

## Curriculum Vitae

04/29/24

### Rezaul Mahmood

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#### EDUCATION:

University of Dhaka, Dhaka, Bangladesh	Geography	B. Sc. 1988
University of Dhaka, Dhaka, Bangladesh	Geography	M. Sc. 1989
State University of New York, Albany, NY	Geography/climatology	M.A. 1993
University of Oklahoma, Norman, OK	Geography/climatology	PhD. 1999

#### CURRENT APPOINTMENTS:

Professor (2018-Present), School of Natural Resources, University of Nebraska-Lincoln

Director (2018-Present), High Plains Regional Climate Center, University of Nebraska-Lincoln

Dr. Rezaul Mahmood joined UNL in 2018. He provides leadership in development of climate data products and climate data-based decision tools and outreach and engagement activities. Rezaul regularly communicates with partners from local, state, regional, and national levels, users from private and public sectors, and decision and policy makers to address their needs.

Before joining HPRCC and UNL he was a professor at the Western Kentucky University (WKU; 2001-2018). Rezaul led and promoted the idea of developing a mesonet for Kentucky, led its base funding initiative and network design, and after securing funding jointly led its implementation, operation, and sustainability efforts. In this capacity he regularly engaged and communicated with users and stakeholders from all levels and also with decision and policy makers. He provided similar leadership in the development of WKU's High Performance Computing Center and contributed significantly to the development of the Meteorology Program.

Rezaul's research interests include, among others, impacts of land use land cover change on weather and climate, land-atmospheric interactions, weather and climate monitoring, and climatology of various atmospheric variables. He uses both atmospheric models (e.g., WRF) and observational data in his research. Rezaul has published 90+ peer-reviewed papers in highly respected journals. His research has been funded by the NSF, NOAA, USDA-ARS, and others. Rezaul served as the Editor-in-Chief of the journal '*Earth Interactions*', jointly published by the American Meteorological Society (AMS), American Geophysical Union (AGU), and American Association of Geographers (AAG) from 2009-2021. Rezaul was a member of the National Climate Assessment and Development Committee (NCADAC) during 2011-2014 and guided completion of the Third National Climate Assessment report. Right after finishing his PhD., Rezaul was a postdoctoral research scientist at the HPRCC from 1999 to 2001.

## **OTHER APPOINTMENTS:**

Advisory Board, College of Atmospheric and Geographic Sciences, University of Oklahoma (2021-present).

Chair, Functional Standards and Practices Subcommittee, American Association of State Climatologist (AASC), (2016-2022)

Member, AASC Mesonet Steering Committee (2016-2022)

Editor-in-Chief, *Earth Interactions* (2009-2021; Jointly Published by The American Meteorological Society, The American Geophysical Union, and The American Association of Geographers)

Member, AMS Publications Commission (2013-2021)

Professor (2011- 2018), Department of Geography and Geology, Western Kentucky University  
Associate Director (2006-2018), Kentucky Climate Center and Kentucky Mesonet

Co-Director (2009-2018), WKU-High Performance Computing Center

Member, Technical Data Committee, Kentucky Water Plan Committee (2016-2018)

Member, National Climate Assessment Development and Advisory Committee, 2011-2014.

Member, Board of Directors, Applied Geography Conference, 2012-2015.

Associate Professor, 2006-2011, Department of Geography and Geology, Western Kentucky University

Assistant Professor, 2001-2006, Department of Geography and Geology, Western Kentucky University

Post-Doctoral Research Associate, 1999-2001, High Plains Regional Climate Center (HPRCC), School of Natural Resource Sciences, University of Nebraska-Lincoln (UNL)

## **COURSES TAUGHT:**

Meteorology

Weather Analysis and Forecasting

Physical Climatology

Microclimate: In a Biological Environment

Introduction to Physical Geography

Computer based Statistics

Dynamic Meteorology

Applied Climatology

## PEER REVIEWED PUBLICATIONS & BOOK CHAPTERS:

\*Undergraduate student; \*\*Graduate student; Post-doc; \*\*\*Research Staff

102. Whitesel D.\*\*\*, **Mahmood, R.**, Phillips, C., Roundy, J., Rappin, E., Flanagan, P., Santanello Jr., J. A., Nair, U., and Pielke, Sr., R. 2023. Assessing convective environment over irrigated and non-irrigated land use with land-atmosphere coupling metrics: results from GRAINEX. *Journal of Hydrometeorology* (in press)
101. Lachenmeier, E.\*\* , **Mahmood, R.**, Phillips, C., Nair, U., Rappin, E., Pielke Sr., R. A., Brown, W., Oncley, S., Wurman, J., Kosiba, K., Kaulfus, A., Santanello Jr., J., Kim, E., Lawston-Parker, P., Hayes, M., and Franz, T. E. 2024. Irrigated agriculture significantly modifies seasonal boundary layer atmosphere and lower tropospheric convective environment. *Journal of Applied Meteorology and Climatology* 63, 245-261.
100. Whitesel, D.\*\* , **Mahmood, R.**, Flanagan, P., Rappin, E., Nair, U., Pielke Sr., R. A. and Hayes, M. 2024. Impacts of irrigation on a precipitation event during GRAINEX in the High Plains Aquifer region. *Agricultural and Forest Meteorology* 345, 109854.
99. Bundy, L. R., Anderson, M. R., Rowe, C., **Mahmood, R.** 2023. Roadway floods and their associated weather-related conditions: new insights using CARS 511 data for state and federal highways in Nebraska, USA. *Transportation Research Interdisciplinary Perspectives* 22, 100955
98. Silva, Phillip J., Cress, T., Drover, R., Michaels, C., Docekal\*, G., Larkin\*, P., Godoy, A., Cavero, D., Sin, C., Waites, J., **Mahmood, R.**, Cohron, M., and Purvis-Robert, K. L., 2023. Characterization of particulate size distributions and water-soluble ions measured at a broiler farm. *Agriculture* 13, 1284. <https://doi.org/10.3390/agriculture13071284>
97. McDermid, S. Nocco, M., Lawston-Parker, P., Keune, J., Pokhrel, Y., Jain, M., Jägermeyr, J., Brocca, L., Massari, C., Jones, A., Vahmani, P., Thiery, W., Yao, Y., Bell, A., Chen, L., Dorigo, W., Hanasaki, N., Jasechko, J., Lo, Min-Hui, **Mahmood, R.**, Mishra, V., Mueller, N. D., Niyogi, D., Rabin, Sam S., Sloat, L., Wada, Y., Zappa, L., Chen, F., Cook, B. I., Kim, H., Lombardozzi, D., Polcher, J., Ryu, D., Santanello, J., Satoh, Y., Seneviratne, S., Singh, D., Yokohata, T. 2023. Irrigation in the Earth system. *Nature Reviews Earth and Environment* <https://doi.org/10.1038/s43017-023-00438-5>
96. Sundstrom, S., Angeler, D., Bell, J., Hayes, M., Hodbod, J., Jalalzadeh-Fard, B., **Mahmood, R.**, VanWormer, E., and Allen, C. 2023. Panarchy Theory for Convergence. *Sustainability Science* <https://doi.org/10.1007/s11625-023-01299-z>
95. Flanagan, P. and **Mahmood, R.** 2023. Spatiotemporal analysis of extreme precipitation in the Southern Great Plains hydroclimate region. *Journal of Applied Meteorology and Climatology* 62: 393-409.

- Fard, B. J., Puvvula, J., Smith, K., Hayes, M., Lookadoo, R., **Mahmood, R.**, Medcalf, S., Rowe, C., Durr, M., Bell, J. E. 2024. Health Vulnerability Mapping for Drought: A Case Study in a Predominantly Rural, Agricultural State. *Environmental Research: Health* (Submitted)
- Umphlett, N. A. Brown, T. J., Konrad, C. E. Wall, T. U., Hall, B. L. DeGaetano, A. T., Nielsen-Gammon, J. W., **Mahmood, R.**, and Houston, T. G. 2023. The Regional Climate Center Program - past, present, and future: reflections from 40 Years of regional climate services. *Bulletin of the American Meteorological Society* (submitted; under revision).
- Flanagan, P. and **Mahmood, R.** 2023. Potential physical mechanisms driving central Great Plains extreme precipitation increases during winter. *Journal of Hydrometeorology* (revised version submitted)
- Phillips, C. E., Nair, U. S., **Mahmood, R.**, Pielke Sr., R. A., Rappin, E. 2023. Modification of Horizontal Convective Rolls by irrigation during the GRAINEX Campaign. *Journal of Atmospheric Sciences* (submitted; under revision)
- Queiroz, P. V. De, **Mahmood, R.**, Fulginiti, L., and Perrin, R. 2023. Land use policies, land use land cover change, and climate: A review with examples from the United States. *Environment, Development, and Sustainability* (submitted)
94. Rappin, E. D., **Mahmood, R.**, Nair, U. S., and Pielke Sr., R. A. 2022. Land-atmosphere interactions during GRAINEX: planetary boundary layer evolution in the presence of irrigation. *Journal of Hydrometeorology* 23: 1401-1417.
93. Winchester, J.\*\* , **Mahmood, R.**, Rodgers, W.\*\*\*, Silva, P. J., Lovanh, N., Durkee, J., and Loughrin, J. 2022. A model-based exploratory study of sulfur dioxide dispersions from concentrated animal feeding operations in the southeastern United States. *Physical Geography* 43: 503-533. DOI: 10.1080/02723646.2021.1875583
92. Phillips, Christopher E., Nair, U., **Mahmood, R.**, Rappin, E. and Pielke Sr., R. A. 2022. Influence of irrigation on diurnal mesoscale circulations: results from GRAINEX. *Geophysical Research Letters* 49, e2021GL096822. <https://doi.org/10.1029/2021GL096822>
91. Fard, Babak J., **Mahmood, R.**, Hayes, M., Rowe, C., Abadi, Azar M., Shulski, M., Medcalf, S., Lookadoo, R., and Bell, J. E. 2021. Mapping Heat Vulnerability Index based on different urbanization levels in Nebraska, USA. *GeoHealth* 5: e2021GH000478. <https://doi.org/10.1029/2021GH000478>
90. Flanagan, P., **Mahmood, R.**, Sohl, T., Svoboda, M., Wardlow, B., Hayes, M., and Rappin, E. 2021. Atmospheric response to four projected land use land cover change scenarios for 2050 in the North Central United States. *Earth Interactions* 25: 177-194.

89. McDermid, S. S., **Mahmood, R.**, Hayes, M., Bell, J. E., and Lieberman, Z. 2021. Environmental trade-offs for sustainable irrigation. *Nature Geoscience* 14:706-709.
88. Rappin, E.\*\*\*, **Mahmood, R.**, Nair, U., Pielke Sr., R. A., Brown, W., Oncley, S., Wurman, J., Kosiba, K., Kaulfus, A., Phillips, C., Lachenmeier, E.\*\* , Santanello Jr., J., Kim, E. and Lawston-Parker, P. 2021. The Great Plains Irrigation Experiment (GRAINEX). *Bulletin of the American Meteorological Society* 102: ES1756-1785. <https://doi.org/10.1175/BAMS-D-20-0041.1>
87. Flanagan, P. and **Mahmood, R.** 2021. Spatio-temporal analysis of extreme precipitation climatology in the Missouri River Basin from 1950 – 2019. *Journal of Applied Meteorology and Climatology* 60: 811-827.
86. Fiebrich, C. A., Brinson, K. R., **Mahmood, R.**, Foster, S. A., Schargorodski, M., Edwards, N. L., Redmond, C. A., Atkins, J. R., Andresen, J. A., and Lin, X. 2020. Towards the standardization of mesoscale meteorological networks. *Journal of Atmospheric and Oceanic Technology* 37: 2033-2048.
85. López-Espinoza, E., Zavala-Hidalgo, J., **Mahmood, R.**, Gómez-Ramos, R. 2020. Assessing the land use and land cover data representation on weather forecast quality: A case study in central Mexico. *Atmosphere* 11, 1242; doi:10.3390/atmos11111242.
84. Flanagan, P. X., **Mahmood, R.**, Umphlett, N. A., Hacker, E., Ray C., Sorensen, W., Shulski, M., Stiles, C. J., Pearson D., and Fajman, P. 2020. A hydrometeorological assessment of the historic 2019 flood of Nebraska, Iowa, and South Dakota. *Bulletin of the American Meteorological Society* 101: E817-E829.
83. **Mahmood, R.**, Schargorodski, M., Rappin, E., Griffin, M., Collins, P., Knupp, K., Quilligan, A., Wade, R., Cary, K., and Foster, S. 2020. The total solar eclipse of 2017: Meteorological observations from a statewide mesonet and atmospheric profiling systems. *Bulletin of the American Meteorological Society* 101: E720-737.
82. Na-Yemeh\*\*, D., **Mahmood, R.**, Goodrich, G., Younger, K., Cary, K., and Durkee, J. 2020. Growing season air mass equivalent temperature ( $T_E$ ) in the east central USA. *Climate* 8, 95:1-17; doi:10.3390/cli8090095
81. Nair, U. S., Rappin\*\*\*, E., Foshee, E., Smith, W., Pielke Sr., R. A., **Mahmood, R.**, Case, J. L., Blankenship, C. B., Shepherd, M., Santanello, J. A., Niyogi, D. A. 2019. Influence of land cover and soil moisture based brown ocean effect on an extreme rainfall event from a Louisiana Gulf Coast tropical System. *Nature Scientific Reports* 9:17136.
80. **Mahmood, R.**, Schargorodski, M., Foster, S., and Quilligan, A. 2019. A technical overview of the Kentucky Mesonet. *Journal of Atmospheric and Oceanic Technology* 36: 1753-1771.

