

CURRICULUM VITAE

John 'Paul' Spence, PhD

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Employment History

- 02/2021-present** **ARC Future Fellow**
School of Geosciences,
University of Sydney, Australia.
<https://www.sydney.edu.au/science/schools/school-of-geosciences.html>
- 07/2016-01/2020** **Senior Lecturer**
Climate Change Research Centre,
University of New South Wales, Sydney, Australia.
www.ccrc.unsw.edu.au
- 08/2015-06/2016** **Lecturer**
Climate Change Research Centre,
University of New South Wales, Sydney, Australia.
www.ccrc.unsw.edu.au
- 08/2011-08/2018** **Research Associate**
Centre of Excellence for Climate System Science,
University of New South Wales, Sydney, Australia.
www.climatescience.org.au
- 06/2009-08/2011** **Post Doctoral Research Fellow**
Climate Change Research Centre, University of New South
Wales, Sydney, Australia. <http://www.ccrc.unsw.edu.au>
- 09/2003-05/2009** **Graduate Student**
Earth and Ocean Sciences, University of Victoria, Canada.
<http://climate.uvic.ca/>
- 10/2000-04/2002** **Software Engineer - Marine Acoustics**
Quester Tangent Corporation, Sidney, Canada.
<http://www.questertangent.com/seabed-classification/>
- 01/2000-09/2000** **Software Engineer - Particle Physics**
Stanford Linear Accelerator Centre, Stanford University.
<http://www.slac.stanford.edu/>
- 04/1999-08/1999** **Researcher - Marine Acoustics**
Quester Tangent Corporation, Sidney, Canada.
<http://www.questertangent.com/seabed-classification/>

09/1998–12/1999 09/1997 – 12/1998	Researcher – Geophysics Pacific Geoscience Centre, Environment Canada, Canada. http://gsc.nrcan.gc.ca/org/sidney/index_e.php
05/1996 – 09/1996 09/1995 – 01/1996 05/1994 – 09/1994	Teacher – Outdoor Education Sheldon Centre for Outdoor Education, Toronto, Canada. http://toes.tdsb.on.ca/residential/sheldon/index.asp
05/1993 – 09/1993	Camp Counsellor – People with Disabilities Easter Seals Camp Shawnigan, Victoria, Canada. http://www.eastersealscamps.ca/camp-shawnigan
03/1992 – 08/1992	Teacher – Kindergarten Morant Bay Elementary School, Jamaica, WI.
09/1991 – 02/1992	Class Room Aid – Mathematics/Physics Souris Regional High School, PEI, Canada. http://www.edu.pe.ca/sourishigh/

Education

May 2009 2005 – 2009	PhD – Climate Science School of Earth and Ocean Sciences, University of Victoria, Canada.
August 2005 2003 – 2005	M.Sc. – Climate Science School of Earth and Ocean Sciences, University of Victoria, Canada.
May 2000 1999 - 2000	Certified Java Software Engineer Sun Microsystems, Palo Alto California, USA.
May 1999 1994 – 1999	B. Sc. – Combined Major, Physics and Physical Oceanography Department of Physics, University of Victoria, Canada.

Grants and Honours

A. Research Income

- Chief Investigator on 2020 ARC Linkage Project, “An Australian Consortium for Eddy-Resolving Global Ocean-Sea Ice Modelling”. (LP200100406, ARC \$ \$1.16M, partners \$300K + in kind contributions)
- Chief Investigator on 2020 ARC Special Research Initiative in Excellence in Antarctic Science Grant, “Australian Centre for Excellence in Antarctic Science”. (ARC \$20M)
- Chief Investigator on 2019 ARC Future Fellowship, “The Antarctic Slope Current

in a warming climate”. (FT190100413, ARC \$857K, University of Sydney)

- Chief Investigator on 2019 ARC Discovery Project, “Risks of rapid ocean warming at the Antarctic continental margin”. (DP180102521, ARC \$580K)
- Chief Investigator on 2016 ARC Linkage Project, “An Australian Consortium for Eddy-Resolving Global Ocean-Sea Ice Modelling”. (LP160100073, ARC \$599K, partners \$240K + in kind contributions)
- Chief Investigator on 2015 ARC DECRA Project, “Dynamics of Southern Ocean abyssal flows”. (DE150100223, ARC \$357K, UNSW \$20K + one year salary)
- Chief Investigator on 2015 ARC *Linkage Infrastructure, Equipment and Facilities* Project, “Connecting big data with high performance computing for climate science”. (LE150100089, \$490K)
- Chief Investigator on 2012 ARCCSS Early Career Research Grant, “Southward wind shifts in the classic recharge oscillator theory for the termination of ENSO events”. (\$22K)
- Awarded 2012 Australian Academy of Science France/Australia Science International Collaboration Grant, “Development of high-resolution global ocean simulations: an assessment and optimization of French and Australian modeling efforts”. (\$6K)
- Awarded a prestigious National Science and Engineering Foundation Grant, Canada for PhD (\$66K).

B. Research Awards

Agency	Title	Date	Amount (\$)
⁷ CoE	Directors Prize	2014	750
⁸ ARC	FASIC Grant	2012	6,000
⁷ CoE	Early Career Researcher Award	2012	22,000
³ NSF	Physical Oceanography Dissertation 2008 Symposium.		3,000
² UVic	Andy Farquharson Award for Excellence in Teaching	2008	150
⁴ AGU	Outstanding Student Paper Award 2007		0
⁵ NERC	Travel Grant Rapid Conference	2006	3,000
¹ NSERC	Student Research Employment	1999	5,000

⁶CWY International Development Grant 1992 10,000

¹NSERC = National Science and Engineering Research Council, Canada.

