

Kyle C. Armour

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Appointments & Education

| | |
|---|--------------|
| Assistant Professor | 2015-present |
| School of Oceanography and Department of Atmospheric Sciences University of Washington, Seattle, WA | |
| Postdoctoral Fellow | 2012-2015 |
| James S. McDonnell Foundation Postdoctoral Fellow Program in Atmospheres, Oceans and Climate Massachusetts Institute of Technology, Cambridge, MA | |
| Ph.D., Physics | 2012 |
| Thesis: Reversibility of sea ice and climate under global change University of Washington, Seattle, WA | |
| M.S., Physics | 2007 |
| University of Washington, Seattle, WA | |
| B.S., Physics and B.A., Applied Mathematics | 2005 |
| University of California, San Diego, CA | |

Awards & Fellowships

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| <i>Nature Climate Change</i> Research Highlight and <i>CLIVAR</i> Science Highlight: 'Southern Ocean warming delayed by circumpolar upwelling and equatorward transport' | 2016 |
| <i>Nature Climate Change</i> Research Highlight: 'The ocean's role in polar climate change: asymmetric Arctic and Antarctic responses to greenhouse gas and ozone forcing' | 2014 |
| <i>Environmental Research Letters</i> Monthly Highlight: 'Rapid and extensive warming following cessation of solar radiation management' | 2014 |
| James S. McDonnell Foundation Postdoctoral Fellowship in Complex Systems | 2012 |
| <i>AGU</i> Editors' Highlight: 'The reversibility of sea ice loss in a state-of-the-art climate model' | 2011 |
| <i>AGU</i> Editors' Highlight and <i>Nature Climate Change Research</i> Highlight: 'Climate commitment in an uncertain world' | 2011 |
| Achievement Rewards for College Scientists (ARCS) Fellowship | 2005-2008 |
| Shang-keng Ma Award, UC San Diego, Department of Physics | 2005 |

Publications

*student or postdoctoral advisee

2017

K.C. Armour (2017) Energy budget constraints on climate sensitivity in light of inconstant climate feedbacks. *Nature Climate Change*, doi: 10.1038/nclimate3278, in press

2016

Y. Kostov, J. Marshall, U. Hausmann, **K.C. Armour**, D.G. Ferreira and M.M. Holland (2016) Fast and slow responses of Southern Ocean sea-surface temperature to the SAM in coupled climate models. *Climate Dynamics*, **5**, 1595–1609, doi: 10.1007/s00382-016-3162-z

March 2017

Kyle C. Armour

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K.C. Armour (2016) Projection and prediction: Climate sensitivity on the rise. *Nature Climate Change*, **6**, 896–897, doi: 10.1038/nclimate3079

K.C. Armour, J. Marshall, J. Scott, A. Donohoe and E.R. Newsom (2016) Southern Ocean warming delayed by circumpolar upwelling and equatorward transport. *Nature Geoscience*, **9**, 549–554, doi: 10.1038/ngeo2731

2015

K.C. Armour and C.M. Bitz (2015) Observed and projected trends in Antarctic sea ice. *US CLIVAR Variations*, 13.4, 13–19

G.H. Roe, N. Feldl, **K.C. Armour**, Y.-T. Hwang and D.M.W. Frierson (2015) The remote impacts of climate feedbacks on regional climate predictability. *Nature Geoscience*, **8**, 135–139, doi: 10.1038/ngeo2346

J. Marshall, J. Scott, **K.C. Armour**, J.-M. Campin, M. Kelley and A. Romonou (2015) The ocean's role in the transient response of climate to abrupt greenhouse gas forcing. *Climate Dynamics*, **44**, 2287–2299, doi: 10.1007/s00382-014-2308-0

2014

A. Donohoe, **K.C. Armour**, A. Pendergrass and D.S. Battisti (2014) Shortwave and longwave radiative contributions to global warming under increasing CO₂. *Proc. Nat. Acad. Sci.*, **111**, 16700–16705, doi: 10.1073/pnas.1412190111

Y. Kostov, **K.C. Armour** and J. Marshall (2014) Impact of the Atlantic Meridional Overturning Circulation on global ocean heat storage and transient climate change. *Geophys. Res. Lett.*, **41**, doi: 10.1002/2013GL058998.