79. Zhang, T., **Mahmood, R.**, Lin, X., and Pielke Sr. R.A., 2019. Irrigation impacts on minimum and maximum surface moist enthalpy in the Central Great Plains of the USA. *Weather and Climate Extremes* 23, 100197.
78. Younger, K.\*\* , **Mahmood, R.**, Goodrich, G., Pielke, R. A. Sr., and Durkee, J. 2019. Mesoscale surface equivalent temperature ( $T_E$ ) for East Central USA. *Theoretical and Applied Climatology* 136:65-75. doi.org/10.1007/s00704-018-2468-7
77. Hu, Z., Xu, Z., Ma, Z., **Mahmood, R.**, Yang, Z. 2019. Potential surface hydroclimate Responses to increases in greenhouse gas concentrations and land use and land cover changes. *International Journal of Climatology* 39:814–827.
76. Dewan, A., Ongee, E., Rahman, M. M. **Mahmood, R.**, and Yamane, Y. 2018. Spatial and temporal analysis of a 17–year lightning climatology over Bangladesh with LIS data. *Theoretical and Applied Climatology* 134: 347-362. DOI 10.1007/s00704-017-2278-3.
75. Tollerud, H., Brown, J., Loveland, T., **Mahmood, R.**, Bilss, N. 2018. Drought and land cover conditions in the Great Plains. *Earth Interactions* 22:1-25.
74. Rodgers, W.\*\* , **Mahmood R.**, Leeper, R., and Yan, J. 2018. Land cover change, surface mining, and their impacts on a heavy rain event in the Appalachia. *Annals of the American Association of Geographers* 108:1187-1209.  
DOI: 10.1080/24694452.2018.1460249
73. Johnson, C. M.\* , Xingang, F., **Mahmood, R.**, Groves, C., Polk, J., and Yan, J. 2018. Evaluating Weather Research and Forecasting model sensitivity to land and soil conditions representative of karst landscapes. *Boundary-Layer Meteorology* 166: 503-530. DOI 10.1007/s10546-017-0312-8
72. Dewan, A., Ongee, E., Rafiuddin, M., Rahman, M. M., **Mahmood, R.** 2018. Lightning activity associated with precipitation and CAPE over Bangladesh. *International Journal of Climatology* 38: 1649–1660, DOI: 10.1002/joc.5286
71. **Mahmood, R.**, Boyles, R., Brinson, K., Fiebrich, C., Foster, S. A., Hubbard, K. G., Robinson, D., Andresen, J., and Leathers D. 2017. Mesonets: Meso-scale weather and climate observations for the U.S. *Bulletin of the American Meteorological Society* 98: 1349-1361.
70. Craft, K\*\* , **Mahmood, R.**, King, S. A., Goodrich, G., and Yan, J. 2017. Droughts of the twentieth and early twenty first centuries: Influences on the production of beef and Forage in Kentucky, USA. *Science of the Total Environment* 577:122-135.
69. Chen, L., Zhuguo, M., **Mahmood, R.**, Zhao, T., Li, Z., and Li, Y. 2017. Recent land cover changes and sensitivity of the model simulations to various land cover datasets for China. *Meteorology and Atmospheric Physics* 129: 395-408.  
DOI: 10.1007/s00703-016-0478-5.

68. **Mahmood, R.** and Pielke Sr., R. A. 2017. Land use/cover change and climate. *Wiley-AAG International Encyclopedia of Geography* 1-11, DOI: 10.1002/9781118786352.wbieg0511
67. Winchester, J.\*\* , **Mahmood, R.**, Rodgers, W.\*\*\*, Hossain, F., Rappin, E., Durkee, J., and Chronis, T. 2017. A Model-based assessment of potential impacts of man-made reservoirs on precipitation. *Earth Interactions* 21: 1-31.
66. **Mahmood, R.**, Pielke Sr., R. A., and McAlpine, C. 2016. Climate relevant land use and land cover change policies. *Bulletin of the American Meteorological Society* 97:195-202.
65. Pielke Sr., R. A., **Mahmood, R.**, and McAlpine, C. 2016. Land's complex role in climate change. *Physics Today* 69 (10): 40-46. (invited) [Also published in a Japanese language journal, *Parity*, June, no. 6, 2017].
64. Quintanar, A. I., **Mahmood, R.**, Suarez\*, A., and Leeper\*\*, R. 2016. Atmospheric sensitivity to roughness length in a regional atmospheric model over the Ohio-Tennessee river valley. *Meteorology and Atmospheric Physics* 128:315–330. DOI 10.1007/s00703-015-0415-z
63. Lin, X., Pielke, Sr., R. A., **Mahmood, R.**, Fiebrich, C. A., and Aiken R. 2016. Observational evidence of temperature trends at two levels in the surface layer. *Atmospheric Chemistry and Physics* 16: 827–841.
62. Kusunose, Y. and **Mahmood, R.** 2016. Imperfect forecasts and decision making in agriculture. *Agricultural Systems* 146: 103-110.
61. Xu, Z., **Mahmood, R.**, Yang, Z-L, Fu, C., Su, H. 2015. Investigating diurnal and seasonal climatic response to land use and land cover change over monsoon Asia with the Community Earth System Model. *Journal of Geophysical Research-Atmospheres* 120: 1137-1152. DOI: 10.1002/2014JD022479.
60. Craft, K\*\*, **Mahmood, R.**, King, S. A., Goodrich, G., and Yan, J. 2015. Twentieth century droughts and agriculture: Examples from impacts on soybean production in Kentucky, USA. *Ambio* 44: 557-568. DOI 10.1007/s13280-014-0598-4
59. Ren, D., Leslie, L. M., Shen, X., Hong, Y., Duan, Q., **Mahmood, R.**, Li, Y., Huang, G., Guo, W., Lynch, M. J. 2015. The gravity environment of Zhouqu debris flow of August 2010 and its implication for future recurrence. *International Journal of Geosciences* 6: 317-325.
58. Fan, X., Ma, Z., Yang, Q., Han, Y., and **Mahmood, R.**, Zheng, Z. 2015. Land use/land cover changes and regional climate over the Loess Plateau during 2001-2009 – Part I. Observed evidences. *Climatic Change* 129: 427-440. DOI 10.1007/s10584-014-1069-4.

57. Fan, X., Ma, Z., Yang, Q., Yunhuan Han, Y., and **Mahmood, R.** 2015. Land use/land cover changes and regional climate over the Loess Plateau during 2001-2009 – Part II. Interrelationship from observations. *Climatic Change* 129: 441-455. DOI 10.1007/s10584-014-1068-5.
56. **Mahmood, R.**, Pielke Sr., R. A. Hubbard, K. G., Niyogi, D., Dirmeyer, P., McAlpine, C., Carleton, A., Hale, R., Gameda, S., Beltran-Przekurat, A., Baker, B., McNider, R., Legates, D. R., Shepherd, M., Du, J., Blanken, P., Frauenfeld, O. W., Nair, U. S., and Fall, S. 2014. Land cover changes and their biogeophysical effects on climate. *International Journal of Climatology* 34: 929–953. DOI: 10.1002/joc.3736
55. Suarez, A. \*, **Mahmood, R.**, Quintanar, A. I., Beltran-Przekurat, A., and Pielke Sr., R. A. 2014. A comparison of the MM5 and the Regional Atmospheric Modeling System simulations for land-atmosphere interactions under varying soil moisture. *Tellus A: Dynamic Meteorology and Oceanography* 66, 21486, <http://dx.doi.org/10.3402/tellusa.v66.21486>.
54. Durkee, J., Degu, A. M., Hossain, F., **Mahmood, R.**, Winchester\*\*, J., and Chronis, T. 2014. Investigating the effect of Land between the Lakes on storm patterns. *Journal of Applied Meteorology and Climatology* 53: 1506-1524.
53. Loveland, T. R. and **Mahmood, R.** 2014. A design for a sustained assessment of climate Forcing and feedbacks related to land use land cover change. *Bulletin of the American Meteorological Society* 95: 1563-1572.
52. Lin, X., Hubbard, K. G., **Mahmood, R.**, and Sassenrath, G. F. 2014. Assessing satellite-based start-of-season trends in the U.S High Plains. *Environmental Research Letters* 9 doi:10.1088/1748-9326/9/10/104016.
51. Lovanh, N., Quintanar, A. I., Rysz, M., Loughrin, J., **Mahmood, R.** 2014. Effect of heat fluxes on ammonia emission from swine waste lagoon based on neural network analyses. *Journal of Environmental Science and Technology* 7:16-29. DOI: 10.3923/jest.2013.
50. Quintanar, A. I., **Mahmood, R.**, Lovanh, N., Rawley, J.\*, E. Becerra-Acosta and Loughrin, J. 2013. Estimating greenhouse gas emission from a waste lagoon. *Applied Engineering in Agriculture* 29: 511-519. (doi: 10.13031/aea.29.10013)
49. Craft, K\*\*, **Mahmood, R.**, King, S. A., Goodrich, G., and Yan, J. 2013. Drought and corn in Kentucky. *Applied Geography* 45: 353-362.
48. **Mahmood, R.**, Keeling\*, T., Foster, S. A., and Hubbard, K. G. 2013. Did irrigation impact 20<sup>th</sup> century temperature in the High Plains aquifer region? *Applied Geography* 38:11-21.
47. **Mahmood, R.**, Keeling\*, T., Foster, S. A., and Hubbard, K. G. 2013. Corrigendum to “Did irrigation impact 20<sup>th</sup> century temperature in the High Plains aquifer region?” *Applied Geography* 40:51.



