microbes more sensitive to climate change than thought.
Pitman, A.	Radio	ABC Local 702 Sydney	On air interview	Hypothetical: What if there was no wind.
Pitman, A.	Newspaper	Sydney Morning Herald	Interviewed for article	Record hot August adds to world's warm spell.
Pitman, A.	Newspaper	Newcastle Herald	Quoted from The Conversation.	OPINION: Sceptics sidestep while Australia burns.
Pitman, A.	Online	Uncover California	Quoted from previous article	September 2014 warmest on record
Pitman, A.	Newspaper	Sydney Morning Herald.	Interviewed for article	September heat puts 2014 on course to be one of the hottest years on record.
Pitman, A.	Online	Insurance News	Quoted from seminar	Actuaries hold key climate change role.
Pitman, A.	Online	Climate Spectator	Quote taken from another story.	CSIRO warns on $1 trillion natural disasters exposure
Pitman, A.	Radio	Radio National ABC	Pre-recorded interview	CSIRO says climate change and poor planning could cost Australia over $1 trillion.
Pitman, A.	Newspaper	Herald Sun	Quotes taken from ABC interview.	CSIRO warns of $1 Trillion natural disasters exposure.
Santoso, A.	Online	Phy.org	From Media Release	Get used to heatwaves: Extreme El Nino events to double
Santoso, A.	Newspaper	Express and Echo (UK)	From Media Release	Global warming doubles risk of extreme El Ninos, Exeter researchers warn
Santoso, A.	Online	Examiner	From Media Release	Climate Scientists predict doubling of El nino events
Santoso, A.	Online	Business Standard (Washington)	From Media Release	Extreme El Nino events expected to double as Earth warms
Santoso, A.		Science Daily	Online quote	Get used to heat waves: Extreme El Nino events to double
Santoso, A.	Online	DNA		Extreme El Nino events set to double as Earth warms
Santoso, A.	Online	Technology.Org		Get used to heat waves: Extreme El Nino events to double
Santoso, A.	Online	Dailymail		Extreme El Niño events could DOUBLE this century: Droughts, wild fires and floods predicted to strike every 10 years

Santoso, A.	Online	Discovery News		El Ninos Could Double as the Pacific Warms
Santoso, A.	TV	Channel News Asia	Live interview via Skype	Between the Lines: Our Oceans Under Siege
Santoso, A.	Newspaper	Canberra Times, Sydney Morning Herald	Phone interview	Climate change to almost triple risk of extreme Indian Ocean weather events
Santoso, A.	Online	Sydney Morning Herald	Phone interview	Dreaded El Nino looms in the Pacific
Santoso, A.	Radio	2SER	On-air interview	Are we facing a Super El Nino?
Santoso, A.	Online	Mashable	Email interview	Global Warming to Triple Frequency of Drought, Floods Along Indian Ocean
Santoso, A.	Online	International Business Times		Climate Change: Australia Advised to Brace for More Devastating Indian Ocean Weather Events; Expect More and Severe Drought, Bushfires, Floods
Santoso, A.	Online	ECOS		Drought in store as El Niño's western cousin to grow stronger
Santoso, A.	Online	The Conversation	Op-Ed	Are we heading for a worrying Super El Niño?
