

Philip Joseph Pegion
Associate Scientist III
University of Colorado/CIRES and NOAA/ESRL Physics Sciences Division
325 Broadway, R/PSD1, Boulder, CO 80305-3328
Tel: 303-497-7897, Fax: 303-497-6449
Philip.Pegion@noaa.gov

EMPLOYMENT

Associate Scientist III

May 2009 – Present

CIRES/University of Colorado, Boulder.

Test out new techniques that account for unresolved processes in the Global Forecast System, and work with NCEP implement successful candidates into operations. Contribute to the development of the next generation global model and data assimilation system by implementing new techniques and performing tests of the data assimilation system and medium range forecasts.

Conduct diagnostic and modeling studies of evolving climate conditions, including exploring the causes of extreme events such as floods and drought. The scope of work would also include understanding the regional impacts of future anthropogenic climate forcing. Improve on new ensemble-based data assimilation techniques for global atmospheric models, with the focus on improving tropical cyclone forecasts.

Research Meteorologist

Mar 2008 – Apr 2009

National Weather Service/Climate Prediction Center Camp Springs, MD

Real-time monitoring of the Global Ocean Data Assimilation System (GODAS). Development of a real-time objective analysis of sub-surface temperature observations. Rotating lead of CPC Ocean Briefing, and the Global Tropical Hazards conference calls/forecasts. Participation in the U.S. Clivar Drought Working Group.

Senior Scientific Programmer/Analyst, Task Lead, SAIC Scientific Programmer/Analyst, GSC/SAIC

Aug 2004 – Feb 2008

Aug 1999 – Jul 2004

In support of the NASA-Seasonal to Interannual Prediction Project (NSIPP) and the Global Modeling and Assimilation Office, (GMAO), NASA, Goddard Space Flight Center.

Run and analyze atmospheric model output for simulation and predictability studies. Produce real-time seasonal forecasts. Generate atmospheric and land initial conditions for the GMAO experimental seasonal forecasts. Execute seasonal forecasts with the atmospheric model in collaboration with the International Research Institute for Climate and Society (IRI). Disseminated the forecasts to outside collaborators.

Analyzed long coupled simulations with the GMAO Coupled model using EOF analysis to

separate modes of SST variability and ENSO and Atlantic variability from model drift associated with model systematic errors.

Part of the NASA Reanalysis (MERRA) validation team. Responsible for analyzing experiments with the GOES-5 DAS aimed to improve the climate of the system. Experiments addressed the impact of new observing systems, satellite bias correction, and model physics. Analysis included comparisons to independent in-situ observations, satellite observations, and other reanalyses such as NCEP Reanalyses, ERA40, JRA-25, and the NCEP and EC operational analyses.

Perform studies of forecasts of hurricane track and intensity dependency on initialization and changes to model physics with a high resolution ($\frac{1}{4}$ degree) GCM.

Part of the proposal writing team that successfully won the GMAO support contract for SAIC.

Graduate Research Assistant

May 1998 - Aug 1999

Center for Ocean-Atmosphere Prediction Studies, Florida State University, Tallahassee, FL

Creation of variationally derived NSCAT pseudostress product. Writing of IDL code to process and display NSCAT data.

Summer Intern/Weather Forecaster

May 1996 - Aug 1996

Brookhaven National Laboratory, Upton, NY

Issued forecasts twice daily. Kept a log of daily meteorological data. Tested radiation sensors before sending them into the field. Calibration of thermometer and wind vane.

Student Intern

Aug 1996 - Dec 1996

National Weather Service, Eastern Region Headquarters, Bohemia, NY

Developed web pages using HTML for interoffice use. COMET training modules for weather forecasting. Participated in daily weather briefings.

EDUCATION

M.S. Meteorology, Florida State University, Tallahassee, FL (1999)

Adviser: Dr. James J. O'Brien

Thesis Title: Objectively Derived Daily "Winds" from Satellite Scatterometer Data.

