**Andrew Whitaker Wood**

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**Education**

University of Washington, Seattle, WA

PhD, Hydrology and Water Resources, Dept. of Civil and Environmental Engineering, 2003

Dissertation: *Using Climate Model Forecasts for Seasonal Hydrologic Prediction*

MSE, Water Resources and Systems Engineering, Dept. of Civil and Envir. Engineering, 1995

Thesis: *The Impact of Climate Change on the Savannah River System*

Amherst College, Amherst, MA – BA, English, 1988

**Employment Experience**

2013-present Project Scientist III, National Center for Atmospheric Research, Climate and Global Dynamics (CGD); Research Applications Laboratory (RAL), Boulder, CO

2010-2013 Development and Operations Hydrologist (GS 14; Mgmt/Tech), NOAA NWS River Forecast Centers: (1) Colorado Basin, Salt Lake City, UT; (2) Northwest, Portland, OR

2008-2010 Senior / Lead Scientist, 3TIER Environmental Forecast Group, Inc., Seattle

2004-2008 Research Assistant Professor, Dept. of Civil & Envir. Engineering, Univ. of Washington

2003-2004 Research Scientist, Dept. of Civil & Envir. Engineering, University of Washington

1998-2003 Research Assistant, Dept. of Civil & Envir. Engineering, University of Washington

1996-1998 Visiting Fellow, U.S. Army Corps of Engineers, Institute for Water Resources, Policy and Special Studies Division, Alexandria, VA

1994-1996 Research Staff, Dept. of Civil & Envir. Engineering, University of Washington

**Publications (peer reviewed)**

101. Newman, AJ, JR Arnold, **AW Wood**, and ED Gutmann, 2022. A Workshop on Improving Our Methodologies of Selecting Earth System Models for Climate Change Impact Applications, *Bull. Amer. Met. Soc.*, 103(4), E1213-E1219. <https://journals.ametsoc.org/view/journals/bams/103/4/BAMS-D-21-0316.1.xml>

100. Tang, G, MP Clark, WJM Knoben, J Liu, S Gharari, L Arnal, HE Beck, **AW Wood**, AJ Newman, SM Papalexiou, 2022. The impact of meteorological forcing uncertainty on hydrological modeling in cryosphere basins globally. *AGU Advances* (in review).

99. Slater, LJ, L Arnal, M-A Boucher, AYY Chang, S Moulds, C Murphy, G Nearing, G Shalev, C Shen, L Speight, G Villarini, R Wilby, **AW Wood**, and M Zappa, 2022, Hybrid forecasting: using statistics and machine learning to integrate predictions from dynamical models. *Hydrol. Earth Syst. Sci.* (in review)

98. Mizukami, N, AJ Newman, JS Littell, TW Giambelluca, **AW Wood**, ED Gutmann, JJ Hamman, DR Gergel, B Nijssen, MP Clark, JR Arnold, 2022, New projections of 21st Century Climate and Hydrology for Alaska and Hawaiʻi, Clim. Serv. 27, 100312, https://doi.org/10.1016/j.cliser.2022.100312.

97. Liu, HL, BA Tolson, AJ Newman, **AW Wood**, 2021, Leveraging ensemble meteorological forcing data to improve parameter estimation of hydrologic models, *Hydrol. Processes, 35(11), e14410.* [*https://doi.org/10.1002/hyp.14410*](https://doi.org/10.1002/hyp.14410)

96. Baker, SA, B Rajagopalan, **AW Wood**, 2021. Enhancing Ensemble Seasonal Streamflow Forecasts in The Upper Colorado River Basin Using Multi-Model Climate Forecasts, *J. AWRA* 57 (6): 906–922. <https://doi.org/10.1111/1752-1688.12960>.

95. Tang, G. MP Clark, SM Papalexiou, AJ Newman, **AW Wood**, D Brunet and PH Whitfield, 2021. EMDNA: An Ensemble Meteorological Dataset for North America, Earth Syst. Sci. Data, 13, 3337–3362, https://doi.org/10.5194/essd-13-3337-2021.

94. Van Beusekom, AE, Hay, LE, Bennett, AR, Choi, Y, Clark, MP, Goodall, JL, Li, Z, Maghami, I, Nijssen, B, & **AW Wood,** 2022. Hydrologic Model Sensitivity to Temporal Aggregation of Meteorological Forcing Data: A Case Study for the Contiguous United States, *J. Hydromet.*, 23(2), 167-183. https://doi.org/10.1175/JHM-D-21-0111.1

93. Gutmann, ED., JJ Hamman, MP Clark, T Eidhammer, **AW Wood**, JR Arnold, 2022. En-GARD: A statistical downscaling framework for the production and testing of large ensembles of climate projections. *AMS J. Hydromet.* https://doi.org/10.1175/JHM-D-21-0142.1

92. Baker, SA, **AW Wood**, B Rajagopalan, J Prairie, C Jerla, E Zagona, RA Butler, R Smith, 2022, The Colorado River Basin Operational Prediction Testbed: a tool for improving water management through benchmarking seasonal to interannual forecasts of streamflow and reservoir system projections, *J. Amer. Water Res. Assn.*, https://doi.org/10.1111/1752-1688.13038.

91. Bunn, PTW, **AW Wood**, AJ Newman, H Chang, CL Castro, MP Clark and JR Arnold, 2022, Improving station-based ensemble surface meteorological analyses using numerical weather prediction: A case study of the Oroville Dam crisis precipitation event. *J. Hydromet.* 23(7), 1155-1169. https://doi-org.cuucar.idm.oclc.org/10.1175/JHM-D-21-0193.1

90. Brunner, M. I., Gilleland, E., and **Wood, A. W.**, 2021: Space–time dependence of compound hot–dry events in the United States: assessment using a multi-site multi-variable weather generator, *Earth Syst. Dynam.*, 12, 621–634, https://doi.org/10.5194/esd-12-621-2021.

89. Brunner, MI, DL Swain, E Gilleland, and **AW Wood**, 2020, The increasing importance of temperature as a driver of streamflow drought spatial extent. *Environ. Res. Lett. 16:02, 4038* https://doi.org/10.1088/1748-9326/abd2f0

88. Troin, M., Arsenault, R., **Wood, A. W.,** Brissette, F., & Martel, J.-L., 2021. Generating ensemble streamflow forecasts: A review of methods and approaches over the past 40 years. *Water Resources Research*, 57, e2020WR028392. https://doi.org/10.1029/2020WR028392

87. Brunner, M. I., Melsen, L. A., **Wood, A. W.,** Rakovec, O., Mizukami, N., Knoben, W. J. M., and Clark, M. P., 2021: Flood spatial coherence, triggers, and performance in hydrological simulations: large-sample evaluation of four streamflow-calibrated models, *Hydrol. Earth Syst. Sci.*, 25, 105–119, https://doi.org/10.5194/hess-25-105-2021.