²UVic = University of Victoria, Canada.

³NSF = National Science Foundation, USA.

⁴AGU = American Geophysical Union, USA.

⁵NERC = National Environment and Research Council, UK.

⁶CWY = Canada World Youth, Government of Canada.

⁷CoE = Australian Centre of Excellence for Climate System Science

⁸ARC = Australian Research Council

Publications

A. Papers published in refereed journals (orcid.org/0000-0001-5156-2204)

2020

1. Menviel, L., *Spence, P.*, Skinner, L., Tachikawa, K., Friedrich, T., Missiaen, L. and Yu, L. 2020: Enhanced Mid-depth Southward Transport in the Northeast Atlantic at the Last Glacial Maximum Despite a Weaker AMOC. **Paleoceanography and Paleoclimatology**. <https://doi.org/10.1029/2019PA003793> [pdf](#)
2. Duran, E., Phillips, H., Furue, R., *Spence, P.*, Bindoff, N. 2020: Southern Australia Current System based on a gridded hydrography and a high-resolution model. **Progress in Oceanography**. <https://doi.org/10.1016/j.pocean.2019.102254> [pdf](#)
3. Hirschi, J. et al. 2020: The Atlantic meridional overturning circulation in high resolution models. **JGR-Oceans**. <https://doi.org/10.1029/2019JC015522> [pdf](#)
4. Zeller, M., McGregor, S., van Sebille, E., Capotondi, A., *Spence, P.* 2020: Subtropical-tropical pathways of spiciness anomalies and their impact on equatorial Pacific temperature. **Climate Dynamics**. <https://doi.org/10.1007/s00382-020-05524-8> [pdf](#)
5. Duran, E., England, M., *Spence, P.* 2020: Surface ocean warming around Australia driven by interannual variability and long-term trends in Southern Hemisphere westerlies. **Geophysical Research Letters**. <https://doi.org/10.1029/2019GL086605> [pdf](#)
6. Kiss, A. et al. 2020: ACCESS-OM2 v1.0: a global ocean–sea ice model at three resolutions. **Geoscientific Model Developments**. <https://doi.org/10.5194/gmd-13-401-2020> [pdf](#)
7. Georgiou, S., Ypma, S., Bruggemann, N., Sayol, J., van der Boog, C., *Spence, P.*, Pietrzak, J. and Katsman, C. 2020: Direct and Indirect Pathways of Convected Water Masses and Their impacts on the Overturning Dynamics of the Labrador Sea. **JGR-Oceans**. <https://doi.org/10.1029/2020JC016654> [pdf](#)
8. Morrison, A., Hogg, A., England, M., Spence, P. 2020: Warm Circumpolar Deep Water transport toward Antarctica driven by local dense water export in canyons. **Science Advances**. DOI: 10.1126/sciadv.aav2516 [pdf](#)

2019

9. Waugh, D., Hogg, A., Spence, P., England, M., Haine, T. 2019: Response of Southern Ocean ventilation to changes in mid-latitude westerly winds. **Journal of Climate**, 32, 5345-5361. <https://doi.org/10.1175/JCLI-D-19-0039.1> [pdf](#)

10. Zeller, M., McGregor, S., Spence, P. 2019: Hemispheric asymmetry of the Pacific shallow meridional overturning circulation. **Climate Dynamics**, <https://doi.org/10.1029/2018JC014840> [pdf](#)
11. Hughes, C., Fukumori, I., Griffies, S., Huthnance, J., Minobe, S., & Spence, P., Thompson, K., Wise, A. 2019: Sea Level and the Role of Coastal Trapped Waves in Mediating the Influence of the Open Ocean on the Coast. **Surveys in Geophysics**. <https://doi.org/10.1007/s10712-019-09535-x> [pdf](#)
12. Ypma, SL, Brüggemann, N, Georgiou, S, Spence, P & Dijkstra, H., Pietrzak, J., Katsman, C. 2019: Pathways and watermass transformation of Atlantic Water entering the Nordic Seas through Denmark Strait in two high resolution ocean models. **Deep Sea Research**, vol. 145, pp. 59–72. <https://doi.org/10.1016/j.dsr.2019.02.002> [pdf](#)
13. Webb, D., Holmes, R., Spence, P., and England, M. 2019: Barotropic Kelvin Wave-Induced Bottom Boundary Layer Warming Along the West Antarctic Peninsula. **Journal of Geophysical Research: Oceans**, vol. 124, no. 3, pp. 1595–1615. <https://doi.org/10.1029/2018JC014227> [pdf](#)

