Christopher Melhauser

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PROFESSIONAL EXPERIENCE

I.M. Systems Group, Inc. College Park, MD
NOAA National Centers for Environmental Prediction - Environmental Modeling Center 04/2016 – present
Support Scientist II (Meteorologist)

- Developing the Rocoto workflow, debugging the current component models (GSM, MOM5.1, CICE5), running benchmark tests, providing visualization support, and aiding in model calibration efforts for the NEMS based Unified Global Coupled System (UGCS) for subseasonal and seasonal prediction
- Performing model validation studies for subseasonal prediction using various prototype Global Ensemble Forecasting System (GEFS) configurations
- Additional support for the NCEP EMC ensemble and climate groups. Research website: http://www.emc.ncep.noaa.gov/gmb/cmelhauser/index.html

The Pennsylvania State University State College, PA
Research Assistant/Graduate Lecturer 04/2012 – 04/2016

- Research assistant for the mesoscale modeling group headed by Fuqing Zhang
  - Multiple model (WRF-ARW, HWRF, COAMPS-TC) pseudo-operational predictability study of Hurricane Sandy (2012) using identical initial/boundary conditions (merged GFS global analysis and APSU WRF-ARW regional EnKF analysis).
  - Algorithm development and error analysis of airborne Doppler radar radial velocity COPLANE retrievals for tropical cyclone data assimilation.
  - Integration of the WRF PSU-EnKF NOAA P-3 airborne Doppler observation operator with the Navy COAMPS-EnKF data assimilation system.
  - Implementation and testing of the parallel COAMPS-TC model and COAMPS-EnKF data assimilation system.
  - Diurnal radiation cycle impact case study on the genesis of Hurricane Karl (2010) through WRF radiation scheme modification and sensitivity experiments.
- Lecturer for the Department of Meteorology (Spring 2015/2014/2013 – Weather and Risk)
- Co-lecturer for the Department of Meteorology (Fall 2013 – Application of Computers to Meteorology)
- Teaching assistant for the Department of Meteorology (Fall 2012 - Introduction to Meteorological Analysis)
- Field forecaster for the NASA Hurricane and Severe Storm Sentinel (HS3) field campaign (September 2014, August 2013)
- Reviewer for AMS Monthly Weather Review, AMS Weather and Forecasting, and AGU Journal for Geophysical Research - Atmospheres (December 2013 – Present)
- On-air weather forecaster for Penn State's Weather World daily broadcast (May 2012 – Present)

Risk Management Solutions, Inc. Hoboken, NJ
Business Analyst 10/2011 – 04/2012

- Supported the RMS solution architecture team with gathering business requirements and coordinating resources across RMS departments for the RMS Open Model Platform and Model Execution NexGen initiative.
- Supported client relationships for exclusive RMS Joint Development Partners for the NexGen initiative.
- Developed and documented workflows and conducted business use case realization in alignment with product development initiatives.

Risk Analyst 07/2010 – 10/2011

- Supported the production of technical marketing material including maps, graphs, and written documentation for the RMS Hurricane v11 model go-to-market agenda and release.
- Analyzed exposure data sets and model output using RiskLink (RMS catastrophe models).
- Engaged in research with respect to natural hazards and the catastrophe insurance market.
- Supported the execution of RMS real-time event response, including hurricane (HU Irene – 2011) and tornado (Alabama outbreak and Joplin tornado of 2011) perils, documenting the characteristics of the event and developing methodologies to estimate insured loss.
- Developed presentations and performed risk analyst training courses in ArcGIS, the RMS product suite, and residual markets.
- Performed global product support for RMS products, researching issues, gathering requirements for clients, and providing final solutions.
- Supported client development with client relations, client questions, and personal client support.
- Completed Pragmatic Marketing and Certified Catastrophe Risk Analyst (CCRA) training through intensive seminar courses.

The Pennsylvania State University — State College, PA
Graduate Teaching/Research Assistant — 08/2008 – 05/2010

- Lab instructor, grading assistant, and course lecturer for earth science courses including Quantitative Analysis in the Earth Sciences, Synoptic Meteorology, Atmospheric Thermodynamics, and Introduction to Meteorology.
- Research assistant for the mesoscale modeling group headed by Fuqing Zhang researching the predictability of severe convective and mesoscale weather systems.
- *VORTEX II* (Verification of the Origins of Rotation in Tornadoes Experiment II) field experiment participant managing data acquisition and providing mobile mesonet driving support while gathering vital thermodynamic data for supercell storm development both tornadic and non-tornadic in nature (May 2009 to June 2009).

EDUCATION

University of Colorado at Boulder, Boulder, CO — 05/2008
Bachelors of Science: Mechanical Engineering — GPA: 3.90

- Minors: Economics and Atmospheric and Oceanic Sciences
- Honors: Magna Cum Laude

The Pennsylvania State University, University Park, PA — 05/2010
Masters of Science: Meteorology — GPA: 3.93

- Thesis: *Predictability and Dynamics of a Squall Line and Bow Echo during BAMEX*

The Pennsylvania State University, University Park, PA — 05/2016
Doctor of Philosophy: Meteorology — GPA: 4.00

- Dissertation: *Practical Predictability of Tropical Cyclones: Hurricanes Karl (2010), Sandy (2012), and Edouard (2014)*

PUBLICATIONS

Zhu, Y., X. Zhou, M. P. Mendez, W. Li, **C. Melhauser**, and D. Hou, 2017: Evaluation of Sea Surface Temperature Forcing on Week 3&4 Forecast Skill using the NCEP Global Ensemble Forecasting System. *Weather and Forecasting*, in-prep.

