

MSI ANNUAL REPORT 2019



MSI

CHANGING OCEANS

2019

The University of Sydney Marine Studies
Institute



Introduction

A word from the Director- Professor Elaine Baker

Marine Studies have been taught and researched at the University of Sydney for over 150 years. The MSI facilitates the collaboration of a world leading multidisciplinary team of marine scientists working on local, national and international issues. MSI continues to strengthen the Universities engagement with external partners including the Sydney Institute of Marine Science (SIMS).

MSI Mission

- The MSI focuses on promoting the problem solving research capacity and marine study opportunities in a wide range of disciplines at the University of Sydney.
- The MSI strives to develop a depth and quality of research excellence in the areas spanning biological science, geoscience, engineering, social science and law of the sea
- The MSI fosters multidisciplinary collaboration through linked marine research institutes.

About MSI

With more than 150 years of marine science teaching and research, the Marine Studies Institute (MSI) is one of the largest marine research and education centers in Australia. The MSI focuses on promoting the problem-solving research capacity and marine study opportunities in a wide range of disciplines at the University of Sydney. MSI scientists are working together to understand local and global challenges to the marine environment through a combination of cutting-edge research, education and leadership training.



MSI develop, promote and share ideas and innovation that support the understanding, use and management of the marine environment. The university hosts many nationally and internationally recognised research groups, currently spanning 10 disciplines, with more than 50 academic staff and over 200 postgraduate students. The MSI fosters multidisciplinary collaboration through linked marine research institutes with the marine network within the university including:

1. The Animal Behaviour Laboratory
2. The Australian Centre for Climate and Environmental Law (ACCEL)
3. The Australian Centre for Field Robotics (ACFR Marine)
4. The Australian Centre for Microscopy and Microanalysis (ACMM)
5. The Byrne Laboratory
6. The Centre for Wind, Waves and Water
7. The Charles Perkin Centre
8. The Coastal and Marine Ecosystems Group (CMEG)
9. The EarthByte Group
10. The Geocoastal Research Group (GRG)
11. The Georeef Laboratory
12. The Ocean Technology Group (OTG)
13. The Sydney Environmental Institute (SEI)
14. The Sydney Institute of Marine Science (SIMS)
15. The Sydney Centre in Geomechanics and Mining Materials (SciGEM)
16. The Vibrational Spectroscopy Core Facility

MSI IN NUMBERS 2018/19

Recognising the breadth, depth and quality of our marine research community



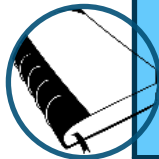
Over **700** undergrad and 240 Postgrad students, spanning 5 faculties: Geo, Bio, Eng, Vet and Law

EDUCATION



OVER **50** MARINE SCIENCE ACADEMIC STAFF MEMBERS OF WHICH ALMOST 50% ARE WOMEN

MSI MEMBERS



200 PEER REVIEWED PUBLICATIONS IN INTERNATIONAL JOURNALS

PUBLICATIONS



AN ESTIMATED **\$30** MILLION IN RESEARCH FUNDING WITH 50 SUCCESSFUL GRANTS

GRANTS



2 RECENTLY ELECTED FELLOWS TO THE AUSTRALIAN ACADEMY OF SCIENCE

HONORS



2 OF THE TOP 10 BEST SCIENCE DISCOVERIES AT THE UNIVERSITY OF SYDNEY

DISCOVERIES

Teaching

MSI markets and coordinates the undergraduate and postgraduate degrees in marine science at the university, providing an administrative point of contact for prospective and current students. MSI aims to enhance the student experience by promoting relevant seminars across the faculties, bringing together the universities undergraduate and postgraduate students in interdisciplinary learning. MSI also organizes many extracurricular marine related events and activities.

Sydney Harbour Projects

Sydney Harbour is one of Australia's most beautiful icons, but most people are unaware that the waterway is a living and breathing ecosystem. MSI scientists are collaborating on many aspects of research in the harbour. These projects could have long-term benefits for the harbour's health.

Research collaborations include:

- Geoscience- Contaminants
- Environmental-Modeling
- Ecology- Restoration
- Climate Change- Fish Migration
- Veterinarian Science- Plastics
- Engineering- Urban Settlements
- Biology- Ocean Acidification

MSI Work Experience Program

The MSI has run a successful Marine Science high school work-experience program for the past 9 years in collaboration with SIMS. The program has grown from modest beginnings to the current selective process due to overwhelming response from potential marine science graduates and with great feedback from the students:

"...Though restricted by time, these presentations delivered a huge amount of information about recent discoveries and work, and ongoing fascinating research..."