Santoso, A.	Online	The Conversation	Op-Ed	Drought in store as El Niño's western cousin to grow stronger
Santoso, A.	Online	The Conversation	Op-Ed	Drought in store as El Niño's western cousin to grow stronger
Santoso, A.	Online	The Conversation	Op-Ed	Don't Dismiss a 2014 "Super" El Nino Just Yet
Santoso, A.	Online	ClimateWire	Email interview	Researchers find the weaker 'sister' of El Niño by studying ancient clamshells
Santoso, A.	Radio	4BC	on-air radio interview	
Sen Gupta, A.	Online	SMH	profile of recent paper	Rising temperatures mean more species going south
Sen Gupta, A.	Online	The Conversation	op-ed	Sydney's waters could be tropical in decades, here's the bad news…
Sherwood, S.	Newspaper	The Independent (UK)	Interview	Earth 'will heat up by 4C' by they year 2100, scientists predict
Sherwood, S.	Online	Science Alert	Taken from MR	Our future: hotter than expected
Sherwood, S.	Online	National Geographic (Daily News)	From Mr and previous interview	Climate: cloud mixing means extra warming
Sherwood, S.	Online	The Times of India	taken from MR	Global temperatures to rise 4 degrees by 2100
Sherwood, S.	Newspaper	Sydney Morning Herald	Lead story on print front page	"Climate models 'wrong'"
Sherwood, S.	Newspaper	The Guardian	Lead story on front page	Climate change models underestimate likely temperature rise, report shows
Sherwood, S.	Online	AAAS ScienceNow	News highlight	Earth More Sensitive to Increasing Greenhouse Gas Than Thought
Sherwood, S.	Magazine	Scientific American online / ClimateWire	News story	Fewer Clouds Could Mean Greater Global Warming
Sherwood, S.	Newspaper	Washington Post	Editorial	Climate-change response demands urgency
Sherwood, S.	Newspaper	Le Figaro	News story	Climat : le réchauffement serait plus grave que prévu
Sherwood, S.	Radio	PM (ABC Radio)	Interview	Climate study paints even uglier picture of the future
Sherwood, S.	Online	The Independent (Ireland)	From media release	Global temperatures set to "increase"
Sherwood, S.	Online	The Morning Bulletin (Rockhampton)	Quoted from other media source	Written in the clouds: The planet is warming faster
Sherwood, S.	Online	Daily Mail online (UK)	From Media Release	Earth's temperature could rise by more than 4C by 2100, scientists claim
Sherwood, S.	Online	Huffington Post	Article takes from MR	Climate change worse than we thought, likely to be 'catastrophic' rather than simply damgerous
Sherwood, S.	Online	Atlanta Journal	Article takes quotes from National Geographic piece	The one thing that I REALLY pray I got wrong
Sherwood, S.	Online	Red Orbit	Taken from MR and video	Decreasing cloud cover could mean higher global temperatures
Sherwood, S.	Online	Zee News (India)	From MR	Global temperatures to go up by at least 4C by 2100
Sherwood, S.	Online	Laboratory Equipment	From MR + video	Temperatures will rise at least 4C by 2100

Sherwood, S.	Online	Eco Business	From MR	Warming climate may cut cloud cover
Sherwood, S.	TV	The Weather Channel	From MR, Guardian and Video	Catastrophic 4C warming possible by 2100 - study
Sherwood, S.	Online	National Monitor	From MR	Global temperatures to rise at least 4C by 2100 study finds
Sherwood, S.	Online	3 News NZ TV	From MR	Worst-case climate scenario looking more likely
Sherwood, S.	Online	International Business Times (UK Edition)	From MR	Global temperatures to rise by 4C within 100 years
Sherwood, S.	Online	Blue and Green Tomorrow	From MR and Guardian	Planet likely to warm by 'catastrophic' 4C by 2100
Sherwood, S.	Newspaper	The Guardian (Nigeria)	From MR	Solution to cloud riddle reveals hotter future
Sherwood, S.	Radio	Voice of America	From video and MR	Warmer world will produce fewer clouds
Sherwood, S.	Newspaper	Vancouver Sun	From MR and interview	Climate change debate heats up in Australia following sweltering year.