J. Marshall, **K.C. Armour**, J. Scott, Y. Kostov, D. Ferreira, T. Shepherd and C.M. Bitz (2014) The ocean's role in polar climate change: asymmetric Arctic and Antarctic responses to greenhouse gas and ozone forcing. *Phil. Trans. R. Soc. A.*, **372**, doi: 10.1098/rsta.2013.0040

B.E.J. Rose, **K.C. Armour**, D.S. Battisti, N. Feldl and D.D.B. Koll (2014) The dependence of transient climate sensitivity and radiative feedbacks on the spatial pattern of ocean heat uptake. *Geophys. Res. Lett.*, **41**, doi:10.1002/2013GL058955

K.E. McCusker, **K.C. Armour**, C.M. Bitz and D.S. Battisti (2014) Rapid and extensive warming following cessation of solar radiation management. *Environ. Res. Lett.*, **9**, 024005, doi:10.1088/1748-9326/9/2/024005

A. Donohoe, J. Marshall, D. Ferreira, **K.C. Armour** and D. McGee (2014) The inter-annual variability of tropical precipitation and inter-hemispheric energy transport. *Journal of Climate*, **27**, 3377–3392, doi: 10.1175/JCLI-D-13-00499.1

2013

K.C. Armour, C.M. Bitz and G.H. Roe (2013) Time-varying climate sensitivity from regional feedbacks. *Journal of Climate*, **26**, 4518–4534, doi: 10.1175/JCLI-D-12-00544.1

2012

C.M. Bitz, K.M. Shell, P.R. Gent, D.A. Bailey, G. Danabasoglu, **K.C. Armour**, M.M. Holland and J.T. Kiehl (2012) Climate sensitivity of the Community Climate System Model Version 4. *Journal of Climate*, **25**, 3053–3070, doi: 10.1175/JCLI-D-11-00290.1

P. Langebroek, C. Bradshaw, A. Yanchilina, R. Caballero-Gill, C. Pew, **K.C. Armour**, S.-Y. Lee and I.-M. Jansson (2012) Improved proxy record of past warm climates needed. *Eos Trans. AGU*, 93(14), 144, doi: 10.1029/2012EO140007

2011

K.C. Armour, I. Eisenman, E. Blanchard-Wrigglesworth, K.E. McCusker and C.M. Bitz (2011) The reversibility of sea ice loss in a state-of-the-art climate model. *Geophys. Res. Lett.*, **38**, L16705, doi: 10.1029/2011GL048739

K.C. Armour and G.H. Roe (2011) Climate commitment in an uncertain world. *Geophys. Res. Lett.*, **38**, L01707, doi: 10.1029/2010GL045850

G.H. Roe and **K.C. Armour** (2011) How sensitive is climate sensitivity? *Geophys. Res. Lett.*, **38**, L14708, doi: 10.1029/2011GL047913

E. Blanchard-Wrigglesworth, **K.C. Armour**, C.M. Bitz and E. DeWeaver (2011) Persistence and inherent predictability of Arctic sea ice in a GCM ensemble and observations. *Journal of Climate*, **24**, 231-250, doi: 10.1175/2010JCLI3775.1

K.C. Armour, C.M. Bitz, L. Thompson and E.C. Hunke (2011) Controls on Arctic sea ice from first- year and multiyear ice survivability. *Journal of Climate*, **24**, 2378-2390, doi: 10.1175/2010JCLI3823.1

Manuscripts Submitted & in Preparation

*student or postdoctoral advisee

M.F. Stuecker, C.M. Bitz and **K.C. Armour** (2017) Cause of the unprecedented Antarctic sea ice melt during the 2016 austral spring season, submitted

A.D. Haugstad*, **K.C. Armour**, D.S. Battisti and B.E.J. Rose (2017) Reconciling distinct explanations for the inconstancy of radiative feedbacks, submitted

H. Goosse, J.E. Kay, **K.C. Armour**, A. Bodas-Salcedo, H. Chepfer, D. Docquier, A. Jonko, P.J. Kushner, O. Lecomte, F. Massonnet, H.-S. Park, F. Pithan, G. Svensson and M. Vancoppenolle (2017) Beyond radiative feedbacks: a process-oriented perspective on climate feedbacks in polar regions, submitted

N. Siler, G.H. Roe and **K.C. Armour** (2017) Surface energetics as a primary control on hydrologic sensitivity to global warming, submitted