B.S. Atmospheric Science, State University of New York at Stony Brook, Stony Brook, NY (1996)

Awards

- Global Modeling and Assimilation Office (GMAO) Outstanding Performance Award, 2008

- The GMAO/SRT Outstanding Performance Award, 2004
- The GMAO/SRT Group Achievement Award, 2003
- Climate and Radiation Branch Exceptional Scientific Support Award, 2001

GRANTS AND CONTRACTS

- Principal Investigator, High Impact Weather Prediction Project, 2014-2017: HIWPP Assimilation, Ensemble, Stochastic Physics and Parameterization Development \$1.22M
- Principal Investigator, Sandy Supplemental, 2014-2016: Sandy Supplemental Lower boundary ensemble initial perturbations in GEFS and hybrid ensemble DA (GEFS): \$280K
- Principal Investigator, Sandy Supplemental, 2014-2016: Sandy Supplemental Multi-model post-processing \$340K
- Principal Investigator, Sandy Supplemental, 2014-2016: Sandy Supplemental Stochastic Physics, \$280K
- Principal Investigator, Sandy Supplemental, 2014-2015: Ensemble-Variational Data Assimilation and Prediction \$201K

REFEREED PUBLICATIONS

- Liebmann, B., M. Hoerling, C. Funk, I. Bladé, R. Dole, D. Allured, X.-W. Quan, **P. Pegion**, J. Eischeid, 2014: Understanding Recent Eastern Horn of Africa Rainfall Variability and Change. *J. Clim.*, 8630-8645.
- Torn R., J. Whitaker, **P. Pegion**, T. Hamill, G. Hakim, 2014: Diagnosis of the source of GFS medium range track errors in Hurricane Sandy (2012). *Mon. Wea. Rev.*, Early online release.
- Han, W., G. Meehl, A. Hu, M. Alexander, T. Yamagata, D. Yuan, M. Ishii, **P. Pegion**, J. Zheng, B. Hamlington, X.-W. Quan, R. Leben, 2013: Intensification of Decadal and Multi- Decadal Sea Level Variability in the Western Tropical Pacific During Recent Decades. *Clim. Dyn.* **43** (5-6), 1-23.
- Hoerling, M., A. Kumar, R. Dole, J. Nielsen-Gammon, J. Eischeid, J. Perlwitz, X. Quan, T. Zhang, **P. Pegion** and M. Chen 2013: Anatomy of an Extreme Event. *J. Clim.*, **26**, 2811-2832.
- Hoerling, M., J. Eischeid, J. Perlwitz, X. Quan, T. Zhang, **P. Pegion**, 2012: On the Increased Frequency of Mediterranean Drought. *J. Clim.*, **25**, 2146-2161.
- Rienecker, M., M. Suarez, R. Gelaro, R. Todling, J. Bacmeister, E. Liu, M. Bosilovich, S. Schubert, L. Takacs, G.-K. Kim, S. Bloom, J. Chen, D. Collins, A. Conaty, A. da Silva, W. Gu, J. Joiner, R. Koster, R. Lucchesi, A. Molod, T. Owens, S. Pawson, **P. Pegion**, C. Redder, R. Reichle, F. Robertson, A. Ruddick, M. Sienkiewicz, J. Woollen, 2011: MERRA - NASA's Modern-Era Retrospective Analysis for Research and Applications. *J. Clim.*, **24**, 3624-3648.
- Dole, R., M. Hoerling, J. Perlwitz, J. Eischeid, **P. Pegion**, T. Zhang, X. Quan, T. Xu, D. Murray, 2011: Was there a basis for anticipating the 2010 Russian heat wave?. *Geophys. Res. Lett.*, **38** (L06702).