46. **Mahmood, R.**, Littell, A\*\*, Hubbard, K. G., and You, J. 2012. Observed data-based assessment of relationships among soil moisture at various depths, precipitation, and temperature. *Applied Geography*, 34: 255-264.
45. Quintanar, A. I. and **Mahmood, R.** 2012. Ensemble forecast spread induced by soil moisture Changes over mid-south and neighbouring mid-western region of the USA. *Tellus A: Dynamic Meteorology and Oceanography*, DOI: 10.3402/tellusa.v64i0.17156
44. Loughrin, J. H, Quintanar, A. I., Cook, K. L., Lovanh, N. C., **Mahmood, R.**, Becerra-Acosta, E. 2012. Seasonal Variation in heat fluxes, predicted emissions of malodorants, and wastewater quality of an anaerobic swine waste lagoon. *Water, Air, & Soil Pollution*, DOI 10.1007/s11270-012-1134-4.
43. Durkee, J., Campbell, L.\* , Berry, K.\* , Jordan, D.\* , Goodrich, G., **Mahmood, R.**, and Foster, S. 2012. A synoptic perspective of the record 1-2 May 2010 Mid-south rain and flood event. *Bulletin of the American Meteorological Society*, 93: 611-620.
42. Leeper, R.\*\*\*, **Mahmood, R.**, Quintanar, A. I. 2011. Influence of karst landscape on Planetary boundary layer atmosphere: A Weather Research and Forecast (WRF) model-based investigation. *Journal of Hydrometeorology*, 12: 1512-1529.
41. **Mahmood, R.**, Leeper, R.\*\* , Quintanar, A. I. 2011. Sensitivity of planetary boundary layer atmosphere to historical and future changes of land use/land cover, vegetation fraction, and soil moisture in Western Kentucky, USA. *Global and Planetary Change*, 78: 36-53 doi:10.1016/j.gloplacha.2011.05.007.
40. Sen Roy, S. , **Mahmood, R.**, Quintanar, A. I., and Gonzalez\*, A. 2011. Impacts of irrigation on dry Season precipitation in India. *Theoretical and Applied Climatology*, 104: 193-207, DOI: 10.1007/s00704-010-0338-z.
39. Legates, D. R., **Mahmood, R.**, Levia, D. F., DeLiberty, T. D., Quiring, S., Houser, C., Nelson, F. E. 2011. Soil Moisture: A central and unifying theme in physical geography. *Progress in Physical Geography* 35:65-86.
38. Loughrin, J.H., Quintanar, A.I., N. Lovanh, **Mahmood, R.** 2011. Heat flux measurements and modeling of malodorous compounds above an anaerobic swine lagoon. *Water, Air, and Soil Pollution*, 27: 463-471, DOI: 10.1007/s11270-010-0601-z.
37. Pielke Sr., R. A., Pitman, A., Niyogi, D., **Mahmood, R.**, McAlpine, C. Hossain, F., Klein Goldewijk, K., Nair, U., Betts, R., Fall, S., Reichstein, M., Kabat, P., de Noblet-Ducoudré, N. 2011. Land use/land cover changes and climate: Modeling analysis and observational evidence. *Wiley Interdisciplinary Reviews: Climate Change* 2: 828-850, doi: 10.1002/wcc.144. (invited)
- Quintanar, A. I., Rodgers, W.\*\* , **Mahmood, R.**, Loughrin, J. H., and Lovanh, N. 2011. Energy flux comparisons in the surface layer of a waste lagoon during warm and cool season

clear skies. *Meteorological Applications* (accepted)

36. **Mahmood, R.**, Pielke Sr., R. A. Hubbard, K. G., Niyogi, D., Bonan, G., Lawrence, P., Baker, B., McNider, R., McAlpine, C., Etter, A., Gameda, S., Qian, B., Carleton, A., Beltran-Przekurat, A., Chase, T., Quintanar, A. I., Adegoke, J. O., Vezhapparambu, S., Conner, G., Asefi, S., Sertel, E., Legates, D. R., Wu, Y., Hale, R., Frauenfeld, O. N., Watts, A., Shepherd, M., Mitra, C., Anantharaj, V. G., Fall, S., Lund, R., Nordfelt, A., Blanken, P., Du, J., Chang, H-I., Leeper\*\*, R., Nair, U. S., Dobler, S., Deo, R., Syktus, J. 2010. Impacts of land use land cover change on climate and future research priorities. *Bulletin of the American Meteorological Society* 91: 37-46.
35. You, J., Hubbard, K. G., **Mahmood, R.**, Sridhar, V., Todey, D. 2010. Quality control of soil water data in ACIS - A case study in Nebraska. *ASCE, Journal of Hydrologic Engineering* 15: 200-209.
34. **Mahmood, R.** and Hubbard, K. G. 2009. Agricultural Cool Island (ACI). In *Land Use Policy*. Eds. A. C. Denman and Oliver M. Penrod. New York: Nova Science Publishers. pp. 217-229.
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25. Quintanar, A., **Mahmood, R.**, Loughrin, J., Lovanh, N. C. 2008. A coupled MM5-Noah land surface model-based assessment of sensitivity of planetary boundary layer variables to anomalous soil moisture conditions. *Physical Geography*, 29: 54-78 (DOI: 10.2747/0272-3646.29.1.54)
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17. **Mahmood, R.** and Hubbard, K. G. 2005. Assessing bias in evapotranspiration and soil moisture estimates due to the use of modeled solar radiation and dew point temperature data. *Agricultural and Forest Meteorology*, 130: 71-84.
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11. Hubbard, K. G., **Mahmood, R.** and Carlson, C.\* 2003. Estimating daily dew point Temperature for the Northern Great Plains using maximum and minimum temperature. *Agronomy Journal* 95:323-328.
10. Adegoke, O. A., Pielke Sr., R. A., Eastman, J., **Mahmood, R.**, and Hubbard, K. G. 2003. Impact of irrigation on mid summer surface fluxes and temperature under dry synoptic conditions: A regional atmospheric model study of the U. S. High Plains. *Monthly Weather Review*, 131: 556-564.
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2. **Mahmood, R.** 1996. Scale issues in soil moisture modelling: problems and prospects. *Progress in Physical Geography*, 20:273-291.
1. **Mahmood, R.** and Hayes, J. T. 1995. A model-based assessment of impacts of climate change on the boro rice yield in Bangladesh. *Physical Geography*, 16:463-86.

#### OTHER SCHOLARLY PUBLICATIONS:

Umphlett, N.A., B.A. Parker, M. Woloszyn, F.A. Akyuz, A.R. Bergantino, S. Brotherson, D. Crow Ghost, M. Downey, L. Edwards, T. Hadwen, Z. Hoylman, K. Jencso, W. Kelley, A. Klein, D. Kluck, D. Longknife, K. Low, **R. Mahmood**, M. Meehan, G. Rush, C.J. Stiles, and S. Tangen. 2022. *2020–2021 Drought in the U.S. Northern Plains and Canadian Prairies: Initial Assessment of Impacts and Response to Build Resilience During an Ongoing Drought*. NOAA National Integrated Drought Information System.

AASC Mesonet Steering Committee (Stuart Foster, **Rezaul Mahmood**, Chris Fiebrich, Kevin Brinson, Nathan Edwards, Jeff Andresen, Xiaomao Lin, Jennie Atkins, Megan Schargorodski, Chip Redmond, Pat Guinan, and Stonie Cooper). 2019. AASC Recommendations and Best Practices for Mesonets.  
<http://stateclimate.org/docs/AASC>

Loveland, T., **Mahmood, R.**, Toral Patel-Weynand, Karstensen, K., Beckendorf, K., Bliss, N., and Carleton, A. 2012. *National Climate Assessment Technical Report on the Impacts of Climate and Land Use and Land Cover Change*. Prepared for the National Climate Assessment Development and Advisory Committee (NCADAC). 82 p.

Niyogi, D., Mahmood, R. and Adegoke, J. O. 2009. Editorial: Land-Use/Land-Cover Change and Its Impacts on Weather and Climate. *Boundary-layer Meteorology*, 133, 297-298.

Frauenfeld, O. W. and **Mahmood, R.** 2008. Editorial: Impacts of Land Use and Land Cover Change on the Atmosphere Special Collection. *Journal of Applied Meteorology and Climatology*.

Mahmood, R., Pielke Sr., R., Hubbard, K. G. 2007. Effect of human activities on the atmosphere. *Eos, Transactions, American Geophysical Union*, 88: 580.

Mahmood R., Pielke Sr., R. A., Hubbard, K. G. 2006. Editorial: Land Use/land cover change and its impacts on climate. *Global and Planetary Change*, 54: vii

#### CONFERENCE PAPERS:

Lovanh, N., Loughrin, J., Rysz, M., Quintanar, A. I., Oh, B. T, and **Mahmood, R.** 2015. Neural network analysis on the effect of heat fluxes on greenhouse gas emissions from anaerobic swine waste treatment lagoon. *ASABE 1<sup>st</sup> Climate Change Symposium: Adaptation and Mitigation*. May 3-5, Chicago, IL, USA. pp. 2-6.

Grogan, D. M., Foster, S., Mahmood R. 2010. The Kentucky Mesonet: perspectives on data access, distribution, and use for a meso-scale surface network. *Proceedings of the 90<sup>th</sup> Annual Meeting of the American Meteorological Society/26th Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology*. American Meteorological Society, Boston. pp. 1-7. ([www.ametsoc.org](http://www.ametsoc.org))

Zachary G. Brown, S. A. Foster, R. Mahmood, S. Struebig, D. Grabowski, M. Grogan, and M. Ferris 2008. An Overview of the Kentucky Mesonet. *Proceedings of the 17th Conference on Applied Climatology*. American Meteorological Society, Boston. pp. 1-7. ([www.ametsoc.org](http://www.ametsoc.org))

Baldwin\*, W. M. and Mahmood, R. 2005. An assessment of key aspects of warm and cool season severe flash flooding in the Southern Appalachians. *Proceedings of 21<sup>st</sup> Conference on Weather Analysis and Forecasting*. American Meteorological Society, Boston. pp. 1-12. ([www.ametsoc.org](http://www.ametsoc.org))

Henry\*, C, Mahmood, R., Smallcomb, C., Mclane, M., and Champlin\*, D. 2005. The evolution of a warm season severe eastern Kentucky flash flood. *Proceedings of 21<sup>st</sup> Conference on Weather Analysis and Forecasting*. American Meteorological Society, Boston. pp. 1-11. ([www.ametsoc.org](http://www.ametsoc.org))

- Legates, D. R., Leathers, D. J., DeLiberty, T. L., Quelch, G. E., Brinson, K., Buttke, J., **Mahmood, R.**, and Foster, S. 2005. DEOS: The Delaware Environmental Observing System. *CD-ROM Proceedings, 85<sup>th</sup> Annual Meeting of the American Meteorological Society*, The American Meteorological Society: Boston. pp. 1-5.
- Mahmood, R., Hubbard, K. G., Carlson, C. 2002. Land use change and modification of near surface temperature records in the Northern Great Plains: verification of modeling results. *Proceedings, 13<sup>th</sup> Conference on Applied Climatology*, The American Meteorological Society: Boston. pp. 262-264.
- Mahmood, R. and Hubbard, K. G. 2002. Sensitivity of soil moisture and evapotranspiration to soils and land use heterogeneity. *Proceedings, 13<sup>th</sup> Conference on Applied Climatology*, The American Meteorological Society: Boston. pp. 265-268.
- Adegoke, J. O, Pielke Sr., R. A., Eastman, J. L., **Mahmood, R.**, Hubbard, K. G. 2002. Modeling the impacts of irrigation on midsummer surface energy budget and the convective boundary layer (CBL) in the U. S. high plains. *Proceedings, 16<sup>th</sup> Conference on Hydrology, The American Meteorological Society*. The American Meteorological Society: Boston. pp. 192-195.
- Mahmood, R. and Hubbard, Kenneth G. 2000. Time of observation and estimation of daily solar radiation for the Northern Great Plains. *Proceedings, 12<sup>th</sup> Conference on Applied Climatology*, The American Meteorological Society: Boston. pp. 78-81.
- Hubbard, Kenneth G., **Mahmood, R.** , Hou, Q. 2000. Daily soil moisture measurement network of the Northern Great Plains: sensors, their calibration, and applications. *Proceedings, 12<sup>th</sup> Conference on Applied Climatology*, The American Meteorological Society: Boston. pp. 150-152.
- Mahmood, R. Humes, K. S., and Legates, D. R. 1999. Scale-aggregation of Landsat-TM data and information loss. *Proceedings, 1999 ASPRS Annual Conference, Portland, Oregon*, pp. 733-742. The American Society for Photogrammetry and Remote Sensing: Bethesda, MD.
- Meo, M. and **Mahmood, R.** 1999. The effect of the 1995-96 southwestern drought on fire suppression activities in Oklahoma. *Proceedings, 11<sup>th</sup> Conference on Applied Climatology*, pp. 161-166. The American Meteorological Society: Boston.
- Mahmood, R., 1996. Model-based Estimates of Air Temperature Variations on the Boro Rice Phenology in Bangladesh. *Proceedings, 22nd Annual Conference on Agricultural and Forest Meteorology*, pp. 367-368. The American Meteorological Society: Boston.

