

## HYODAE SEO

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### EDUCATION

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- 2007 Ph.D., Oceanography, Scripps Institution of Oceanography, University of California San Diego  
2002 B.S., Meteorology, Yonsei University, Seoul, South Korea

### POSITIONS HELD

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- 2014 – Present, *Associate Scientist*  
2010 – 2014 *Assistant Scientist*, Department of Physical Oceanography, Woods Hole Oceanographic Institution  
2009 – 2010 *Visiting Assistant Researcher*, International Pacific Research Center, University of Hawaii, Manoa  
2008 – 2009 *NOAA Climate and Global Change Postdoctoral Fellow*, International Pacific Research Center, University of Hawaii, Manoa  
2007 – 2008 *NOAA Climate and Global Change Postdoctoral Fellow*, Department of Atmospheric and Oceanic Sciences, University of California, Los Angeles  
2007 *Visiting Scientist*, International Pacific Research Center, Univ. Hawaii, Manoa  
2002 – 2007 *Graduate Research Assistant*, Scripps Institution of Oceanography, UCSD

### RESEARCH INTEREST

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My research interests span a broad range of topics including: air-sea interactions; atmospheric boundary layer dynamics; synoptic meteorology; tropical meteorology and oceanography; climate dynamics; coupled climate modeling; global and regional climate variability and changes. These interests are pursued using process-oriented high-resolution numerical simulations of the ocean and the atmosphere and their coupled interactions, in addition to extensive use of satellite and *in situ* data and global climate model outputs.

### FUNDED PROJECTS

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#### *Current Projects*

- NSF (2014-2017): EaSM-3: Collaborative Research Quantifying Predictability Limits, Uncertainties, Mechanisms, and Regional Impacts of Pacific Decadal Climate Variability. Seo
- NSF (2014-2015): Regional Coupled Ocean-Atmosphere Feedback Processes Affecting Climate Along the California Coast. Seo
- NASA (2013-2015): Coupling Between the Atmospheric Intra-Seasonal Variability and Ocean Circulation in the Northern Hemisphere. Kwon, Joyce, and Seo
- WHOI Independent Study Award (2013-2015): Submesoscale air-sea Interactions. Seo
- NSF (2014-2016): Decadal Variability in the North Atlantic Extra-Tropics: The Role of Coupling Between Atmospheric Blocking and the Atlantic Multidecadal Oscillation.

Ummenhofer, Seo, Kwon, Joyce

*Past Projects*

- ONR (2012-2014): Predictability and Coupled Dynamics of MJO During DYNAMO. Seo
- ONR (2011-2014): Coupled Ocean-Atmosphere Dynamics and Predictability of MJO's. Seo
- WHOI OCCI (2011-2013): Dynamical analysis of surface wind responses to sea ice and surface temperature variations in the Arctic Ocean: Synthesis of data and model simulation, Seo, Yang
- WHOI Independent Study Award (2011-2013): Trends in coastal upwelling and sea breeze in the California-Oregon Coast: Land-ocean-atmosphere interactions in data and model. Seo