86. Mazrooei, A, A Sankarasubramanian and **AW Wood**, 2021. Potential in improving monthly streamflow forecasting through variational assimilation of observed streamflow. *J. Hydrology*, 600, 126559, https://doi.org/10.1016/j.jhydrol.2021.126559

85. Baker, SA, B Rajagopalan, **AW Wood**, 2020, Application of Postprocessing to Watershed-Scale Subseasonal Climate Forecasts over the Contiguous United States, *J. Hydrometeorology*, 21(5), 971-987. https://doi.org/10.1175/JHM-D-19-0155.1

84. Liu, Hongli, **AW Wood**, AJ Newman and MP Clark, 2021, Ensemble dressing of meteorological fields: using spatial regression to estimate uncertainty in deterministic gridded meteorological datasets, AMS *J. Hydromet.*, <https://doi.org/10.1175/JHM-D-21-0176.1>

83. Viterbo F, Read L, Nowak K, **Wood AW**, Gochis D, Cifelli R, Hughes M, 2020. General Assessment of the Operational Utility of National Water Model Reservoir Inflows for the Bureau of Reclamation Facilities. *Water* 12(10):2897. https://doi.org/10.3390/w12102897

82. Newman, AJ, MP Clark, **AW Wood,** and JR Arnold, 2020. Probabilistic spatial meteorological estimates for Alaska and the Yukon. Journal of Geophysical Research: Atmospheres, 125, e2020JD032696. https://doi.org/10.1029/2020JD032696

81. Tang, G, MP Clark, AJ Newman, **AW Wood**, SM Papalexiou, V Vionnet and PH Whitfield, 2020, SCDNA: a serially complete precipitation and temperature dataset for North America from 1979 to 2018, *Earth Syst. Sci. Data*, 12, 2381–2409, https://doi.org/10.5194/essd-12-2381-2020

80. Wu, W, Emerton, R, Duan, Q, **AW Wood**, Wetterhall, F, Robertson, DE, 2020. Ensemble flood forecasting: Current status and future opportunities. *WIREs Water*. 2020;e1432. https://doi.org/10.1002/wat2.1432.

79. Brunner, MI, LA Melsen, AJ Newman, **AW Wood**, and MP Clark, 2020: Future streamflow regime changes in the United States: assessment using functional classification, *Hydrol. Earth Syst. Sci.*, 24, 3951–3966, https://doi.org/10.5194/hess-24-3951-2020.

78. Brunner, M. I., Gilleland, E., **Wood, A**., Swain, D. L., & Clark, M. (2020). Spatial dependence of floods shaped by spatiotemporal variations in meteorological and land-surface processes. Geophysical Research Letters, 47, e2020GL088000. https://doi.org/10.1029/2020GL088000

77. Pendergrass, AG, GA Meehl, R Pulwarty, M Hobbins, A Hoell, A AghaKouchak, CJW Bonfils, AJE Gallant, M Hoerling, D Hoffmann, L Kaatz, F Lehner, D Llewellyn, P Mote, R Neale, JT Overpeck, A Sheffield, K Stahl, M Svoboda, MC Wheeler, **AW Wood**, CA Woodhouse, 2019, Flash droughts: High-impact events that present a new challenge for S2S prediction. *Nat. Clim. Change* 10, 191–199 (2020). https://doi.org/10.1038/s41558-020-0709-0

76. Rakovec, O, N Mizukami, R Kumar, A Newman, S Thober, **AW Wood**, MP Clark, and L Samaniego, 2019. Diagnostic evaluation of large‐domain hydrologic models calibrated across the contiguous United States. Journal of Geophysical Research: Atmospheres, 2019; 124: 13991– 14007. https://doi.org/10.1029/2019JD030767.

75. Lehner, F, **AW Wood**, J Vano, D Lawrence, MP Clark, J Mankin, 2019, The potential to reduce uncertainties in regional water security projections with Earth System Models, *Nature Climate Change*, v. 9, 926–933, https://doi.org/10.1038/s41558-019-0639-x.z

74. Quinn, N, G Blöschl, A Bárdossy, A Castellarin, M Clark, C Cudennec, D Koutsoyiannis, U Lall, L Lichner, J Parajka, CD Peters-Lidard, G Sander, H Savenije, K Smettem, H Vereecken, A Viglione, P Willems, **AW Wood**, R Woods, C-Y Xu, E Zehe, 2018, Invigorating hydrological research through journal publications, Joint Editorial in *J. Hydromet*, *Wat. Res. Rsrch*, and multiple journals.

73. Zhu E, X Yuan and **AW Wood**, 2019, Benchmark Decadal Forecast Skill for Terrestrial Water Storage Estimated by an Elasticity Framework, *Nature Comm.* 10:1, 2041-1723, DOI https://doi.org/10.1038/s41467-019-09245-3.

72. Mizukami, N., Rakovec, O., Newman, A. J., Clark, M. P., Wood, A. W., Gupta, H. V., and Kumar, R., 2019, On the choice of calibration metrics for “high-flow” estimation using hydrologic models, Hydrol. Earth Syst. Sci., 23, 2601–2614, https://doi.org/10.5194/hess-23-2601-2019.

71. Peters-Lidard, C.D., F. Hossain, L.R. Leung, N. McDowell, M. Rodell, F.J. Tapiador, F.J. Turk, and A. Wood, 2018: 100 Years of Progress in Hydrology. Meteorological Monographs, 59, 25.1–25.51, https://doi.org/10.1175/AMSMONOGRAPHS-D-18-0019.1

70. Baker, SA, **AW Wood**, and B Rajagopalan, 2019. Developing Subseasonal to Seasonal Climate Forecast Products for Hydrology and Water Management. *J. American Water Resources Association* 1– 14. https://doi.org/10.1111/1752-1688.12746.

69. **Wood, AW**, S Arumugam, and P Mendoza, 2018, The post-processing of seasonal streamflow forecasts, Chapter 7.3 in the Handbook of Hydrometeorological Ensemble Forecasting”, ed. Q Duan, H Cloke, JC Schaake, J Thielen, AW Wood, F Pappenberger. Springer-Verlag GmbH, Berlin Heidelberg (Live Reference ISBN 978-3-642-40457-3)

68. Hopson, TM, **AW Wood**, and A Weerts, 2018, Motivation and Overview of Hydrological Ensemble Post-processing, Chapter 7.1 in the Handbook of Hydrometeorological Ensemble Forecasting”, ed. Q Duan, H Cloke, JC Schaake, J Thielen, AW Wood, F Pappenberger. Springer-Verlag GmbH, Berlin Heidelberg (Live Reference ISBN 978-3-642-40457-3), doi:10.1007/978-3-642-40457-3\_36-1

67. Vano, J, B Nijssen, **AW Wood**, F Lehner, M Clark, N Addor, E Gutmann, J Hamann, JR Arnold, 2018, Dos and Don’ts for using climate change information for water resource planning and management, version 1.0: guidelines for study design, *Climate Services* 12, pp. 1-13. https://doi.org/10.1016/j.cliser.2018.07.002

66. Mizukami, N, M Clark, A Newman, **AW Wood**, E Gutmann, B Nijssen, O Rakovec, L Samaniego, 2017, Towards seamless large domain parameter estimation for hydrologic models, *Wat. Res. Rsrch.* (accepted doi:10.1002/2017WR02040167.

65. Lehner, F, **AW Wood**, D Llewellyn, DB Blatchford, AG Goodbody, and F Pappenberger, 2017. Mitigating the impacts of climate nonstationarity on seasonal streamflow predictability in the U.S. Southwest. *Geoph. Res. Let.*, 44. https://doi.org/10.1002/2017GL076043

64. Clark, EA, **AW Wood**, and B Nijssen, 2018, Assessing ensemble particle filters for the estimation of model states for streamflow forecasting, *Wat. Res. Rsrch.* (in revision).

63. Mendoza, PA, **AW Wood**, EA Clark, N Voisin, B Nijssen, MH Ramos, 2017, An assessment of streamflow post-processing techniques for short-range ensemble streamflow forecasts, in prep.

62. Clark, MP, MFP Bierkens, L Samaniego, R Woods, R Uijlenhoet, K Bennett, V Pauwels, X Cai, **AW Wood,** and C Peters-Lidard. (2017). The evolution of process-based hydrologic models: Historical challenges and the collective quest for physical realism. Hydrology and Earth System Sciences. 21. 3427-3440. 10.5194/hess-21-3427-2017.

