

MARK D. SVOBODA

PERSONAL

Work Address: National Drought Mitigation Center
University of Nebraska-Lincoln
3310 Holdrege Street
819 Hardin Hall
Lincoln, NE 68583-0988

Telephone: (402) 472-8238
Fax: (402) 472-2946
E-mail: msvoboda2@unl.edu

EDUCATION

Ph.D. 2016 University of Nebraska-Lincoln. Natural Resources with Human Dimensions Specialization
M.A. 1992 University of Nebraska-Lincoln. Geography with Remote Sensing/Climatology/GIS Specialization
B.S. 1989 University of Nebraska-Lincoln. Geography with Climatology Specialization
Minor for Bachelor's Degree: Meteorology

CURRENT AND PREVIOUS POSITIONS

Director/Research Associate Professor, National Drought Mitigation Center (NDMC), University of Nebraska-Lincoln (UNL), School of Natural Resources (SNR), Lincoln, NE. September 2016-present.
Climatologist/Geoscientist, Monitoring Program Area Leader, National Drought Mitigation Center (NDMC), University of Nebraska-Lincoln (UNL), School of Natural Resources (SNR), Lincoln, NE. July 2011-September 2016.
Climatologist/Associate Geoscientist, Monitoring Program Area Leader, NDMC (UNL). July 2006-June 2011.
Climatologist/Assistant Geoscientist, NDMC (UNL). February 2004-June 2006
Climatologist, NDMC, University of Nebraska-Lincoln (UNL), June 1995-Jan. 2004
Geographic Information Specialist, USDA-Soil Conservation Service (SCS), Midwest National Technical Center, Lincoln, NE, June 1993-May 1995.

As the NDMC's Director, Mark administers and oversees the center's staff and mission, which involves the research, operational, planning and education/outreach programs of the NDMC and NOAA's Drought Risk Management Research Center (DRMRC). Svoboda works closely with federal, tribal, state, basin, local and international officials and governments on drought monitoring early warning information systems, drought impacts, risk management planning and collaborative research. He provides expertise on a wide range of climate/water management issues and is responsible for assessing user product needs and responding to information/data requests. Other duties include supervising the NDMC's various operational decision support tool web site development/maintenance and product creation. Responsibilities also cover handling media interviews and requests for other drought information. Svoboda is involved with drought monitoring, assessment, and prediction committees and activities at the state, regional, tribal, national and international levels. Mark is a member of the United Nations Convention to Combat Desertification (UNCCD) Bureau of the Committee on Science and Technology's (CST) Science Policy Interface (SPI) team. He served as a co-chair for both the Monitoring and Prediction Task Group of the Interim National Drought Council and the Monitoring and Prediction working group under the U.S. National Drought Policy Commission. Mark is the co-founder (1999) of the weekly U.S. Drought Monitor (<http://droughtmonitor.unl.edu>) and he continues to serve as one of the primary authors for the monthly North American Drought Monitor. His work with the Core Team of the Western Governors' Association led to the development of a report and recommendations on creating a National Integrated Drought Information System (NIDIS: drought.gov) for the United States. Svoboda

currently sits on NIDIS's Executive Council, was a member of the initial NIDIS Implementation Team and co-chair for the original NIDIS drought portal development, as well as assisting in a leadership capacity for NIDIS's regional drought early warning system activities across the country. He is also a member of the World Meteorological Organization/Global Water Partnership Integrated Drought Management Programme's Advisory Panel. Mark is internationally known for his drought monitoring/early warning work and has been a keynote speaker, consultant, advisory board member, or an invited expert for activities in over 50 countries/regions/organizations to date including: World Meteorological Organization (2010, 2014-18), Global Water Partnership (2014-18), USAID (July 2007, 2015-18 in Jordan, Lebanon, Tunisia and Morocco), United Nations Convention to Combat Desertification (UNCCD) Bolivia (2017), Caribbean Institute of Meteorology and Hydrology (CIMH/Barbados)(2010-17), Organization of Eastern Caribbean States (2015-16), Brazil/World Bank (2013-15), Morocco/World Bank (2014-15), Czech Republic, Germany, China (2005 and 2012); Turkey (2011 and 2014-15) Consultant for the United Nation's FAO, Argentina (October 2010); Poland (June 2010), Spain (June 2010 and February 2006), WMO/Mali (2009), Chile (2009), Australia (November 2008), Portugal (Nov 2007), European Commission (July 2007), and the Republic of Korea (2005 and 2012).

AREAS OF RESEARCH INTEREST

drought monitoring, drought early warning and information systems; drought indicators/indices and impacts; "flash drought"; soil moisture and its role in drought monitoring; decision support tool development; water resource issues; GIS and remote sensing applications.

AWARDS AND HONORS

2012—The "Omtvedt Innovation Award" in recognition of exceptional service provided by the NDMC at the University of Nebraska and the Institute of Agriculture and Natural Resources.

PROFESSIONAL AFFILIATIONS, APPOINTMENTS, AND ACTIVITIES

Member of: American Meteorological Society, American Geophysical Union and the American Association of State Climatologists
Member, 2017-present, United Nations Convention to Combat Desertification (UNCCD) Bureau of the Committee on Science and Technology (CST) Science Policy Interface (SPI) team
Member, 2016-present, National Integrated Drought Information System's Executive Council
Member, 2016-present, Integrated Drought Management Programme (IDMP) Advisory Committee for the World Meteorological Organization of the United Nations and the Global Water Partnership
Member, 2010-2016, American Meteorological Society's Applied Climate Committee:
Led Drafting Committee for the AMS's revision of their Drought Information Statement
Member, 2016-present, State of Nebraska/Governor's Climate Assessment and Response Committee
Guest Editor, 2015, Special Issue on Drought in Advances in Meteorology Journal
Contributing author, 2011, United Nations International Strategy for Disaster Reduction (ISDR) Global Assessment Report (GAR11) on Disaster Risk Reduction
Review Editor, 2011-2012, National Climate Assessment, SW Climate Assessment Technical Team
Member, 2011-2015, UNISDR GAR13 and GAR 15 Risk Model Scoping Team on Drought Risk
Member, 2006-present, NOAA-National Integrated Drought Information System (NIDIS) Implementation and Web Portal Development Teams (Co-chair). Also Co-Lead (2013-present) for the Missouri Basin Regional Drought Early Warning System Pilot Program
Faculty Fellow, (2014-present), with the Robert B. Daugherty Water for Food Institute
Faculty Fellow, (2014-present), with the Center for Great Plains Studies
Member, 2011-present, NOAA-Modeling, Analysis, Predictions and Projections Drought Task Force
Co-Chair, 2014-present, NOAA-Modeling, Analysis, Predictions and Projections Drought Task Force 2
Technical Coordinator, 2005, U.S.-China Bilateral Drought Workshop, Beijing, China
Member, 2003-2004, WGA/NOAA NIDIS Core Team

Co-Chair, 2001-2005, Monitoring and Prediction Task Group, Interim National Drought Council
Co-Chair, 1999-2000, Monitoring and Prediction Working Group, National Drought Policy Commission
Co-author, 1999-present, U.S. Drought Monitor (<http://drought.unl.edu/dm>)
Co-author, 2002-present, North American Drought Monitor
Member, 1995-2016, Nebraska Water Availability and Outlook Committee (WAOC)