PUBLICATIONS

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*Peer Reviewed*

- Oltmanns, M., F. Straneo, **H. Seo**, G. W. K. Moore, The role of wave dynamics and small-scale topography for downslope wind events in southeast Greenland *J. Atmos. Sci.*, revision submitted.
- Cavanaugh, N., T. Allen, A. Subramanian, B. Mapes, **H. Seo**, and A. J. Miller, 2014: The Skill of Tropical Linear Inverse Models in Hindcasting the Madden-Julian Oscillation. *Climate Dynm.*, DOI:10.1007/s00382-014-2181-x.
- **Seo, H.**, A. Subramanian, A. J. Miller, N. Cavanaugh, 2014: Effect of diurnal cycle in sea surface temperature on the initiation and intensity of convection during DYNAMO. *J. Climate*, 27, 8422-8443, DOI: <http://dx.doi.org/10.1175/JCLI-D-14-00141.1>.
- Park, J.-Y., J.-S. Kug, **H. Seo**, and J. Bader, 2014: Impact of bio-physical feedbacks on the tropical climate in coupled and uncoupled GCMs. *Climate Dynm.*, 43, 1811-1827, DOI: 10.1007/s00382-013-2009-0.
- **Seo, H.**, Y.-O. Kwon, and J.-J. Park, 2014: On the effect of the East/Japan Sea SST variability on the North Pacific atmospheric circulation in a regional climate model. *J. Geophys. Res.–Atmospheres*, 119, 418-444, DOI: 10.1002/2013JD020523.
- Subramanian, A, M. Jochum, A. J. Miller, R. Neale, **H. Seo**, D. Waliser, and R. Murtugudde, 2014: The MJO and Global warming: A study in CCSM4, *Climate Dynm.*, 42, 2019-2031, DOI: 10.1007/s00382-013-1846-1.
- **Seo, H.**, and J. Yang, 2013: Dynamical response of the Arctic atmospheric boundary layer process to uncertainties in sea ice. *J. Geophys. Res.–Atmospheres*, 118, 12383-12402, DOI: 10.1002/2013JD020312.
- Putrasahan, D., A. J. Miller, and **H. Seo**, 2013: Regional coupled ocean-atmosphere downscaling in the Southeast Pacific: Impacts on upwelling, mesoscale air-sea fluxes, and ocean eddies. *Ocean Dynm.*, 63, 463-488, DOI: 10.1007/s10236-013-0608-2.
- **Seo, H.**, and S.-P. Xie, 2013: Impact of ocean warm layer thickness on the hurricane intensity

change in a regional coupled model. *Met. Atmos. Phys.*, 122, 19-32, DOI: 10.1007/s00703-013-0275-3.

- Putrasahan, D. A. J. Miller, and **H. Seo**, 2013: Isolating Mesoscale Coupled Ocean-Atmosphere Interactions in the Kuroshio Extension Region. *Dyn. Atmos. Oceans*, 63, 60-78, DOI: <http://dx.doi.org/10.1016/j.dynatmoce.2013.04.001>.
- **Seo, H.**, K. H. Brink, C. E. Dorman, D. Koracin, and C. A. Edwards, 2012: What determines the spatial pattern in summer upwelling trends on the U.S. West Coast? *J. Geophys. Res.–Oceans*, 117, C08012, DOI: 10.1029/2012JC008016.
- Alexander, M. A., **H. Seo**, S.-P. Xie, J. D. Scott, 2012: ENSO's impact on the gap wind regions of the eastern tropical Pacific Ocean. *J. Climate*, 25, 3549-3565, DOI: <http://dx.doi.org/10.1175/JCLI-D-11-00320.1>.
- **Seo, H.**, and S.-P. Xie, 2011: Response and Impact of Equatorial Ocean Dynamics and Tropical Instability Waves in the Tropical Atlantic under Global Warming: A regional coupled downscaling study. *J. Geophys. Res.–Oceans*. 116, C03026, DOI: 10.1029/2010JC006670.
- **Seo, H.**, S.-P. Xie, R. Murtugudde, M. Jochum, and A. J. Miller, 2009: Seasonal effects of Bay of Bengal barrier layer dynamics in a regional coupled model. *J. Climate*, 22, 6577-6596, DOI: 10.1175/2009JCLI2990.1.
- **Seo, H.**, R. Murtugudde, M. Jochum, A. J. Miller, 2008: Modeling of Mesoscale Coupled Ocean-Atmosphere Interaction and its Feedback to Ocean in the Western Arabian Sea. *Ocean Modell.*, 25, 120-131, DOI: 10.1016/j.ocemod.2008.07.003.
- **Seo, H.**, M. Jochum, R. Murtugudde, A. J. Miller, J. O. Roads, 2008: Precipitation from African Easterly Waves in a Coupled Model of the Tropical Atlantic, *J. Climate*, 21, 1417-1431, DOI: <http://dx.doi.org/10.1175/2007JCLI1906.1>.
- Small, R. J., S. de Szoeke, S.-P. Xie, L. O'Neill, **H. Seo**, Q. Song, P. Cornillon, M. Spall, S. Minobe, 2008: Air-Sea Interaction over Ocean Fronts and Eddies. *Dyn. Atmos. Oceans*, 45, 274-319, DOI: 10.1016/j.dynatmoce.2008.01.001.
- **Seo, H.**, M. Jochum, R. Murtugudde, A. J. Miller, J. O. Roads, 2007: Feedback of Tropical Instability Wave - induced Atmospheric Variability onto the Ocean. *J. Climate*, 20, 5842-5855, DOI: <http://dx.doi.org/10.1175/JCLI4016.1>.
- **Seo, H.**, A. J. Miller J. O. Roads, 2007: The Scripps Coupled Ocean-Atmosphere Regional (SCOAR) model, with applications in the eastern Pacific sector. *J. Climate*, 20, 381-402, DOI: <http://dx.doi.org/10.1175/JCLI4016.1>.
- **Seo, H.**, M. Jochum, R. Murtugudde, A. J. Miller, 2006: Effect of Ocean Mesoscale Variability on the Mean State of Tropical Atlantic Climate. *Geophys. Res. Lett.*, 33,