- Ferguson, I., P. Duffy, T. Phillips, X. Liang, J. Dracup, S. Schubert, **P. Pegion**, 2011: Non-stationarity of the signal and noise characteristics of seasonal precipitation anomalies. *Clim. Dyn.*, **36** (3), 739-752.
- Hoerling M., J. Hurrell, A. Kumar, L. Terray, J. Eischeid, **P. Pegion**, T. Zhang, X.-W. Quan, T. Xu, 2011: On North American decadal climate for 2011-2020, *J. Clim.*, **24**, 4519-4528.
- Pegion, P.**, A. Kumar, 2010: Multi-model Estimates of Atmospheric Response to Modes of SST Variability and Implications for Droughts. *J. Clim.*, **23**, 4327-4341.
- Ferguson, I., J. Dracup, P. Duffy, **P. Pegion**, S. Schubert, 2010: Influence of SST Forcing on Stochastic Characteristics of Simulated Precipitation and Drought. *J. Hydrometeorol.*, **11**, 754-769.
- Xue, Y., F. De Sales, W. Lau, A. Boone, J. Feng, P. Dirmeyer, Z. Guo, K.-M. Kim, A. Kitoh, V. Kumar, I. Pocard-Leclercq, N. Mahowald, W. Moufouma-Okia, **P. Pegion**, D. Rowell, J. Schemm, S. Schubert, A. Sealy, W. Thiaw, A. Vintzileos, S. Williams, M.-L. Wu, 2010: Intercomparison and analyses of the climatology of the West African Monsoon in the West African Monsoon Modeling and Evaluation project (WAMME) first model intercomparison experiment. *Clim. Dyn.*, **34** (1), 3-27.
- Wu, M.-L. C., O. Reale, S. Schubert, M. Suarez, R. Koster, **P. Pegion**, 2009: African Easterly Jet: Structure and Maintenance. *J. Clim.*, **22**, 4459-4480.
- Findell, K., A. Pitman, M. England, **P. Pegion**, 2009: Regional and Global Impacts of Land Cover Change and Sea Surface Temperature Anomalies. *J. Clim.*, **22**, 3248-3269.
- Wang, H., S. Schubert, M. Suarez, J. Chen, M. Hoerling, A. Kumar, **P. Pegion**, 2009: Attribution of the Seasonality and Regionality in Climate Trends over the United States during 1950-2000. *J. Clim.*, **22**, 2571-2590.
- Schubert, S., and Coauthors, 2009: A U.S. CLIVAR Project to Assess and Compare the Responses of Global Climate Models to Drought-Related SST Forcing Patterns: Overview and Results. *J. Clim.*, **22**, 5251-5272.
- Schubert, S., M. Suarez, **P. Pegion**, R. Koster, and J. Bacmeister, 2008: Potential Predictability of Long-Term Drought and Pluvial Conditions in the U.S. Great Plains. *J. Clim.*, **21**, 802-816.
- Scaife, A., F. Kucharski, C. Folland, J. Kinter, S. Brönnimann, D. Fereday, A. Fischer, S. Grainger, K. Jin, I.-S. Kang, J. Knight, S. Kusunoki, N. Lau, M. Nath, T. Nakaegawa, **P. Pegion**, S. Schubert, P. Sporyshev, J. Syktus, J. H. Yoon, N. Zeng and T. Zhou, 2008: The CLIVAR C20C project: selected twentieth century climate events. *Clim. Dyn.*, **33** (5), 603-614.
- Zhou T., B. Wu, A. Scaife, S. Brönnimann, A. Cherchi, D. Fereday, A. Fischer, C. Folland, K. Jin, J. Kinter, J. Knight, F. Kucharski, S. Kusunoki, N. Lau, L. Li, M. Nath, T. Nakaegawa, A. Navarra, **P. Pegion**, E. Rozanov, S. Schubert, P. Sporyshev, A. Voldoire, Xinyu Wen, J.-H. Yoon and N. Zeng, 2008: The CLIVAR C20C project: which components of the Asian-Australian monsoon circulation variations are forced and reproducible? *Clim. Dyn.*, **33**, 615-627.
- Kucharski, F., A. Scaife, J. Yoo, C. Folland, J. Kinter, J. Knight, D. Fereday, A. Fischer, K. Jin, J. Kröger, N. Lau, T. Nakaegawa, M. Nath, **P. Pegion**, E. Rozanov, S. Schubert, P. Sporyshev, J. Syktus, A. Voldoire, J.-H. Yoon, N. Zeng and T. Zhou, 2008: The CLIVAR C20C project: skill of simulating Indian monsoon rainfall on interannual to decadal timescales. Does GHG forcing play a role? *Clim. Dyn.*, **33** (5), 615-627.