MSI Research Showcase 2019

The MSI strives to develop a depth and quality of research excellence in the areas spanning biological science, geoscience, engineering, social science and law of the sea with the MSI Research Showcase 2019 connecting marine scientist across the University of Sydney.

The University of Sydney Marine Studies Institute (MSI) Showcase 2019 provides an overview of marine research being undertaken throughout the university. The MSI showcase spotlights high-caliber research and projects that are being undertaken by marine academics and postgraduate students. Each talk is from 3-5 minutes in duration demonstrating research snapshots with a focus on current projects. In addition to the formal presentations, there are opportunities to more fully discuss topics of interest and connect with colleagues.

MSI Showcase 2019 Program:

- **Prof Tim Stephens:** The Role and Relevance of Nationally Determined Contributions under the Paris Agreement to Ocean and Coastal Management in the Anthropocene.
- **Alexandra Jones:** The significance of Jervis Bay for humpback whale (*Megaptera novaeangliae*) mother-calf groups during their southern migration.
- **Dr Brigitte Sommer:** Ecological dynamics of corals at their high-latitude range limits.
- **Dr Daniel Harrison:** Environmental engineering interventions to mitigate coral bleaching. The Reef Restoration and Adaptation Program.
- **Prof Dietmar Muller:** Modeling the evolution of an Eastern Australian coastal volcanic landscape into the 26th Century considering future climate trajectories.
- **Dione Deaker:** The impact of diet on the growth of the herbivorous juveniles Crow-of-Thorns starfish.
- **Prof Doug Cato:** Behavioural response of Australian Humpbacked Whales to Seismic Survey (BRAHSS)

- **Dr Edwina Tanner:** The World Harbour Project
- **A/Prof. Eleanor Bruce:** Earth observation for assessing environmental livelihood security in coastal mangrove communities.
- **Dr Elisa Bone:** Global education collaborations in environmental science
- **Dr Fiona Tang:** The effects of urban and agricultural contamination on the dynamics of suspended sediment.
- **Dr Joanna Aldridge:** Fate of Contaminated Sediments in Sydney Harbour: application of high-performance computing and finite volume modelling.
- **A/Prof Jody Webster:** HALO - Halimeda bioherm Origins, function and fate in the northern Great Barrier Reef.
- **Prof Maria Byrne:** The impact of environmental acidification on the microstructure and mechanical integrity of marine invertebrate skeletons
- **Dr Marine Fuhrmann:** Risk factors for disease and oyster resilience to OsHV-1: The effect of abiotic factors.
- **Dr Ziggy Marzinelli:** Host-microbiome interactions in marine ecosystems

MSI Affiliated Staff

MSI Director

Professor Elaine Baker

MSI Deputy Director

Professor Tim Stephens

MSI Coordinator

Dr Edwina Tanner

MSI Technical Coordinator

Siobhan Threlfall

Marine Geoscience Undergraduate Advisor Geoscience

A/Professor Ana Vila-Concejo

Biology

A/Professor Will Figueira

Marine Science Postgraduate Coursework Advisor

A/Professor Eleanor Bruce

Marine Science Postgraduate Advisor

Professor Ross Coleman

Director of One Tree Island Research Station

A/Professor William Figueira

Deputy Director of One Tree Island Research Station

A/Professor Ana Vila-Concejo

Members and Research Staff

Alexandra Jones
 A/Prof Amin Chabchoub
 Dr Ana Bugnot
 Dr Ashley Ward
 Dr Bree Morgan
 Dr Brigitte Sommer
 Prof Dale Dominey-Howes
 Prof Douglas Cato
 Dr Daniel Harrison
 Prof Dietmar Müller
 Dr Elisa Bone
 Dr Elliot Scanes
 Prof Elspeth Probyn
 Dr Emma Thompson
 Dr Ezequiel "Ziggy" Marzinelli
 A/Prof Federico Maggi
 Dr Gabriel Machovsky-Capuska
 A/Prof Gavin Birch
 Prof Ian SF Jones
 Prof Itai Einav
 Dr Joanna Aldridge
 A/Prof Jody Webster
 Dr Joy Becker
 Dr Kevin Davies
 Prof Maria Byrne
 Dr Maria Seton
 Dr Marine Fuhrmann
 Dr Michelle Blewitt
 Dr Navneet Dhand
 Dr Olivia Evans
 Dr Paul Hick
 Prof Peter Lay
 Dr Renata Ferrari Legorreta
 Dr Richard Murphy
 Prof Richard Whittington
 Prof Rosmary Lyster
 Prof Stefan Williams
 Prof Ross Coleman
 Dr Tom Hubble
 Prof Tim Stephens