Peer Journal/Chapter/Proposal/Grant/Report/Assessment Reviewer for: Intergovernmental Panel on Climate Change (IPCC) AR4 chapter(s) reviewer, 2012 National Climate Assessment chapter review editor and chapter co-author, American Geosciences Institute's Congressional Hazards Caucus Alliance, Journal of Climate, International Journal of Climatology, AMS's Journal of Applied Meteorology and Climatology, AMS's Journal of Hydrometeorology, Natural Hazards Journal, Agricultural and Forest Meteorology, Journal of Geophysical Research, Geophysical Research Letters, Environmental Research Letters, Climate Research, International Journal of Remote Sensing, Journal of Water Resources Management, Journal of Hydrology and Earth System Sciences, Journal of Water Resources Planning and Management, Applied Geography, The Professional Geographer, Geocarto International, Environmental Reviews, proposal reviewer for NOAA's Office of Global Programs Sectoral Application Research Program (SARP), and as an Expert Proposal Evaluator and Rapporteur for the European Commission.

RELEVANT PUBLICATIONS

Journal Articles (peer reviewed)

- Otkin, J.A., **M. Svoboda**, E.D. Hunt, T.W. Ford, M.C. Anderson, C. Hain, and J.B. Basara, 2017. Flash Droughts: A Review and Assessment of the Challenges Imposed by Rapid Onset Droughts in the United States. *Bulletin of the American Meteorological Society* 0 0:02016. <https://doi.org/10.1175/BAMS-D-17-0149.1> Published Online: 20 November 2017.
- Lorenz, D.J., J. Otkin, **M. Svoboda**, C. Hain, M.C. Anderson, and Y Zhong, 2017. Predicting U.S. Drought Monitor States Using Precipitation, Soil Moisture, and Evapotranspiration Anomalies. **Part I:** Development of a Nondiscrete USDM Index. *Journal of Hydrometeorology* 18:7, 1943-1962. Online publication date: 1-Jul-2017. <https://doi.org/10.1175/JHM-D-16-0066.1>
- Lorenz, D.J., J. Otkin, **M. Svoboda**, C. Hain, M.C. Anderson, and Y. Zhong, 2017. Predicting the U.S. Drought Monitor Using Precipitation, Soil Moisture, and Evapotranspiration Anomalies. **Part II:** Intraseasonal Drought Intensification Forecasts. *Journal of Hydrometeorology* 18:7, 1963-1982. Online publication date: 3-Jul-2017. <https://doi.org/10.1175/JHM-D-16-0067.1>
- Van Loon, A.F., Gleeson, T., Clark, J., Van Dijk, A., Stahl, K., Hannaford, J., Di Baldassarre, G., Teuling, A., Tallaksen, L.M., Uijlenhoet, R., Hannah, D.M., Sheffield, J., **Svoboda, M.**, Verbeiren, B., Wagener, T., Rangecroft, S., Wanders, N. and Van Lanen, H.A.J., 2016. Drought in the Anthropocene. *Nature Geoscience*, 9(2), pp.89-91, doi: 10.1038/ngeo2646. <http://rdcu.be/gemf>
- Otkin, J., Anderson, M. C., Hain, C., **Svoboda, M.**, Johnson, D. M., Mueller, R., Tadesse, T., Wardlow, B., Brown, J., 2016. Assessing the evolution of soil moisture and vegetation conditions during the 2012 United States flash drought. *Ag.Forest Meteorology*, Volumes 218-219, 230-242. [doi:10.1016/j.agrformet.2015.12.065](https://doi.org/10.1016/j.agrformet.2015.12.065)
- Muth, M., Anderson, K., Brown, D., Brown, T., Delgado, E., Garfin, G., Hadwen, T., Murphy, V., Pasqual, R. R., Pugh, B., Robles Gutiérrez, J. H., Heim, R., Rippey, B., and **Svoboda, M.**, 2016. Advancing preparedness and response to drought and wildfires through North American transboundary collaboration. *Bull. Amer. Meteor. Soc.*, doi:10.1175/BAMS-D-16-0296.1
- Collins, K., Hannaford, J., **Svoboda, M.**, Knutson, C., Wall, N., Bernadt, T., Crossman, N., Overton, I., Acreman, M., Bachmair, S., Stahl, K., 2016. Stakeholders Coinquiries on Drought Impacts, Monitoring, and Early Warning Systems. *Bull. Amer. Meteor.*, 97(3): ES217-220. <http://journals.ametsoc.org/doi/10.1175/BAMS-D-16-0185.1>
- Finnessey, T., Hayes, M. J., Lukas, J., **Svoboda, M.**, 2016. Using Climate Information for Drought

