

Graig Sutherland

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Research and Development
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Research Interests

Air-sea interaction, autonomous observational systems, boundary layer physics, turbulence, mixing, waves, wave-ice and wave-current interactions, observational oceanography, tidal dynamics.

Professional Experience

2017- Scientist, Norwegian Meteorological Institute, Oslo, Norway
2014-2017 Postdoctoral Fellow, Department of Mathematics, University of Oslo, Norway
2009-2010 Physical Oceanographer, Oceans Ltd. St. John's, Canada.
2005-2006 Research Assistant, Korean Ocean Research and Development Institute, South Korea.
2003-2005 Research Assistant, Ocean Sciences and Productivity, Institute of Ocean Sciences,
 Department of Fisheries and Oceans Canada, Patricia Bay, Canada.

Education

2011-2014 PhD in Ocean Physics, National University of Ireland, Galway.
2007-2009 MSc in Physical Oceanography, Memorial University of Newfoundland and Labrador.
1998-2003 BSc in Physics and Ocean Sciences (Physical Oceanography) with a minor in
 Mathematics, University of Victoria.

Awards

2011 National Science and Engineering Research Council, Canada, Postgraduate Scholarship
 (PGS-D): \$63000 CAD (\$21000 per annum for 3 years).
2009 Memorial University of Newfoundland and Labrador, Recognition of Excellence.
2008 National Science and Engineering Research Council, Canada, Alexander Graham Bell Award
 (CGS-M): \$17500 CAD.
2008 Memorial University of Newfoundland and Labrador, SGS Merit Award: \$5000 CAD.

Professional Activities

- Reviewer for *National Science Foundation*, *Geophysical Research Letters*, *Journal of Atmospheric and Oceanic Technology*, *Ocean Modelling*, *Ocean Dynamics*, *Continental Shelf Research*.
- Session chair "The Dynamics of the Air-Sea Interface: Application to Oceanic Mixing and Transports" at the 2016 Ocean Sciences Meeting, New Orleans, USA.
- Organizing committee, "5th Norway-Scotland waves symposium." 2017, Oslo, Norway.