Financial Report



I & E Statement (including Variance & Prior Year)

User Selection: Period: June Year: Calendar Year 2019 Responsibility Centre: Marine Studies Institute (L1501)
Project Code: Discretionary Analysis Code: Analysis Codes Measures: Total Accounting View

	YTD				FULL YEAR			
	Prior Year \$	Budget \$	Actual \$	Act v Bud \$	Prior Year \$	Budget \$	Forecast \$	For v Bud \$
Revenue								
Internal Income	80,068	-	-	-	80,068	-	-	-
Total Revenue	80,068	-	-	-	80,068	-	-	-
Expenses: Employee Benefits								
Casual Salary Costs	17,868	16,599	20,617	(4,018)	41,261	35,461	35,461	0
Total Employee Benefits	17,868	16,599	20,617	(4,018)	41,261	35,461	35,461	0
Expenses: Non Salary								
Employee Related Costs	130	-	-	-	137	-	-	-
Repairs and Maintenance	564	-	-	-	1,036	-	-	-
Equip Purchases & Lease <\$10,000	(7)	908	-	908	128	2,102	2,102	0
Utilities and Communications	285	-	190	(190)	285	-	-	-
Insurance, Legal, Motor, Admin	0	-	-	-	0	-	-	-
Total Non Salary Expenses	971	908	190	718	1,586	2,102	2,102	0
UEM Chrgs, Levies, Allocations	18,601	24,295	51,981	(27,687)	91,231	49,342	75,245	(25,903)
Total Expenses	37,440	41,802	72,788	(30,986)	134,078	86,905	112,808	(25,903)
OPERATING MARGIN	42,628	(41,802)	(72,788)	(30,986)	(54,011)	(86,905)	(112,808)	(25,903)
NET OPERATING MARGIN	42,628	(41,802)	(72,788)	(30,986)	(54,011)	(86,905)	(112,808)	(25,903)
Net Op Margin as a % of Total Revenue	53.2%	-	-	-	(67.5%)	-	-	-
NET FINANCIAL PERFORMANCE	42,628	(41,802)	(72,788)	(30,986)	(54,011)	(86,905)	(112,808)	(25,903)
Accumulations								
Carry Forward (Prior Year)	(40,068)	-	0	0	0	-	-	-
CLOSING BALANCE	2,560	(41,802)	(72,788)	(30,986)	(54,011)	(86,905)	(112,808)	(25,903)
RESERVES	-	-	-	-	-	-	-	-

Select Publications

MSI Journal Publications 2018 - 2019

Davidson, P., Thompson, J., Foster, M., Moseley, M., Byrne, M., Wray, G. (2019). A comparative analysis of egg provisioning using mass spectrometry during rapid life history evolution in sea urchins. *Evolution and Development*, 21(4), 188-204. <http://dx.doi.org/10.1111/ede.12289>

Zamora, L., Delorme, N., Byrne, M., Borra, C., Sewell, M. (2019). Characterization of the lecithotrophic larval development of the temperate New Zealand asterinid *Stegnaster inflatus*. *Invertebrate Biology*, 138(2), 1-9. <http://dx.doi.org/10.1111/ivb.12244>

Hodin, J., Heyland, A., Mercier, A., Pernet, B., Cohen, D., Hamel, J., Allen, J., McAlister, J., Byrne, M., Cisternas, P., et al (2019). Culturing echinoderm larvae through metamorphosis. In edited by Kathy R. Foltz, Amro Hamdoun (Eds.), *Echinoderms. Part A*, (pp. 125-169). Cambridge: Academic Press. <http://dx.doi.org/10.1016/bs.mcb.2018.11.004>