Y. Kostov, D.G. Ferreira, **K.C. Armour** and J. Marshall (2017) Interpretation of Southern Ocean sea-surface temperature trends in historical simulations and observations, in preparation

S. Po-Chedley*, **K.C. Armour** and Q. Fu (2017) On the intermodel spread of the global lapse rate and water vapor feedbacks, in preparation

Funding

NSF-1523641: OCE-RIG: Identifying the role of ocean circulation in polar climate change. (PI) \$96,329

2015-2017

James S. McDonnell Foundation Postdoctoral Fellowship. \$200,000

2012-2015

Teaching

OCEAN 423: Ocean Circulation and Climate (*Spring 2016, 2017*)

ATM S 587: Fundamentals of Climate Change (*Autumn 2015, 2016*)

OCEAN 569/ATMS 591/ESS 590: Climate Dynamics (*Winter 2017*)

Atmospheric Sciences Colloquium (*coordinator Autumn 2016*)

Physical Oceanography Seminar (*coordinator Spring 2017*)

Guest lecturer for the following courses

University of Washington, Seattle, WA, 2016, ATM S 220: Exploring the Atmospheric Sciences (D. Frierson)

Seattle University, Seattle, WA, 2016, ATM S 220: Mass Extinctions (D. Faust)

Princeton University, AOS Workshop: Ice in the climate system, Princeton, NJ, 2014 (*invited lecturer*)

Bard College, Annandale-on-Hudson, NY, 2013, CSP 513: Science of Climate (S. Penny)

MIT, Cambridge, MA, 2013, EAPS 12.707: Pre-Pleistocene Paleoclimatology and Paleoceanography (D. McGee)

MIT, Cambridge, MA, 2013, EAPS 12.842: Climate Physics and Chemistry (J. Marshall)

Selected Presentations

2017

Institute for Atmospheric and Climate Science Seminar, ETH Zürich, Switzerland: Energy budget constraints on climate sensitivity in light of inconstant climate feedbacks (*invited*)

AMS Annual Meeting, Seattle, WA: Energy budget constraints on climate sensitivity in light of inconstant climate feedbacks

2016

AGU Fall Meeting, San Francisco, CA: Understanding the spatial patterns of ocean heat uptake and storage under global warming

Atmospheric and Climate Dynamics Seminar, UW: Energy budget constraints on climate sensitivity in light of inconstant climate feedbacks

Oceanography Colloquium, University of Washington, Seattle, WA: Why has the Southern Ocean cooled while the Arctic has warmed rapidly?

PCC Summer Institute Public Lecture, Friday Harbor, WA: A polar climate change puzzle

Department Seminar, University of Victoria, Victoria, Canada: What causes polar amplification, and why does it emerge more rapidly in the Arctic? (*invited*)

Polar bear specialist group meeting, Anchorage, AK: The polar bear commitment. (*invited*)

Atmospheric Physics Seminar, University of Oxford, Oxford, UK: What causes polar amplification, and why does it emerge more rapidly in the Arctic? (*invited*)

WCRP Workshop on Polar Climate Feedbacks, Louvain-la-Neuve, Belgium: Why has the Southern Ocean cooled while the Arctic has warmed rapidly?

UW Polar Day, University of Washington, Seattle, WA: Why has the Southern Ocean cooled while the Arctic has warmed rapidly?

Ocean Sciences Meeting, New Orleans, LA: Understanding the spatial patterns of ocean heat uptake and storage under global warming. *(invited)*

NAS Workshop on Antarctic Sea Ice Variability, Boulder, CO: Antarctic sea-ice expansion in a warming world.

American Mathematical Society Meeting, Seattle, WA: Wind-driven expansion of the Antarctic sea-ice cover. *(invited)*

2015

WCRP Grand Challenge Workshop: Earth's Climate Sensitivities, Ringberg, Germany: Robust increase in effective climate sensitivity with transient warming.

University of Chicago, GeoSci Seminar, Chicago IL: The ocean's role in polar climate change. *(invited)*

Brown University, Providence, RI: The ocean's role in polar climate change. *(invited)*

2014

AGU Fall Meeting, San Francisco, CA: Robust increase in effective climate sensitivity with transient warming in CMIP5 GCMs. *(invited)*

AGU Fall Meeting, San Francisco, CA: Trends and variability of Southern Ocean temperature and salinity in models and observations. *(invited)*

US CLIVAR Ocean Heat and Carbon Uptake Meeting, San Francisco, CA: Mechanisms of delayed Southern Ocean Warming.