61. Wobus, C, E Gutmann, R Jones, M Rissinga, N Mizukami, M Lorie, H Mahoney, **AW Wood**, D Mills, and J Martinich, 2017, Increasing Flood Risk and Asset Damages within Mapped Floodplains of the Contiguous United States, Nat. Haz. and Earth Syst. Sci (*in review*)

60. Newman, A.J., N. Mizukami, M.P. Clark, **AW Wood**, B. Nijssen, and G. Nearing, 2017: Benchmarking of a Physically Based Hydrologic Model. *J. Hydrometeor.,* 18, 2215–2225, <https://doi.org/10.1175/JHM-D-16-0284.1>

59. Lehner, F, ER Wahl, **AW Wood**, DB Blatchford, and D Llewellyn, 2017, Assessing recent declines in Upper Rio Grande River runoff efficiency from a paleoclimate perspective, *Geophys. Res. Lett.*, 44, doi:10.1002/2017GL073253.

58. Mendoza, PA, **AW Wood**, EA Clark, E Rothwell, MP Clark, B Nijssen, LD Brekke, and JR Arnold, 2017, An intercomparison of approaches for improving predictability in operational seasonal streamflow forecasting, *Hydrol. Earth Syst. Sci., 21, 3915–3935, 2017*

57. Arnal, L., **AW Wood**, E. Stephens, H.L. Cloke, and F. Pappenberger, 2017: An Efficient Approach for Estimating Streamflow Forecast Skill Elasticity. J. Hydrometeor., 18, 1715–1729, https://doi.org/10.1175/JHM-D-16-0259.1

56.Zhao, T., J.C. Bennett, Q.J. Wang, A. Schepen, **AW Wood**, D.E. Robertson, and M. Ramos, 2017: How Suitable is Quantile Mapping For Postprocessing GCM Precipitation Forecasts?. J. Climate, 30, 3185–3196, https://doi.org/10.1175/JCLI-D-16-0652.1

55.Maurer, EP, G Kayser, L Doyle, and **AW Wood**, 2017, Adjusting flood peak frequency changes to account for climate change impacts: A western U.S. example. *ASCE J. of Water Resources Planning and Management* 144:3, doi:10.1061/(ASCE)WR.1943-5452.0000903

54.Pagano, TC, F Pappenberger, **AW Wood**, MH Ramos, A. Persson and B Anderson, 2016, Automation and human expertise in operational river forecasting. *WIREs Water*, 3: 692–705. doi:10.1002/wat2.1163

53.Madadgar, S, A AghaKouchak, S Shukla, S Sorooshian, K-L Hsu, M Svoboda, and **AW Wood**, 2016, A Hybrid Statistical-Dynamical Drought Prediction Framework: Application to for the Southwestern United States, *Wat. Res. Rsrch*, 52 (7), 5095-5110, doi: 10.1002/2015WR018547

52. **Wood, AW**, T Hopson, A Newman, L. Brekke, J. Arnold, M Clark, 2016, Quantifying streamflow forecast skill elasticity to initial condition and climate prediction skill. *J. Hydromet.* **17**, 651–668. doi: http://dx.doi.org/10.1175/JHM-D-14-0213.1

51.Clark, MP, RL Wilby, ED Gutmann, JA Vano, S Gangopadhyay, **AW Wood**, HJ Fowler, C Prudhomme, JA Arnold, and LD Brekke, 2016, Characterizing uncertainty of the hydrologic impacts of climate change, *Current Climate Change Reports* **2**:2, 55-64.

50.Huang, C, AJ Newman, MP Clark, **AW Wood** and X Zheng, 2016, Evaluation of snow data assimilation using the ensemble Kalman Filter for seasonal streamflow prediction in the Western United States, *Hydrol. Earth Syst. Sci*. 21, 635-650, 2017, <http://www.hydrol-earth-syst-sci.net/21/635/2017/>, doi:10.5194/hess-21-635-2017

49.Emerton, R, EM Stephens, F Pappenberger, TC Pagano, AH Weerts, **AW Wood**, P Salamon, JD Brown, N Hjerdt, C Donnelly and HL Cloke, 2016. Continental and Global Scale Flood Forecasting Systems, *WIREs Water* 3:391–418. doi: 10.1002/wat2.1137.

48.Sofaer, HR, SK Skagen, JJ Barsugli, BS Rashford, GC Reese, JA Hoeting, **AW Wood** and BR Noon, 2016, Projected wetland densities under climate change: habitat loss but little geographic shift in conservation strategy. *Ecol Appl.* (online), doi: 10.1890/15-0750.1

47.Hobbins, M, **AW Wood**, D McEvoy, J Huntington, C Morton and J Verdin, 2016, The Evaporative Demand Drought Index: Part I – Linking Drought Evolution to Variations in Evaporative Demand, AMS *J. Hydromet. DOI:* http://dx.doi.org/10.1175/JHM-D-15-0121.1

46.McEvoy, D, J Huntington, M Hobbins, **AW Wood**, C Morton and J Verdin, 2016, The Evaporative Demand Drought Index Part II: Application and Assessment, AMS *J. Hydromet.* DOI: http://dx.doi.org/10.1175/JHM-D-15-0122.1

45.Newman, AJ, MP Clark, J Craig, B Nijssen, **AW Wood**, E Gutmann, N Mizukami, L Brekke, and JR Arnold, 2015, Gridded Ensemble Precipitation and Temperature Estimates for the Contiguous United States, *J. Hydromet.*, doi: <http://dx.doi.org/10.1175/JHM-D-15-0026.1>

44.Newman, AJ, MP Clark, K Sampson, **AW Wood**, LE Hay, A Bock, R Viger, D Blodgett, L Brekke, JR Arnold, T Hopson, and Q Duan, 2015, Development of a large-sample watershed-scale hydrometeorological data set for the contiguous USA: data set characteristics and assessment of regional variability in hydrologic model performance, *Hydrol. Earth Syst. Sci*., 19, 209-223, [www.hydrol-earth-syst-sci.net/19/209/2015/doi:10.5194/hess-19-209-2015](http://www.hydrol-earth-syst-sci.net/19/209/2015/doi:10.5194/hess-19-209-2015)

43.Crochemore, L, MH Ramos, F Pappenberger, SJ van Andel, **AW Wood**, 2015, An experiment on risk-based decision-making in water management using probabilistic forecasts, Bull. Amer. Met. Soc. doi: http://dx.doi.org/10.1175/BAMS-D-14-00270.1

42.Wood, EF, S Schubert, **AW Wood**, C Peters-Lidard, K Mo, A Mariotti and R Pulwarty, 2015, Prospects for Advancing Drought Understanding, Monitoring and Prediction, *J. Hydromet.* doi:10.1175/JHM-D-14-0164.1

41.Clark, MP, B Nijssen, JD Lundquist, D Kavetski, DE Rupp, RA Woods, JE Freer, ED Gutmann, **AW Wood**, LD Brekke, JA. Arnold, DJ Gochis, and RM Rasmussen, 2015, A unified approach to hydrologic modeling: Part 1. Model structure, Wat. Res. Rsrch doi:10.1002/2015WR017198

40.Clark, MP, B Nijssen, JD Lundquist, D Kavetski, DE Rupp, RA Woods, JE Freer, ED Gutmann, **AW Wood**, DJ Gochis, and RM Rasmussen, DG Tarboton, V Mahat, GN Flerchinger, and DG Marks, 2015, A unified approach to hydrologic modeling: Part 2. Comparison of alternative process representations, Wat. Res. Rsrch doi:10.1002/2015WR017200.

39.Gochis, DJ and many authors (including **AW Wood**), 2015, The Great Colorado Flood of September 2013, *Bull. Amer. Met. Soc.* http://dx.doi.org/10.1175/BAMS-D-13-00241.1

38.Pagano, TC, **AW Wood**, MH Ramos, HL Cloke, F Pappenberger, V Andréassian, MP Clark, M Cranston, D Kavetski, T Mathevet, S Sorooshian, and JS Verkade, 2014. Challenges of Operational River Forecasting, *AMS J. Hydromet*. 15, 1692–1707, doi: http://dx.doi.org/10.1175/JHM-D-13-0188.1

37.Arumugam, S, **AW Wood**, B Rajagopalan and J Schaake (2014), Improving Forecasts for Water Management, *Eos* Trans. AGU, 95(1), 3, DOI: 10.1002/2014EO010004

36.Pagano, T., **AW Wood**, K. Werner and R. Tama-Sweet (2014), Western U.S. Water Supply Forecasting: A Tradition Evolves, *Eos* Trans. AGU, 95(3), 28.