Publications

Refereed

Journal Articles

- 2017 **Sutherland, G.**, J. Rabault and A. Jensen. A method to estimate reflection and directional spread using rotary spectra from accelerometers on large ice floes. *Journal of Atmospheric and Oceanic Technology*. Accepted.
- Esters L., S. Landwehr, **G. Sutherland**, T. G. Bell, K. H. Christensen, E. S. Saltzman, S. D. Miller and B. Ward. Parameterizing air-sea gas transfer with dissipation. *Journal of Geophysical Research: Oceans*. Accepted.
 - Rabault J., **G. Sutherland**, O. Gundersen and A. Jensen. Measurements of wave damping by grease ice using Open Source loggers. *Journal of Glaciology*. Accepted.
 - **Sutherland G.**, T. Halsne, J. Rabault and A. Jensen. The attenuation of monochromatic surface waves due to the presence of an inextensible cover. *Wave Motion*. 68, 88-96.
- 2016 **Sutherland G.**, L. Marié, G. Reverdin, K. Christensen, G. Broström and B. Ward. Enhanced turbulence associated with the diurnal jet in the ocean surface boundary layer. *Journal of Physical Oceanography*. 46(10), 3051-3067.
- Rabault J., **G. Sutherland**, B. Ward, K.H. Christensen, T. Halsne and A. Jensen. Measurements of waves in landfast ice using inertial motion units. *IEEE Transactions on Geoscience and Remote Sensing*. 54(11), 6399-6408.
 - **Sutherland G.** and J. Rabault. Observations of wave dispersion and attenuation in landfast ice. *Journal of Geophysical Research: Oceans*. doi:10.1002/2015JC011446.
- 2015 Reverdin, G., S. Morisset, L. Marié, D. Bourras, **G. Sutherland**, B. Ward, J. Salvador, J. Font, Y. Cuypers, L. Centurioni, V. Hormann, N. Koldziejczyk, J. Boutin, F. D'Ovidio, F. Nencioli, N. Martin, D. Diverres, G. Alory and R. Lumpkin. Surface salinity in the North Atlantic subtropical gyre during the Strasse/SPURS summer 2012 cruise. *Oceanography*. 28(1), 114-123.
- 2014 **Sutherland G.**, G. Reverdin, L. Marié and B. Ward. Mixed and mixing layer depths in the ocean surface boundary layer under conditions of diurnal stratification. *Geophysical Research Letters*. 41(23), 8469-8476.
- Ward B., T. Fristedt, A.H. Callaghan, **G. Sutherland**, X. Sanchez, J. Vialard and A. ten Doeschate. The Air-Sea Interaction Profiler (ASIP): An autonomous upwardly-rising profiler for microstructure measurements in the upper ocean. *Journal of Atmospheric and Oceanic Technology*. 31(10), 2246-2267
 - **Sutherland G.**, K.H. Christensen and B. Ward. Evaluating Langmuir turbulence parameterizations in the ocean surface boundary layer. *Journal of Geophysical Research: Oceans*. 119(3), 1899-1910.
- 2013 **Sutherland G.**, K.H. Christensen and B. Ward. Wave-turbulence scaling in the ocean mixed layer. *Ocean Science*. 9(4), 597-608.
- 2008 Cherniawsky J.Y. and **G. Sutherland**. Large-scale errors in ERS altimeter data. *Marine Geodesy*. 31(1), 2-16.
- 2007 Arbic B.K., P. St-Laurent, **G. Sutherland** and C. Garrett. On the resonance and influence of the tides in Ungava Bay and Hudson Strait. *Geophysical Research Letters*. 34, L17606, doi:10.1029/2007GL030845.
- **Sutherland G.**, M.G.G. Foreman and C. Garrett. Tidal current energy assessment for Johnstone Strait, Vancouver Island. *Proceedings of the Institution of Mechanical Engineers Part A: Journal of Power and Energy*. 221(2), 147-157.
- 2005 **Sutherland G.**, C. Garrett and M.G.G. Foreman. Tidal resonance in Juan de Fuca Strait and the Strait of Georgia. *Journal of Physical Oceanography*, 35(7), 1279-1286.
- 2004 Foreman M.G.G., **G. Sutherland**, P.F. Cummins. M2 tidal dissipation around Vancouver Island: an inverse approach. *Continental Shelf Research*, 24(18), 2167-2185.

Conference Proceedings

- 2017 Marchenko A., J. Rabault, **G. Sutherland**, C. O. Collins III, P. Wadhams and M. Chumakov. Field observations and preliminary investigations of a wave event in solid drift ice in the Barents Sea. In *POAC-17*, Busan, South Korea.
- 2016 Rabault J., T. Halsne, **G. Sutherland** and A. Jensen. PTV investigation of the mean drift currents under water waves. *18th International Symp. on the App. of Laser and Imaging Tech. to Fluid Mech.*, Lisbon, Portugal.
- Esters L., S. Landwehr, **G. Sutherland**, T. G. Bell, E. S. Saltzman, K. H. Christensen, S. D. Miller and B. Ward. The relationship between ocean surface turbulence and air-sea gas transfer velocity: An in-situ evaluation. In *IOP Conference Series: Earth and Environmental Science*, 35(1), p. 012005. Seattle, USA.

Non-Refereed

Technical Reports

- 2005 Foreman, M.G.G., L. Beauchemin, J.Y. Cherniawsky, M. A. Peña, P. F. Cummins, and **G. Sutherland**. A review of models in support of oil and gas exploration off the north coast of British Columbia. Can. Tech. Rep. Fish. Aquat. Sci. 2712: v + 58p.
- 2002 Rohr K.M.M. and **G. Sutherland**. A Reconnaissance AVO Study of the Queen Charlotte Basin. *CEOR Report 2002-3*.

Mentoring, Teaching and Outreach

Mentoring

- 2014-2015 Trygve Halsne, MSc co-supervisor, Department of Mathematics, University of Oslo.
- 2015-2018 Jean Rabault, PhD co-supervisor, Department of Mathematics, University of Oslo.