US AMOC Meeting, Seattle, WA: Role of the AMOC in ocean heat storage and transient climate change.

Caltech, ESE Seminar, Pasadena, CA: New perspectives on the ocean's role in transient climate change. *(invited)*

Latsis Symposium, Zurich, Switzerland: New perspectives on the ocean's role in transient climate change.

MIT, Sack Lunch Seminar, Cambridge, MA: New perspectives on the ocean's role in transient climate change. *(invited)*

University of Washington, Seattle, Future of Ice Seminar, Seattle, WA: New perspectives on the ocean's role in transient climate change. *(invited)*

SUNY Albany, EPS Seminar, Albany, NY: The ocean's role in polar climate change. *(invited)*

University of Toronto, Physics Department Seminar, Toronto, Canada: New perspectives on the ocean's role in transient climate change. *(invited)*

University of California, Berkeley, EPS Seminar, Berkeley, CA: New perspectives on the ocean's role in transient climate change. *(invited)*

Columbia University, Applied Mathematics Colloquium, New York, NY: Causes and consequences of time-varying climate sensitivity. *(invited)*

University of Colorado, Boulder, CIRES Seminar, Boulder, CO: The ocean's role in polar climate change. *(invited)*

APS March Meeting, Denver, CO: Causes and consequences of time-varying climate sensitivity. *(invited)*

Ocean Sciences Meeting, Honolulu, HI: Mechanisms of delayed Southern Ocean warming.

CESM Polar Climate Working Group Meeting, Boulder, CO: The ocean's role in polar climate change.

University of Colorado, Boulder, INSTAAR Seminar, Boulder, CO: New perspectives on the role of oceans in transient climate change. *(invited)*

2013

AGU Fall Meeting, San Francisco, CA: Mechanisms of delayed Southern Ocean warming.

Harvard University, ClimaTea Seminar, Cambridge, MA: What sets the patterns and timescales of climate response to forcing? (*invited*)

Ocean Sciences Meeting, New Orleans, LA: Understanding the spatial patterns of ocean heat uptake and storage under global warming. (*invited*)

NAS Workshop on Antarctic Sea Ice Variability, Boulder, CO: Antarctic sea-ice expansion in a warming world.

AMS/Joint Mathematics Meeting, Seattle, WA: Wind-driven expansion of the Antarctic sea-ice cover. (*invited*)

2012

AGU Fall Meeting, San Francisco, CA: Time-varying climate sensitivity from regional feedbacks.

Scripps Institution of Oceanography, CASPO Seminar, San Diego, CA: Time-varying climate sensitivity from regional feedbacks. (*invited*)

Paleoclimate Model Intercomparison Workshop, Honolulu, HI: Regional feedbacks and climate change.

2011

AGU Fall Meeting, San Francisco, CA: Sea ice age characteristics in a global climate model and observations. (*invited*)

5th Graduate Climate Conference, Woods Hole, MA: Climate change reversibility.

Geophysical Fluid Dynamics Laboratory Seminar, Princeton, NJ: Climate change commitment and reversibility. (*invited*)

University of Chicago, Geophysical Sciences Seminar, Chicago, IL: Climate change commitment and reversibility. (*invited*)

2010

AGU Fall Meeting, San Francisco, CA: Is sea ice loss reversible?

4th Graduate Climate Conference, Seattle, WA: Climate commitment in an uncertain world.

2009

AGU Fall Meeting, San Francisco, CA: Controls on Arctic sea ice from first-year and multiyear ice survivability.

CCSM Annual Meeting, Breckenridge, CO: Ice-ocean interactions, tidal mixing, and dense shelf water formation within the Sea of Okhotsk.

ARCUS Sea Ice Outlook Workshop, Boulder, CO: A simple model for Arctic sea ice area trends and variability.

CCSM Polar Climate Working Group Meeting, Sante Fe, NM: A simple model for Arctic sea ice area trends and variability.

2008

AGU Fall Meeting, San Francisco, CA: Ice-ocean interactions, tidal mixing, and dense shelf water formation within the Sea of Okhotsk.