- Wang B., J.-Y. Lee, I.-S. Kang, J. Shukla, C.-K. Park, A. Kumar, J. Schemm, S. Cocke, J.-S. Kug, J.-J. Luo, T. Zhou, B. Wang, X. Fu¹, W.-T. Yun, O. Alves, K. Jin, J. Kinter, B. Kirtman, T. Krishnamurti, N. Lau, W. Lau¹, P. Liu, **P. Pegion**, T. Rosati, S. Schubert, W. Stern, M. Suarez and T. Yamagata, 2008: Advance and prospectus of seasonal prediction: assessment of the APCC/CliPAS 14-model ensemble retrospective seasonal prediction (1980–2004). *Clim. Dyn.*, **33** (1),93-117.
- Schubert, S., Y. Chang, M. Suarez, and **P. Pegion**, 2008: ENSO and Wintertime Extreme Precipitation Events over the Contiguous United States. *J. Clim.*, **21**, 22–39.
- Castro, C., R. Pielke, J. Adegoke, S. Schubert, and **P. Pegion**, 2007: Investigation of the Summer Climate of the Contiguous United States and Mexico Using the Regional Atmospheric Modeling System (RAMS). Part II: Model Climate Variability. *J. Clim.*, **20**, 3866–3887.
- Wu, M.-L., S. Schubert, M. Suarez, **P. Pegion**, and D. Waliser, 2006: Seasonality and Meridional Propagation of the MJO. *J. Clim.*, **19**, 1901–1921.
- Gutzler, D., H. Kim, R. Higgins, H. Juang, M. Kanamitsu, K. Mitchell, K. Mo, **P. Pegion**, E. Ritchie, J. Schemm, S. Schubert, Y. Song, and R. Yang, 2005: The North American Monsoon Model Assessment Project: Integrating Numerical Modeling into a Field-based Process Study. *Bull. Amer. Meteor. Soc.*, **86**, 1423–1429.
- Schubert, S, M Suarez, **P Pegion**, R Koster, J Bacmeister, 2004: On the Cause of the 1930s Dust Bowl. *Science*, **303**, 1855-1859.
- Schubert, S., M. Suarez, **P. Pegion**, R. Koster, and J. Bacmeister, 2004: Causes of Long-Term Drought in the U.S. Great Plains. *J. Clim.*, **17**, 485–503.
- Straus, D., J. Shukla, D. Paolino, S. Schubert, M. Suarez, **P. Pegion**, and A. Kumar, 2003: Predictability of the Seasonal Mean Atmospheric Circulation during Autumn, Winter, and Spring. *J. Clim.*, **16**, 3629–3649.
- Schubert, S., M. Suarez, **P. Pegion**, M. Kistler, and A. Kumar, 2002: Predictability of Zonal Means during Boreal Summer. *J. Clim.*, **15**, 420–434.
- Pegion, P.**, M. Bourassa, D. Legler, and J. O'Brien, 2000: Objectively Derived Daily “Winds” from Satellite Scatterometer Data. *Mon. Wea. Rev.*, **128**, 3150–3168.

OTHER PUBLICATIONS

- Weaver, S., J. Trapp, M. Tippett, R. Schneider, **P. Pegion**, S.-K. Lee. W. Higgins, A. Dean , G. Carbin, H. Brooks, M. Baldwin, F. Alvarez 2013: Advancing the Nation’s capability to anticipate tornado and severe weather risk, *NOAA/NWS/NCEP/CPC* http://www.cpc.ncep.noaa.gov/products/severe_weather/Climate.Severe.Weather.White.Paper.Apr2013.pdf
- Pegion, P.**, A. Kumar, 2008: Analysis of the multi-model U.S. CLIVAR Drought Working Group simulations. *U. S. CLIVAR Variations* **6**, 6-8.
- Vintzileos, A, M Rienecker, M Suarez, S Miller, P Pegion, J Bacmeister, 2008: Simulation of the El Niño – Southern Oscillation phenomenon with NASA's Seasonal-to-Interannual Prediction Project coupled general circulation model. *CLIVAR Exchanges* **8**, 25-27.
- Pegion, P.**, S. Schubert, M. Suarez 2002: Validation of NSIPP Tier-2 Seasonal Forecasts: what can we gain from improved SST forecasts? *16th Conference on Probability and Statistics in the Atmospheric Sciences*. Orlando, FL, Amer. Meteor. Soc., 1-6.