2018

14. Thompson, AF, Stewart, AL, Spence, P & Heywood, KJ 2018: The Antarctic Slope Current in a Changing Climate, **Reviews of Geophysics** , vol. 56, no. 4, pp. 741–770. <https://doi:10.1029/2018rg000624> [pdf](#)
15. Menviel, L, Spence, P, Yu, J, Chamberlain, MA & Matear, RJ et al. 2018: Southern Hemisphere westerlies as a driver of the early deglacial atmospheric CO₂ rise, **Nature Communications**, vol. 9, no. 1, <https://doi:10.1038/s41467-018-04876-4> [pdf](#)
16. Thran, AC, Dutkiewicz, A, Spence, P and Müller, RD 2018: Controls on the global distribution of contourite drifts: Insights from an eddy-resolving ocean model, **Earth and Planetary Science Letters**, vol. 489, pp. 228–240, <https://doi.org/10.1016/j.epsl.2018.02.044> [pdf](#)
17. Maher, N, England, MH, Gupta, AS and Spence, P, 2017: Role of Pacific trade winds in driving ocean temperatures during the recent slowdown and projections under a wind trend reversal, **Climate Dynamics**, vol. 51, no. 1-2, pp. 321–336, <https://doi:10.1007/s00382-017-3923-3> [pdf](#)
18. Stoney, L, Walsh, KJE, Thomas, S, Spence, P & Babanin, AV, 2018: ‘Changes in Ocean Heat Content Caused by Wave-Induced Mixing in a High-Resolution Ocean Model’, **Journal of Physical Oceanography**, vol. 48, no. 5, pp. 1139–1150, <https://doi:10.1175/jpo-d-17-0142.1> [pdf](#)
19. Downes, SM, Spence, P & Hogg, AM 2018, ‘Understanding variability of the Southern Ocean overturning circulation in CORE-II models’, **Ocean Modelling**, vol. 123, pp. 98–109, <https://doi.org/10.1016/j.ocemod.2018.01.005> [pdf](#)

2017

20. Spence, P, Holmes, RM, Hogg, AM, Griffies, SM, Stewart, KD & England, M, 2017, ‘Localized rapid warming of West Antarctic subsurface waters by remote winds’, **Nature Climate Change**, vol. 7, no. 8, pp. 595–603, <https://doi.org/10.1038/nclimate3335> [pdf](#)
21. Walsh, K, Govekar, P, Babanin, AV, Ghantous, M, Spence, P, Scoccimarro, E., 2017, ‘The effect on simulated ocean climate of a parameterization of unbroken wave-induced mixing incorporated into the k-epsilon mixing scheme’, **Journal of Advances in Modeling Earth Systems**, vol. 9, no. 2, pp. 735–758, <https://doi.org/10.1002/2016ms000707> [pdf](#)
22. Stewart, KD, Hogg, AM, Griffies, SM, Heerdegen, AP, Ward, ML, Spence, P, England, M, 2017, ‘Vertical resolution of baroclinic modes in global ocean

models', **Ocean Modelling**, vol. 113, pp. 50–65,
<https://doi.org/10.1016/j.ocemod.2017.03.012> [pdf](#)

23. Jourdain, NC, Mathiot, P, Merino, N, Durand, G, Sommer, JL, Spence, P, Dutrieux, P, and Madec, G, 2017, 'Ocean circulation and sea-ice thinning induced by melt- ing ice shelves in the Amundsen Sea', **Journal of Geophysical Research: Oceans**, vol. 122, no. 3, pp. 2550–2573, <https://doi.org/10.1002/2016jc012509> [pdf](#)
24. Hogg, AM, Spence, P, Saenko, OA & Downes, SM 2017, 'The Energetics of Southern Ocean Upwelling', **Journal of Physical Oceanography**, vol. 47, no. 1, pp. 135–153, <https://doi.org/10.1175/jpo-d-16-0176.1> [pdf](#)
25. Downes, SM, Langlais, C, Brook, JP & Spence, P 2017, 'Regional Impacts of the Westerly Winds on Southern Ocean Mode and Intermediate Water Subduction', **Journal of Physical Oceanography**, vol. 47, no. 10, pp. 2521–2530, <https://doi.org/10.1175/jpo-d-17-0106.1> [pdf](#)
26. Donat-Magnin, M, Jourdain, NC, Spence, P, Sommer, JL & Gallée, H and Durand, G, 2017, 'Ice-Shelf Melt Response to Changing Winds and Glacier Dynamics in the Amundsen Sea Sector, Antarctica', **Journal of Geophysical Research: Oceans**, vol. 122, no. 12, pp. 10206– 10224, <https://doi.org/10.1002/2017jc013059> [pdf](#)
27. Courtois, P, Hu, X, Pennelly, C, Spence, P & Myers, PG 2017, 'Mixed layer depth calculation in deep convection regions in ocean numerical models', **Ocean Modelling**, vol. 120, pp. 60–78, <https://doi.org/10.1016/j.ocemod.2017.10.007> [pdf](#)