Sherwood, S.	Online	Huffington Post (comment)	From video and MR	The pyromaniacs arrive with blowtorches on planet Earth
Sherwood, S.	Newspaper	Economic Times	Built from MR	Global temperatures to rise 4C by 2100
Sherwood, S.	Radio	Radio NZ	Interview	Experts say 5C rise disastrous for New Zealand
Sherwood, S.	Newspaper	The Daily Telegraph (UK)	From MR and interview	World's climate warming faster than feared, scientists say
Sherwood, S.	TV	The Project	Interview for package	Climate Change
Sherwood, S.	Omline	J-Wire	Commentary on Science Letter by Prof Sherwood	Australia wiorking wiht Hebrew University on climate change
Sherwood, S.	Online	Washington Post	Commentary on sensitivity paper	Dire signs from a warming world
Sherwood, S.	Newspaper	Washington Post	Editorial by Eugene Robinson	Dire signs from a warming world
Sherwood, S.	Online	Readfearn Planet Oz hosted by The Guardian	blog	Fact check: How Maurice Newman misrepresents science to claim future global cooling
Sherwood, S.	Newspaper	The Guardian	News story, Environment section	Tony Abbott adviser warns of threat of 'global cooling'
Sherwood, S.	Radio	SYN Melbourne	recorded interview	Panorama
Sherwood, S.	Newspaper	The Australian	Interview	No sure bets in the climate debate
Spence, P.	TV	ABC	Recorded Inteview	Lateline
Spence, P.	Newspaper	Sydney Morning Herald	Interview with Journalist	
Spence, P.	Radio	ABC	Recorded Interview	AM national radio
Spence, P.	Newspaper	The Australian		Changing Antarctic winds create new sea level threat
Spence, P.	Newspaper	The Daily Mail - UK		A bit over the top
Spence, P.	Magazine	Australasian Science	Interview and MR	Changing Antarctic Winds Create New Sea Level Threat
Spence, P.	Online	Climate Central	op-ed	http://www.climatecentral.org/news/antarctic-winds-melting-ice-rising-seas-18250
Spence, P.	Radio	ABC RN breakfast	radio interview	Faster melt projected for West Antarctic icesheet
Spence, P.	Online	ABC news	online interview	Warm water likely to accelerate Antarctic ice melt and sea level rises, Australian scientists find
Spence, P.	Online	SMH	online interview	Bad news about rising sea levels as quickening Antarctic winds lead to faster ice melt
Spence, P.	Online	The Australian Business Review	online interview	Changing Antarctic winds create new sea level threat
Spence, P.	Online	WA Today	online interview	Bad news about rising sea levels as quickening Antarctic winds lead to faster ice melt
Spence, P.	Online	The Age	online interview	Bad news about rising sea levels as quickening Antarctic winds lead to faster ice melt
Stone, A.	Press/Media Release	CoECSS website	Media Release	Solution to cloud riddle reveals hotter future

Stone, A.	Press/Media Release	Media Release	Media Release mailed out	No warming hiatus for extreme hot temperatures
van Sebille, E.	Other	Associated Press	interview	AP story
van Sebille, E.	Newspaper	SMH and other Fairfax	Interview	Jose Salvador Albarengo: a tale of ocean survival that smells a bit fishy
van Sebille, E.	Radio	ABC Radio Central/Western Vic	Live on-air interview	Mornings
van Sebille, E.	Online	The Conversation	Op-Ed	Ocean debris leads the way for castaway fisherman
van Sebille, E.	TV	Channel Seven	Live interview	Weekend Sunrise
van Sebille, E.	Online	The Conversation	op-ed	Ghostly art, made from debris that menaces marine life
van Sebille, E.	TV	BSkyB (UK)	Pre record interview	News
van Sebille, E.	Radio	My MP 1377 Melbourne	Live interview	MH370
van Sebille, E.	Radio	SBS radio / SBS website	recorded interview	
van Sebille, E.	Radio	ABC local radio	Live interview	Evening
van Sebille, E.	Radio	ABC Sunshine Coast	On Air Interview	School of the Air
van Sebille, E.	Radio	ABC News Radio	Prerecorded interview	PM
van Sebille, E.	TV	ABC News 24	In-studio live interview	Breakfast
van Sebille, E.	TV	ABC News 24	On air interview	Evenings