## **OTHER EDITORIAL EXPERIENCE:**

Mahmood, R., Pielke Sr., R. A., and Hubbard, K. G. 2006. *Guest Editors* for a theme issue on Land use change and its impacts on Climate. Published by the journal *Global and Planetary Change*.

Frauenfeld, O and Mahmood, R. 2008. Coordinating Editors for a theme issue on Land use change and its impacts on Climate. *Journal of Applied Meteorology and Climatology*.

## **AWARDS/HONORS:**

**Recipient of the Ogden College of Science and Engineering, Western Kentucky University Award for Most Prolific Proposer of FY 2015.**

**Recipient of the WKU Award for Research and Creativity, 2013-2014. (One faculty per year from the entire University)**

**Recipient of the Ogden College of Science and Engineering, WKU, Award for Research and Creativity, 2013-2014.**

**Recipient of the Ogden College of Science and Engineering, Western Kentucky University Award for Most Prolific Proposer of FY2013.**

**Recipient of the Western Kentucky University Award for Research and Creativity, 2005-2006. (One faculty per year from the entire University)**

**Recipient of the Ogden College of Science and Engineering, WKU, Award for Research and Creativity, 2005-2006.**

**WKU Nominee for the Kentucky Academy of Science's Distinguished Scientist Award, 2006.**

Winner of the Ralph E. and Margaret Olson Geography Graduate Student of the Year Scholarship, 1997. (Received: \$1000)

Winner of the Francis E. Lortz Scholarship of 1995. Presented by the *American Society for Photogrammetry and Remote Sensing*, Rolla Region. (Received: \$500)

Second Prize Winner for the Paper, Titled, " Impacts of Air Temperature Fluctuations on the Boro Rice Phenology in Bangladesh: A Model-based assessment". Climate Specialty Group Student Paper Competition, 91st Annual Conference of the American Association of Geographers, Chicago, March 14-18, 1995.

Honorable Mention for the Presentation of the Paper, Titled, "Impacts of El Nino Related Monsoonal Rainfall Variability and Resultant Rice Productivity in Bangladesh and Eastern India: A Model-based Assessment". Annual Conference 1994, South West Division, American Association of Geographers. Held at Hot Springs, Arkansas, October 21-22.



## GRANTS & CONTRACTS:

### Total Grant Support Successfully Obtained: ~\$20 million

PIs-Tirthankar Roy, Liang Chen, Rezaul Mahmood, and Shih-Yu Wang. 2024-2026. A Comprehensive Assessment of the Occurrence and Severity of Flood-rich and Drought-rich Periods in the Midwest. Submitted to: NSF. Budget: \$780,000. Status: Pending.

PIs-Liang Chen, Kristina Kinzinger, Gwendwr Meredith, and Rezaul Mahmood. 2024. Rural Advancement: Navigating Irrigation and Climate Change Challenges (RANICC). Submitted to: NU. Budget: \$87,791. Status: Pending.

PIs-Liang Chen, Tirthankar Roy, and Rezaul Mahmood. 2024-26. Land-Atmosphere Interactions in Flash Drought Development. Submitted to: NSF. Budget: \$582,109. Status: Pending.

PIs-Eric Rappin, David Kristovich, Junming Wang, Rezaul Mahmood, and Jerry Brotzge. 2024-2026. River Land Atmosphere Interactions and Turbulence Transitions in the Mississippi River Ohio River Confluence (RAINMORE). Submitted to: NSF. Budget: 1,169,235. Status: Not Funded.

PIs-Trenton Franz, Brian Wardlow, Rezaul Mahmood, Mark Svoboda, and Justin Bradley. 2023-2028. Mid-scale RI-1 (M1: IP): N-CROS: National Cosmic-Ray Observing System. Submitted to: NSF. Budget: \$ 19,999,717. Status: Under revision for resubmission.

PIs-Clinton Rowe, Michael Hayes, Rezaul Mahmood (with 22 others) 2023. Community Climate Resilience on the Great Plains. Submitted to: UNL. Budget: \$80,000. Status: **Funded.**

PIs-Rezaul Mahmood. 2023-24. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$ 338, 273. Status: **Funded.**

PIs-Rezaul Mahmood. 2022-23. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$159,781. Status: **Funded.**

PI-Craig Allen and 23 others including Rezaul Mahmood. Resilience in agricultural working landscapes. Submitted to: NU. Budget: \$149,845.00. July 2021 – June 2023. Status: **Funded.**

PIs-Rezaul Mahmood and Tirthankar Roy. 2022-24. Updating rainfall zones and intensities. Submitted to: Nebraska Department of Transportation. Budget: \$120,000. Status: **Funded.**

PI-Brandi Janssen (U. of Iowa); UNL-PIs: Rezaul Mahmood, Lisa PytlikZillig, Michael Hayes, Aemal Khattak, and Tirthankar Roy. 2023-28. RISA: Co-LEARN: A Midwestern Community of Learning for Empowerment, Climate Adaptation and Resilience for the Next Generation. Submitted to NOAA. Total budget: \$6,000,000. UNL Budget: \$767, 470. Status: **Funded.**

PI-Joe Luck (Co-PI, Rezaul Mahmood with 6 others). 2021-26. **NRATE: Nitrogen Research for Agriculture Transformation and Enhancement**. Submitted to USDA. Budget: \$2,214,000. Status: **Funded**. (Received \$1,328,400)

PIs-Rezaul Mahmood, Udaysankar Nair, Eric Rappin, Roger Pielke Sr., and Dallas Staley. 2017-2023. Collaborative Research: The Great Plains Irrigation Experiment (GRAINEX) for Understanding the Influence of Irrigation on the Planetary Boundary Layer and Weather Events. Submitted to: NSF. Science Budget: \$663,859; Field work: \$1,291,036; Supplemental Funding: \$44,601. Status: **Funded**.

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2021-26. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$ 3,247,500. Status: **Funded**.

PIs: Pascal Hitzler, Krzysztof Janowicz, Rezaul Mahmood, Ajay Sharada, and Melinda Smith. 2023-28. Knowledge-Centric AI for Climate Adaptive Agriculture in the Great Plains (Know-CAP AI Institute). Submitted to: NSF. Budget: \$ 20,000,000. Status: Not Funded.

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2021. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$ 90,052. Status: **Funded**.

PIs-Rezaul Mahmood. 2022. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$159,781. Status: **Funded**.

PIs: Rezaul Mahmood and Tirthankar Roy. 2022. Updating rainfall zones and intensities. Submitted to: Nebraska Department of Transportation. Budget: \$120,000. Status: **Funded**.

PI-Brandi Janssen (U. of Iowa); UNL-PIs: Rezaul Mahmood, Lisa PytlikZillig, Michael Hayes, Aemal Khattak, and Tirthankar Roy. 2022. RISA: Co-LEARN: A Midwestern Community of Learning for Empowerment, Climate Adaptation and Resilience for the Next Generation. Submitted to NOAA. Total budget: \$5,000,000. UNL Budget: \$802,879. Status: **Funded**.

PI: Joe Luck (Co-PI, Rezaul Mahmood with 6 others). 2021. **NRATE: Nitrogen Research for Agriculture Transformation and Enhancement**. Submitted to USDA. Budget: \$2,214,000. Status: **Funded**. (Received \$1,328,400)

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2021. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$ 32,451. Status: **Funded**.

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2021. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$ 32,451. Status: **Funded**.

PIs-Rezaul Mahmood, Tarik Abdel-Monem, Lilyan Fulginiti, and Richard Perrin. 2021. Linking Policy, Land Use Land Cover Change, and Weather and Climate in Nebraska. Submitted to: The Nebraska Governance and Technology Center. Budget: \$10,000. Status: **Funded**.

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2020. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$562,500. Status: **Funded**.

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2020. Climate Normals Project (Additional Work Requirement). Submitted to: NOAA. Budget: \$90,000. Status: **Funded**.

PI-Rezaul Mahmood. 2020. Improved Water Management through Better Understanding of Irrigation Impacts on Precipitation in the Northern Great Plains. Submitted to: The Daugherty Water for Food Global Institute Graduate Student Research Support Application Budget: \$17,500. Status: **Funded**.

PIs-Tsegaye Tadesse, Mark Svoboda, Jesse Bell, Brian Wardlow, Michael Hayes, Rezaul Mahmood, Elizabeth VanWormer, Kelly Smith, Seasonal Drought Prediction and Vulnerability Applications for Critical Sectors in the Greater Horn of Africa (GHA). Submitted to: UNL. Budget: ~\$150,000. Status: Not funded.

PIs-Paul Flanagan, Rezaul Mahmood, Tsegaye Tadesse, and Darren Clabo. 2019. Quantifying the Role of Increasing Wet-Dry Phase Modulation on Drought Evolution and Wildfire Over the North Central United States. Submitted to: MAPP/CPO/NOAA. Budget: \$507,725, Status: Not funded.

PIs-Francisco Munoz-Arriola, Byrav Ramamurthy, Rezaul Mahmood, Natalie Umphlett, and William Sorensen. 2019. Nebraska extreme weather and climate information system for resilient small communities. Submitted to: Nebraska Environmental Trust Fund. Budget: \$553,697. Status: Not funded.

PIs- Rezaul Mahmood, Eric Rappin, Joseph Santanello, Paul Flanagan, Brian Wardlow, Udaysankar Nair, Edward Kim, and Patricia Lawston. 2019. Utilizing SMAP Observations for the Examination of Land-Atmosphere Coupling over Irrigated and Rainfed Agriculture and Impacts on Ambient Weather. Submitted to: NASA. Budget: \$448, 422. Status: Not funded.

PIs-Tsegaye Tedesse, Mir Matin, Faisal Qamer, Mark Svoboda, Jesse Bell, Brian Wardlow, Jason Otkin; Collaborator: Michael Hayes, Rezaul Mahmood. 2019. Agricultural Drought Monitoring, Crop Productivity Assessments, and Health Vulnerability Mapping over Hindu-Kush-Himalaya Region. Submitted to: NASA. Budget: \$653,542. Status: Not Funded.

PIs-Rezaul Mahmood, Natalie Umphlett, Crystal Bergman, and William Sorensen. 2019. The High Plains Regional Climate Center. Submitted to: NOAA. Budget: \$562,500. Status: **Funded**.

PIs-Jesse Bell, Martha Shulski, Sharon Medcalf, Rezaul Mahmood, Clinton Rowe, Michael Hayes, Rachel Lookadoo, and John Lowe. 2019. Emergency Preparedness Team for Weather- and Climate-Related Events: A Safer Nebraska. Submitted to: University of Nebraska. Budget: \$143,911. Status: **Funded**.

PIs-Rezaul Mahmood, Udaysankar Nair, Eric Rappin, Roger Pielke Sr., and Dallas Staley. 2017-2023. Collaborative Research: The Great Plains Irrigation Experiment (GRAINEX) for Understanding the Influence of Irrigation on the Planetary Boundary Layer and Weather Events. Submitted to: NSF. Science Budget: \$663,859. Field work: \$1,291,036. Status: **Funded**. Supplemental Funding: \$44,601.

PIs-Stuart Foster and Rezaul Mahmood. 2017. Kentucky Mesonet. Submitted to: Commonwealth of Kentucky. Total budget: \$750,000. Status: **Funded**.

PI- Rezaul Mahmood. 2017. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$70,717. Status: **Funded**.

PIs-Rezaul Mahmood, Janey Camp, Eric Toman, Ramiro Berardo, Xingang Fan, Jonathan Gilligan, Gregory Goodrich, George Hornberger, and Eric Rappin. 2017. Midwest Climate, Water Resources, Energy, and Transportation Consortium (MCWET). Submitted to: NOAA. Total budget: \$3,499,959. Status: Not funded.

PIs-Rezaul Mahmood and Stuart Foster, 2017. Department of Commerce: NOAA Scientific and Technical Support. Submitted to: NOAA. Total Budget: \$160,000. Status: **Funded**.

PIs-Stuart Foster and Rezaul Mahmood. 2016. Kentucky Mesonet. Submitted to: Commonwealth of Kentucky. Total budget: \$750,000. Status: **Funded**.