35.Barsugli, J. J., and many authors including **AW Wood** (2013), The Practitioner's Dilemma: How to Assess the Credibility of Downscaled Climate Projections, *Eos* Trans. AGU, 94(46), 424.

34.Mariotti, A, S. Schubert, K. Mo, C. Peters-Lidard, **AW Wood**, R. Pulwarty, J. Huang, and D. Barrie, 2013. Advancing drought understanding, monitoring and prediction, *Bull. Amer. Meteor. Soc.* 94, ES186–ES188, doi: 10.1175/BAMS-D-12-00248.1

33.Bardsley, T, **AW Wood**, M Hobbins, T Kirkham, L Briefer, J Niermeyer, S Burian, 2013: Planning for an uncertain future: climate change sensitivity assessment toward adaptation planning for public water supply. *Earth Interact.*, 17, 1–26, doi: http://dx.doi.org/10.1175/2012EI000501.1

32.Rosenberg, EA, **AW Wood**, AC Steinemann, 2013: Informing Hydrometric Network Design for Statistical Seasonal Streamflow Forecasts. *J. Hydrometeor*, 14, 1587–1604, doi: http://dx.doi.org/10.1175/JHM-D-12-0136.1

31.Harding, BL, **Wood, AW**, and Prairie, JR, 2012. The implications of climate change scenario selection for future streamflow projection in the Upper Colorado River Basin, *Hydrol. Earth Syst. Sci.*, 16, 3989-4007, doi:10.5194/hess-16-3989-2012.

30.Hobbins, Michael, **AW Wood**, David Streubel, Kevin Werner, 2012. What Drives the Variability of Evaporative Demand across the Conterminous United States?. *J. Hydrometeor,* 13, 1195–1214.

29.Rosenberg, E. A., **AW Wood**, and A. C. Steinemann, 2011, Statistical applications of physically based hydrologic models to seasonal streamflow forecasts, *Water Resour. Res*., 47, W00H14, doi:10.1029/2010WR010101.

28.Maurer, E.P., J.C. Adam and **AW Wood**, 2009, Climate Model based consensus on the hydrologic impacts of climate change to the Rio Lempa basin of Central America, *Hydrol. Earth Syst. Sci.,* 13, 183-194.

27.Hidalgo H.G., Das T., Dettinger M.D., Cayan D.R., Pierce D.W., Barnett T.P., Bala G., Mirin A., **Wood AW**, Bonfils C., Santer B.D. and T. Nozawa, 2009, Detection and Attribution of Streamflow Timing Change in the Western United States, *J. Climate* v. 22, p. 3838–3855.

26. **Wood, AW** and D.P. Lettenmaier, 2008. An ensemble approach for attribution of hydrologic prediction uncertainty, *Geophys. Res. Lett.,* 35, L14401, doi:10.1029/2008GL034648.

25. **Wood, AW** and J.C. Schaake, 2008, Correcting errors in streamflow forecast ensemble mean and spread, *J. Hydromet.* 9:1, 132-148.

24.Shukla, S. and **AW Wood,** 2008, Use of a standardized runoff index for characterizing hydrologic drought, *Geophys. Res. Lett.* 35, L02405, doi:10.1029/2007GL032487.

23.Munoz-Arriola, F., D.P. Lettenmaier, C. Zhu, **AW Wood**, R. Lobato-Sanchez, A. Wagner-Gomez, 2008. Extended West-wide Seasonal Hydrological System: Seasonal Hydrological Prediction in the NAMS Region, *CLIVAR Exchanges* 45, 13(2).

22.Barnett, T., D.W. Pierce, H. Hidalgo, C. Bonfils, B.D. Santer, T. Das, G. Bala, **AW Wood**, T. Nazawa, A. Mirin, D. Cayan, M. Dettinger, 2008, Human-induced changes in the hydrology of the western United States, *Science*, published online 31 Jan 2008, doi:10.1126/science.1152538.

21.Voisin, N**.,** **AW Wood** and D.P. Lettenmaier, 2008, Evaluation of precipitation products for global hydrological prediction, *J. of Hydromet.* 9, 388–407.

20.Tang, Q., **AW Wood** and D.P. Lettenmaier, 2008, Real-time precipitation estimation based on index station percentiles *J. Hydromet.,* doi: 10.1175/2008JHM1017.1

19.Pierce, D.W., T. Barnett, H. Hidalgo, T. Das, C. Bonfils, B.D. Santer, G. Bala, M. Dettinger, D. Cayan, A. Mirin, D., **AW Wood**, T. Nazawa, 2008, Attribution of Declining Western U.S. Snowpack to Human Effects, *J. Climate* v. 21, p. 6425-6444.

18.Shi, X., **AW Wood** and D.P. Lettenmaier, 2008, How essential is hydrologic model calibration to seasonal streamflow forecasting?, *J. of Hydromet.* **9**, 1350-1363*,* doi: 10.1175/2008JHM1001.1.

17.Bonfils, C., D.W. Pierce, B.D. Santer, H. Hidalgo, G. Bala, T. Das, T. Barnett, C. Doutriaux, **AW Wood**, A. Mirin, T. Nazawa, 2008, Detection and attribution of temperature changes in the mountainous western United States, *J. Climate* v. 21, p. 6404-6424.

16. **Wood, AW** and D.P. Lettenmaier, 2006, A testbed for new seasonal hydrologic forecasting approaches in the western U.S., *Bull. Amer. Met. Soc.* 87(12), 1699-1712, doi:10.1175/BAMS-87-12-1699.

15.Mcguire, M., **AW Wood**, A.F. Hamlet and D.P. Lettenmaier, 2006, Use of satellite data for streamflow and reservoir storage forecasts in the Snake River Basin, ID, ASCE *J. Water Res. Planning and Mgmt.* 132, 97-110. (Received ***Best Research Paper Award***)

14.Higgins, W. and many authors (including **AW Wood**), 2006, The North American Monsoon Experiment (NAME) 2004 field campaign and modeling strategy, *Bull. Amer. Met. Soc* 87(1), 79-94, DOI 10.1175/BAMS-87-1-79.

13.Andreadis, K.M., E.A. Clark, **AW Wood**, A.F. Hamlet, and D.P. Lettenmaier, 2005, 20th Century Drought in the Conterminous United States , *J. of Hydrometeorology* 6(6): 985-1­­001.

12. **Wood, AW**, A. Kumar and D.P. Lettenmaier, 2005, A retrospective assessment of NCEP climate model-based ensemble hydrologic forecasting in the western U.S. *J. Geophys. Res*. 110 (D4).

11. **Wood, AW**, L.R. Leung, V. Sridhar and D.P. Lettenmaier, 2004, Hydrologic implications of dynamical and statistical approaches to downscaling climate model outputs, *Clim. Change* Vol. 62, 1-3, 189-216.

10.Christensen, N.S., **Wood, AW**, Voisin, N., Lettenmaier, D.P. and R.N. Palmer, 2004, Effects of climate change on the hydrology and water resources of the Colorado River Basin, *Clim. Change* 62, 1-3, 337-363.

9.Payne, J.T., **AW Wood**, A.F. Hamlet, R.N. Palmer and D.P. Lettenmaier, 2004, Mitigating the effects of climate change on the water resources of the Columbia River basin, *Clim. Change* Vol. 62, 1-3, 233-256.

8.Van Rheenen,N.T., **AW Wood**, R.N. Palmer and D.P. Lettenmaier, 2004, Potential Implications of PCM Climate Change Scenarios for Sacramento - San Joaquin River Basin Hydrology and Water Resources, *Clim. Change* Vol. 62, Issue 1-3, 257-281.