- Planning. *Climate Research*, 70, 251-263. <http://www.int-res.com>
- Van Loon, A. F., Stahl, K., Di Baldassarre, G., Clark, J., Rangecroft, S., Wanders, N., Gleeson, T., Van Dijk, A. I.J.M., Tallaksen, L. M., Hannaford, J., Uijlenhoet, R., Teuling, A. J., Hannah, D. M., Sheffield, J., **Svoboda, M.**, Verbeiren, B., Wagener, T., Van Lanen, H. A.J., 2016. Drought in a human-modified world: reframing drought definitions, understanding, and analysis approaches. *Hydrology and Earth System Sciences*, 20, 3631-3650. <http://www.hydrol-earth-syst-sci.net/20/3631/2016/>
- Ahmadalipour, A., Moradkhani, H., and **Svoboda, M.**, 2016. Centennial drought outlook over the CONUS using NASA-NEX downscaled climate ensemble. *Int. J. Climatol.*. 15pp. DOI: 10.1002/joc.4859
- Bachmair, S., Stahl, K., Collins, K., Hannaford, J., Acreman, M., **Svoboda, M.**, Knutson, C., Helm Smith, K., Wall, N., Fuchs, B., Crossman, N. D., Overton, I. C., 2016. Drought indicators revisited: practice in monitoring and early warning and the link to drought impacts. *WIREs Water*, 3(4), 516-536. <http://onlinelibrary.wiley.com/doi/10.1002/wat2.1154/full>
- Madadgar, S., AghaKouchak, A., Shukla, S., Wood, A., Cheng, L., Sorooshian, S., Hsu, K.-L., **Svoboda, M.**, 2016. A Hybrid Statistical-Dynamical Drought Prediction Framework: Application to the Southwestern United States. *Water Resources Research*, 52(7), 5095-5110. American Geophysical Union. <http://onlinelibrary.wiley.com/doi/10.1002/2015WR018547/full>
- Svoboda, M.**, Fuchs, B., Poulsen, C., Nothwehr, J., 2015. The Drought Risk Atlas: Enhancing Decision Support for Drought Risk Management in the United States. *J. Hydrology*, 526, 274-286. doi: [10.1016/j.jhydrol.2015.01.006](https://doi.org/10.1016/j.jhydrol.2015.01.006)
- Trnka, M., Brazdil, R., Mozny, M., Stepanek, P., Dubrovsky, M., Zahradnicek, P., Balek, B., Dobrovolny, P., Semaradova, D., Hlavinka, P., Eitzinger, J., Wardlow, B., **Svoboda, M.**, Hayes, M. J., 2015. Soil moisture trends in the Czech Republic between 1961 and 2012. *Int. J. Climatol.*, 35(13): 3733-3747. doi:10.1002/joc.4242
- Otkin, J., Shafer, M., **Svoboda, M.**, Wardlow, B., Anderson, M., Hain, C., Basara, J., 2015. Facilitating the Use of Drought Early Warning Information through Interactions with Agricultural Stakeholders. *Bull. Amer. Meteor.*, 96(7), 1073-1078. doi:10.1175/BAMS-D-14-00219.1
- Tadesse, T., Wardlow, B., Brown, J. F., **Svoboda, M.**, Hayes, M. J., Fuchs, B., Gutzmer, D., 2015. Assessing the Vegetation Condition Impacts of the 2011 Drought across the U.S. Southern Great Plains Using the Vegetation Drought Response Index (VegDRI). *J. Applied Meteorology and Climatology*, 54, 153-169. <http://journals.ametsoc.org/doi/pdf/10.1175/JAMC-D-14-0048.1> doi:10.1175/JAMC-D-14-0048.1
- Otkin, J., Anderson, M., Hain, C., **Svoboda, M.**, 2015. Using Temporal Changes in Drought Indices to Generate Probabilistic Drought Intensification Forecasts. *J. Hydrometeorology*, 16(1), 88-105. doi: <http://dx.doi.org/10.1175/JHM-D-14-0064.1>
- Nam, W., Hayes, M. J., Svoboda, M., Tadesse, T., Wilhite, D., 2015. Drought hazard assessment in the context of climate change for South Korea. *Agricultural Water Management*, 160, 106-117. doi:10.1016/j.agwat.2015.06.029 <http://www.sciencedirect.com/science/article/pii/S0378377415300433>
- You, J., Hubbard, K., Shulski, M., **Svoboda, M.**, Hayes, M. J., 2015. Development of a Long-Term Serially Complete Dataset of U.S. Temperatures and Precipitation for Climate Services. *J. Service Climatology*, pp.1-23. <http://www.journalofserviceclimatology.org/>
- Xia, Y., M. B. Ek, C. D. Peters-Lidard, D. Mocko, **M. Svoboda**, J. Sheffield, and E. F. Wood, 2014. Application of USDM statistics in NLDAS-2: Optimal blended NLDAS drought index over the continental United States, *J. Geophys. Res. Atmos.*, 119(6), 2947-2965 doi:[10.1002/2013JD020994](https://doi.org/10.1002/2013JD020994).
- Yu, M., Li, Q., Hayes, M. J., **Svoboda, M. D.** and Heim, R. R., 2014. Are droughts becoming more frequent or severe in China based on the Standardized Precipitation Evapotranspiration Index: 1951–2010? *Int. J. Climatol.*, 34(3): 545–558. doi: 10.1002/joc.3701

- Hunt, E., **M. Svoboda**, B. Wardlow, K. Hubbard, M.J. Hayes and T. Arkebauer, 2014. Monitoring the effects of rapid onset of drought on non-irrigated maize with agronomic data and climate-based drought indices. *J. Agric. For. Meteorol.*, **191C**, 1-11. doi: 10.1016/j.agrformet.2014.02.001.
- Otkin, J. A., M. C. Anderson, C. Hain, and **M. Svoboda**, 2014. Examining the relationship between drought development and rapid changes in the Evaporative Stress Index. *J. Hydrometeorol.*, 15(3), 938-956. DOI: 10.1175/JHM-D-13-0110.1
- Trnka, M., Brázdil, R., Balek, J., Semerádová, D., Hlavinka, P., Možný, M., Štěpánek, P., Dobrovolný, P., Zahradníček, P., Dubrovský, M., Eitzinger, J., Fuchs, B., **Svoboda, M.**, Hayes, M., Žalud, Z. (2014). Drivers of soil drying in the Czech Republic between 1961 and 2012. *Royal Meteorological Society, Int. J. Climatol.*
<http://onlinelibrary.wiley.com/doi/10.1002/joc.4167/abstract>
- Nam, W.-H., Kim, T., Hong, E.-M., Hayes, M. J., **Svoboda, M.**, 2015. Water Supply Risk Assessment of Agricultural Reservoirs using Irrigation Vulnerability Model and Cluster Analysis. *J. Korean Society of Agricultural Engineers*, 57, 59-67.
- Nam, W.-H., Hayes, M. J., Wilhite, D., **Svoboda, M.**, 2015. Projection of Temporal Trends on Drought Characteristics using the Standardized Precipitation Evapotranspiration (SPEI) Index in South Korea. *J. Korean Society Ag Engineers*, 57, 37-45
- Fu, X., **M. Svoboda**, Tang, Z., Dai, Z., Wu, J., 2013. An overview of US state drought plans: crisis or risk management? *Natural Hazards/Springer*, 69(3), 1607-1627.
<http://link.springer.com/article/10.1007%2Fs11069-013-0766-z#page-1>
- Trnka, M., Kersenbaum, C., Eitzinger, J., Hayes, M. J., Hlavinka, P., **Svoboda, M.**, Dubrovsky, M., Semerádová, D., Wardlow, B., Pokorný, E., Možný, M., Wilhite, D., Waltman, W., Zalud, Z., 2013. Consequences of climate change for the soil climate in central Europe and central U.S. *Int. J. Climate Change*
- Dubrovsky, M., Hayes, M. J., Duce, P., Trnka, **M.**, **Svoboda, M.**, Zara, P., 2013. Multi-GCM projections of future drought and climate variability indicators for the Mediterranean region. *Springer Regional Environmental Change*.
- Otkin, J. A., M. C. Anderson, C. Hain, I. Mladenova, J. Basara, and **M. Svoboda**, 2013. Examining flash drought development using the thermal infrared based Evaporative Stress Index. *J. Hydrometeorol.*, 14, 1057-1074.
- Anderson, M. C., C. Hain, J. A. Otkin, X. Zhan, K. Mo, **M. Svoboda**, W. Dulaney, and A. Pimstein, 2013. An intercomparison of drought indicators based on thermal remote sensing and NLDAS-2 simulations with U.S. Drought Monitor classifications. *J. Hydrometeorol.*, 14, 1035-1056.
- Pozzi, W., Sheffield, J., Stefanski, R., Cripe, D., Pulwarty, R., Heim, R., Brewer, M. J., Vogt, J., Westerhoff, R., Pappenberger, F., Werner, M., Lloyd-Hughes, B., Wagner, W., Mo, K., Schubert, S., Dijk, A. v., **Svoboda, M.**, Bettio, L., Nicholson, M., van Beek, R., Bierkens, M., Nunez, L., Lawford, R., Goncalves, L. G., Dutra, E., Wetterhall, F. (2013). Towards A Global Drought Early Warning System: Expanding international cooperation for the development of a framework for global drought monitoring and forecasting. *Bulletin of the American Meteorological Society*. 10.
- Hayes, M., **M. Svoboda**, N. Wall, and M. Widhalm, 2011. The Lincoln Declaration on Drought Indices: Universal meteorological drought index recommended. *Bulletin of the American Meteorological Society*, 92(4): 485-488.
- Hlavinka, P., M. Trnka, J. Balek, D. Semerádová, M. Hayes, **M. Svoboda**, J. Eitzinger, M. Možný, M. Fischer, E. Hunt, and Z. Zalud, 2011. Development and evaluation of the SoilClim model for water balance and soil climate estimates. *Agricultural Water Management*, 98(8): 1249-1261.
- Ryu, J.H., **M.D. Svoboda**, J.D. Lenters, T. Tadesse, and C. Knutson, 2010. Finding Potential Extents for ENSO-driven Hydrologic Drought Forecasts in the United States. *Climatic Change*, 101: Numbers 3-4, 575-597, DOI: 10.1007/s10584-009-9705-0
- Tadesse, T., B. Wardlow, M. Hayes, **M. Svoboda** and J. Brown, 2011. The Vegetation Outlook (VegOut): a New Method for Predicting Vegetation Seasonal Greenness. *GIScience and Remote Sensing*, 47(1), 25-52.