- Morris, V., Kable, E., Koop, D., Cisternas, P., Byrne, M. (2019). Early development of the feeding larva of the sea urchin *Heliocidaris tuberculata*: role of the small micromeres. *Development Genes and Evolution*, 229(1), 1-12. <http://dx.doi.org/10.1007/s00427-018-0622-y>
- Martino, C., Chiarelli, R., Roccheri, M., Matranga, V., Byrne, M. (2019). Effects of magnesium deprivation on development and biomineralization in the sea urchin *Arbacia lixula*. *Invertebrate Reproduction and Development*, 63(3), 165-176. <http://dx.doi.org/10.1080/07924259.2019.1611670>
- Byrne, M., Sewell, M. (2019). Evolution of maternal lipid provisioning strategies in echinoids with non-feeding larvae: Selection for high-quality juveniles. *Marine Ecology Progress Series*, 616, 95-106. <http://dx.doi.org/10.3354/meps12938>
- Byrne, M., Mazzone, F., Elphick, M., Thorndyke, M., Cisternas, P. (2019). Expression of the neuropeptide SALMFamide-1 during regeneration of the seastar radial nerve cord following arm autotomy. *Proceedings of the Royal Society B: Biological Sciences*, 286(1901), 1-8. <http://dx.doi.org/10.1098/rspb.2018.2701>
- Clements, M., Wolfe, K., Schwartz, K., Byrne, M. (2019). Forever fissiparous: asexual propagation and stable demography in a tropical and geographically isolated asterinid sea star. *Marine Biology*, 166(6), 1-11. <http://dx.doi.org/10.1007/s00227-019-3518-0>
- Balogh, R., Wolfe, K., Byrne, M. (2019). Gonad development and spawning of the Vulnerable commercial sea cucumber, *Stichopus herrmanni*, in the southern Great Barrier Reef. *Journal of the Marine Biological Association of the United Kingdom*, 99(2), 487-495. <http://dx.doi.org/10.1017/S0025315418000061>
- Bronstein, O., Kroh, A., Miskelly, A., Smith, S., Dworjanyn, S., Mos, B., Byrne, M. (2019). Implications of range overlap in the commercially important pan-tropical sea urchin genus *Tripneustes* (Echinoidea: Toxopneustidae). *Marine Biology*, 166(3), 1-5. <http://dx.doi.org/10.1007/s00227-019-3478-4>
- Khan, M., Whittington, C., Thompson, M., Byrne, M. (2019). Intra-gonadal incubation of progeny in three viviparous asterinid sea stars that differ in offspring provisioning, lecithotrophy vs matrotrophy. *Marine Biology*, 166(6), 1-17. <http://dx.doi.org/10.1007/s00227-019-3507-3>
- Migliaccio, O., Pinsino, A., Maffioli, E., Smith, A., Agnisola, C., Matranga, V., Nonnis, S., Tedeschi, G., Byrne, M., Gambi, M., et al (2019). Living in future ocean acidification, physiological adaptive responses of the immune system of sea urchins resident at a CO₂ vent system. *Science of the Total Environment*, 672, 938-950. <http://dx.doi.org/10.1016/j.scitotenv.2019.04.005>
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- Kim, S., Sampayo, E., Sommer, B., Sims, C., Gomez-Cabrera, M., Dalton, S., Beger, M., Malcolm, H., Ferrari, R., Fraser, N., Figueira, W., Byrne, M., et al (2019). Refugia under threat: Mass bleaching of coral assemblages in high-latitude eastern Australia. *Global Change Biology*, 25(11), 3918-3931. <http://dx.doi.org/10.1111/gcb.14772>
- Hariato, J., Carey, N., Byrne, M. (2019). respR-An R package for the manipulation and analysis of respirometry data. *Methods in Ecology and Evolution*, 10(6), 912-920. <http://dx.doi.org/10.1111/2041-210X.13162>
- Rodrigues das Chagas Pereira, R., Scanes, E., Parker, L., Byrne, M., Cole, V., Ross, P. (2019). Restoring the flat oyster *Ostrea angasi* in the face of a changing climate. *Marine Ecology Progress Series*, 625, 27-39. <http://dx.doi.org/10.3354/meps13047>
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- Smith, K., Byrne, M., Deaker, D., Hird, C., Nielson, C., WilsonMcNeal, A., Lewis, C. (2019). Sea urchin reproductive performance in a changing ocean: poor males improve while good males worsen in response to ocean acidification. *Proceedings of the Royal Society B: Biological Sciences*, 286(1907), 1-10. <http://dx.doi.org/10.1098/rspb.2019.0785>
- Deaker, D., Foo, S., Byrne, M. (2019). Variability in egg and jelly-coat size and their contribution to target size for spermatozoa: a review for the Echinodermata. *Marine and Freshwater Research*, 70(7), 995-1006. <http://dx.doi.org/10.1071/MF18134>
- Aguera, A., Byrne, M. (2018). A dynamic energy budget model to describe the reproduction and growth of invasive starfish *Asterias amurensis* in southeast Australia. *Biological Invasions*, 20(8), 2015-2031. <http://dx.doi.org/10.1007/s10530-018-1676-5>
- Liversage, K., Byrne, M. (2018). A note on life-history traits and conservation concerns for viviparous Australian seastars (*Parvulastra parvivipara* and *P. vivipara*). *Research Ideas and Outcomes*, 4, 1-5. <http://dx.doi.org/10.3897/rio.4.e29766>
- Wolfe, K., Vidal-Ramirez, F., Dove, S., Deaker, D., Byrne, M. (2018). Altered sediment biota and lagoon habitat carbonate dynamics due to sea cucumber bioturbation in a high-pCO₂ environment. *Global Change Biology*, 24(1), 465-480. <http://dx.doi.org/10.1111/gcb.13826>
- Foo, S., Deaker, D., Byrne, M. (2018). Cherchez la femme - impact of ocean acidification on the egg jelly coat and attractants for sperm. *Journal of Experimental Biology*, 221(13). <http://dx.doi.org/10.1242/jeb.177188>
- Fitzer, S., Gabarda, S., Daly, L., Hughes, B., Dove, M., O'Connor, W., Potts, J., Scanes, P., Byrne, M. (2018). Coastal acidification impacts on shell mineral structure of bivalve mollusks. *Ecology and Evolution*, 8(17), 8973-8984. <http://dx.doi.org/10.1002/ece3.4416>