2016

28. Ypma, SL, Sebille, Ev, Kiss, AE & Spence, P 2016, 'The separation of the E ast A ustralian C urrent: A L agrangian approach to po- tential vorticity and upstream control', **Journal of Geophysical Research: Oceans**, vol. 121, no. 1, pp. 758–774, <https://doi.org/10.1002/2015jc011133> [pdf](#)
29. Wang, Q, Ilicak, M, Gerdes, R, Drange, H & Aksenov, Y et al. 2016, 'An assessment of the Arctic Ocean in a suite of interannual CORE-II simulations. Part II: Liquid freshwater', **Ocean Modelling**, vol. 99, pp. 86–109, <https://doi.org/10.1016/j.ocemod.2015.12.009> [pdf](#)
30. Wang, Q, Ilicak, M, Gerdes, R, Drange, H & Aksenov, Y et al. 2016, 'An assessment of the Arctic Ocean in a suite of interannual CORE-II simulations. Part I: Sea ice and solid freshwater', **Ocean Modelling**, vol. 99, pp. 110–132, <https://doi.org/10.1016/j.ocemod.2015.12.008> [pdf](#)
31. Ilicak, M, Drange, H, Wang, Q, Gerdes, R & Aksenov, Y et al. 2016, 'An assessment of the Arctic Ocean in a suite of interannual CORE-II simulations. Part III: Hydrography and fluxes', **Ocean Modelling**, vol. 100, pp. 141–161, <https://doi.org/10.1016/j.ocemod.2016.02.004> [pdf](#)
32. Dutkiewicz, A, Müller, RD, Hogg, AM & Spence, P 2016, 'Vigorous deep-sea currents cause global anomaly in sediment accumulation in the Southern Ocean', **Geology**, vol. 44, no. 8, pp. 663–666, <https://doi.org/10.1130/g38143.1> [pdf](#)

2015

33. Menviel, L., Spence, P., Golledge, N.R., and England, M.H., 2015: Southern Ocean overturning role in modulating high south- ern latitude climate and atmospheric CO₂ on millennial timescales. **Nova Acta Leopoldina NF** 121: 159-166.
34. Stewart, KD, Spence, P, Waterman, S, Sommer, JL & Molines, Lilly, J, England, M, 2015, 'Anisotropy of eddy variability in the global ocean', **Ocean Modelling**, vol. 95, pp. 53–65, <https://doi.org/10.1016/j.ocemod.2015.09.005> [pdf](#)
35. Saenko, OA, Yang, D, Gregory, JM, Spence, P & Myers, PG 2015, 'Separating the influence of projected changes in air temperature and wind on patterns of sea level change and ocean heat content', **Journal of Geophysical Research: Oceans**, vol. 120, no. 8, pp. 5749– 5765, <https://doi.org/10.1002/2015jc010928> [pdf](#)

36. Menviel, L, Spence, P & England, MH 2015, ‘Contribution of enhanced Antarctic Bottom Water formation to Antarctic warm events and millennial-scale atmospheric CO₂ increase’, **Earth and Planetary Science Letters**, vol. 413, pp. 37–50, <https://doi.org/10.1016/j.epsl.2014.12.050> [pdf](#)
37. Downes, SM, Farneti, R, Uotila, P, Griffies, SM & Marsland, SJ et al. 2015, ‘An assessment of Southern Ocean water masses and sea ice during 1988–2007 in a suite of interannual CORE-II simulations’, **Ocean Modelling**, vol. 94, pp. 67–94, <https://doi.org/10.1016/j.ocemod.2015.07.022> [pdf](#)

2014

38. Spence, P, Griffies, SM, England, MH, Hogg, AM & Saenko, OA et al. 2014, ‘Rapid subsurface warming and circulation changes of Antarctic coastal waters by poleward shifting winds’, **Geophysical Research Letters**, vol. 41, no. 13, pp. 4601–4610, <https://doi.org/10.1002/2014gl060613> [pdf](#)
39. England, MH, McGregor, S, Spence, P, Meehl, GA & Timmermann, A et al. 2014, ‘Recent intensification of wind-driven circulation in the Pacific and the ongoing warming hiatus’, **Nature Climate Change**, vol. 4, no. 3, pp. 222–227, <https://doi.org/10.1038/nclimate2106> [pdf](#)
40. Spence, P, Seville, Ev, Saenko, OA & England, MH 2014, ‘Using Eulerian and Lagrangian Approaches to Investigate Wind-Driven Changes in the Southern Ocean Abyssal Circulation’, **Journal of Physical Oceanography**, vol. 44, no. 2, pp. 662–675, <https://doi.org/10.1175/JPO-D-13-0108.1> [pdf](#)
41. McGregor, S, Spence, P, Schwarzkopf, FU, England, MH & Santos, A et al. 2014, ‘ENSO-driven interhemispheric Pacific mass transports’, **Journal of Geophysical Research: Oceans**, vol. 119, no. 9, pp. 6221–6237, <https://doi.org/10.1002/2014jc010286> [pdf](#)

2013

42. Seville, Ev, Spence, P, Mazloff, MR, England, MH & Rintoul, SR et al. 2013, ‘Abyssal connections of Antarctic Bottom Water in a Southern Ocean State Estimate’, **Geophysical Research Letters**, vol. 40, no. 10, pp. 2177–2182, <https://doi.org/10.1002/grl.50483> [pdf](#)
43. Frankcombe, LM, Spence, P, Hogg, AM, England, MH & Griffies, SM 2013, ‘Sea level changes forced by Southern Ocean winds’, **Geophysical Research Letters**, vol. 40, no. 21, pp. 5710–5715, <https://doi.org/10.1002/2013gl058104> [pdf](#)
44. Spence, P, Saenko, OA, Sijp, W & England, MH 2013, ‘North Atlantic Climate Response to Lake Agassiz Drainage at Coarse and Ocean Eddy-Permitting Resolutions’, **Journal of Climate**, vol. 26, no. 8, pp. 2651–2667, <https://doi.org/10.1175/jcli-d-11-00683.1> [pdf](#)
45. Morrison, AK, Saenko, OA, Hogg, AM & Spence, P 2013, ‘The role of vertical eddy flux in Southern Ocean heat uptake’, **Geophysical Research Letters**, vol. 40, no. 20, pp. 5445–5450, <https://doi.org/10.1002/2013gl057706> [pdf](#)
46. McGregor, S, Ramesh, N, Spence, P, England, MH & McPhaden, MJ et al. 2013, ‘Meridional movement of wind anomalies during ENSO events and their role in event termination’, **Geophysical Research Letters**, vol. 40, no. 4, pp. 749–754, <https://doi.org/10.1002/grl.50136> [pdf](#)
47. Fogwill, C, Turner, C, Meissner, K, Golledge, N, Spence, P, et al. 2013, ‘Testing the sensitivity of the East Antarctic Ice Sheet to Southern Ocean dynamics: past changes and future implications’, **Journal of Quaternary Science**, vol. 29, no. 1, pp. 91–98, <https://doi.org/10.1002/jqs.2683>