PI-Rezaul Mahmood. 2016. Mesonet data application for Public Health. Kentucky Population Health Institute and Kentucky Department of Public Health. Total Budget: \$10,000. Status: **Funded**.

PIs-Zhonfeng Xu, Rezaul Mahmood, Jiangfeng Wei, and Ying Han. 2016. A dynamical downscaling study on the response of monsoon Asian climate to the anthropogenic changes in greenhouse gases concentration and land use/cover. Submitted to: NSFC. Budget: ~800000 RMB (~\$119000). Status: **Funded**.

PIs-Zhongfeng Xu, Jianfeng Wei, and Rezaul Mahmood. 2016. Land-atmosphere coupling over the Tibetan Plateau and its influence on meso- and small-scale convections by using a high-resolution WRF model. Submitted to: NSFC. Budget: ~800000 RMB (~\$119000). Status: **Funded**.

PIs-Rezaul Mahmood, Janey Camp, Eric Toman, Ramiro Berardo, Mark Cohen, Xingang Fan, Jonathan Gilligan, Gregory Goodrich, George Hornberger, Eric Rappin, and Robyn Wilson. 2016. Midwest Climate, Water Resources, Energy, and Transportation Consortium (MCWET). Submitted to: NOAA. Total budget: \$3,496,841. Status: Not funded.

PIs-Stuart Foster and Rezaul Mahmood. 2016. Kentucky Mesonet Critical Instrumentation Upgrades. Submitted to: Kentucky Agricultural Development Fund. Total budget: \$105,250. Status: **Funded**.

PI- Rezaul Mahmood. 2016. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: ~\$63,000. Status: **Funded**.

PIs-Rezaul Mahmood, Udaysankar Nair, Eric Rappin, Roger Pielke Sr., and Dallas Staley. 2015. Collaborative Research: The Great Plains Irrigation Experiment (GRAINEX) for Understanding the Influence of Irrigation on the Planetary Boundary Layer and Weather Events. Submitted to: NSF. Total Budget: \$674,465. Status: Not funded.

PIs Eric Rappin, Rezaul Mahmood, and Jeremy Pal. 2015. Collaborative Research: A Multiscale Spatiotemporal Study of the Impacts of Land Cover Change on the West African Monsoon. Submitted to: NSF. Total Budget: \$427,112. Status: Pending.

PIs-Rezaul Mahmood and Stuart Foster, 2015. Department of Commerce NOAA Scientific and Technical Support. Submitted to: NOAA. Total Budget: \$206,666. Status: **Funded**.

PIs David Crocker III, Phil Silva, Kathleen Purvis-Roberts, Rezaul Mahmood, and Matthew Nee 2015-18. Aerosol formation from agricultural volatile organic compounds. Submitted to: NSF. Total Budget: \$765,131. Status: **Funded**.

PI- Rezaul Mahmood. 2015. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: ~\$102,000. Status: **Funded**.

PIs Xiaomao Lin, Tao Li, Eric Rappin, and Rezaul Mahmood. 2015. Weather Forecast-Based Real-Time Nitrogen and Phosphorus Optimization System in Philippine Rice. Submitted to: Global Center for Food Systems Innovation (GCFSI), MSU. Total budget: ~\$250,000. Status: Not funded.

PIs Rezaul Mahmood, Udaysankar Nair, Eric Rappin, Roger Pielke Sr., and Dallas Staley. 2014. Collaborative Research: The Great Plains Irrigation Experiment (GRAINEX) for Understanding the Influence of Irrigation on the Planetary Boundary Layer and Weather Events. Submitted to: NSF. Total Budget: \$553,787. Status: Not funded.

PIs-Janey Camp, Rezaul Mahmood, Eric Rappin, Amanda Carrico, Peter Newton, Chris Small, Heather Johnson, and Andrew Hostetler. 2015. Hazard SEES Collaborative Research: Social and physical dimension of land use and cyclone vulnerability. Submitted to: NSF. Total Budget: ~\$3,000,000. Status: Not funded.

PI-Rezaul Mahmood. 2014. Meso-scale equivalent temperature. Graduate Student Research Fellowship. Submitted to WKU: Total budget: ~\$26,000. Status: **Funded**.

PIs-Rezaul Mahmood and Scott Dobler, 2014. Drought Monitoring at the Meso-scale. Submitted to the American Geophysical Union (AGU). Total budget: \$27,000. Status: **Funded**.

PIs- David Sanford (UK), Rezaul Mahmood and Stuart Foster, 2014. Development of a farmer friendly ag-weather website for Kentucky. Submitted to Corn Growers Association of Ky and

Small Grain Growers Association of KY. Total Budget: \$26,000 WKU portion (\$24,000). Status: **Funded.**

PIs-Rezaul Mahmood and Stuart Foster, 2014. Department of Commerce NOAA Scientific and Technical Support. Submitted to: NOAA. Total Budget: \$100,000. Status: **Funded.**

PI- Rezaul Mahmood. 2014 Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: ~\$101,000. Status: **Funded.**

PIs-Eric Rappin, Rezaul Mahmood, Xingang Fan, Joseph Santanello, 2014. A mesoscale perspective of soil moisture influences on extreme weather patterns in both current and potential future thermodynamic climate scenarios. Submitted to: NSF. Total budget: \$487,665. Status: In review.

PIs-Janey Camp, Rezaul Mahmood, Eric Rappin, Amanda Carrico, and Andrew Hostetler, 2014. Coastal SEES Collaborative Research: Land Use Land Cover Changes and Their Impacts on Post-landfall Cyclones in Coastal Bangladesh - Identifying Sustainable Land Management Options. Submitted to: NSF. Total Budget: \$1,992,321 Status: Not Funded.

PIs-Rezaul Mahmood and Stuart Foster, 2013. Department of Commerce NOAA Scientific and Technical Support. Submitted to: NOAA. Total Budget: \$75,000. Status: **Funded.**

PIs-Rezaul Mahmood and Scott Dobler, 2013. Drought Monitoring at the Meso-scale (summary proposal). Submitted to the American Geophysical Union (AGU). Total budget: \$2,000. Status: **Funded.**

PIs-Xingang Fan and Rezaul Mahmood, 2013. Soil Temperature Variability, Land Memory of Heat, and Associated Regional Climate Predictability. Submitted to: NSF. Total Budget: \$475,134. Status: Not Funded.

PIs David Crocker III, Phil Silva, Rezaul Mahmood, Matthew Nay, and Kathleen Purvis-Roberts. 2013. Aerosol formation from agricultural volatile organic compounds. Submitted to: NSF. Total Budget: \$472, 903. Status: Not funded.

PI- Rezaul Mahmood. 2013. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: ~\$97,000. Status: **Funded.**

PI- David Van Sanford, Co-PIs Paul Vincelli, Yoko Kusonose, Carol Hanley, Senthold Asseng, Pam Knox, Brenda Ortiz, Al Sutherland, and Rezaul Mahmood. 2013. Adaptation to Climate variability and change through use of forecast-based crop management: An integrated project. Submitted to: USDA-AFRI. Total Budget: \$999, 458. Status: Not funded.

PI-Phil Silva, Co-PIs, Kim Cook, David Cocker, Akua-Asa Awuku, and Rezaul Mahmood. 2013. Emissions and Atmospheric Fate of Ammonia and Amines from Managed Agroecosystems. Submitted to: USDA-NIFA. Total Budget: \$340,000. Status: Not funded.

PI- David Van Sanford, Co-PIs Rebecca McCulley, Paul Vincelli, Jerry Skees, Rezaul Mahmood, and Stuart Foster. 2012. Developing and Delivering Useful Climate Information and Decision Support Tools for Kentucky Agriculture: Preparing for Extreme Events. Submitted to: NOAA. Total Budget: \$100,000. Status: Not funded.

PIs-Rezaul Mahmood and Stuart Foster, 2012. Department of Commerce NOAA Scientific and Technical Support. Submitted to: NOAA. Total Budget: \$50,000. Status: **Funded**.

PI- David Van Sanford, Co-PIs Rebecca McCulley, Carol Hanley, Chad Lee, Sue Nokes, Matthew Dixon, Rezaul Mahmood, Stuart Foster, Al Sutherland. 2012. Development of a farmer-friendly agweather website for Kentucky. Total Budget: \$38,916. Status: **Funded**

PIs-Rezaul Mahmood and Tom Loveland. 2012. Linking socio-economic decisions, technological advancement, and biogeophysical impacts of land use land cover change on climate in the Great Plains: A synthesis. Submitted to: USGS. Total Budget: \$132,726. Status: Not funded.

PI- Rezaul Mahmood. 2012. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$85,852. Status: **Funded**.

PI-Stuart Foster, Co-PI Rezaul Mahmood, 2012. Soil Monitoring with Kentucky Mesonet, Phase II. Submitted to: KY Agricultural Development Fund. Total budget: \$19,629. Status: Not funded.

PI-Stuart Foster, Co-PI Rezaul Mahmood, 2012. WKU: Expanded weather monitoring for Barren County. Submitted to: Kentucky Agricultural Development Fund. Total budget: \$23,950. Status: **Funded**.

PI-Xingang Fan, Co-PI Rezaul Mahmood. 2011. Investigating the Imbalance of Energy and Water Budget and Its Control over Regional Climate from the NASA MERRA Reanalysis. Submitted to NASA. Total Budget: \$298,803. Status: Not Funded.

PI-Rezaul Mahmood, Nanh Lovanh, John Loughrin, Phil Silva, George Day, Joseph Taraba. 2010. Factors controlling the emissions of malodors and greenhouse gases from livestock operations: Monitoring to mathematical modeling of fate and transport processes. Submitted to: The United States Department of Agriculture. Total Budget: \$2,369,393 Status: Not funded.

PI- Rezaul Mahmood. 2010. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$147,306. Status: **Funded**.

PI- Cathleen Webb and Rezaul Mahmood. 2009. NSF-REU: Impacts of Land Use/Land Cover on Mammoth Cave/Upper Green River Watershed in Western Kentucky. Submitted to: The NSF. Total budget: \$349,806. Status: **Funded**.

PIs-Claire Rinehart and Rezaul Mahmood. 2009. WKU-High Performance Computing Center. Submitted to: U. S. Department of Education. Total Budget: \$2,379,000. Status: **Funded**.

PI-Xingang Fan, Co-PI Rezaul Mahmood. Land Memory of Heat and Response of Regional Climate. Submitted to: NOAA. Total Budget: \$477,207. Status: Not Funded.

PI-Rezaul Mahmood, Robert Tindall, and Stuart Foster. Scoping Workshop for Identifying Decision Tools for Non-coastal Flood Response and Mitigation in the Contiguous US. Submitted to: NOAA. Total Budget: \$50,000. Status: Not funded.

PI-Stuart Foster, Co-PI Rezaul Mahmood. Developing an environmental monitoring system for Kentucky. Submitted to: NOAA. Total budget: \$700,000. Status: **Funded**.

PI- Rezaul Mahmood. 2009. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$135, 229. Status: **Funded**.

PI-Rezaul Mahmood. Timing Shifts in Occurrence of Continental-scale Seasonal High and Low Atmospheric Moisture Content. Submitted to WKU: Total Budget: \$5,000. Status: **Funded**.

PI-Rezaul Mahmood, Nanh Lovanh, and John Loughrin. 2009. Factors controlling the emissions of malodors and greenhouse gases from livestock operations: Monitoring to mathematical modeling of fate and transport processes. Submitted to USDA. Total Budget: \$391,182. Status: Not funded.

PI-Rezaul Mahmood, James Gary, and Jun Yan. 2009. MRI: Acquisition of Land-Surface Energy Flux Measurement Equipments and Building Cyberinfrastructure for Understanding the Role of Soil Moisture in Development of Planetary Boundary Layer. Submitted to: The NSF. Total budget: \$1,159,000. Status: Not funded.

PI- Cathleen Webb and Rezaul Mahmood. 2008. Impacts of Land Use/Land Cover in the Upper Green River Watershed in Western Kentucky. Submitted to: The NSF. Total budget: \$428, 000. Status: Not funded.