- Wardlow, B.D., M.J. Hayes, **M.D. Svoboda**, T. Tadesse, and K.H. Smith, 2009. Sharpening the Focus on Drought: New Monitoring and Assessment Tools at the National Drought Mitigation Center. *Earthzine*, unpaginated (Available on-line at: <http://www.earthzine.org/2009/03/30/sharpening-the-focus-on-drought-%e2%80%93-new-monitoring-and-assessment-tools-at-the-national-drought-mitigation-center/>).
- Wu, H., **M.D. Svoboda**, M.J. Hayes, D.A. Wilhite, and Wen, F., 2007. Appropriate Application of the Standardized Precipitation Index in Arid Locations and Dry Seasons. *International Journal of Climatology*, 27: 65-79.
- Trnka, M., M. Dubrovsky, **M. Svoboda**, D. Semeradova, M. Hayes, Z. Zalud, and D. Wilhite, 2008. Developing a Regional Drought Climatology for the Czech Republic. *International Journal of Climatology*. [On-line] DOI: 10.1002/joc.1745
- Dubrovsky, M., **M. Svoboda**, M. Hayes, D. Wilhite, Z. Zalud, and P. Hlavinka, 2006. The Application of Relative Drought Indices in Assessing Climate Change Impacts on Drought Conditions in Czechia. *Theoretical and Applied Climatology*. [On-line] DOI: 10.1007/s00704-008-0020-x
- Wu, H., M.J. Hayes, D.A. Wilhite, and **M.D. Svoboda**, 2005. The effect of Data Length on the Standardized Precipitation Index Calculation. *Int. Journal of Climatology*, 25:4, 505-520.
- Svoboda, M.**, D. LeComte, M. Hayes, R. Heim, K. Gleason, J. Angel, B. Rippey, R. Tinker, M. Palecki, D. Stooksbury, D. Miskus, and S. Stephens, 2002. The Drought Monitor. *Bulletin of the American Meteorological Society*, 83(8):1181-1190.
- Lawrimore, J., R.R. Heim Jr., **M. Svoboda**, V. Swail, and P.J. Englehart, 2002. Beginning a New Era of Drought Monitoring Across North America, *Bulletin of the American Meteorological Society*, 83 (8): 1191–1192.
- Svoboda, M.**, M. Hayes and D. Wilhite, 2002. The Role of Integrated Drought Monitoring in Drought Mitigation Planning. *Annals of Arid Zone*, 40(1): 1-11.
- Peters, A., E. Walter-Shea, L. Ji, A. Viña, M. Hayes, and **M. Svoboda**, 2002. Drought Monitoring with NDVI-Based Standardized Vegetation Index. *Photogrammetric Engineering & Remote Sensing*, 68(1):71-75.
- Hayes, M., **M. Svoboda**, D. Wilhite, and O. Vanyarkho, 1999. Monitoring the 1996 Drought Using the Standardized Precipitation Index. *Bulletin of the American Meteorological Society*, 80(3): 429-438.

Book Chapters, Magazine Articles, Technical Reports and Other (peer and non-peer reviewed)

- Svoboda, M.**, Fuchs, B., 2017. Handbook of Drought Indicators and Indices. WMO-No. 1173 ed., pp. 52. *World Meteorological Organization (Geneva, Switzerland) and Global Water Partnership (Stockholm, Sweden)*. http://library.wmo.int/pmb_ged/wmo_1173_en.pdf
- van Lanen, H., J.V. Vogt, J. Andreu, H. Carrao, L. de Stefano, E. Dutra, L. Feyen, G. Forzieri, M. Hayes, A. Iglesias, C. Lavaysse, G. Naumann, R. Pulwarty, J. Spinoni, K. Stahl, R. Stefanski, N. Stilianakis, **M. Svoboda** and L.M. Tallaksen, 2017. Climatological risk: droughts. In: *Science for disaster risk management 2017: knowing better and losing less*. Poljanšek, K., Marín Ferrer, M., De Groeve, T., Clark, I. (Eds.), 2017. EUR 28034 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-79-60679-3, doi:10.2788/842809, JRC102482.
- Huang, J., **M. Svoboda**, A. Wood, S. Schubert, C.D. Peters-Lidard, E. Wood, R. Pulwarty, A. Mariotti and D. Barrie. 2017. Research to Advance Drought Monitoring and Prediction Capabilities. In: *Drought and Water Crises: Integrating Science, Technology, and Management Issues, Second Edition*. D. Wilhite and R. Pulwarty eds., CRC Press, pp. 127-140.
- Hayes, M., **M. Svoboda** and K. Redmond. 2017. Drought Monitoring and Early Warning: Twenty-First Century Advancements and Challenges. In: *Drought and Water Crises: Integrating Science, Technology, and Management Issues, Second Edition*. D. Wilhite and R. Pulwarty eds., CRC Press, pp. 141-154.

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- McNutt, C., D. Kluck, D. Todey, B. Fuchs, **M. Svoboda** and C. Black. 2017. Floods Punctuated by Drought: Developing an Early Warning System for the Missouri River Basin in the Midst of Alternating Extremes. In: *Drought and Water Crises: Integrating Science, Technology, and Management Issues, Second Edition*. D. Wilhite and R. Pulwarty eds., CRC Press, pp. 347-358.
- Wang, W., Ertsen, **M., Svoboda, M.**, Hafeez, M., 2016. Migration of Drought: from Meteorological Drought to Hydrological and Agricultural Drought. Article ID 6547209 ed., vol. 2016, 5pgs. Migration of Drought: from Meteorological Drought to Hydrological and Agricultural Drought. *Advances in Meteorology*. Hindawi Publishing Corporation. <https://www.hindawi.com/journals/amete/2016/6547209/>
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GRANTS AWARDED