2012

48. Spence, P, Saenko, OA, Sijp, W & England, M 2012, ‘The Role of Bottom Pressure Torques on the Interior Pathways of North Atlantic Deep Water’, **Journal of Physical**

Oceanography, vol. 42, no. 1, pp. 110–125,
<https://doi.org/10.1175/2011jpo4584.1> [pdf](#)

49. Spence, P, Saenko, OA, Dufour, CO, Sommer, JL & England, MH 2012, ‘Mechanisms Maintaining Southern Ocean Meridional Heat Transport under Projected Wind Forcing’, **Journal of Physical Oceanography**, vol. 42, no. 11, pp. 1923–1931, <https://doi.org/10.1175/jpo-d-12-03.1> [pdf](#)
50. Sijp, WP, Gregory, JM, Tailleux, R & Spence, P 2012, ‘The Key Role of the Western Boundary in Linking the AMOC Strength to the North–South Pressure Gradient’, **Journal of Physical Oceanography**, vol. 42, no. 4, pp. 628–643, <https://doi.org/10.1175/jpo-d-11-0113.1> [pdf](#)
51. Saenko, OA, Gupta, AS & Spence, P 2012, ‘On Challenges in Predicting Bottom Water Transport in the Southern Ocean’, **Journal of Climate**, vol. 25, no. 4, pp. 1349–1356, <https://doi.org/10.1175/jcli-d-11-00040.1> [pdf](#)

2011

52. Montenegro, A, Spence, P, Meissner, KJ, Eby, M & Melchin, MJ et al. 2011, ‘Climate simulations of the Permian-Triassic boundary: Ocean acidification and the extinction event’, **Paleoceanography**, vol. 26, no. 3, <https://doi.org/10.1029/2010pa002058> [pdf](#)

2010

53. Spence, P, Fyfe, JC, Montenegro, A & Weaver, AJ 2010, ‘Southern Ocean Response to Strengthening Winds in an Eddy-Permitting Global Climate Model’, **Journal of Climate**, vol. 23, no. 19, pp. 5332–5343, <https://doi.org/10.1175/2010jcli3098.1> [pdf](#)

2009

54. Spence, P, Saenko, OA, Eby, M & Weaver, AJ 2009, ‘The Southern Ocean Overturning: Parameterized versus Permitted Eddies’, **Journal of Physical Oceanography**, vol. 39, no. 7, pp. 1634–1651, <https://doi.org/10.1175/2009jpo4120.1> [pdf](#)

2008

55. Spence, JP, Eby, M & Weaver, AJ 2008, ‘The Sensitivity of the Atlantic Meridional Overturning Circulation to Freshwater Forcing at Eddy-Permitting Resolutions’, **Journal of Climate**, vol. 21, no. 11, pp. 2697–2710, <https://doi.org/10.1175/2007jcli2103.1> [pdf](#)

2006

56. Spence, JP & Weaver, AJ 2006, ‘The Impact of Tropical Atlantic Freshwater Fluxes on the North Atlantic Meridional Overturning Circulation’, **Journal of Climate**, vol. 19, no. 18, pp. 4592–4604, <https://doi.org/10.1175/jcli3873.1> [pdf](#)

B. Contributions to industrial research and development

1. Young, D., **Spence, P., 2002**: Commercial Beta Release of QTC Multiview and Sideview Seabed Classification System. Quester Tangent Corporation, Sidney, BC.
2. **Spence, P., Young, D., 2001**: System Functional Design Manual of QTC Multiview and Sideview Seabed Classification System. Quester Tangent Corporation, Sidney, BC.

C. Theses

1. **P. Spence, 2009**: Coarse versus ocean eddy-permitting global climate simulations: Experiments with the UVic ESCM. Ph.D. Thesis. University of

Victoria, Canada.