Pegion, P., S. Schubert, M. Suarez, 2000. An Assessment of the Predictability of Northern Winter Seasonal Means with the NSIPP 1 AGCM. *Technical Report Series on Global Modeling and Data Assimilation 104606, 18.*

Bacmeister, J., S. Schubert, M. Suarez, **P. Pegion**, 2000. Atlas of Seasonal Means Simulated by the NSIPP 1 Atmospheric GCM. *Technical Report Series on Global Modeling and Data Assimilation 104606, 17.*

CONFERENCE PRESENTATIONS

AMS Conference on Hurricanes and Tropical Meteorology, 2014, San Diego, CA

Workshop on Severe Convection and Climate, 2013, Palisades, NY - Invited

Seasonal Severe Weather Workshop, 2012, Norman OK – Invited

Climate Diagnostics and Prediction Workshop, 2012, Fort Collins, CO

AGU Fall Meeting, 2011, San Francisco, CA

Climate Diagnostics and Prediction Workshop, 2010, Raleigh, NC

Ensemble Kalman Filter (EnKF) workshop, 2010, Rensselaerville, NY

Climate Diagnostics and Prediction Workshop, 2008, Lincoln, NE

CPO/COD 6th Annual System Review, 2008, Silver Spring, MD

AMS Annual Meeting, 2008, New Orleans, LA

Climate Diagnostics and Prediction Workshop, 2007, Tallahassee, FL

3rd Annual NEWS PI Meeting, 2007, Huntsville, AL

Hurricane And Climate Change Workshop, 2006 Boulder, CO

Climate Diagnostics and Prediction Workshop, 2006, Boulder, CO

2nd Annual NEWS PI Meeting, 2006, College Park, MD

APEC Climate Center Symposium 2006, Busan, Republic of Korea - invited

AGU Joint Assembly, 2005, Baltimore, MD

Climate Diagnostics and Prediction Workshop, 2005, State College, PA

AGU Joint Assembly, 2005, New Orleans, LA

Climate Diagnostics and Prediction Workshop, 2004, Madison, WI

1st International CLIVAR Science Conference, 2004 Baltimore, MD

AMS Annual Meeting, 2003, Seattle, WA

Climate Diagnostics and Prediction Workshop, 2003, Reno, NV

AMS Annual Meeting, 2002, Orlando, FL

Climate Diagnostics and Prediction Workshop, 2001 La Jolla, CA

Climate Diagnostics and Prediction Workshop, 2000, Palisades, NY

SPECIALIZED SKILLS

Data formats: grib, NetCDF, HDF, binary

Programming Languages: Fortran 90, C, IDL GrADS, shell and perl scripting.

TECHNICAL SKILLS

Climate Models: NASA/NSIPP1, NASA/GEOS5, MPI/ECHAM-5

Weather Models: NOAA/FIM, NOAA/GFS, NOAA/GSM

Programming: Fortran 77/90, C, python, shell-scripting

Data Analysis: GrADS, IDL, Matlab

Operating Systems: Unix/Linux, Mac OSX, MS Windows

Supercomputing Systems: NOAA, NASA, DOE, University of Colorado, Texas A & M

Other software: subversion, openmp, mpi

Supervisory Activities

Currently supervise one CIRES Scientist

Previously supervised 2 contract staff in support of the GMAO

Teaching Activities

Summer School on Atmospheric Modeling (SSAM), July 2010 – Introduction to FIM Diagnostics