- Drought Information Services for Agriculture across the United States. B. Fuchs and **M. Svoboda**. USDA-OCE. \$927,774. 10/1/2016-9/30/2018. **(Co-PI)**
- Providing Drought Information Services for the Nation: The National Drought Mitigation Center. **M. Svoboda**, M. Hayes, C. Knutson, T. Tadesse, D. Bathke and B. Fuchs. NOAA-CPO-SARP. \$2,445,736. 6/1/2015-5/31/2018. **(PI)**
- NIDIS Help Desk Support. **M. Svoboda**, B. Fuchs, D. Wood and N. Umphlett. NOAA-National Integrated Drought Information System. \$150,000. 9/1/2017-8/31/2017. **(PI)**
- Drought Information Services for Agriculture across the United States. B. Fuchs and **M. Svoboda**. USDA-OCE. \$827,501. 10/1/2016-9/30/2017. **(Co-PI)**
- Drought Risk Management and Planning Assistance in the Caribbean. **M. Svoboda**, C. Knutson, M. Hayes and B. Fuchs. Caribbean Institute of Meteorology and Hydrology, Barbados. \$49,917. 1/1/2017-6/30/2017. **(PI)**
- Development of the MENA Regional Drought Management System. M. Hayes, **M. Svoboda**, C. Knutson. USAID/International Centre for Biosaline Agriculture (ICBA). \$1,025,440. 1/1/2016-3/31/2017. **(PI)**
- Global Inventory and Comparative Assessment of Drought Risk Modelling Tools. **M.Svoboda** and T. Tadesse. World Bank via subcontract with Deltares (Netherlands). \$11,484. 6/1/2017-10/10/2017. **(Co-PI)**
- Drought Information Services for Agriculture across the United States. M. Hayes, B. Fuchs and **M. Svoboda**. USDA-OCE. \$839,442. 10/1/2015-9/30/2016. **(Co-PI)**
- Drought Early Warning and Policy in the Eastern Caribbean. B. Fuchs, M. Hayes, **M. Svoboda**, C. Knutson and T. Tadesse. Organization of Eastern Caribbean States. 1/1/2016-6/30/2016 \$49,227. **(Co-PI)**

The Wind River Indian Reservation's Vulnerability to the Impacts of Drought and the Development of Decision Tools to Support Drought Preparedness. C. Knutson, **M. Svoboda**. DOI/USGS. \$253,547. 6/2015-5/2017. **(Co-PI)**

Development of the Middle East and North Africa Network of Water Centers. M. Hayes, **M. Svoboda**, B. Fuchs, T. Tadesse and K. Smith. Development Alternatives, Inc. \$40,052. 2/1/2015-12/31/2015, **(Co-PI)**

Development of Probabilistic Drought Intensification Forecasts Using the GOES-Based Evaporative Stress Index. J. Otkin, M. Anderson, **M. Svoboda**, C. Hain and X. Zhan. NOAA-CPO-MAPP. \$594,118. 8/2014-8/2017. **(Co-PI)**

Advancing Drought Monitoring and Prediction Using a Multi-Index Multivariate Framework. A. AghaKouchak, A. Wood and **M. Svoboda**. NOAA-CPO-MAPP. \$443,960. 8/2014-8/2017. **(Co-PI)**

Integrating GRACE and GRACE Follow-on Data into Flood and Drought Forecasts of Drought Categories. M. Rodell, B. Zaitchik, **M. Svoboda**, B. Wardlow, P. Restrepo & others. NASA-Applied Sciences. \$1,637,285. 10/2014-9/2018. **(Co-Investigator)**

Drought Impacts: Vulnerability Thresholds in Monitoring and Early Warning Research. K. Stahl, C. Knutson, **M. Svoboda**, J. Hannaford, K. Collins, I. Overton, N. Crossman, M. Colloff, and M. Acreman. National Science Foundation/Belmont Forum ICER. \$1,526,850. 9/2013-8/2016. **(Co-PI)**

The Quick Drought Response Index (Quick DRI): An Integrated Approach for Rapid Response Agricultural Drought Monitoring. B. Wardlow, **M. Svoboda**, M. Hayes, T. Tadesse, M. Anderson, M. Rodell, and J. Brown. NASA-ROSES. \$1,150,701. 8/2013-8/2016. **(Co-PI)**

ET Mapping over North America. M. Anderson, C. Hain, B. Wardlow and **M. Svoboda**. NASA-ROSES. \$106,575. 12/31/2013-12/12/2016. **(Co-PI)**

Drought Risk Management for the United States. M. Hayes, **M. Svoboda**, C. Knutson, T. Tadesse, B. Fuchs, and D. Bathke. NOAA-University of Oklahoma. \$693,696. 9/1/2014-8/31/2016. **(Co-PI)**

Improving U.S. Drought Monitoring—Integrating Soil Moisture Data and Developing a Drought Blends Portal. M. Hayes, **M. Svoboda** and B. Fuchs. USDA-OCE, \$240,000. 7/16/2014-7/15/2015. **(Co-PI)**

Drinking Water Utilities. C. Knutson, M. Hayes and **M. Svoboda**. Cadmus Group, Inc. \$17,072. 9/25/2014-6/15/2015. **(Co-PI)**

Technical Assistance on Drought Preparedness in Brazil. M. Hayes, **M. Svoboda**, C. Knutson, B. Fuchs and K. Smith. The World Bank. \$70,000. 10/2013-6/2015 **(Co-PI)**

NDMC Drought Information Services for Agriculture. M. Hayes, **M. Svoboda** and B. Fuchs. USDA-OCE, \$200,000. 9/2013-2/2015. **(Co-PI)**

Regional Climate Services Support in the High Plains Region. Fuchs, B., **M. Svoboda** and M. Hayes. NOAA-National Climatic Data Center. \$265,000. 10/2013-3/2015. **(Co-PI)**

Facilitating Adaptive Management Under Conditions of Rapid Drought Onset Using the GOES-Based Evaporative Stress Index. J. Otkin, M. Anderson, M. A. Shafer, **M. Svoboda**, J. Basara, and B. Wardlow, C. Hain and X. Zhan. NOAA-CPO-MAPP. \$299,940. 9/2013-08/2015. **(Co-Investigator)**

Dual Assimilation of Microwave and Thermal-Infrared Satellite Observations of Soil Moisture into NLDAS for Improved Drought Monitoring. M. Anderson, C. Hain, J. Otkin, B. Wardlow and **M. Svoboda**. NOAA-CPO-MAPP. \$592,374. 8/2011-7/2014. **(Co-Investigator)**

Development of a Multi-Scale Remote Sensing Based Framework for Mapping Drought over North America. C. Hain, M. Anderson, X. Zhan, F. Gao, **M. Svoboda**, B. Wardlow, J. Otkin and C. Kongoli. NASA-ROSES. \$106,576. 8/2013-08/2016. **(Co-Investigator)**

Drought Information Service in Support of the National Integrated Drought Information System NIDIS. M. Hayes, **M. Svoboda**, C. Knutson, B. Fuchs and D. Bathke. NOAA-OAR. \$739,803. 10/2013-9/2014. **(Co-PI)**

2013 Workshop on Remote Sensing for Drought Monitoring and Water Resources Applications. **M. Svoboda** and B. Wardlow. NASA. \$24,553. **(PI)**