2. **P. Spence, 2005:** The impact of tropical Atlantic fresh water fluxes on the North Atlantic Meridional Overturning Circulation. M.Sc. Thesis. University of Victoria, Canada.
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Presentations at Conferences and Institutions

A. Selected Oral Presentations at Refereed Scientific Meetings as First Author

1. International Conference of Southern Hemisphere Meteorology and Oceanography (Oral), Cape Town, South Africa, Aug., 2017. Remote warming of West Antarctica by East Antarctic winds. P. Spence, S. Griffies, A. Hogg, M. England.
2. Ocean Sciences (Oral), New Orleans, USA, March, 2016. Remote warming of West Antarctica by East Antarctic winds. P. Spence, S. Griffies, A. Hogg, M. England.
3. International Conference of Southern Hemisphere Meteorology and Oceanography (Oral), Santiago, Chile, Oct., 2015. Subsurface warming and circulation changes around coastal Antarctica. P. Spence, S. Griffies, A. Hogg, M. England, O. Saenko.
4. Australian Meteorological and Oceanographic Society (Oral), Hobart, Australia, February 2014. 'Using Eulerian and Lagrangian Approaches to Investigate the Southern Ocean Abyssal Circulation'. P. Spence, E. van Sebille, O. Saenko, and M. England.
5. Ocean Sciences Meeting, Honolulu, USA, February 2014. 'Using Eulerian and Lagrangian Approaches to Investigate the Southern Ocean Abyssal Circulation'. P. Spence, E. van Sebille, O. Saenko, and M. England.
6. CLIVAR Working Group on Ocean Model Development Workshop (Oral), May, 2014, Kiel, Germany. "High-resolution Ocean Model Developments within the Australian Centre of Excellence for Climate System Science" Spence, P., S. Griffies, M. England, A. Hogg.
7. European Geophysical Union Annual Meeting (Oral), May, 2014, Vienna, Austria. "Warming of subsurface Antarctic coastal waters by poleward intensifying winds.." Spence, P., S. Griffies, M. England, A. Hogg, N. Jourdain.
8. European Geophysical Union Annual Meeting, May, 2014, Vienna, Austria. "Using Eulerian and Lagrangian Approaches to Investigate Wind--Driven Changes in the Southern Ocean Abyssal Circulation." Spence, P., O. Saenko, M. England, E. van Sebille.
9. Australian Meteorological and Oceanographic Society (Oral), February, 2014, Hobart, AUS. "Using Eulerian and Lagrangian Approaches to Investigate Wind--Driven Changes in the Southern Ocean Abyssal Circulation." Spence, P., O. Saenko, M. England, E. van Sebille.

10. PAGES Young Scientists Meeting, Feb., 2013, Goa, India. "High Resolution Simulations of EOCENE climate". P. Spence, C. Bull, W. Sijp, and M. England.
11. PAGES Past Global Changes Conference, Feb., 2013, Goa, India. "High Resolution Simulations of EOCENE climate". P. Spence, C. Bull, W. Sijp, and M. England.
12. Australian Research Council Centre of Excellence for Climate System Science Annual Meeting, Sept., 2012 Hobart, Australia. "A review of Australia's global ocean eddy-permitting climate model: ACCESS-OEP". P. Spence, M. Ward, A. Hogg and M. England.
13. International Conference on Southern Hemisphere Meteorology and Oceanography, April, 2012, Noumea, New Caledonia. "Mechanisms maintaining Southern Ocean heat transport under projected wind forcing." Spence, P., O. A. Saenko, J. Le Sommer, C. Dufour and M. H. England
14. *Workshop on modeling of polar ocean circulation and processes* (Oral), Nov, 2011, Tokyo University, Tokyo, Japan. "Towards an Australian High Resolution Ocean Climate Model." Spence, P.
15. *International Union of Geodesy and Geophysics* (Oral), July, 2011, Melbourne, Australia. "The role of bottom pressure torques on the interior pathways of NADW." Spence, P., O. Saenko, W. Sijp and M. England.
16. *European Geophysical Union* (Oral), April, 2011, Vienna, Austria. "The Southern Ocean response to poleward intensifying winds in a global eddy permitting climate model." Spence, P., J Fyfe, A. Montenegro and A.Weaver.
17. *European Geophysical Union* (Poster), April, 2011, Vienna, Austria. "The role of bottom pressure torques on the interior pathways of NADW." Spence, P., O. Saenko, W. Sijp and M. England.
18. *Australian Meteorological and Oceanographic Society* (Oral), February, 2011, Wellington, NZLD. "The role of bottom pressure torques on the interior pathways of NADW." Spence, P., O. Saenko, W. Sijp and M. England.
19. *Australian Meteorological and Oceanographic Society* (Oral), February, 2010, Canberra, AUS. "The Southern Ocean response to poleward intensifying winds." Spence, P., J Fyfe, A. Montenegro and A.Weaver.
20. *American Geophysical Union Fall Meeting*, December (Poster), 2008, San Francisco, USA. "The Southern Ocean overturning: Parametrized versus permitted eddies". Spence, P., O. Saenko, and A.Weaver.
21. *Physical Oceanography Dissertation Symposium* (Oral), National Science Foundation, October, 2008, Honolulu, USA. "Coarse versus eddy-permitting global climate simulations". Spence, P., J Fyfe, A. Montenegro and A.Weaver.
22. *Canadian Meteorological and Oceanographic Society* (Oral), May, 2008, Kelowna,

Canada. “Model resolution sensitivity of a subpolar Atlantic warming response triggered by freshwater discharge along the Labrador coast”. Spence, P., J Fyfe, and A.Weaver.