7.Zhu, C., D.W. Pierce, T.P. Barnett, **AW Wood**, and D.P. Lettenmaier, 2004. Evaluation of hydrologically relevant PCM climate variables and large-scale variability over continental U.S., *Clim. Change* 62, 45-74.

6. **Wood, AW**, Maurer, E.P., Kumar, A. and D.P. Lettenmaier, 2002. Long Range Experimental Hydrologic Forecasting for the Eastern U.S., *J. Geophys. Res.,* 107(D20), doi:10.1029/2001JD000659.

5.Maurer, E.P., **AW Wood**, J.C. Adam, D.P. Lettenmaier and B. Nijssen, 2002. A long-term hydrologically-based data set of land surface fluxes and states for conterminous United States, *J. Clim.* 15(22), 3237-51.

4.Chen, C-T., Nijssen, B., Jianjun, G., Tsang, L., **Wood, AW**, Hwang, J-N. and D.P. Lettenmaier, 2001. Passive microwave remote sensing of snow constrained by hydrological simulations. *IEEE Trans. on Geosci. and Rem. Sens.*, 39:8, August, 1744 -1756.

3.Lettenmaier, D.P., **Wood, A.W**, Palmer, R.N., Wood, E.F. and E.Z. Stakhiv, 1999. Water Resources Implications of Global Warming: A U.S. Regional Perspective. *Clim. Change* Vol 43, no.3, Nov, 537-579.

2. **Wood, AW**, Lettenmaier, D.P. and E.Z. Stakhiv, 1997. Assessing climate change implications for water resources planning. *Climatic Change* **37**, 203-228.

1. **Wood, AW**, R.N. Palmer and K. Petroff, 1997. An Assessment of Zero-Tolerance Regulation in King County. ASCE *J. Water Res. Planning and Mgmt.*, Vol. **123**, No. 4, July/August, 239-245.

**Books and Book Chapters**

Q Duan, F Pappenberger, **AW Wood**, H Cloke, JC Schaake (Eds) 2018. ***Handbook of Hydrometeorological Ensemble Forecasting***, Springer-Verlag GmbH, Berlin Heidelberg (Live Reference ISBN 978-3-642-40457-3)

Christa D. Peters-Lidard, Faisal Hossain, L. Ruby Leung, Nate McDowell, Matthew Rodell, Francisco J. Tapiador, F. Joe Turk, **AW Wood**, 2019. 100 Years of Progress in Hydrology, *Meteorological Monographs*, 59, 25.1-25.51. https://journals.ametsoc.org/view/journals/amsm/59/1/amsmonographs-d-18-0019.1.xml

Huang, J, M Svoboda, **AW Wood**, S Schubert, C Peters-Lidard, E Wood, R Pulwarty, A Mariotti, and D Barrie, 2017, Research to Advance Drought Monitoring and Prediction Capabilities. Chapter 6 in Drought and Water Crises: Integrating Science, Management, and Policy. D.A. Wilhite and R.S. Pulwarty (eds.), CRC Press, Boca Raton, Florida.

**Wood, AW** and G. Sreckovic, 2013. The sustainability of Pacific Northwest hydropower in the context of non-stationarity and renewable energy growth. In Pielke, R.A. Sr., ed., Water Encyclopedia, Climate Sustainability: Understanding and Addressing Threats to Essential Resources. Elsevier, Netherlands, Pages 177–194, http://dx.doi.org/10.1016/B978-0-12-384703-4.00514-1.

**Wood, AW**, D.P. Lettenmaier and R.N. Palmer, 1997. Assessing climate change implications for water resources planning, in Climate Change and Water Resources Planning Criteria, K.D. Frederick, D.C. Major and E.Z. Stakhiv, eds., Kluwer Academic Publishers.

**Technical Reports, Conference Papers, Editorials and Blogs**

Danjelka, J, Tuteja, N, and **AW Wood** (lead authors), 2021, Guidelines on Seasonal Hydrological Prediction, WMO-No. 1274, World Meteorological Organization, Geneva, Switzerland, 77 pages.

Wetterhall, F., I. G. Pechlivanidis, M.-H. Ramos, **A. Wood**, Q. J. Wang, E. Zehe, and U. Ehret, eds, 2017. Sub-seasonal to seasonal hydrological forecasting. Special Issue, HESS. https://hess.copernicus.org/articles/special\_issue824.html

Lukas, J, E Payton (eds), S McAfee, **AW Wood**, C Woodhouse, B Harding, L Woelders, R Smith, E Gutmann, F Lehner, J Barsugli, K Wolter, I Rangwala, B Duncan, J Deems, C Jerla, and J Prairie, 2020, Colorado River Basin Climate and Hydrology: State of the Science, Western Water Assessment, University of Colorado, DOI: https://doi.org/10.25810/3hcv-w477.

**Wood, AW**, T Pagano, and M Roos, 2016, Tracing the Origins of ESP, HEPEX Historical Hydrology Series, Edition 1 (online at: <https://hepex.irstea.fr/tracing-the-origins-of-esp/> )

Wang, S and **AW Wood**, Dec 2015, Review and recommendations on sub-seasonal to seasonal prediction, Report to the Taiwan Central Weather Bureau (Taipei)

Bamzai, A, S Avery, D Bromwich, L Goddard, J Overpeck, P Stott, **A Wood**, and C Zhang, May 2015, Summary Report of the Review of the Physical Sciences Division, NOAA ESRL (2010-2015)

Huang, J, M Svoboda, **AW Wood**, S Schubert, C Peters-Lidard, E Wood, R Pulwarty, A Mariotti, and D Barrie, 2016, Research to Advance National Drought Monitoring and Prediction Capabilities, NOAA Drought Task Force Report, NOAA OAR, 2016.

**Wood, AW** and T Bardsley, 2015, VIC model calibration and future hydroclimate analysis in selected Utah watersheds. Report to the Utah Division of Water Resources, February 24, 2015 (available from http://wwa.colorado.edu/climate/Wood\_UTDWR\_Report\_2015.pdf)

**Wood, AW** and N Mizukami, 2014, CMIP5 1/8th Degree Daily Weather and VIC Hydrology Datasets for CONUS. NCAR Final Project Report to USACE Responses to Climate Change Project (W26HM423495778), 32 pages.

Raff, D, L Brekke, KV Werner, **AW Wood**, and K White, 2013. Short-Term Water Management Decisions: User Needs for Improved Climate, Weather, and Hydrologic Information. Bureau of Reclamation, U.S. Army Corps of Engineers and National Oceanic and Atmospheric Administration, Technical Report CWTS-2013-1.

**Wood, AW**, 2012, Dynamical-statistical approaches for hydrologic ensemble prediction. In *WIRADA (2012) Water Information Research and Development Alliance: Science Symposium Proceedings,* Melbourne, Australia, 1–5 August 2011. (online: http://www.clw.csiro.au/publications/waterforahealthycountry/wirada/WIRADA\_Science\_Symposium\_Proceedings.pdf).

**Wood, AW** and KV Werner, 2011: A seasonal climate and streamflow forecasting testbed for the Colorado River basin, Extended Summary, 36th NOAA Annual Climate Diagnostics and Prediction Workshop, Fort Worth, TX, National Weather Service, 101-106. [http://www.nws.noaa.gov/ost/climate/STIP/36CDPW/36cdpw-elu.pdf]

Wells, E., **AW Wood**, E. Jones, J. Ostrowski, and K. He, 2011, “*Hydrologic Ensemble Forecast Service: Requirements*”, Report to U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service Office of Hydrologic Development, Silver Spring, Maryland.

Hollingsworth, J.A., **AW Wood**, E. Wells, S. Buan, and K. Stellman, 2011, Service Assessment: “*Record Floods of Greater Nashville: Including Flooding in Middle Tennessee and Western Kentucky, May 1-4, 2010*”. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, MD.