Enhancing Decision Support for Drought Risk in the United States: The Drought Risk Atlas. **M. Svoboda**, M. Hayes, B. Fuchs, M. Shulski, M. Timofeyeva and M. Brewer. NOAA-Climate Program Office: Sectoral Applications Research Program (SARP). \$260,131. 8/2012-7/2014. **(PI)**

The Quick Drought Response Index (QuickDRI): An Integrated Approach for Rapid-Response Agricultural Drought Monitoring. B. Wardlow, **M. Svoboda**, M. Hayes, T. Tadesse, J. Brown. M. Anderson and M. Rodell. NASA ROSES ESA: Water Resources. \$199,678. 8/1/2012-7/31/2013. **(Co-PI)**

Regional Climate Services Support in the High Plains Region. Shulski, M., **M. Svoboda** and M. Hayes. NOAA-National Climatic Data Center. \$1,696,136,000. 9/2011-3/2013. **(Co-PI)**

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Drought Mitigation, Nebraska. M.J. Hayes, **M. Svoboda**, C. Knutson and B. Wardlow. USDA-NIFA. \$558,401. 8/2010-7/2012. **(Co-PI)**

Dual Assimilation of Microwave and Thermal-Infrared Satellite Observations of Soil Moisture into NLDAS for Improved Drought Monitoring. NOAA. M. Anderson (USDA-ARS), B. Wardlow, **M. Svoboda**. NOAA-MAPP. \$592,374, 8/2011-7/2014. **(Co-Investigator)**

Use of Satellite Data and Model Products in Improving the Categorization, Delineation and Mitigation of Agricultural Drought. McNider, R.T., J. Christy, D. Zierden, **M. Svoboda**, B. Wardlow, A. Limaye, J. Mecikalski and G. Hoogenboom. NASA. \$20,383. 9/1/2010-8/31/2012. **(Co-Investigator)**

NIDIS Portal Content Development and Help Desk Support. **M.D. Svoboda**. NOAA. \$497,797. 8/15/2009 - 8/14/2012. **(PI)**

A GOES Thermal-Based Drought Early Warning Index for NIDIS, Anderson, M.C., K. Mo, **M. Svoboda**, B. Wardlow, X. Zhan, J.R. Mecikalski, W.P. Kustas, and J.F. Brown. NOAA Climate Dynamics and Experimental Prediction (CDEP). \$682,884. 8/1/2009 – 7/30/2012. **(Investigator)**

Integrating Enhanced GRACE Water Storage Data into the U.S. and North American Drought Monitors, Rodell, M., J. Lawrimore, J.S. Famiglietti, R. Heim, R. Reichle, **M. Svoboda**, B. Wardlow, B. Zaitchik, and A. Pinheiro. NASA's Decision Support through Earth Science Research Results. NASA. \$597,000. 8/6/2008 – 8/5/2011. **(Co-PI)**

Development of a "Drought Ready Communities" Program. **M.D. Svoboda**, M. Sittler, K. H. Smith, M. Shafer, M. Palecki, C. L. Knutson, D. Arndt, D. Woudenberg and J. Angel. NOAA. \$288,670. Grant No. NA08OAR4310696. 7/1/2008 - 6/30/2010. **(PI)**

Drought Mitigation, NE Project, M. Hayes, **M. Svoboda**, C. Knutson, and B. Wardlow. USDA-CSREES. \$347,246. 7/15/2008 – 7/14/2010. **(Co-PI)**

Building a Drought Impact Reporting System for Hawaii. **M.D. Svoboda**, M. J. Hayes, and Y. Ding. Commission on Water Resource Management, State of Hawaii. \$100,000. 6/23/2008 - 6/30/2011. **(Co-PI)**

Developing a Predictive Capability Decision Support System for Drought Mitigation, J. Ryu, **M. Svoboda**, C. Knutson. NASA. \$331,000. 8/1/2008 - 7/31/2011. **(Co-PI)**

Development of a Drought Decision Support Portal for the Republican River Basin of Nebraska, Colorado, and Kansas. C. L. Knutson, **M. Svoboda**, J. H. Ryu, B. Lubeck, D. Smith and J. Fanning. NOAA. \$223,525. 8/1/2007 - 7/31/2009. **(Investigator)**

Low-flow Impact Study for the Upper Colorado Basin, **M. Svoboda**, M. Hayes, C. Knutson, and D. Woudenberg. NOAA/NIDIS. \$87,000. 10/1/2008 – 3/1/2010. **(Co-PI)**

Low-flow Project in the Alabama, Coosa, Tallapoosa (ACT), and the Apalachicola, Chattahoochee, Flint (ACF) River Basins, **M. Svoboda**, M. Hayes, C. Knutson, and D. Woudenberg. \$24,999. 9/15/2008 – 3/15/2010. **(Co-PI)**

EuroGEOSS: A European Approach to GEOSS, **M. Svoboda**. European Commission/Research Directorate General of the Environment. \$7,600,000. 12/1/2008 – 11/30/2011. **(Collaborator)**

NIDIS Portal Content Development and Help Desk Support. **M.D. Svoboda**. NOAA. \$165,409. 8/15/2008 - 8/14/2009. **(PI)**

Rangeland and Forage Geospatial Decision Support System for Drought Risk Management. D.A. Wilhite, K. Hubbard, **M. Svoboda**, T. Tadesse, J. Brown, M. Hayes, C. Knutson, J. Volesky, and M. Tooze. USDA/RMA. \$1,023,038. (10/1/2005 to 9/30/2010). **(Investigator)**

Transitioning the Drought Impact Reporter into an Operational System. M. Hayes, D. Wilhite, **M. Svoboda**, G. Garfin, C. Knutson, D. Wood, and M. Higgins. NOAA Office of Global Programs. \$453,523. (3/1/07 to 2/28/10). **(Investigator)**

Enhancement of the U.S. Drought Monitor by Integrating Earth Science Data. S.V. Nghiem, G.R. Brakenridge, R. Dole, D. LeComte, E.G. Njoku, J. Verdin, and D.A. Wilhite, Co-PIs. **Collaborators: M. Svoboda**, B. Wardlow, and T. Tadesse. NASA. \$119,000. (2007-2010).

Drought Risk, Impact, and Mitigation Information System. S. Goddard and D. Wilhite, co-PIs. **Collaborators: M. Hayes, M. Svoboda**, T. Tadesse, C. Knutson, K. Schoengold, and K. Hubbard. USDA/RMA. \$6,407,472. (10/1/2005 to 9/30/2008).

Climate and Soil Risk Information System. S. Goddard and D. Wilhite, co-PIs. **Collaborators: M. Hayes, M. Svoboda**, and C. Knutson. USDA/RMA. \$1,212,055. (6/1/2005 to 5/31/2008).