L09606, DOI: 10.1029/2005GL025651.

*Non-Peer Reviewed*

- **Seo, H.**, 2007: Mesoscale Coupled Ocean-Atmosphere Interaction. Ph.D. thesis, University of California, San Diego

**AWARDS**

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- NOAA Climate and Global Change Postdoctoral Fellowship, Class 17, 2007-2009
- Physical Oceanography Dissertation Symposium V, Honolulu, October 2008
- NCAR Advanced Study Program (ASP) Graduate Student Visiting Program Fellowship, June-October 2006
- Scripps Institution of Oceanography Frieman Director's Prize for Excellence in Graduate Student Research, August 2006
- Outstanding Student Paper Award, Ocean Sciences Meeting, Honolulu, 2006

**TEACHING AND ADVISING ACTIVITIES**

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- UCAR SOARS Undergraduate Research Program (mentoring Mr. Carlos Martinez, Texas A&M University).
- Thesis committee member for Ms. Sara Bosshart (MIT-WHOI Joint Program Master's thesis, 2013)

**OTHER PROFESSIONAL ACTIVITIES**

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*Society Memberships:*

- American Geophysical Union (2002-Present)
- American Meteorological Society (2002-Present)
- The Oceanography Society (2012-Present)
- The Korean Society of Oceanography (2012-Present)

*Community Activities:*

- Member: AMS Scientific and Technological Activities Commission (STAC) committee on Coastal Environment, 2011-Present.
- Panelist: Agency proposal review panels (NASA Surface Water Ocean Topography (SWOT), July 24-26, 2012)

*Journal Reviewer*: The number in the parenthesis indicates times I reviewed manuscripts. Asian Pacific Journal of Atmospheric Science (1), Atmospheric Science Letters (1), Bulletin of the American Meteorological Society (1), Climate Dynamics (4), Dynamics of Atmospheres and Oceans (1), Geophysical Research Letters (2), J. Advances in Modeling Earth Systems (1), Journal of Climate (13), Journal of Marine Systems (1), Journal of Physical Oceanography (2), Journal of Geophysical Research-Atmospheres (4), Journal of Geophysical Research-Oceans (10), Ocean Dynamics (3), Ocean Modelling (1), Remote Sensing (1).

*Proposal Reviewer:*

NOAA (CPO); NSF (OCE Physical Oceanography, ATM Climate and Large-scale Dynamics, ATM Physical and Dynamic Meteorology); The Portuguese Foundation for

Science and Technology (FCT); The French Research Agency (ANR); Programme on National Monsoon Mission (India).

*WHOI Committee*

Advisory committee for the WHOI High Performance Computing Facility: 2010-Present

*Meeting Convener:*

- Air-sea interactions in coastal environments AMS Annual Meeting, Phoenix, AZ, 2015
- Regional climate modeling in the North Pacific, PICES Annual Meeting, Yeosu, 2014
- East Asian Marginal Seas: sea surface temperature variability and ocean-atmosphere process, Ocean Sciences Meeting, Honolulu, HI, February 2014
- Climate Trends and Projections in the Coastal Environment, American Meteorological Society Annual Meeting, Austin, TX, January 2013
- Marine Regional Integrated Assessments: Observations, Predictions, and Uncertainty, WCRP Open Science Conference, Denver, CO, 2011
- Regional and Mesoscale Coupled Air-Sea Modeling, Ocean Sciences Meeting, Portland, OR, 2010