**Wood, AW**, Wiley, M. and B. Nijssen, 2009, Seasonal streamflow forecasting in the Columbia River Basin, WaterPower 2009, Spokane, WA, 12 p.

**Wood, AW**, J. Fung, M. Wiley and K. Westrick, 2009, FirstLook Hydro: An online tool for small-scale hydro resource identification, *HYDRO 2009*, Lyon, FR, 8 p.

Mantua, N., T. Pagano, M. Dettinger, **AW Wood** and K. Redmond, 2008, Synthesis and Assessment Product 5.3: Decision-Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data, A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research [Nancy Beller-Simms, Helen Ingram, David Feldman, Nathan Mantua, Katharine L. Jacobs, and Anne M. Waple (eds.)]. NOAA’s National Climatic Data Center, Asheville, NC, 192 pp.

Goddard, L., **AW Wood**, N. Mantua and K. Jacobs, 2008, “Decadal Climate Prediction: Learning from the Oceans”. In California Drought 2008: An Update. California Department of Water Resources, State of California, The Resources Agency.

**Wood, AW**, 2008, The University of Washington Surface Water Monitor: An experimental platform for national hydrologic prediction, Proc. Amer. Meteor. Soc. Annual Meeting, New Orleans, 13 p. (available from <http://ams.confex.com/ams/pdfpapers/134844.pdf>).

**Service Activities (Selected)**

Technical Development Lead, WMO global Hydrologic Status and Outlook System, 2022-

Advisory Board, ECMWF European Flood Awareness System (EFAS) and Global Flood Awareness System (GLOFAS), 2017-2020; Copernicus Emergency Management Services (CEMS) Flood Forecasting Centre (2021- )

Member, WMO Standing Committee on Data Processing for Applied Earth System Modelling and Prediction & Projection (SC-ESMP), Infrastructure Commission, 2020-

Advisory Board, USDA/NRCS SNOTEL Supersite initiative, 2020-

Member, Joint Expert Team on Hydrological Monitoring, WMO, 2020-

Convener/Chair, AMS Annual Hydrology Meeting Session, Actionable Hydrology, Jan 2021

Convener/Chair, AGU Fall Meeting Session, Machine Learning in Hydrological Forecasting, Dec 2020

Organizer/Moderator, Colorado River Hydrology Research Symposium Webinar, Prospects for hydroclimate prediction on seasonal and longer timescales, Oct 2020

Task Lead, WMO global operational Hydrologic Status and Outlook System (HydroSOS), 2017-

Editor, AMS *Journal of Hydrometeorology*, 2015-2020

Co-Chair, Hydrologic Ensemble Prediction Experiment (HEPEX; <http://www.hepex.org> ), 2012-2020

Co-Chair, US CLIVAR Predictability, Prediction, and Applications Interface (PPAI) panel, 2018-2019; member (2017-2021).

Guest Editor, Special Issue, "Sub-seasonal to seasonal hydrological forecasting”, HESS, 2016-2018

Assoc. Editor, AMS *Journal of Hydrometeorology*, 2011-2015

Advisory Board, European Commission Horizon 2020 project – IMPREX (IMproving PRedictions and management of hydrological EXtremes; <http://www.arctik.eu/pub_articles/87>), 2016-2019

Co-Lead and Author, Drafting Committee, AMS *Statement on Drought* (<https://www.ametsoc.org/ams/index.cfm/about-ams/ams-statements/statements-of-the-ams-in-force/drought/)>

Program Review Committee, Undergraduate Water and Environmental Programs, U. of Colorado Dept of Civil, Environmental, and Architectural Engineering, May 2018

Chair, Hydrology Committee, American Meteorological Society, 2011-2013.

Member, WMO Cmte for Hydrology, Group on Seasonal Streamflow Predictions, 2015-2017

Panel Member, NOAA Review Board, ESRL Physical Sciences Division, May 2015

Co-Lead, NOAA MAPP Drought Task Force, 2011-2014

Co-Chair, HEPEX Tenth Anniversary Workshop, June 2014, at NCEP (Maryland)

Co-Organizer, HEPEX Ensemble Hydrometeorological Forecasting Workshops at locations: BNU (Beijing, 2012); NCEP (Maryland, 2014); U. Laval (Quebec City, 2016); U. Melbourne (Melbourne, 2018)

Review Editor, 3rd National Climate Assessment, Water Resources Chapter, 2014

Co-Chair, AGU Chapman Conference on Seasonal Hydroclimate Forecasting and Water Management, July 2013, Portland, OR

Co-Chair, American Meteorological Society Annual Meeting Hydrology Conferences, 2011, 2012, 2013

Co-Convener and Chair, AGU Fall Meeting Sessions and AMS Annual Meeting Sessions, from 2006-present: various topics such as “Seasonal Hydrology and Climate Predictions and Their Applications”, “Ensemble Hydrometeorological Forecasting Techniques and Applications”

COMET Advanced Hydrology Training Course, 2011 – Ensemble Hydrologic Prediction

Technical Subcommittee member for US Bureau of Reclamation Hydrology and Climate Science Working Group, Boulder, CO, 2008-2011.

Session Moderator, Workshop on Climate Change Adaptation for Water Managers, Oracle, AZ, 2008

NASA Snow and Cold Land Processes satellite mission science advisory group, May-June 2007

NOAA CDEP Applied Research Center (ARC) review panel member for the Climate Diagnostics Center (CDC), Boulder, CO, Feb 2007 (This center is now ESRL PSD)

Member / author, US Inter-agency Climate Change Science Program (CCSP) Committee on Decision Support Experiments and Evaluations using Seasonal to Interannual Forecasts and Observational Data, 2007-2008

**Seminars And Oral Presentations (Selected, 2017-)**

ECWMF, Jan 2022, Hydrologic Prediction and HydroSOS (upcoming)

WMO Regional Assoc. III (South America) Regional Conference (RECO), Jun 2022 (invited), Global Data Processing and Forecasting System (GDPFS) for hydrological services

Advanced Study Program (ASP) Virtual Colloquium – *The Science of Subseasonal to Seasonal (S2S) Predictions*, Jul 2021 & 2022 (invited), Subseasonal Hydrological Prediction

US CLIVAR Societally-Relevant Multi-Year Climate Prediction Workshop (Boulder), Mar 2022 (invited), Multi-year land surface predictability

NOAA NMFS Western Region Applications Program, Jan 2022 (invited), Hydrologic predictability and prediction at climate time scales

USGS/NIDIS Listening Session on Drought Prediction, Mar 2022 (invited): A Focus on Streamflow, Streamflow forecasting for drought in the US

DOE ORNL Webinar Series, June 2021 (invited), New ensemble-based hydrometeorological modeling resources for US water applications: striking the balance between complexity and usability

Global Water Futures core webinar series, June 2021 (invited), New ensemble-based hydrometeorological modeling resources for US water applications: balancing complexity and usability

WMO International S2S project, May 2021 (invited), "Connecting S2S climate predictions to US water management"

Interagency URGWOM Technical Team Meeting, Mar 9, NCAR streamflow forecasting in the Rio Grande River basin

American Meteorological Society (AMS) Annual Meeting, Jan 2021, Wood, A., A new hydrometeorological modeling resource for US water applications

American Geophysical Union (AGU) Fall Meeting, Dec 2020, Wood, A., A new hydrometeorological modeling resource for US water applications

Standing Committee on Data Processing for Applied Earth System Modelling and Prediction & Projection (SC-ESMP) of WMO's Infrastructure Commission, A. Wood, Prospects for hydrological prediction and projection from ESMs, Nov 2020

SNWA Colorado River Hydrology Research Symposium Webinar, A new hydrometeorological modeling resource for US water applications, Oct 2020

University of Colorado CVEN Hydrology and Water Resources Seminar, Feb 2020, Development of Watershed-based Large-Domain Modeling to Support Monitoring, Prediction and Water Management Applications