Teaching

- 2016 Guest lecturer “Experimental Methods in Fluid Mechanics” at University of Oslo.
- 2011-2013 Lab instructor for first year Physics at National University of Ireland, Galway.
- 2007-2009 Lab instructor for first and second year Physics courses at Memorial University of Newfoundland and Labrador.
- 2002-2003 Lab assistant in Astronomy Department at University of Victoria.

Outreach

- 2011-2014 Public demonstration during annual Sea2Sky event in Galway, Ireland.
- 2011-2014 Tyndall Lecture (annually): Introduction to oceanography for secondary school students.
- 2013 Youth Academy: Fluid dynamics lecture to secondary school students.
- 2012 Focus of “Me and the Sea” column in Galway Independent.
- 2008-2009 Judge in the provincial Newfoundland and Labrador science fair.

Field Work

- 2016 Adventdalen, Svalbard. Responsible for sampling strategy and development of instrumentation to measure wave motion in ice. 6 days.
- 2015 Galway Bay, Ireland. Investigating the impact of surfactants on wave propagation and air-sea fluxes. 5 days.
- Svea and Tempelfjorden, Svalbard. Responsible for sampling strategy and development of instrumentation to measure wave motion in ice. 14 days.
- 2013 B/O *Sarmiento de Gamboa*, Jordi Font (CSIC), subtropical Atlantic, SPURS project, operated the Air-Sea Interaction Profiler (ASIP), which is a prototype microstructure profiler which is semi-autonomous and vertically rising, 28 days.

- 2012 N/O *Thalassa*, Gilles Reverdin (LOCEAN), subtropical Atlantic, SPURS project, operated ASIP, 37 days.
- 2011 R/V *Knorr*, Scott Miller (SUNY Albany), north Atlantic, gas exchange study, operated ASIP, 30 days.
 - R/V *Johan Hjort*, Göran Broström (Met. No.), Vestfjorden, Norway, operated ASIP, 10 days.
- 2008 CCGS *Amundsen*, Tim Paparyiakou (U. of Manitoba), western Canadian Arctic, Canadian Flaw lead IPY project, operated the Vertical Microstructure Profiler, 42 days.
- 2003 R/V *Seiyo Maru*, Hidekatsu Yamazaki (Tok. U. of Fish.), Sea of Japan, collected microstructure TurboMap profiles, 7 days.
- 2002 CCGS *JP Tully*, Michael Riedel (UVIC), seismic reflection survey in Queen Charlotte Basin, acquisition of seismic reflection data, 28 days.

Select Conference Presentations and Invited Seminars (last 5 years)

- 2017 A look at directional spread in sea ice: Observations from the Barents Sea. *5th Norway-Scotland Waves Symposium*, Oslo, Norway (invited).
- 2016 Waves in Oil and Ice Experiment (WOICE). Invited seminar, *TAO Seminar Series*, University of Victoria.
 - Measurements of waves in landfast ice in Svalbard: Effect of flexural stress on wave properties. *Ocean Sciences Meeting*, New Orleans, USA (invited).
 - Enhanced dissipation associated with the diurnal jet in the ocean surface boundary layer. *Ocean Sciences Meeting*, New Orleans, USA.
- 2015 Detection and transport of oil in ice. Invited seminar, University of Manitoba.
 - Dispersion, attenuation, and the directional spectra of waves in landfast ice: Observations from Tempelfjorden, Svalbard. *4th Norway-Scotland Waves Symposium*, Edinburgh, UK (invited).
- 2014 Diurnal evolution of turbulence in the ocean surface boundary layer. *EGU/ESA/SOLAS joint Conference, Earth Observation for Ocean-Atmosphere Interactions Science*, Frascati, Italy.
 - Evaluating turbulence regimes in the ocean surface boundary layer: Measurements from a vertically rising microstructure profiler. *Ocean Sciences Meeting*, Honolulu, USA.
- 2012 Scaling Turbulence in the Upper Ocean. *Ocean Sciences Meeting*, Salt Lake City, USA.
- 2011 Scaling Turbulence in the Upper Ocean. *EGU/ESA/SOLAS joint Conference, Earth Observation for Ocean-Atmosphere Interactions Science*, Frascati, Italy.