- Carrier, T., Wolfe, K., Lopez, K., Gall, M., Janies, D., Byrne, M., Reitzel, A. (2018). Diet-induced shifts in the crown-of-thorns (*Acanthaster* sp.) larval microbiome. *Marine Biology*, 165(10), 1-8. <http://dx.doi.org/10.1007/s00227-018-3416-x>
- Espinel-Velasco, N., Hoffmann, L., Aguera, A., Byrne, M., Dupont, S., Uthicke, S., Webster, N., Lamare, M. (2018). Effects of ocean acidification on the settlement and metamorphosis of marine invertebrate and fish larvae: A review. *Marine Ecology Progress Series*, 606, 237-257. <http://dx.doi.org/10.3354/meps12754>
- Kamya, P., Byrne, M., Mos, B., Dworjanyn, S. (2018). Enhanced performance of juvenile crown of thorns starfish in a warm-high CO₂ ocean exacerbates poor growth and survival of their coral prey. *Coral Reefs*, 37(3), 751-762. <http://dx.doi.org/10.1007/s00338-018-1699-5>
- Byrne, M., Koop, D., Morris, V., Chui, J., Wray, G., Cisternas, P. (2018). Expression of genes and proteins of the Pax-Six-EyaDach network in the metamorphic sea urchin: insights into development of the enigmatic echinoderm body plan and sensory structures. *Developmental Dynamics*, 247(1), 239-249. <http://dx.doi.org/10.1002/dvdy.24584>
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- Dworjanyn, S., Byrne, M. (2018). Impacts of ocean acidification on sea urchin growth across the juvenile to mature adult life-stage transition is mitigated by warming. *Proceedings of the Royal Society B: Biological Sciences*, 285(1876), 1-7. <http://dx.doi.org/10.1098/rspb.2017.2684>
- Ferrari, R., Marzinelli, E., Ayroza, C., Jordan, A., Figueira, W., Byrne, M., Malcom, H., Williams, S., Steinberg, P. (2018). Large-scale assessment of benthic communities across multiple marine protected areas using an autonomous underwater vehicle. *PloS One*, 13(3), 1-20. <http://dx.doi.org/10.1371/journal.pone.0193711>
- Byrne, M., Ross, P., Dworjanyn, S., Parker, L. (2018). Larval ecology in the face of changing climate - impacts of ocean warming and ocean acidification. In Tyler J. Carrier, Adam M. Reitzel, Andreas Heyland (Eds.), *Evolutionary Ecology of Marine Invertebrate Larvae*, (pp. 251-272). Oxford: Oxford University Press. <http://dx.doi.org/10.1093/oso/9780198786962.003.0017>
- Lamare, M., Harianto, J., Uthicke, S., Aguera, A., Karelitz, S., Pecorino, D., Chin, J., Byrne, M. (2018). Larval thermal windows in native and hybrid *Pseudoboletia* progeny (Echinoidea) as potential drivers of the hybridization zone. *Marine Ecology Progress Series*, 598, 99-112. <http://dx.doi.org/10.3354/meps12601>