LECTURES & SEMINARS

- Eddy-wind interaction in the California Current System: Eddy kinetic energy and Ekman pumping, Kyushu University, Japan, December 15, 2014
- Regional coupled climate modeling of mesoscale air-sea interactions: dynamics and impacts, San Diego State University, November 21, 2014.
- Coupled impacts of the diurnal cycle of sea surface temperature on the Madden-Julian Oscillation, Kyushu University, September 26, 2014
- Mesoscale Air-Sea Interactions. WHOI Summer Lecture Series, July 28, 2014
- Surface wind response to Arctic sea ice in a regional weather model. WHOI Physical Oceanography Seminar, April 15, 2014.
- Dynamics of near-surface winds over ocean eddies and sea ice: Regional modeling studies of tropical and arctic atmospheres. Univ. Rhode Island, December 6, 2013.
- (Invited) Ocean mesoscale eddies, air-sea interactions and regional climate: regional coupled climate modeling. APEC Climate Center, Busan, Korea, September 13, 2013.
- (Invited) Effect of East/Japan Sea SST variability on the North Pacific atmospheric circulation. International Workshop on Regional Climate Models-II, Busan, Korea, September 11, 2013.
- Role of Ocean Mesoscale Eddies in Air-Sea Interaction and Regional Climate Change. MIT MSEAS Seminar Series, November 16, 2012.
- (Invited) Mesoscale air-sea interactions and regional climate change: the Tropical Instability Waves example. Korea Institute of Ocean Science and Technology (KIOST), May 30, 2012.
- (Invited) Regional modeling of ocean-atmosphere interaction: from tropics to mid-latitudes. Kyushu University, Japan, May 25, 2012.
- (Invited) Mesoscale air-sea interactions and regional climate change: Tropical Instability Waves in a regional coupled model. Yonsei University, Korea, October 14, 2011.
- Regional coupled downscaling of climate and weather. NRL-Stennis Space Center, Mississippi, May 26, 2010.
- (Invited) Regional coupled downscaling: mesoscale air-sea interaction and regional climate

- change, Univ. Texas, Austin, April 26, 2010.
- (Invited) Regional coupled downscaling: Role of mesoscale ocean eddies in climate- Tropical Instability Waves. International Workshop Development and Application of Regional Climate Models, Seoul, Korea, October 11, 2011.
  - (Invited) Regional coupled-downscaling of climate and weather. WHOI PO Seminar Series, March 23, 2010.
  - (Invited) Applications of a regional coupled model to studies of global warming and hurricane-ocean interaction. March 4, 2010, NCAR CGD Seminar
  - (Invited) Mesoscale ocean-atmosphere interaction due to the ocean mesoscale eddies. Physical Oceanography Dissertation Symposium (PODS) V, October 6, 2008.
  - Coupled modeling of mesoscale ocean-atmosphere interactions: tropical instability waves and ocean eddies. NOAA C&GC Summer Institute, Steamboat Springs, CO, July 14, 2008.
  - Mesoscale ocean-atmosphere interaction in the western Arabian Sea: Dynamic and thermodynamic feedback to the ocean. NCAR CGD Seminar, May 23, 2008.
  - (Invited) Coupled Ocean-Atmosphere Interaction; Tropical Instability Waves and Atmospheric Feedback. ESSIC Seminar Series, Univ. Maryland, January 18, 2008,
  - Ocean-Atmosphere Interaction in a High-Resolution Regional Coupled Model. Oceanography Seminar Series, Univ. Hawaii, Manoa, August 23, 2007.
  - Tropical Ocean-Atmosphere Interaction in a Regional Coupled High-Resolution GCM. NCAR CGD Seminar, August 23, 2006,
  - (Invited) Regional Ocean-Atmospheric Feedback in the Eastern Pacific; Gap Winds, TIWs, and Mesoscale Eddies. UCLA AOS 270 Seminar Series, October 12, 2005.