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HIGHLIGHTED INTERNATIONAL ACTIVITIES

- Invited keynote speaker for United Nations Convention to Combat Desertification's (UNCCD) "Latin America and the Caribbean Regional Conference on Drought Management and Preparedness" in Santa Cruz de la Sierra, Bolivia. (2017)
- Invited participant for the United Nations Office for Disaster Risk Reduction (UNISDR) "Scoping Meeting for Agricultural Risk Assessment" in Boulder, Colorado, USA. (2017)
- Attended and participated in meetings as an Advisory Panel member of the World Meteorological Organization and Global Water Partnerships' Integrated Drought Management Programme in Geneva, Switzerland. (2017)
- Invited speaker and facilitator for the National Aeronautics and Space Administration's IDS: "Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa" participatory workshop in Addis Ababa, Ethiopia. (2017)
- Invited speaker and panelist (via the University of Southern Queensland) for the Australian Meat and Livestock Association in Brisbane, Australia. (2017)
- Invited speaker and panelist at the International Tropical Agriculture Conference in Brisbane, Australia. (2017)
- Helped organize and host (and presented/trained in coordination with the Global Water for Food Institute at UNL) a hands-on drought early warning system (DEWS) workshop for visiting scientists from India's Agriculture Research Institute as part of an UNL-IARI initiative to discuss building a Pan-India combined drought indicator in Lincoln, NE, USA. (2017)
- Invited speaker/panelist for World Meteorological Organization-Global Water Partnership-National Oceanic and Atmospheric Administration/NIDIS sponsored "Drought Mitigation & Preparedness: Benefits of Action & Costs of Inaction" Workshop hosted by the World Bank in Washington, D.C., USA. (2017)
- Helped NDMC host scientists from the Kenyan Drought Management Programme (2017)
- Helped NDMC host scientists from South African government (emergency management), agricultural coop and university. (2017)
- Helped NDMC host scientists from the Korean Water Corporation. (2017)
- Helped Department of Agronomy host scientists from the Nigerian Extension Service. (2017)

- Helped NDMC host Director of the Intergovernmental Authority on Development's (IGAD) International Climate Prediction and Applications Centre (ICPAC). (2017)
- Helped organize, facilitate, host and presented (in coordination with the Global Water for Food Institute at UNL) at a drought early warning system (DEWS) workshop for visiting scientists from India's Agriculture Research Institute as part of the Obama-Singh initiative to discuss building a Pan India DEWS in Lincoln, NE, USA. (2016)
- Helped organize and lead a drought risk management and early warning Town Hall meeting in Tunis, Tunisia. The NDMC is collaborating with the Daugherty Global Water for Food Institute, the International Center for Biosaline Agriculture (United Arab Emirates), CALMIT (UNL) and the University of Maryland on this USAID sponsored research and capacity building project. I assisted in the planning of additional Town Hall meetings in Jordan, Lebanon and Morocco that I was unable to attend. (2016)
- Hosted scientists from the Inter-American Institute for Cooperation on Agriculture from Cost Rica. (2016)
- As part of invitation to serve on the World Meteorological Organization and Global Water Partnerships Integrated Drought Management Programme's Advisory Panel, attended and participated at the meetings in Geneva, Switzerland. (2016)
- Helped organize (on planning committee), facilitate and presented at a central European "Sort-Out" Drought Impacts and Indicators Workshop in Dresden, Germany. (2016)
- Led the organization of, facilitated and presented at the U.S. Virgin Islands (St. Croix)/Puerto Rico (San Juan) Drought Monitor Forums as part of our USDA Cooperative Agreement with the Office of the Chief Economist. (2016)
- Invited to give presentations and helped facilitate at the North American Drought Monitor Forum involving Canada, Mexico and the U.S. in Ft. Worth, TX. (2016)
- Invited presentation on joint drought monitoring efforts between the NDMC and DWFI in front of the Water for Food Institute's International Advisory Panel as part of the annual conference in Lincoln. (2016)
- Assisted and presented at a stakeholder forum in Adelaide, Australia as part of an international research team (Belmont/National Science Foundation) focused of researching the relationship between drought indicators and impacts in Australia, Europe and the U.S. (2016)
- As part of a consulting contract between the NDMC and Organization of Eastern Caribbean States, I helped plan, organize, facilitate and presented in Antigua and materials produced were also utilized for workshops in St. Kitts and Saint Lucia in coordination with the Caribbean Institute for Meteorology and Hydrology in Barbados. (2016)
- Consultant for World Meteorological Organization/Global Water Partnership's in developing a *Drought Indicators and Indices Handbook* as part of activities for the Integrated Drought Management Program of the WMO, which was published in 2016. (2014-16)
- Helped host (in coordination with the Global Water for Food Institute) visiting scientist (Rabi Sahoo) from India (IARI) as part of the Obama-Singh initiative to discuss research ideas and capacity building and exchange between both parties. A workshop is being planned as a follow-on to the WFI Annual Conference in spring 2017 in Lincoln. (2016)
- Invited speaker for the MENA Regional Stakeholder's Workshop for the development of a regional drought risk management system/platform based on the methodology I built for Morocco. Cairo, Egypt. (2015)
- World Bank consultant for drought monitoring and early warning system development for northeast Brazil and collaborations with ANA and Ministry of Integration. Presented a panel talk at the Brazilian Water Conference. Activities in Fortaleza, Ceara and Brasilia. (2013-15)
- World Bank consultant for Moroccan Royal Remote Sensing Centre on developing a composite drought indicator for Morocco in Rabat (2014-15)

- Consultant for a Turkish consulting firm on the application of a gridded composite drought index/monitoring system. Ankara, Turkey (2014-15)
- Invited speaker at the Global Change Research Centre's InterDrought Project workshop on "State-of-the-Art Drought Monitoring Methods and the Art of Sharing it with Stakeholders" in Brno, Czech Republic. (February 2015)
- Organized and conducted a Drought Early Warning and Information System training workshop for the Caribbean Region at the Caribbean Institute for Meteorology and Hydrology in Bridgetown, Barbados (January 2015)
- Invited speaker for the Global Drought Information System meetings in Pasadena, CA (December 2014)
- Invited keynote speaker for the European Geophysical Union's Leonardo HYPER Drought Conference in Prague, Czech Republic (November 2014)
- Invited speaker for the North American Drought Monitor Forum with partners in Canada and Mexico in Toronto, Canada (June 2014)
- Invited speaker (by U.S. Department of State/NIDIS and Turkish Meteorological Service) for the International Workshop on Drought Management in Ankara, Turkey (March 2014)
- Belmont Forum/National Science Foundation DrIVER project kick-off meetings with partners in Germany, UK, U.S. and Australia in Freiburg, Germany (January 2014)
- Expert panel/discussant participant, rapporteur and side event presenter for the High-Level Meeting on National Drought Policy sponsored by the WMO and other United Nations organizations in Geneva, Switzerland (March 2013)
- External advisory board member for European Commission research project entitled: Fostering European Drought Research and Science-Policy Interfacing, Milan, Italy (February 2013)
- Member of the Organizing Committee for the Asia-Pacific Economic Cooperation Climate Center's International Conference on Climate, Water and Policy (ICCWP) 2012, Busan, Republic of Korea. (September 2012)
- Organized and conducted a Drought Risk Management and Early Warning workshop for the Caribbean region in Kingston, Jamaica. (May 2012)
- Consultant for the World Meteorological Organization (WMO) in developing a *User's Guide on the Standardized Precipitation Index* for their constituents around the globe (2011-2012)
- Invited speaker for the Drought Monitoring, Assessing and Planning Under Global Climate Change Workshop in Beijing, China. (June 2012)
- Helped host and conduct a Climate Change short course for delegates from Vietnam to the University of Nebraska-Lincoln (May 2012)
- Speaker and participant at the North American Drought Monitor Forum in Cancun, Mexico. (April 2012)
- Invited speaker and poster presentation at the WCRP Global Drought Information System Workshop in Frascati, Italy. (April 2012)
- Invited speaker and external advisory board member for European Commission research project entitled: Fostering European Drought Research and Science-Policy Interfacing, Valencia, Spain (March 2012)
- Invited speaker for a drought session at the International Workshop on Water-related Disaster Prediction and Prevention at Hohai University, Nanjing, China. (November 2011)
- Invited expert for the United Nations International Strategy for Disaster Reduction (UNISDR) Global Assessment Report on Disaster Risk Reduction (GAR13 + 15) scoping team. Beijing, China (November 2011)
- Invited speaker for the Integrated Research on Disaster Risk (IRDR) 2011 Conference in Beijing, China (November 2011)