PI-Nanh Lovanh, John Loughrin, and Rezaul Mahmood. 2008. Factors controlling the emissions of malodors and greenhouse gases from livestock operations: Monitoring to mathematical modeling of fate and transport processes. Submitted to USDA. Total Budget: \$579,000. Status: Not funded.

PI-Stuart Foster, Co-PI Rezaul Mahmood. 2008. Developing an environmental monitoring system for Kentucky. Submitted to: NOAA. First Year budget: \$668, 997. Status: **Funded**.

PI- Rezaul Mahmood. 2008. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$112, 599. Status: **Funded**.

PI-Rezaul Mahmood, James Gary, Jun Yan, and Stuart Foster. 2008. MRI: Acquisition of Land-Surface Energy Flux Measurement Equipments and Building Cyberinfrastructure for Understanding the Role of Soil Moisture in Development of Planetary Boundary Layer. Submitted to: The NSF. Total budget: \$1,200,000. Status: Not funded.



PI- Phillip Womble, Tim Stombaugh, Rezaul Mahmood, John Spadaro. 2007. AgWatch: A Method of Detecting Crop Disease Breakouts Using Multispectral Sensors. Pre-proposal. Submitted to: National Institute for Hometown Security. Total Budget: \$973,000. Status: Not Funded.

PI- Eugene S. Takle, WKU PI-Rezaul Mahmood, Co-PIs Jun Yan, Gregory Goodrich, Yanmei Li, Stuart Foster. 2007. Midwest Consortium for Climate Assessment (MiCCA). Submitted to: NOAA. WKU budget: \$250, 000. Status: Not Funded.

PI-Stuart Foster, Co-PI Rezaul Mahmood. 2007. Developing an environmental monitoring system for Kentucky. Submitted to: NOAA. First Year budget: \$400, 000. Status: **Funded.**

PI- Rezaul Mahmood. 2007. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$82, 878. Status: **Funded.**

PI-Rezaul Mahmood, Roger Pielke Sr., Kenneth Hubbard. 2007. Workshop on Detecting the Atmospheric Response to the Changing Face of the Earth (Boulder, Colorado, August 27-29, 2007). Submitted to: The National Science Foundation. Total Budget: \$15, 000. Status: **Funded.**

PI-Stuart Foster, Co-PI Rezaul Mahmood. 2006. Developing an environmental monitoring system for Kentucky. Submitted to: NOAA. First Year budget: \$1, 500, 000. Status: **Funded.**

PI-Rezaul Mahmood. Changes in timing of first and last days of frost and annual frost frequency due to land use change. WKU Faculty Research Council. Total Budget: \$5, 000. Status: **Funded.**

PI-Rezaul Mahmood, Co-PI Jun Yan, Lakshmi Narasimhan, Christi McMichael, John Tibe, and Stuart Foster. 2007. Pre-proposal: The Center for Integrated Land Atmosphere Studies (CILAS). Submitted to: **The National Science Foundation.** Total Budget: \$4, 200, 000. Status: Not funded

PI-Lakshmi Narasimhan, Co-PI Rezaul Mahmood, James Gary, Jun Yan, and Christi McMichael. Collaborative Research: EDAM: An anchor desk for Environmental Disaster Analysis & Management -Design of foundational infrastructure based on high performance & grid computing. Submitted to: The National Science Foundation. Total Budget: \$368, 199. Status: Not funded.

PI- Rezaul Mahmood. 2006. Emission dispersion modeling from livestock farms. Submitted to: The United States Department of Agriculture. Total Budget: \$40, 000. Status: **Funded.**

PI-Rezaul Mahmood. 2006. Flash flood climatology of the Appalachian region. Submitted to: The National Climatic Data Center/NOAA. Total Budget: \$1, 900. Status: **Funded.**

PI-Rezaul Mahmood. 2005. Collaborative research: Spatio-temporal variability of soil moisture and land memory processes in the Great Plains. Submitted to: The National Science Foundation. Total Budget: \$225, 704. Status: Not funded.

PI- Rezaul Mahmood. 2005. The First Assessment of Observed Data-based Soil Moisture Variations in the Northern Great Plains. Total Budget: \$5, 000. Status: **Funded**.

PI-Rezaul Mahmood 2005. Measurement and modeling of near surface micro- and meso-scale processes. Submitted to: The United States Department of Agriculture. **Total Budget: \$45, 000.** Status: **Funded**.

PI-Michael Trapasso, Co-PI Rezaul Mahmood. 2005. Establishment of research grade climate/meteorology laboratory facility. Proposal submitted to KY NSF-EPSCoR. **Total Budget: \$75, 000.** Status: **Funded**.

PI-David Legates, Co-PI Rezaul Mahmood and Collaborators. 2005. Estimating bias in precipitation measurement. Submitted to The National Science Foundation. **Total Budget: \$290, 000.** Status: Not funded.

PI- Michael Trapasso, Co-PI Rezaul Mahmood. 2005. Enhancement of computation facilities for the Climate/Meteorology program. **Total Budget: \$10, 000.** Status: **Funded**.

PI-Cathleen Webb, Co-PI Rezaul Mahmood. 2004. Summer Research Experience for Undergraduates in the Mammoth Cave/ Upper Green River Watershed. Proposal submitted to: The National Science Foundation (NSF). **Total Budget: \$254, 000.** Status: **Funded**

PI-Kenneth G. Hubbard, Rezaul Mahmood, and David R. Legates. 2004. Spatio-temporal variability of soil moisture and land memory processes in the Great Plains. Submitted to: The National Science Foundation. Total Budget: \$347, 000. Status: Not Funded.

PI-Rezaul Mahmood, Daniel Leathers, and David R. Legates. 2004. An alternative hypothesis of El Nino related monsoonal rainfall variability in Bangladesh and Eastern India. Submitted to: The National Science Foundation. Total Budget: \$282,000. Status: Not Funded.

PI-Rezaul Mahmood. 2004. Assessing Precipitation Variability in the Mid-latitudes Using A High Density Precipitation Measuring Network in the Mammoth Cave National Park. Budget: \$1, 000. Status: **Funded.** (second phase)

PI- Michael Trapasso, Co-PI Rezaul Mahmood. 2004. Enhancement of computation facilities for the Climate/Meteorology program. Amount requested: \$25, 000. Status: Not Funded.

PI-Rezaul Mahmood and Co-PI Stuart Foster. 2004. Development of southcentral Kentucky mesonet. Total Budget: **\$24, 000.** Status: **Funded**.

PI-Rezaul Mahmood. 2004. Impacts of Land Use Change on Near Surface Dew Point Temperature Records in the Great Plains. Submitted to the National Climatic Data Center. Total Budget: **\$2,500.** Status: **Funded**.

PI-Rezaul Mahmood, Daniel Leathers, and David R. Legates. 2003. An alternative hypothesis of El Nino related monsoonal rainfall variability in Bangladesh and Eastern India. Submitted to:

The National Science Foundation. Total Budget: \$318,000. Status: Not Funded.

PI-Kenneth G. Hubbard, Rezaul Mahmood, and David R. Legates. 2003. Spatio-temporal variability of soil moisture and land memory processes in the Great Plains. Submitted to: The National Science Foundation. Total Budget: \$264,000. Status: Not Funded.

PI-Rezaul Mahmood. 2003. Flash flooding in Eastern Kentucky: A hydrometeorological case study. Submitted to: The National Oceanic and Atmospheric Administration. **Total Budget: \$10,000.** Status: **Funded.**

PI- Michael Trapasso, Co-PI Rezaul Mahmood. 2003. Real-time meteorological data feed to Climate/Meteorology lab. **Total Budget: \$24,000.** Status: **Funded**

PI-Rezaul Mahmood. 2003. Relationship between near-surface and root zone soil moisture: Implication for remote sensing. WKU faculty research council. **Total Budget: \$5,000.** Status: **Funded**

PI-Rezaul Mahmood. 2003. Assessing Precipitation Variability in the Mid-latitudes Using A High Density Precipitation Measuring Network in the Mammoth Cave National Park. **Total Budget: \$1,000.** Status: **Funded.**

PI-Stuart Foster, Co-PI Rezaul Mahmood. 2003. Joint initiative on local and regional hydroclimatic research. Funding source: Applied Research and Technology Program (ARTP), Western Kentucky University. **Total Budget: \$25,000.** Status: **Funded.**

PI-Stuart Foster, Co-PI Rezaul Mahmood. 2003. Developing an environmental monitoring system for Kentucky. Proposed budget: \$3,248,500. Status: Pending

PI-Rezaul Mahmood. 2003. Precipitation measurement at the Mammoth cave National Park. Funding Source: Kentucky Council on Postsecondary Education. **Total Budget: 13,000.** Status: **Funded.**

PI-Michael Trapasso, Co-PI Rezaul Mahmood. 2002. Meteorological lab upgrade. Funding organization: Western Kentucky University. **Total Budget: \$24,762.** Status: **Funded.**

PI-Rezaul Mahmood. 2002. Determining Sensitivity of a Physically-based Soil Water Model to Estimated Solar Radiation and Relative Humidity. Proposal Submitted to Western Kentucky University Faculty Research Council. **Total Budget: \$5,000.** Status: **Funded.**

PI-Rezaul Mahmood. 2003. An assessment of El Nino related monsoonal rainfall variability in Bangladesh and eastern India. KY NSF-EPSCoR. Proposed total budget: \$49,000. Status: Not funded.

PI-Rezaul Mahmood. 2002. An alternative hypothesis of El Nino related monsoonal rainfall variability in Bangladesh and eastern India. Proposal submitted to: The National Science Foundation, CAREER Program. Amount requested: \$491,921. Status: Not funded.

PI-Kenneth G. Hubbard, Co-PI Rezaul Mahmood and Alan Basist. 2002. Soil moisture climatology and land memory processes in the Northern Mississippi and Missouri Basins. Proposal submitted to: The Office of Global Programs, The National Oceanic and Atmospheric Administration (NOAA). Amount Requested: \$189, 223. Status: Not funded.

PI-Cathleen Webb, Co-PI Rezaul Mahmood. 2002. Summer Research Experience for Undergraduates in the Mammoth Cave/ Upper Green River Watershed. Proposal submitted to: The National Science Foundation (NSF). Amount requested: \$314, 061. Status: Not funded.

PI-Michael Trapasso, Co-PI Rezaul Mahmood. 2002. Meteorological lab upgrade. Funding organization: Western Kentucky University. Proposed budget: \$33, 632. Status: Not funded.

PI-Rezaul Mahmood, Co-PI Chris Groves. 2002. Mammoth cave meteorological flux measuring instrumentation. Funding Organization: National Park Service. Proposed budget: \$200, 000. Status: Not funded.

PI-Kenneth G. Hubbard, Co-PI Rezaul Mahmood and Alan Basist. 2001. Soil moisture climatology and land memory processes in the Northern Mississippi and Missouri Basins. Proposal submitted to: The Office of Global Programs, The National Oceanic and Atmospheric Administration (NOAA). Amount Requested: \$267, 277. Status: Not funded.

PI-Cathleen Webb, Co-PI Rezaul Mahmood. 2001. Summer Research Experience for Undergraduates in the Mammoth Cave/ Upper Green River Watershed. Proposal submitted to: The National Science Foundation (NSF). Amount requested: \$284,880. Status: Not funded.

PI-Nevil Speer 2001. A case study of anthropogenic inputs in a karst/non-karst watershed: stakeholder participation in watershed management. Proposal submitted to: The United States Department of Agriculture (USDA). Amount Requested: \$590,296. Status: Not funded

PI-Rezaul Mahmood, Co-PI Burl I. Naugle, Co-PI Christopher Groves, Co-PI Sturat Foster. 2001. Flooding in karst watersheds: a hydrometeorological and hydro-geomorphic analysis. Proposal submitted to: KYEPSCoR. Amount requested: \$20,000. Status: Not funded.