NOAA Forecast Improvement Team webinar, Merging HRRR output into a real-time gage-based ensemble CONUS-wide dataset of gridded meteorological fields, Feb 2020

American Meteorological Society (AMS) Annual Meeting (Hydrology), Jan 2020, Wood, A, (1) CONUS-wide hydrological modeling for monitoring, prediction and water management applications;   
(2) Merging HRRR output into a real-time gage-based ensemble CONUS-wide dataset of gridded meteorological fields

American Geophysical Union (AGU) Fall Meeting, Dec 2019, Wood, A, (1) Development of watershed-based large-domain modeling to support monitoring, prediction and water management applications; (2) Applications of emerging technologies in climate downscaling and hydrologic modeling for water resources monitoring, planning and management; (3) The Potential to Reduce Uncertainty in Regional Water Security Projections with Climate Models; (4) Enhancing Sub-seasonal Climate Forecast Skill through Post-processing at the Scales of Water Management

Reclamation Reservoir Operations Meeting, Boulder City, NV (Oct 2019): Wood, A., "Over the Loop Forecasting and NCAR tools for water management"

Seminar, IIT Gandingnagar, India (June 2019): Wood, A., "Development of over-the-loop approaches for ensemble streamflow prediction at regional to national scales to support water management"

S2S/S2D workshop, NCAR, Boulder, USA (Sep 19, 2018): Wood et al, “Using hydrologic prediction skill elasticity to quantify the benefits of s2s climate information for hydrologic forecasting

AGCI drought meeting, Aspen, USA (Sep 13, 2018): Wood et al, “Western US Water Prediction through the Lens of Hydrology: Examples and Opportunities

American Geophysical Union (AGU) Fall Meeting, Dec 2018, Wood et al, Application of an ensemble-based modeling approach for assimilating observations to improve hydrologic and streamflow predictions

American Meteorological Society (AMS) Annual Meeting (Hydrology), Jan 2019, Wood et al, Application of an ensemble modeling approach for assimilating observations to improve hydrologic and streamflow predictions

American Meteorological Society (AMS) Annual Meeting (Hydrology), Jan 2019, Baker et al, Developing new watershed-based climate forecast products for water managers

EGU Annual Congress, Apr 2019, Development and demonstration of real-time approaches for ensemble streamflow prediction at regional to national scales to support water management

CLIVAR Scientific Steering Committee, Feb 2019, Predictability, Prediction, Application Interface Panel Status and Update

AGU 2018, Building a Community of Practice: HEPEX's 15 years of successful collaboration to advance ensemble streamflow forecasting for risk-based decision-making in water management

(2) Application of an ensemble-based modeling approach for assimilating observations to improve hydrologic and streamflow predictions

ECMWF Hydrological Services for Business (ECMWF, Reading, UK), May 2018, Advancing Modeling, Prediction and Management through Earth Science

WMO HydroSOS Planning Meeting (UK Center for Environment and Hydrology, Wallingford, UK), Apr 2018, (1) Product communication & Dissemination; (2) Communications & Capacity building in HydroSOS

HEPEX Biennial Workshop (Univ. Melbourne, Melbourne, AU), Feb 2018, (1) Exploring the application of ensemble prediction methods across regional forecasting domains; (2) Watershed-oriented climate forecast products for hydrologic forecasters and water managers

Western Snow Conference (Albuquerque, NM), Apr 2018, Advancing operational streamflow prediction for water management through new watershed modeling and methods

NCAR MMM-RAL Retreat (Boulder, CO), Mar 2018, Advances in Ensemble Streamflow Prediction

AMS Annual Meeting (Austin, TX), Jan 2018, Development and evaluation of an ensemble hydrologic data assimilation strategy for a real-time distributed hydrologic forecast system

AGU Fall Meeting (New Orleans, LA), Dec 2017, The Rise of Complexity in Flood Forecasting: Opportunities, Challenges and Tradeoffs

WMO Global Hydrological Status and Outlook System (HydroSOS) Initial Planning Meeting (Entebbe, Uganda), Sep 2017, Hydrologic Monitoring and Prediction Systems Requirements, Trade-offs, and Science

European Geophysical Union General Assembly (Vienna, AU), Apr 2017, (1) A real-time evaluation and demonstration of strategies for ‘Over-The-Loop’ ensemble streamflow forecasting in US watersheds; (2) Practical implementation of a particle filter data assimilation approach to estimate initial hydrologic conditions and initialize medium-range streamflow forecasts; (3) Improving medium-range ensemble streamflow forecasts through statistical post-processing

NCAR RAL Retreat (Boulder, CO), Jan 2017, Applying hydrologic data assimilation and post-processing to improve real-time medium-range ensemble streamflow forecasts

AMS Annual Meeting (New Orleans, LA), Jan 2017, Development and evaluation of an ensemble hydrologic data assimilation strategy for a real-time distributed hydrologic forecast system

AGU Fall Meeting (San Francisco, LA), Dec 2016, Assessing the viability of ‘Over-the-loop’ real-time short-to-medium range ensemble streamflow forecasts

IMproving PRediction of Hydrological Extremes (IMPREX), Crete, Greece (Sep 2017), US Climate Services

Columbia River Forecast Group, Portland (June 2017), NCAR Research in Climate Change and Streamflow Forecasting

Southern Nevada Water Authority, Las Vegas (May 2017), Opportunities and Challenges in Seasonal Streamflow Forecasting

**Teaching**

Civil Engineering Systems (Junior Level), University of Washington, 2008

Snow Hydrology (Graduate Level), University of Washington, 2009

CUAHSI Short Course, May 21-23, 2019, The Science and Practice of Operational Ensemble Hydrological Prediction (proposed, organized, ran and co-taught), NCAR, 2019

Lecture contribution for one week (Ensemble Methods) Geography 825 (Prof. M. Clark), U. Saskatchewan, 2021; 2022

**Degree Exam Committee Membership**

Stuart Smith, Comp and Final Exam Committees (PhD degree, Purdue University, 2019, 2021)

Sarah Ann Baker, General, Comp and Final Exam (PhD degree, Univ. of Colorado, 2016, 2018, 2019)

Diana Lucatero, Final Exam (PhD degree, Univ. Copenhagen, Denmark, 2018)

Jannatun Nahar, Final Exam (PhD degree, Univ. New South Wales, Australia, 2017)

Elizabeth Clark, General Exam and Final Exam (PhD degree, U Washington, 2015-2017)

Kimberly Smith, General and Final Exams (PhD, Univ. of Utah, Nov 2015)

Yanto Mas, General and Final Exams (PhD, Univ. of Colorado, May 2015)

Nina Caraway, Final Exam (Masters degree, Univ. of Colorado, July 2012)

Kristen Yeager, Final Exam (Masters degree, Univ. of Utah, Dec 2011)

Frank Seglenieks, Final Exam reading committee (PhD, U. Waterloo, May 2009)

Jenny Adam, Final Exam reading committee (PhD, UW, Sep 2003 - Nov 2007)

Tazebe Beyene, Qualifying Exam (PhD candidate, UW, Sep 2007)

Mergia Sonessa, Qualifying Exam (PhD candidate, UW, Sep 2007)

Ben Livneh, Qualifying Exam (PhD candidate, UW, Sep 2007)

Eric Rosenberg, Qualifying Exam (PhD candidate, UW, Aug 2007)

Shraddhanand Shukla, Qualifying Exam ***Chair*** (PhD, UW, Sep 2007)

Matt Fontaine, Final Exam (Masters Degree, UW, 2007)

Nicoleta Cristea, Qualifying Exam (PhD candidate, UW, 2007)

Austin Polebitski, Qualifying Exam (PhD candidate, UW, 2007)

Nathalie Voisin, Qualifying and General Exams (PhD, UW, 2005)

Xiaogang Shi, Qualifying Exam (PhD candidate, UW, 2006)