#### CONFERENCE PROCEEDINGS

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- Coupled impacts of the diurnal cycle of sea surface temperature on the Madden-Julian Oscillation, International Regional Spectral Meeting, JAMSTEC, Japan, Nov. 27-28, 2014
- Coupled impacts of the diurnal cycle of sea surface temperature on the Madden-Julian Oscillation, Korean Oceanographic Society Meeting, Jinhae, Korea, November 7, 2014
- Regional coupled modeling of eddy-wind interaction in the California Current System: Eddy kinetic energy and Ekman pumping, PICES Annual Meeting, Yeosu, Korea, Oct. 21, 2014
- Effect of Eddy-Wind Interaction on Ekman pumping and Eddy Kinetic Energy in the California Current System: A Regional Coupled Modeling Study, OFES International Workshop, Aizu University, Oct. 2-3, 2014
- Effect of the East Asian Marginal Sea SST variability on the North Pacific atmospheric circulation: East/Japan Sea case study. European Geophysical Union, Vienna, Austria, Apr. 28 - May 1, 2014.
- Effect of the East/Japan Sea SST variability on the North Pacific atmospheric circulation. Ocean Sciences Meeting, Honolulu, February 24-28, 2014.
- Predictability and Coupled Dynamics of MJO during DYNAMO: Role of diurnal cycle in the intensity of MJO2. ONR Physical Oceanography Peer Review Program, Monterey, September 23-24, 2013.
- Dynamical response of the Arctic surface winds to sea ice variability. Workshop on Climate Implications of Frontal Scale Air-Sea Interaction. NCAR, August 5, 2013.
- Dynamical Response in the Arctic Atmospheric Boundary Layer Process to Uncertainties in Sea Ice Concentration. AMS Polar Meteorology and Oceanography Meeting, Seattle, April

30, 2013.

- What determines the spatial pattern in summer upwelling trends on the U.S. West Coast? AMS Annual Meeting, Austin, TX, January 9, 2013.
- Role of the East/Japan Sea SST variability in the atmospheric circulation in the North Pacific. AMS 18th Conference on Air-Sea Interaction, Boston, July 12, 2012.
- (Invited) Role of the East-Asian marginal sea SST in the regional predictability and the North Pacific climate variability. Japan Geoscience Union Meeting, Tokyo Japan, May 23, 2012.
- Effect of Seasonal Freshwater Forcing on the Indian Monsoon: A Regional Coupled Modeling Study. ONR Bay of Bengal Monsoon Workshop, WHOI, November 16-18, 2011.
- Tropical Instability Waves in the Atlantic: Air-sea interactions and climate change. Coupled Ocean-Atmosphere-Land Processes in the Tropical Atlantic. Miami, March 24, 2011.
- Downscaling global warming with a regional ocean-atmosphere model over the tropical Atlantic: role of equatorial ocean dynamics. AGU Meeting, San Francisco, Dec. 2009.
- Tropical Atlantic response to global warming: Equatorial upwelling and tropical instability waves. International Regional Spectral Model Workshop, Maui, August 4, 2009.
- Seasonal effects of Indian Ocean freshwater forcing in a regional coupled model: barrier layers and Indian Monsoon. IPRC Annual Symposium, June 2, 2009.
- Mesoscale air-sea interaction and feedback in the western Arabian Sea. CLIVAR Western Boundary Current Workshop, Phoenix, January 15, 2009.
- Mesoscale air-sea interaction and feedback in the western Arabian Sea. AMS Annual Meeting, Phoenix, January 14, 2009.
- Overview of the Scripps Coupled Ocean-Atmosphere Regional Model. ONR Coupled Modeling Workshop, Ballston, VA, December 12, 2008.
- Effect of Coupling of Wind and Current on Tropical Instability Waves in the Atlantic Ocean. CLIVAR Tropical Atlantic Variability Meeting, Paris, October 18, 2006.
- Air-sea Coupling Associated with the Tropical Instability Waves: A High-Resolution Coupled-Model Study. Ocean Sciences Meeting, Honolulu, February 24, 2006.
- Coupled Modeling of Regional Ocean-Atmosphere Feedback in the Eastern Equatorial Pacific: Tropical Instability Waves. AMS Annual Meeting, Atlanta, February 2, 2006.
- Atmospheric Boundary Layer Response to SST in the Eastern Pacific. AGU Fall Meeting, San Francisco, December 2005.
- Tropical Instability Waves and Ocean-Atmosphere Feedback. ROMS/TOMS User Workshop, San Diego, 2005.
- Regional Air-Sea Interaction in the Eastern Pacific. International RSM Workshop, New York, August, 2005.
- Development of the Regional Coupled Ocean-Atmosphere Model. AMS Annual Meeting, San Diego, January 2005.
- Preliminary Simulation of the Regional Coupled Atmosphere-Ocean Model in the Southern California Coastal Region. International RSM Workshop, Seoul, Korea, August 2004.