PI-Rezaul Mahmood. 2001. El Nino related monsoonal rainfall variability in Bangladesh and eastern India: an analysis of synoptic-scale atmospheric forcing. Proposal Submitted to Western Kentucky University Faculty Research Council. **Total Budget: \$3,930. Status: Funded.**

PI-Kenneth G. Hubbard, Co-PI Rezaul Mahmood and Geoffrey Henebry. 2000. Soil moisture persistence and water cycling through land-surface-atmosphere-continuum in the Northern Great Plains. Proposal submitted to: The National Aeronautics and Space Administration (NASA). Amount Requested: \$595,324. Status: Not funded.

PI-Kenneth G. Hubbard, Co-PI Rezaul Mahmood and Alan Basist. 2000. Soil moisture climatology and land memory processes in the Northern Mississippi and Missouri Basins. Proposal submitted to: The Office of Global Programs, National Oceanic and Atmospheric

Administration (NOAA). Amount Requested: \$401,812. Status: Not funded.

PI-Kenneth G. Hubbard, Co-PI Rezaul Mahmood, Mary Knapp, Allen Bender, John Enz, and Gary Peterson. 2000. Understanding Drought and mitigating its impacts through monitoring, modeling, and education. Pre-proposal submitted to: United States Department of Agriculture-North Central Region. Amount requested: \$85,878. Status: Not funded.

PI-Rezaul Mahmood. Impacts of scale-aggregation of Landsat-TM data on energy flux estimation. Funded by Oklahoma NASA Space Grant Consortium (OSGS), 1999. Amount: \$2,500. **Funded**

Dissertation Field Research Grant from the University of Oklahoma, 1998. Amount: \$1,850. **Funded.**

Travel Grant from the Department of Geography and College of Geosciences, The University of Oklahoma, 1998. Amount: \$750. **Funded**

PI-D. R. Legates, Co-PI Rezaul Mahmood. The Himalayan Snow Melt Runoff and It's Impact on the Flooding Magnitude of the Lower Ganges-Brahmaputra basin. Pre-proposal Submitted to: National Aeronautics and Space Administration. Amount Requested: \$210, 000. Status: Not funded. 1997.

PI-Mark Morrissey, Co-PI- Rezaul Mahmood. El Nino Related Monsoonal Rainfall Variability and Rice Productivity in South Asia. Submitted to: National Science Foundation. Amount Requested: \$9, 150. Status: Not funded. 1997.

PI-D. R. Legates, Co-PI May Yuan and Rezaul Mahmood. Interactions between Monsoonal Rainfall Variability and Rice Productivity in South Asia Using a GIS-based Approach. Submitted to: National Science Foundation. Amount Requested: \$120,000. Status: Not funded. 1997.

Received \$250 from the Graduate Student Senate to participate 94th annual meeting of the American Association of Geographers at Boston, Massachusetts. 1998.

Received \$250 from the Graduate Student Senate to participate 93<sup>rd</sup> annual meeting of the American Association of Geographers at Fort Worth, Texas. 1997.

Received \$200 from the Graduate Student Senate to participate 92<sup>nd</sup> annual meeting of the American Association of Geographers at Charlotte, North Carolina. 1996.

Received \$600 from University at Albany Graduate Student Organization for the research project, titled, "Monsoonal Fluctuations and Rice Yield in Bangladesh: Application of a Numerical Crop Yield Model". 1992.

Received \$500 from University at Albany Benevolent Association for the research project, titled, "Monsoonal Fluctuations and Rice Yield in Bangladesh: Application of a Numerical Crop Yield Model". 1991.

## **INVITED PRESENTATIONS:**

University of Alabama, Tuscaloosa, AL (1999)  
University of Nebraska-Lincoln, Lincoln, NE (1999)  
Kent State University, Kent, OH (2000)  
University of Montana, Missoula, MN (2000)  
California State University, Los Angeles, CA (2001)  
Western Kentucky University, Bowling Green, KY (2001)  
University of Missouri-Columbia, Columbia, MO (2001)  
Kansas State University, Manhattan, KS (2001)  
University of Minnesota, Twin Cities, MN (2002)  
University of Delaware, Newark, DE (2003)  
University of Kentucky, Lexington, KY (2012)  
Chinese Academy of Sciences, Beijing, China (2012)  
University of Alabama at Huntsville, AL (2013)  
Texas A&M University, TX (2013)  
Vanderbilt University, TN (2013)  
National Autonomous University of Mexico (UNAM; 2015)  
University of Oklahoma (2015)  
AGU Annual Meeting (2015)  
University of Nebraska-Lincoln (2016)  
International Conference on Earth and Environmental Sciences & Technology for Sustainable Development, Dhaka, Bangladesh, (2020)  
Earth Observation Laboratory/NCAR (2020)  
University of Alabama in Huntsville (2021)  
GLASS/GHP Irrigation Cross-Cut kick off meeting (2021)  
South Dakota State University (2022)

## **GRANT REVIEWER:**

Various programs of The National Science Foundation, USA, including:

Office of Polar Programs,  
Atmospheric Science,  
Hydrology, and  
Geography and Regional Science.

University Grant Committee, Hong Kong.  
National Oceanic and Atmospheric Administration (NOAA)

## **MANUSCRIPT REVIEWER:**

Nature Climate Change, Geophysical Research Letters, Journal of Geophysical Research-Atmosphere, Journal of Applied Meteorology and Climatology, Bulletin of the American Meteorological Society, Journal of Atmospheric and Oceanic Technology, Weather, Climate, and Society, International Journal of Climatology, Climate Research, Agricultural and Forest

Meteorology, Journal of Civil and Environmental Engineering, Physical Geography, Applied Geography, Journal of Hydrology, Hydrological Sciences Journal, Journal of the American Water Resources Association, Agricultural Water Management, Journal of Spatial Hydrology, International Journal of Environmental Pollution, International Journal of Remote Sensing, Geography Compass, and Global and Planetary Change.

**EDITORIAL BOARD MEMBER:**

Physical Geography (2006-2010)  
Geography Compass (2006-2015)

**PROFESSIONAL MEMBERSHIP:**

The American Academy of Advancement of Science (AAAS)  
The American Association of Geographers (AAG)  
The American Meteorological Society (AMS)  
The American Geophysical Union (AGU)  
The American Association of State Climatologists (AASC)

**RESEARCH ASSISTANT PROFESSOR, POST-DOCTORAL SCIENTIST and RESEARCH STAFF MENTORING:**

Daniel Whitesel (2022-current)  
Dr. Paul Flanagan (2019-2021)  
Dr. Eric Rappin (2012-2018)  
William Rodgers (2012-2018)  
Ronnie Leeper (2009-2011)  
Dr. Arturo Quintanar (2006-2011)

**PROFESSIONAL STAFF SUPERVISION and MENTORING:**

Michael Grogan, Stephen Struebig, Dana Grabowski, Megan Ferris, David Pedigo, Jason Givens, Andrew Quilligan, Ara Nazem, James Thompson, Patrick Collins, Charles O'Connell, William Schwind, Christopher Jones, Fatima Chebchoub, Melissa Griffin, James Wood, Jason Smith, William Sorensen, Jamie Lahowetz, Warren Pettee, Shellie Hanneman, Dr. Natalie Umphlett, Dr. Crystal Stiles, and Gannon Rush.

**DISSERTATION PROJECT DIRECTOR FOR THE FOLLOWING STUDENTS:**

Syeda Tasneem Binte Haider (current), University of Nebraska-Lincoln  
Chanchal Gupta (current), University of Nebraska-Lincoln  
Andrew Mwape (current; co-advisor), University of Nebraska-Lincoln

## **DISSERTATION COMMITTEE:**

F. Cruz, 2009, The University of New South Wales, Sydney, Australia  
Prakash K. Patil, 2002, Department of Geography, University of Pune, India  
Kevin Brinson PhD. (2023), University of Delaware  
Chris Phillips PhD. (2023), University of Alabama in Huntsville

## **M.S. THESIS PROJECT DIRECTOR FOR THE FOLLOWING STUDENTS:**

Daniel Taylor (Outstanding Graduate Student in Geoscience--2004), Dasen Kendrick (2005), Christina Henry (2006), William Baldwin (2007), Ashley Littell (2007; Outstanding Graduate Student in Geoscience--2007), and Ronnie Leeper (2009; Outstanding Graduate Student in Geoscience; and Outstanding Graduate Student of the Ogden College of Science and Engineering--2009), Michael Grogan (2010), Kortney Craft (2011), Mitchell Gaines (2012) William Rodgers (2014), James Kyle Thompson (2014), Jesse Winchester (2015), Keri Younger (2015), Austin Wardall (2016), Dolly Na-Yemeh (2017; Outstanding Graduate Student in Geoscience), Gerardo Diaz (2019), Emilee Lachenmeier (2020), Daniel Whitesel (2022), and Gannon Rush (current).

## **THESIS COMPLETED AND CURRENT PROFESSIONAL AFFILIATION:**

**Title:** Irrigation Impacts on a Precipitation Event During GRAINEX in Nebraska. Completed by: Daniel Whitesel. Thesis Project Director: Dr. Rezaul Mahmood, August, 2022.

Currently employed by the High Plains Regional Climate Center and the National Drought Mitigation Center.

**Title:** Impacts of Irrigated Agriculture on the Near Surface and Planetary Boundary Layer Atmosphere: Results from the Great Plains Irrigation Experiment (GRAINEX). Completed by: Emilee Lachenmeier. Thesis Project Director: Dr. Rezaul Mahmood and Co-Director: Dr. Trenton Franz, December, 2020.

Currently employed by the North Dakota Department of Environmental Quality.

**Title:** Analysis of 2017 Multi-Agency Field Campaign Data for Wintertime Surface Pollution in the Cache Valley of Utah. Completed by: Gerardo Diaz. Thesis Project Director: Dr. Rezaul Mahmood, May, 2019.

Currently employed by the National Weather Service.

**Title:** Synoptic atmospheric conditions, land cover, and equivalent temperature variations in Kentucky. Completed by: Dolly Na-Yemeh. **Thesis Project Director:** Dr. Rezaul Mahmood, May, 2017.

Currently a Ph.D. student at the University of Oklahoma.

**Title:** Dispersion of ammonia from concentrated animal feeding operations. Completed by:



Austin Wardall. **Thesis Project Director:** Dr. Rezaul Mahmood, December, 2016.

Currently employed in the private sector.

**Title:** Assessing meso-scale equivalent temperature in Kentucky. **Completed By:** Keri Younger. **Thesis Project Director:** Dr. Rezaul Mahmood. April, 2015.

Currently employed in the private sector.

**Title:** Emissions from concentrated animal feeding operations during wet and dry periods in the Southeastern United States. **Completed By:** Jesse Winchester. **Thesis Project Director:** Dr. Rezaul Mahmood. March, 2015.

Currently employed in the private sector.

**Title:** Station exposure and resulting bias in temperature observations: A comparison of the Kentucky Mesonet and ASOS data. **Completed by:** James Kyle Thompson. **Thesis Project Director:** Dr. Rezaul Mahmood. December, 2014.

Currently employed in the private sector.

**Title:** Land cover change and its impacts on a flash flood producing rain event in eastern Kentucky. **Completed by:** William Rodgers. **Thesis Project Director:** Dr. Rezaul Mahmood April, 2014.

Currently employed in the private sector.

**Title:** Application of the Weather Research and Forecasting (WRF) model to simulate a squall line: Implications of choosing parametrization scheme combinations and model initialization data sets. **Completed by:** Mitchell Gaines. **Thesis Project Director:** Dr. Rezaul Mahmood. April, 2012.

Currently employed by the National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA).

**Title:** Economic impacts of drought on Kentucky corn, hay, and soybeans. **Completed by:** Kortney E. Craft. **Thesis Project Director:** Dr. Rezaul Mahmood. January, 2011.

**Title:** Information technology implementation decisions to support the Kentucky Mesonet. **Completed by:** Michael Grogan. **Thesis Project Director:** Dr. Rezaul Mahmood. April, 2010.

Currently employed in the private sector.

**Title:** Near surface atmospheric response to simulated changes in land-cover, vegetation fraction, soil moisture over western Kentucky. **Completed by:** Ronnie Leeper. **Thesis Project Director:** Dr. Rezaul Mahmood. Summer, 2009.

Currently employed by Cooperative Institute of Climate and Satellite Studies, NCSU/NCEI, NOAA.