23. *American Geophysical Union Fall Meeting (Oral)*, December, 2007, San Francisco, USA. “The Southern Ocean temperature response to poleward intensifying winds”. Spence, P., J. Fyfe, A. Montenegro and A.Weaver.
24. *Canadian Meteorological and Oceanographic Society (Oral)*, May, 2007, St. Johns, Canada. “The influence of mesoscale eddies and boundary currents on surface freshwater forcings used to drive meridional overturning variations”. Spence, P., and A.Weaver.
25. *RAPID Climate Change Conference (Oral)*, October, 2006, Birmingham, England. “Sensitivity of 8.2 kYr event simulations to increasing horizontal resolution”. Spence, P., and A.Weaver.
26. *Ocean Sciences Meeting (Oral)*, February, 2006, Honolulu, USA. “The impact of tropical Atlantic freshwater fluxes on the AMOC.” Spence, P., and A.Weaver.
27. *Canadian Meteorological and Oceanographic Society (Oral)*, May, 2005, Montreal, Canada. “The impact of tropical Atlantic freshwater fluxes on the AMOC.” Spence, P., and A. Weaver.

B. Invited Lectures at Research Institutes

1. “Does the Southern Ocean have sleep apnea.” Nov., 2019, University of Sydney, Australia.
2. “Does the Southern Ocean have sleep apnea.” Oct., 2019, University of New South Wales, Australia.
3. “Does the Southern Ocean have sleep apnea.” March, 2018, University of Hawaii, HI, USA.
4. “Mechanisms of subsurface warming of coastal Antarctic waters.” March, 2017, University of Hawaii, HI, USA.
5. “Mechanisms of subsurface warming of coastal Antarctic waters.” Feb, 2017, University of Victoria, BC, Canada.
6. “The Science of Surf”, Australia National University, Canberra, Aus., Oct., 2016.
7. “Mechanisms of subsurface warming of coastal Antarctic waters.” July 2016, SCRIPPS Institute of Oceanography, Ca., USA.
8. “Mechanisms of subsurface warming of coastal Antarctic waters.” Jan. 2016, Univ. Hokkaido, Hokkaido, Japan.
9. “Mechanisms of subsurface warming of coastal Antarctic waters.” July, 2015, GFDL, Princeton, NJ, USA.

10. "Vorticity Dynamics." April 2014, ANU, Canberra, Australia.
11. "Investigating the Southern Ocean abyss with Eulerian and Lagrangian approaches." April, 2014, GEOMAR, Kiel, Germany.
12. "Investigating the Southern Ocean abyss with Eulerian and Lagrangian approaches." April, 2014, LEGI, Univesite de Grenoble, Grenoble, France.
13. "Southern Ocean abyssal response to a positive Southern Annular Mode." Sept., 2013, GFDL, Princeton, NJ, USA.
14. "Fundamentals of Geophysical Fluid Dynamics." Feb., 2013, CoE Summer School, UNSW, Sydney, Australia.
15. "Towards an Australian High Resolution Ocean Climate Model." Nov., 2011, ANU, Canberra, Australia.
16. "Towards an Australian High Resolution Ocean Climate Model." Oct., 2011, CCRC, Sydney, Australia.
17. "Coarse versus ocean eddy permitting global climate simulations." May, 2011, LEGI-MEOM, Grenoble, France.
18. "Coarse versus ocean eddy permitting global climate simulations of the Southern Ocean." February, 2010, *Climate Change Research Centre*, University of New South Wales, Australia.
19. "The Southern Ocean response to poleward intensifying winds." October, 2009, *CSIRO Marine and Atmospheric Research Centre*, Hobart, Tasmania, Australia.
20. "Climate sensitivity to 8.2 kyr event freshwater forcing at eddy-permitting resolutions." February, 2006, *Climate Change Research Centre*, University of New South Wales, Australia.

C. Invited Extended Visitations at Research Institutes

1. Laboratoire des Ecoulements Géophysiques et Industriels, Univesité de Grenoble, France, February, 2016. Host: **Dr. Bernard Bernier**.
2. Institute of Low Temperature Science, University of Hokkaido, Hokkaido, Japan, Jan, 2016. Host: **Dr. Keichi Ohshima**
3. Geophysical Fluid Dynamics Laboratory, Princeton, NJ, July, 2015. Host: **Dr. Stephen Griffies**. Objective: Develop an Australian High Resolution Ocean Climate Model.
4. Canadian Centre for Climate Modelling and Analysis, Victoria, Canada, July, 2015. Host: **Dr. Oleg Saenko**. Objective: Antarctic coastal warming research.

5. Laboratoire des Ecoulements Géophysiques et Industriels, Univesité de Grenoble, France, January, 2013. Host: **Dr. Bernard Bernier**. Objective: Reynolds Eddy Statistics.
6. Geophysical Fluid Dynamics Laboratory, Princeton, NJ, Sept, 2013. Host: **Dr. Stephen Griffies**. Objective: Develop an Australian High Resolution Ocean Climate Model.
7. Canadian Centre for Climate Modelling and Analysis, Victoria, Canada, Sept. 2013. Host: **Dr. Oleg Saenko**. Objective: Antarctic coastal warming research.
8. Laboratoire des Ecoulements Géophysiques et Industriels, Univesité de Grenoble, France, January, 2013. Host: **Dr. Bernard Bernier**. Objective: DRAKKAR Consortium Annual Meeting.
9. National Centre for Atmospheric Research, Boulder Colorado, July, 2012. Host: **Dr. Stephen Griffies**. Objective: Develop an Australian High Resolution Ocean Climate Model.
10. Australian National University, Canberra, Australia, 2011-2012 (Numerous visits). Host: **Dr. Andy Hogg**. Objective: Develop an Australian High Resolution Ocean Climate Model.
11. Laboratoire des Ecoulements Géophysiques et Industriels, Univesité de Grenoble, France, January, 2012. Host: **Dr. Bernard Bernier**. Objective: DRAKKAR Consortium Annual Meeting.
12. Geophysical Fluid Dynamics Laboratory, Princeton, USA, August, 2011. Host: **Dr. Steven Griffies**. Objective: Develop an Australian High Resolution Ocean Climate Model.
13. Laboratoire des Ecoulements Géophysiques et Industriels, Univesité de Grenoble, France, May, 2011. Host: **Dr. Bernard Bernier**. Objective: Develop an Australian High Resolution Ocean Climate Model.
14. Canadian Centre for Climate Modelling and Analysis, Victoria, Canada, July, 2011. Host: **Dr. Oleg Saenko**. Objective: North Atlantic Deep Water research.
15. School of Earth and Ocean Science, University of Victoria, Canada, July, 2010. Host: **Dr. Andrew Weaver**. Objective: Southern Ocean research.