Jae Sun Hru, General & Final Exams (PhD, UW, 2006)

Chunmei Zhu, General Exam (PhD candidate, UW, 2005)

Ted Bohn, Qualifying Exam (PhD candidate, UW, 2005)

Kostas Andreadis, Qualifying and General Exam (PhD, UW, 2005)

Ali Akanda, Qualifying Exam (PhD candidate, UW, 2005)

Elizabeth Korb, Final Exam (Masters degree, UW, 2005)

Elizabeth Clark, Final Exam (Masters degree, UW, 2005)

**Graduate Student Supervision**

Sudarshana Mukhopadhyay (PhD; NCSU, 2019 summer GVP visit)

Sudershan Gangrade (PhD; NCSU, 2019 summer visit)

Amirhossein Mazrooei (PhD; NCSU, 2017 summer GVP visit)

Diana Lucatero (PhD; U. Copenhagen; 2016 three-month visit to NCAR)

Elizabeth Clark (PhD; Academic advisor was Bart Nijssen at U. Washington, 2015-2017)

Sarah Baker (PhD; Academic advisor was Balaji Rajagopalan at U. of Colorado, 2016-2019)

Shraddhanand Shukla (PhD – 2 years; transferred on leaving UW), Nathalie Voisin (PhD: co-supervised until leaving UW), Kristian Mickelson (MSE; until leaving UW), Taryn Sass (MSE; non-thesis), Donee Alexander (MSE, 1 quarter)

*On behalf of Dr. Dennis Lettenmaier (UW) and as project Co-PI*

Ted Bohn, Xiaogang Shi, Niklas Christensen, Chunmei Zhu, Marketa McGuire, Jeff Payne, Darren Wilton, Ali Akanda

*On behalf of Dr. Anne Steinemann (UW) and as project Co-PI*

Eric Rosenberg, Julie Vano

**Research Staff & Post-Doc Supervision**

At NCAR, I have directly supervised:

Dr. Pablo Mendoza (post-doc), Dr. Flavio Lehner (post-doc), Manabendra Saharia (post-doc), Ridwan Siddique (post-doc), Josh Sturtevant (associate scientist), Dr. Hongli Liu (post-doc), Dr. Naoki Mizukami (associate scientist), Guoqiang Tang (post-doc)

At NCAR, I also have provide(d) supporting supervision and/or review to a research group including:

Dr. Andrew Newman, Chengcheng Huang, Nans Addor, Keith Musselman, Julie Vano, Nick Lybarger, Abby Smith

At NOAA CBRFC and NWRFC:

I co-managed the team of operational river forecasters (~12 in each location).

At 3TIER, Inc:

I supervised a research team (the 3TIER Science Group) consisting of:

Dr. Mark Stoelinga, Dr. Eric Grimit, Dr. Jeff Yin, Dr. Scott Otterson, Ms. Jessemine Fung

At U. Washington, I provided official or de facto supervision to:

Dr. Francisco Munoz, Dr. Xiaodong Zeng, Dr. Qiuhong Tang, George Thomas, Seethu Babu, Ali Akanda, Lise Johannesen, Niklas Christensen, Archana Gupta, Erin Rogers, Kathy Devlin, Dr. Venkataramana Sridhar, Shraddhanand Shukla, Elizabeth Clark, Eric Rosenberg, among others.

**NCAR Visitor Hosting / Supervision**

Mr. Dylan Cunningham (Vail Mountain School, 2 weeks, 2013)

Dr. Maria-Helena Ramos (Irstea, France, 1 week, 2015)

Dr. Elisabeth Stephens (U. of Reading, England, 1 month, 2016)

Ms. Louise Arnal (U. of Reading and ECMWF, England, 2 weeks, 2016)

Dr. Katrina Bennett (DOE Los Alamos, 1 month, 2016)

Ms. Diana Lucatero (U. of Copenhagen, Denmark, 3 months, 2016)

Dr. Katrina Bennett (DOE Los Alamos, 1 week, 2017)

Dr. Sankar Arumugam (North Carolina State University, 2 weeks 2017; 2 weeks 2019)

Mr. Amirhossein Mazrooie (North Carolina State University, 3 months, 2017)

Ms. Elizabeth Clark (University of Washington, 2 weeks, 2017)

Dr. Sean Fleming (White Rabbit LLC / Oregon State Univ, 1 week, 2018)

Ms. Sudarshana Mukhopadhyay (PhD; NCSU, 2017 summer GVP visit)

Mr. Sudershan Gangrade (PhD; NCSU, 2017 summer visit)

Dr. Manuela Brunner (Swiss NSF Fellow, 2019-2021)

**Fellowships, Honors And Awards**

NCAR Scientific and Technical Advancement Award, 2017, for the National Water Model

Editor’s Award, AMS *J. Hydrometeorology*, 2008*.*

ASCE Best Research Paper 2007, Mcguire, M., **A. Wood**, and others (2006), in ASCE *J. Water Res. Planning and Mgmt.* 132.

NASA New Investigator Program Research Grant Award, 2006-2009

VALLE Scholarship and Scandinavian Exchange Program, University of Washington, 1998-1999

Intergov. Personnel Act Fellowship, U.S. Army COE Institute for Water Resources, 1996-98

National Merit Scholar, 1984

**Professional Memberships**

American Geophysical Union

American Meteorological Society (currently lapsed)

American Society of Civil Engineers (currently lapsed)

**Professional Registration**

Engineer-in-Training, Washington State, 1995, No. 20716

**Consulting**

3TIER Environmental Forecast Group (Seattle), 2005, Implementing automated hydrologic forecasting system for the PNW

UC Santa Barbara (Tim Barnett at Scripps Institute), 2006-07, Hydrologic analysis based on downscaling NCAR Parallel Climate Model scenarios

PCM historical and control climate scenarios for Scripps Institute, 2006-2007.

University of Arizona Water Sustainability Program and the Bureau of Reclamation *Enhancing Water Supply Reliability* Project (2007-2008)

AMEC (Boulder, CO), Climate Change, Hydrology, VIC modeling and the Colorado Basin, 2008.

Kerr-Wood Leidal, Inc. (for the World Bank) - Mexico - Rio Piaxtla Hydro Assessment, 2010.

Utah Department of Water Resources, Climate Change Analysis for Eight Utah River Basins, 2015.

Taiwan Central Weather Bureau (CWB), On-site Review of Subseasonal to Seasonal Forecasting Activities, Taipei, 2015.

State of Colorado, Update of Maurer et al. (2002) 1/8th degree forcings for Colorado, 2015.

**Field Work**

Snow surveying, various locations, CO (March 2004): participant, NASA Cold Land Processes Experiment (CLPX), collected transect SWE and pit data for verification of snow modeling and remote sensing algorithms; several independent survey/study trips in different years to Stanley, ID and Berthoud Pass, CO for microwave radiometer validation

Atmospheric boundary level profiling, Rayon, Mexico (July 2004): participant, deployed rain gages and tethersonde as part of North American Monsoon Experiment (NAME) data collection activities.

Soil moisture surveying, Chickasaw, OK (July 1999): NASA SGP99 experiment.

**Technical Reviews**

Articles: J. American Water Resources Association, Bulletin of the American Meteorological Society, ASCE J. Water Resources Planning and Management, J. Hydrometeorology, Climatic Change, Water Resources Research, J. Climate Research, Int. Journal Climatology, J. Geophysical Research, Proc. Nat. Academy of Sciences (PNAS), Geophysical Research Letters, J. Hydrologic Engineering, J. Hydrology, J. Climate, HESS.

Proposals: Reclamation, USACE, Fondecyte (Chilean Research Foundation), NSF, NOAA MAPP Program; NASA New Investigator Program; NASA Water Management Program, ECMWF (European Center for Medium Range Weather Forecasting), NERC (Natural Environment Research Council, Canada)