- Invited speaker, panelist and facilitator for South Korea's Asia Pacific Economic Cooperation (APEC) Climate Center's APCC 2011 Climate Symposium in Honolulu, HI (October 2011)
- Part of UNL's School of Natural Resources' faculty cadre for program information exchange with the ICTA Faculty at the Autonomous University of Barcelona. Barcelona, Spain (October 2011)
- Consultant and workshop organizer for the United Nations/Food and Agriculture Organization (FAO) and Turkish Ministry of Agriculture for drought early warning and mitigation planning evaluation. Ankara, Turkey. (April 2011)
- Invited speaker and workshop organizer for Drought Workshop: Monitoring through Earth Observations, hosted by the Group on Earth Observations (GEO). Presented at the Global Earth Observations System of Systems (GEOSS) in Sydney, Australia. (April 2011)
- Invited speaker (3 presentations) at the Canada Extremes Workshop in Winnipeg, Manitoba, Canada. (February 2011)
- Invited key note speaker and consultation with Argentine officials at the 33rd Congress of Argentina Animal Production on drought early warning systems in Viedma, Argentina. (October 2010)
- Invited to present and provide consultation at a workshop with Argentine officials, decision makers and resource managers of the Patagonia region on developing a drought early warning system in Viedma, Argentina. (October 2010)
- Invited presenter and Advisory Board member participation (for EuroGEOSS project) at the INSPIRE European Commission international meetings in Krakow, Poland. (June 2010)
- Invited to participate and present in the World Meteorological Organization (WMO)/United Nations International Strategy for Disaster Reduction (ISDR) Expert Group Meeting on Agricultural Drought in Murcia, Spain. (June 2010)
- Helped host, present and participated in the World Meteorological Organization's Inter-Regional Workshop on Indices and Early Warning Systems for Drought in Lincoln, NE, U.S.A. (December 2009)
- Organizer and presenter/participant for the NDMC on behalf of the World Meteorological Organization Drought Monitoring/Early Warning Workshop in Bamako, Mali (September 2009)
- Invited participant and speaker for the XEROCHORE Workshop on Drought and Natural Systems (Climate and Hydrology) in Noordwijkerhout, The Netherlands (June 2009)
- Invited speaker for the "International Seminar on Drought and Climate Risk Management" in La Serena, Chile (May 2009)
- International Workshop for CHANGE Climate/Water/Drought/Policy Meetings
CHANGE: Climate and Hydrology Academic Network for Governance and the Environment
U.S./Mexico/Canada, Mexico City, Mexico (March 2009)
- Invited speaker and participant at the annual Canada Drought Research Initiative annual meeting in Regina, Saskatchewan, Canada (January 2009)
- Invited speaker on drought monitoring and early warning for a U.S. delegation participating in a bilateral drought workshop between Australia and the United States hosted by the Australian Bureau of Rural Sciences entitled "*Drought in a changing climate, sharing management approaches*" at the Australian National University in Canberra, Australia. (November 2008)
- Invited plenary speaker and panelist for the International Conference on Drought Management Systems sponsored by Portugal's Ministry of Environment, Water Institute, and the European Union in Lisbon, Portugal. (November 2007)
- Consultant for Chemonics on assessing the status of the Moroccan Drought Observatory in Rabat, Morocco. (August/December 2007)
- Invited Expert Evaluator and Rapporteur for the European Commission in Brussels for research proposal reviews. (July, 2007)

- Invited roundtable expert and plenary speaker for Mediterranean: Water and Drought Forum, in Zaragoza, Spain sponsored by the Spanish Ministry of Environment. (February 2006)
- Appointed Technical Coordinator for the United States in organizing a U.S.-China Bilateral drought monitoring and assessment workshop with the Chinese Meteorological Administration, Beijing, China. (November 2005)
- Invited speaker for International Workshop on Drought Management Issues and consultation for the Korean Drought Project under the Korea Water Resources Corporation (KOWACO) in Seoul and Daejeon, Korea (November 2005)
- Invited speaker for international workshop in Vienna, Austria. “Drought and Drought Monitoring in Agriculture”. (June 2004)
- Responsible for initial contact between NDMC and Czech Republic scientists leading to a joint NATO research project for scientific exchange between the two countries on drought and climate change related matters. Participation and presentations at meetings at Mendel Ag. Univ. in Brno (May 2003) and the Hydrometeorological Institute in Prague (June 2004).
- Invited lecturer for an advanced course on “Drought Preparedness and Mitigation Strategies in the Mediterranean” in Zaragoza, Spain. Sponsored by the International Center for Advanced Mediterranean Agronomic Studies (CIHEAM) in Zaragoza, Spain, and the International Center for Agriculture in the Dry Areas (ICARDA). (April 2004)
- Invited lecturer for an advanced course on “Management strategies to mitigate drought in the Mediterranean: monitoring, risk analysis, and contingency planning” in Rabat, Morocco. Sponsored by the International Center for Advanced Mediterranean Agronomic Studies (CIHEAM) in Zaragoza, Spain, the Institute of Agronomy and Veterinarian Sciences, Hassan II in Rabat, Morocco, and the European Commission (DGI). (May 2001)
- Presentation and participation in the Central and Eastern European Workshop on Drought Mitigation in Budapest-Felsögöd, Hungary. (April 2000)
- Assisted the NDMC in conducting two Planning for Drought Workshops in Recife and Fortaleza, Brazil, sponsored by the World Bank, Inter-American Institute for Cooperation in Agricultural Sciences, the State of Ceara and the Superintendent for the Development of the Northeast (SUDENE). (December 1998)
- Assisted the NDMC in conducting a Planning for Drought Workshop sponsored by the U.S. Bureau of Reclamation, Mexican National Water Commission and Mexican Institute of Water Technology in Cuernavaca, Mexico. (October 1998) Also invited to speak on the drought monitoring activities of the U.S. at the follow up workshop in El Paso, TX. (October 1999)
- Drought monitoring consultant for the Hungarian Meteorological Service in Budapest, Hungary. (September 1997)