Teaching and Supervision Experience

A. Graduate Student Supervision

Year	Student	Project & Student Outcomes
2015-2020	Earl Duran	PhD project on South Australia ocean circulation.

		Graduated in 06/2021.
2015-2020	David Webb	PhD project on the Southern Ocean. Graduated in 06/2021.
2015-2016	Valeria Prando	PhD student project on the Southern Ocean. Student withdrawn from program.
2014	Tomas Beuzen	12 week summer student project on Southern Ocean Outcomes: paper in progress.
2013	David Crock	6 week summer student project on Southern Ocean. Outcomes: student started Masters program.
2012	Christopher Bull	6 week summer student project on Eocene climate. Outcomes: PhD at UNSW.
2011	Nandini Ramesh	3 month summer student project on tropical Pacific. Outcomes: 1 published paper, and student started PhD at Columbia University.

B. Courses taught at Bamfield Marine Science Station, Canada

Year	Course	No.
2018	MTI20148 – Marine Terrestrial Interactions • Co-taught with 1 other lecturer	21
2014	MTI2014 – Marine Terrestrial Interactions • Co-taught with 1 other lecturer	25
2012	MTI2012 – Marine Terrestrial Interactions • Co-taught with 1 other lecturer	17

Student Evaluations: My average student rating across all categories and years is 4.6/5.

C. Courses taught at University of New South Wales, Australia

Year	Course	Students
2011-2019	MSCI2001 – Marine Sciences • Co-taught with 4 other lecturers	20-75
2012-2019	CLIM3001 – Climate Science • Co-taught with 5 other lecturers	5-10
2009-2010	MSCI0501 – The Marine Environment • Co-taught with 3 other lecturers	>150
2009	MATH3261 – Fluid Dynamics	23

2009	<ul style="list-style-type: none"> • Co-taught with 1 other lecturer MSCIO501 – The Marine Environment	>150
	<ul style="list-style-type: none"> • Co-taught with 3 other lecturers 	

D. Courses taught at University of Victoria, Canada

Year	Course	No. Students
2007	EOS340 – Dynamic Meteorology	35
	<ul style="list-style-type: none"> • Full lecture duties 	
2006	EOS340 – Dynamic Meteorology	35
	<ul style="list-style-type: none"> • Full lecture duties 	
2003-2007	EOS101 – Intro. Earth Science Lab	25
	<ul style="list-style-type: none"> • Lab instructor for 6 terms 	

Student Evaluations: My average student rating across all categories and years is 4.4/5.

E. Other teaching experience

Year	Institution
1994-1997	Sheldon Centre for Outdoor Education, Canada. Instructor of Toronto school board programs for three, 4-month contracts. Taught basic farming, and nature skills.
1992	Morant Bay Elementary, Jamaica Five-month kindergarten teacher position as part of Canada World Youth.
1991	Souris Regional High School, Canada Teaching aid (math and physics) for five-months as part of Canada World Youth program.

Service and Professional Activities

A. Membership and service on professional bodies and societies

- American Geophysical Union (since 2005)
- Canadian Geophysical Union (since 2004)
- Canadian Meteorological and Oceanographic Society (since 2004)
- Australian Meteorological and Oceanographic Society (since 2009)
- European Geophysical Union (since 2011)

B. Reviewer for journals

- Journal of Climate
- Climate Dynamics
- Nature

- Geophysical Research Letters
- Nature Geoscience
- Nature Climate Change
- Journal of Physical Oceanography
- Ocean Modelling
- Journal of Geoscientific Research

C. Voluntary Service

- Volunteer for the organizing committee of the 2018 Australian Meteorological and Oceanographic conference.
- Volunteer for the 2016 UNSW Talented Students Program.
- Volunteer for the 2016 secondary school research mentorship program at the CCRC.
- Chief organiser of the four day 2015 ARC Centre of Excellence for Climate System Science Oceans Node Annual Meeting.
- Member of CSIRO's Scientists in Schools Program from 2013-2015, which links scientists with local community public schools. I was partnered at Mascot and Ascham Public Schools.
- Session organizer for 2013 Australian Meteorological and Oceanographic Society Annual Meeting.
- Volunteer for the 2013 UNSW Parent and Students Information Night.
- Volunteer for Mentoring Students Program at the 2014 Ocean Sciences conference.
- Invited Public Talks – "*The Science of Climate Change*" Volunteered over 30 lectures to the general public on behalf of the University of Victoria Speakers Bureau, 2003-2008.