Ping, L., Y. Zhu, Q. Zhang, J. Gottschalck, M. Zhang, **C. Melhauser**, W. Li, H. Guan, X. Zhou, D. Hou, M. P. Mendez, G. Wu, Y. Liu, L. Zhou, B. He, W. Hu, and R. Sukhdeo, 2016: Tracking Persistent Maxima of 500-hPa Geopotential Height. *Weather and Forecasting*, submitted.

Melhauser, C. and F. Zhang, 2016: A Multiple-Model Ensemble Examination of the Probabilistic Prediction of Hurricane Sandy (2012) and Hurricane Edouard (2014), *Weather and Forecasting*, **32**, 665-668.

Melhauser, C., and F. Zhang, 2016: Development and Application of a Simplified Coplane Wind Retrieval Algorithm Using Dual-Beam Airborne Doppler Radar Observations for Tropical Cyclone Prediction. *Monthly Weather Review,* **144**, 2645-2665.

Zhang, F., **C. Melhauser**, D. Tao, Y. Q. Sun, E. B. Munsell, Y. Weng and J. A. Sippel, 2016: Predictability of Severe Weather and Tropical Cyclones at the Mesoscales. To appear in Dynamics and Predictability of Large-scale, High-impact Weather and Climate Events (eds, J. Li, R. Swinbank, H. Volkert and R. Grotjahn). Cambridge University Press, 2016.

Melhauser, C., and F. Zhang, 2014: Diurnal radiation cycle impact on the genesis of Hurricane Karl (2010). *Journal of the Atmospheric Sciences,* **71,** 1241-1259.

Melhauser, C., and F. Zhang, 2012: Practical and intrinsic predictability of Severe and Convective Weather at the mesoscales. *Journal of the Atmospheric Sciences*, **69**, 3350-3371.

PRESENTATIONS

Melhauser, C., W. Li, Y. Zhu, H. Guan, M. Pena, Q. Zhou, and D. Hou, 2016: Sub-Seasonal Precipitation and Surface Temperature Forecast Skill Using the Extended Range NCEP Global Ensemble Forecasting System. *Poster.* AGU 2016 Fall Meeting. San Francisco, CA.

Melhauser, C., W. Li, Y. Zhu, M. Pena, D. Hou, and Q. Zhou, 2016: Sub-seasonal Temperature and Precipitation Skill using the Extended Range NCEP Global Ensemble Forecasting System. 41st Climate Diagnostic and Prediction Workshop. Orono, ME.

Melhauser, C., and F. Zhang, 2015: *A Multiple-Model Examination of the Probabilistic Prediction of Hurricanes Sandy (2012) and Edouard (2014)*. Hurricane Forecasting and Improvement Project (HFIP) 2015 annual meeting. Miami, FL.

Melhauser, C. and F. Zhang, 2015: *A Multiple-Model Ensemble Examination of the Probabilistic Prediction of Hurricane Sandy (2012) and Hurricane Edouard (2014).* The 23rd Conference on Numerical Weather Prediction. Chicago, IL.

Melhauser, C., and F. Zhang, 2014: *Airborne Tail Doppler Radar Coplanar Dual-Doppler Wind Velocity Retrievals For Use In Tropical Cyclone Numerical Model Initialization*. The 2014 AMS Summer Community Meeting, Student Presentation. State College, PA.

Melhauser, C., F. Zhang, Y. Weng, and J. Sippel, 2013: *The Use of Airborne Doppler Radar Radial Velocity Super Observations for Tropical Cyclone Prediction.* The 36th Conference on Radar Meteorology. Breckenridge, CO.

Melhauser, C., F. Zhang, M. Weisman, and D. P. Jorgensen, 2009: *Predictability and dynamics of a squall line and bow echo event during BAMEX.* The 13th Conference on Mesoscale Processes. Salt Lake City, UT.

TECHNICAL SKILLS

- Advanced knowledge of the Global Ensemble Forecasting System (GEFS), Weather Research and Forecasting Model (WRF-ARW), WRF post-processing software (RIP4, UPP), Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS), COAMPS post-processing software (COAMPS utilities), and HWRF (WRF-NMM).
- Advanced knowledge of the PSU-WRF and Navy-COAMPS square-root EnKF data assimilation systems.
- Advanced knowledge of NetCDF and grib/grib2 data formats.
- Advanced knowledge of WGRIB and WGRIB2.
- Advanced knowledge of the Microsoft Office suite.
- Intermediate knowledge of RMS products including RiskLink.
- Intermediate knowledge of WRFDA including standard 4DVar, E4DVar, and 4DEnsVar.
- Intermediate knowledge of GIS products including ESRI ArcGIS desktop applications and Google Earth Pro.
- Programming languages: MatLab (advanced), bash/csh/sh/ksh scripting (advanced), Fortran-77/90 (advanced), NCL (advanced), T-SQL (intermediate), Python (intermediate), LabVIEW (basic), and SOLIDWorks (basic).

HONORS AND AWARDS

NASA Group Achievement Award for HS3 (2015)
Hands Neuberger Meteorology Teaching Award (2010)

PROFESSIONAL CERTIFICATIONS/EXAMS

Certified Catastrophe Risk Analyst (CCRA)
NCEES Fundamentals of Engineering Exam (FE)

AFFILIATIONS

American Meteorological Society (AMS)
American Geophysical Union (AGU)
Chi Epsilon Pi Meteorological Honor Society
Pi Kappa Phi Fraternity