- Porter, A., Ferrari, R., Kelaher, B., Smith, S., Coleman, R., Byrne, M., Figueira, W. (2018). Marine infrastructure supports abundant, diverse fish assemblages at the expense of beta diversity. *Marine Biology*, 165(7), 1-13. <http://dx.doi.org/10.1007/s00227-018-3369-0>
- Hammill, E., Johnson, E., Atwood, T., Harianto, J., Hinchliffe, C., Calosi, P., Byrne, M. (2018). Ocean acidification alters zooplankton communities and increases top-down pressure of a cubozoan predator. *Global Change Biology*, 24(1), e128-e138. <http://dx.doi.org/10.1111/gcb.13849>
- Parker, L., O'Connor, W., Byrne, M., Dove, M., Coleman, R., Portner, H., Scanes, E., Virtue, P., Gibbs, M., Ross, P. (2018). Ocean acidification but not warming alters sex determination in the Sydney rock oyster, *Saccostrea glomerata*. *Proceedings of the Royal Society B: Biological Sciences*, 285(1872), 1-9. <http://dx.doi.org/10.1098/rspb.2017.2869>
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- Foo, S., Byrne, M., Gambi, M. (2018). Residing at low pH matters, resilience of the egg jelly coat of sea urchins living at a CO₂ vent site. *Marine Biology*, 165, 1-6. <http://dx.doi.org/10.1007/s00227-018-3359-2>
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- Foo, S., Byrne, M., Ricevuto, E., Gambi, M. (2018). The carbon dioxide vents of Ischia, Italy, a natural laboratory to assess impacts of ocean acidification on marine ecosystems: an overview of research and comparisons with other vent systems. In S. J. Hawkins, A. J. Evans, A. C. Dale, L. B. Firth, D. J. Hughes, & I. P. Smith (Eds.), *Oceanography and Marine Biology - An Annual Review*, (pp. 237-310). Boca Raton: CRC Press. <http://dx.doi.org/10.1201/9780429454455-4>
- Harianto, J., Nguyen, H., Holmes, S., Byrne, M. (2018). The effect of warming on mortality, metabolic rate, heat-shock protein response and gonad growth in thermally acclimated sea urchins (*Heliocidaris erythrogramma*). *Marine Biology*, 165(6), 1-12. <http://dx.doi.org/10.1007/s00227-018-3353-8>
- Wolstenholme, J., Nozawa, Y., Byrne, M., Burke, W. (2018). Timing of mass spawning in corals: potential influence of the coincidence of lunar factors and associated changes in atmospheric pressure

from northern and southern hemisphere case studies. *Invertebrate Reproduction and Development*, 62(2), 98-108. <http://dx.doi.org/10.1080/07924259.2018.1434245>

Passos, T. U., Webster, J.M, Braga, J.C., Voelker, D., Renema, W., Beaman, R.J., Nothdurft, L.D., Hinestrosa, G., Clarke, S., Yokoyama, Y., Barcellos, R.L., Kinsela, M.A., Nothdurft, L.N., and Hubble, T. (2019) Paleoshorelines and lowstand sedimentation on subtropical shelves: a case study from the Fraser Shelf, Australia. *Australian Journal of Earth Sciences.* (In Press)

Salas-Saavedra, Marcos, Dechnik, Belinda, Webb, Gregory E., Webster, Jody M., Zhao, Jianxin, Nothdurft, Luke D., Clark, Tara R., Graham, Trevor, and Duce, Stephanie (2018) Holocene reef growth over irregular Pleistocene karst confirms major influence of hydrodynamic factors on Holocene reef development. *Quaternary Science Reviews*, 180. pp. 157-176.

Hinestrosa, Gus, Webster, Jody M., and Beaman, Robin J. (2018) Spatio-temporal patterns in the postglacial flooding of the Great Barrier Reef shelf, Australia. *Continental Shelf Research.* (In Press)

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Couzens, E., Stephens, T., Solis, M., Karim, S., Holley, C. (2018). Editorial: Governance and development in the Asia Pacific region. *Asia Pacific Journal of Environmental Law*, 21(2), 77-80.

Stephens, T. (2018). The Antarctic Treaty System and the Anthropocene. *The Polar Journal*, 8(1), 29-43.

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