Selected Workshops

UW PCC Summer Institute: Southern Ocean and Antarctic Climate, Friday Harbor, WA, 2016
UW College of the Environment Science Communication Training, 2016
WCRP Workshop: Polar Climate Feedbacks, Louvain-la-Neuve, Belgium, 2016
NAS Workshop: Antarctic Sea Ice Variability, Boulder, CO, 2016
UW PCC Summer Institute: Terrestrial ecosystems, land surface, and climate change, Friday Harbor, WA, 2015
WCRP Grand Challenge Workshop: Earth's Climate Sensitivities, Ringberg, Germany, 2015
US CLIVAR Ocean heat and carbon uptake Meeting, San Francisco, CA, 2014
Princeton University, AOS Workshop: Ice in the climate system, Princeton, NJ, 2014 (*invited lecturer*)
UW PCC Summer Institute: Climate variability and uncertainty, Friday Harbor, WA, 2014
Forum for Arctic Modeling and Observational Synthesis Workshop, Woods Hole, MA, 2013
Advanced Climate Dynamics Course: Dynamics of the last deglaciation, Nyksund, Norway, 2013
Oceans at MIT, Southern Ocean Workshop, Cambridge, MA, 2013
UW PCC Summer Institute: Ice sheet and ocean interactions, Friday Harbor, WA, 2012
Heat Transport in Aquaplanet Models Workshop, University of Washington, Seattle, WA, 2012
Paleoclimate Model Intercomparison Project Workshop, Honolulu, HI, 2012
Advanced Climate Dynamics Course: Dynamics of past warm climates, Friday Harbor, WA, 2011
UW PCC Summer Institute: Hydrological cycle and climate change, Friday Harbor, WA, 2011
UW PCC Summer Institute: Climate feedbacks, Friday Harbor, WA, 2010
UW PCC Summer Institute: Climate impacts on the Pacific Northwest, Friday Harbor, WA, 2009
ARCUS Sea Ice Outlook Workshop, Boulder, CO, 2009
UW PCC Summer Institute: The ocean circulation and climate change, Friday Harbor, WA, 2008
UW PCC Summer Institute: Couplings between changes in the climate system and biogeochemistry, Friday Harbor, WA, 2007

Professional Service

Committee on Atmospheric and Oceanic Fluid Dynamics (AOFD) Member Jan 2017-Jan 2020

Reviewer for the following journal and foundations:

Science, Nature Geoscience, Nature Climate Change, Journal of Climate, Geophysical Research Letters, Climate Dynamics, Journal of Geophysical Research, Climatic Change Letters, The Cryosphere, Environmental Research Letters, Current Climate Change Reports, Progress in Earth and Planetary Science, and the National Science Foundation

Convener for the following conference and workshop sessions:

Understanding natural and anthropogenic drivers of trends and variability, NCAR Southern Ocean Workshop, 2017, Boulder, CO

Large-scale Circulation, AMS Annual Meeting, 2017, Seattle, WA

Physical and Biogeochemical Processes in the Southern Ocean: Observations, State Estimation, and Modeling, Ocean Sciences Meeting, 2016, New Orleans, LA

Dynamics of Deglaciations, AGU Fall Meeting, 2014, San Francisco, CA

Climate Sensitivity and Feedbacks: Advances and New Paradigms, AGU Fall Meeting, 2013, San Francisco, CA

Atmospheric Feedbacks and Climate Change: Observations, Theory, and Modeling, AGU Fall Meeting, 2012, San Francisco, CA

Memberships:

American Geophysical Union, American Meteorological Society, Heterodox Academy

Volunteering & Outreach

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| Public Lecture, "A polar climate change puzzle", invited by Cascadia Climate Action, Ada's Bookstore, Seattle, WA | 2016 |
| UW Polar Science Weekend (<i>volunteer</i>) | 2016 |
| Polar Bears International, Churchill, Manitoba, Canada (<i>volunteer</i>) | 2015 |
| Oceans at MIT outreach, Cambridge, MA (<i>volunteer and assistant to the coordinator</i>) | 2012–2015 |
| Climate science workshops for high school science teachers, Seattle, WA (<i>volunteer</i>) | 2011-2012 |
| UW Focus the Nation climate science "teach-in", Seattle, WA, 2008 (<i>volunteer</i>) | 2008 |