**Title:** Spatio-temporal analysis of observed soil moisture data from Nebraska. **Completed by:** Ashley Littell. **Thesis Project Director:** Dr. Rezaul Mahmood. April, 2007.

Currently employed in private sector.

**Title:** An analysis of key aspects of warm and cool season flash flooding in the southern Appalachians. **Completed by:** William Baldwin. **Thesis Project Director:** Dr. Rezaul Mahmood. April, 2007.

Currently employed in the private sector.

**Title:** Flash flooding in eastern Kentucky: An analysis of 3-4 August 2001 event. **Completed by:** Christina Henry. **Thesis Project Director:** Dr. Rezaul Mahmood. November, 2006.

K-12 Teacher.

**Title:** The relationship between meteorological patterns and rural ground ozone concentration. **Completed by** Dasen Kendrick. **Thesis Project Director:** Dr. Rezaul Mahmood. December, 2005.

Currently employed in the private sector.

**Title:** Evaluating Spatial Variability of Precipitation in Kentucky with Exploratory Data Analysis. **Completed by** Daniel R. Taylor. **Thesis Project Director:** Dr. Rezaul Mahmood. September, 2004.

Currently employed by the US Government. (September, 2004)

#### **UNDERGRADUATE STUDENT MENTORING AND THEIR CURRENT PROFESSIONAL AFFILIATION:**

Dan Taylor (works for the USACE), William Baldwin (Currently a doctoral student at the MSU), David Logan (graduated in 2004), Christopher A. Hawkins (works for the local govt, in Kentucky), Ronnie Leeper (research associate-NCSU/NCDC/NOAA), Travis Keeling (Outstanding undergraduate student award in Geography, currently works for the NWS), Jessica S. Phillips (works in the private sector), William Rodgers (Outstanding undergraduate student in Geography award; Research Associate, Kentucky Climate Center, WKU), Nicholas Lawalin (works for an engineering farm), Ashley Littell (outstanding undergraduate and graduate student award; works in the private sector), Astrid Gonzalez (outstanding undergraduate student in Meteorology; graduate student at PSU), Jane Wix (Works for the National Weather Service), Timothy Malone (work in the private sector as a forecaster), Danny Gant (Works for the National Weather Service), Jeremy Taylor (works in the private sector), Dan Vecellio (NSF-REU Student, 2010), Justin Rawley (NSF-REU student, 2010), Ryan Torres (US Army), Ian Blaylock (Currently at NWS), Lee Campbell

(graduated), Kyle Berry (graduated), Matthew Payne (Currently at ESRI), Sean Freeman (Student, Florida State University), Emily Morris (NSF-REU Student, 2011), Andrew Fultz (NSF-REU student, 2012), Christopher Johnson (2012-14), Emily Thornton (2012-14), Bryan Knowles (graduated in 2014; and 2016), Victoria Hampton (Gatton Academy Staff), Jacob Wilkins (2013-15; BGMU), Dakota Smith (2014), Logan Mitchell (currently a Graduate student at OU), Tori Schow, Nathan Crowdus, Grant Larkin, Greg Docekal (private sector), CJ Padgett (NWS), Pascal Ntaganda (2018-19), and Gannon Rush (graduated in 2020; currently a graduate student at UNL).

### **HONORS THESIS SUPERVISED:**

**Title:** Aerosol size distribution measurements during the 2014 NASA SARP Campaign in the Central Valley and Sierra Nevada Mountains in California.

**Completed By:** Victoria Hampton. Thesis Project Director: Dr. Rezaul Mahmood. April, 2015.

**Title:** Constructing a Radar data-based Summer Season Flash Flood Rainfall Climatology of Eastern Kentucky and West Virginia.

Currently employed by Western Kentucky University.

**Completed by:** Jane M. Wix. Thesis Project Director: Dr. Rezaul Mahmood. April, 2010.

Currently employed by the National Weather Service (NWS).

**Title:** Sensitivity of planetary boundary layer to varying soil moisture: A comparison of the MM5 and the RAMS simulations.

**Completed by:** Astrid Gonzalez. Thesis Project Director: Dr. Rezaul Mahmood. May, 2010.

Completed Ph. D. from the Pennsylvania State University and currently employed by the US Air Force as a researcher.

### **HONORS THESIS COMMITTEE:**

Ian Blaylock (Committee member, 2012)  
Emily Morris (2013; Appalachian State University)

### **PAST PROFESSIONAL EXPERIENCE (TEACHING):**

\* Instructor, Physical Geography, Department of Geography, The University of Oklahoma, Spring and Summer, 1996.

\* Lecturer, Computer Science Minor Program, SUNYA, Spring, 1993. Assigned to Teach Introduction to Mainframe Computing and Programming with Mainframe SPSS.

- \* Teaching Assistant, Computer Science Minor Program, SUNYA, Fall, 1991 to Fall, 1992.
- \* Teaching Assistant for the Course 'Geography of New York State' at the Department of Geography and Planning, SUNYA, in spring, 1991.
- \* Lecturer, Dept. of Geography, Dhaka City College, Dhaka, Bangladesh, August, 1989 - March, 1990.

### **PAST PROFESSIONAL EXPERIENCE (RESEARCH):**

- \* Post-doctoral research associate, High Plains Regional Climate Center, School of Natural Resource Sciences, University of Nebraska-Lincoln. 1999 – 2001.
- \* Research assistant, Science and Public Policy Program, Summer, 1997 to Spring, 1999. Title of the project: "Climate prediction, information, and policy response: a retrospective assessment of drought management in Oklahoma."
- \* Student Intern, Space Imaging/EOSAT, Summer, 1996 to Spring , 1997.
- \* Research Assistant, Department of Geography, The University of Oklahoma, Fall, 1994 to Spring, 1996. Title of the project: "Abnormal precipitation and floods and droughts in the Southern Great Plains."
- \* Member, University at Albany Graduate Student Organization's research grant review committee, 1992.
- \* Geographer-Researcher and SPANS Analyst, Agricultural Sector Team, Canadian International Development Agency, Dhaka, Bangladesh, April - August, 1990.
- \* Research Assistant, Center for Urban Studies, University of Dhaka, Bangladesh, April-July, 1989.
- \* Assisted faculty members as a research assistant in 12 research projects (1983-1988).

### **PROFESSIONAL ACTIVITIES (SERVICE):**

- Co-organizer of a session, titled, "**Advances in Understanding Land-Atmosphere Interactions**" at the annual meeting of the American Geophysical Union, 2013.
- Invited Chair of a Panel Discussion Session, titled, "**Urban Climate: Global Impact and Mitigation Techniques**", at the 106<sup>th</sup> annual meeting of the AAG, 2010.
- Co-organizer, two special sessions in hydroclimatology, at the 106<sup>th</sup> annual meeting of the AAG, 2010.

Chair, special session in hydroclimatology at the 106<sup>th</sup> annual meeting of the AAG, 2010.

Lead organizer (with Stuart Foster, Bill Caldwell, Steve Peek, Scott Dobler, Ara Nazem, and Michael Grogan) of **Kentucky Mesonet Workshop**. October 7-8, 2008, Bowling Green, Kentucky.

Lead organizer (with Roger Pielke Sr. and Kenneth G. Hubbard) of a **NSF funded workshop**, titled, **Detecting the Atmospheric Response to the Changing Face of the Earth: A Focus on Human-Caused Regional Climate Forcings, Land-Cover/Land-Use Change, and Data Monitoring**, August 27-29, 2007 Boulder, CO.

Organized first meeting of KY-Mesonet consortium. (Geography Symposium: “Building the Kentucky Mesonet”). **92<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Morehead, KY 9-11 November, 2006.

Organizer, two special sessions in hydroclimatology and land use/land cover change, at the 102<sup>nd</sup> annual meeting of the AAG, 2006.

Organizer, three special sessions in hydroclimatology, at the 101<sup>st</sup> annual meeting of the AAG, 2005.

Chair, one special session in hydroclimatology, at the 101<sup>st</sup> annual meeting of the AAG, 2005.

Organizer, two special sessions in hydroclimatology, at the 100<sup>th</sup> annual meeting of the AAG, 2004.

Chair, one special session in hydroclimatology, at the 100<sup>th</sup> annual meeting of the AAG, 2004.

Organizer, special session in hydroclimatology, at the 99<sup>th</sup> annual meeting of the AAG, 2003.

Chair, one special session in hydroclimatology, at the 99<sup>th</sup> annual meeting of the AAG, 2003.

Organizer, two special sessions in hydroclimatology at the 97<sup>th</sup> annual meeting of the American Association of Geographers, 2001.

Chair, one special session on hydroclimatology at the 97<sup>th</sup> annual meeting of the Association of American Geographers, 2001.

**Young Scholar Director**, 1997-1999, Climate Specialty Group (CSG), The American Association of Geographers.

Organizer, two special sessions in hydroclimatology at the 94<sup>th</sup> annual meeting of the American Association of Geographers, 1998.

Chair, one special session in hydroclimatology at the 94<sup>th</sup> annual meeting of the American Association of Geographers, 1998.

Organizer, two special sessions in hydroclimatology at the 93<sup>rd</sup> annual meeting of the American

Association of Geographers, 1997.

Organizer, three special sessions in hydroclimatology at the 92<sup>nd</sup> annual meeting of the American Association of Geographers, 1996.

Chair, Special Session on Precipitation Climatology: Temporal Aspects, at the 92<sup>nd</sup> annual meeting of the American Association of Geographers, 1996.

## **PROFESSIONAL PRESENTATIONS:**

\*Student

\*\*Post-doc

A talk, titled, “Climate and Agriculture” was presented at the Nebraska Investment Funding Authority, Lincoln, NE, April 17-19, 2023.

Paper, titled, “Lessons Learned from the GRAINEX Regional Irrigation Field Campaign,” was presented at the Irrigation in the Earth System [workshop, Aspen Global Change Institute, Aspen, CO, June 04 - 9, 2023.](#)

A talk, titled, “High Plains Regional Climate Center and Its Activities.” was presented at Weather Camp, University of Nebraska-Lincoln, Lincoln, NE June 11-16, 2023.

A talk, titled, “An update from the HPRCC” was presented at the Annual Meeting of the American Association of State Climatologists, Nashville, TN, June 20-23, 2023.

Paper, titled, “Influence of Irrigation on Horizontal Convective Rolls during GRAINEX,” was presented at the **103rd Annual Meeting of the American Meteorological Society**, Denver, CO, January, 08-12, 2023 (Authors: Chris E. Phillips, U. Nair and R. Mahmood)

Paper, titled, “Assessing Land-Atmosphere Interactions over Irrigated and Non-Irrigated Cropland using Selected Coupling Metrics: Results from GRAINEX in Nebraska, USA,” was presented at the **103rd Annual Meeting of the American Meteorological Society**, Denver, CO, January, 08-12, 2023 (Daniel Lawrence Whitesel, R. Mahmood, J. K. Roundy, E. Rappin, P. X. Flanagan, J. A. Santanello Jr., U. Nair, R. A. Pielke Sr., and C. E. Phillips)

Paper, titled, “Detection and Attribution of LULC Impacts on Atmospheric Processes,” was presented at the **103rd Annual Meeting of the American Meteorological Society**, Denver, CO, January, 08-12, 2023 (Udaysankar S. Nair, R. Mahmood, R. A. Pielke Sr., and C. Mitra)

Paper, titled, “Physical Mechanisms Driving Central Great Plains Extreme Precipitation Increases during Winter,” was presented at the **103rd Annual Meeting of the American Meteorological Society**, Denver, CO, January, 08-12, 2023 (Paul X. Flanagan and R. Mahmood)

Paper, titled, “Spatiotemporal Analysis of Extreme Precipitation in the Southern Great Plains Hydroclimate Region,” was presented at the **103rd Annual Meeting of the American Meteorological Society**, Denver, CO, January, 08-12, 2023 (Paul X. Flanagan, and R. Mahmood)

Paper, titled, “The High Plains Regional Climate Center (HPRCC): An Update,” was presented at the **Midwest & Missouri River Basin Drought Early Warning Systems (DEWS) Partners Meeting**, Omaha, NE, October, 13-14, 2022.

Paper, titled, “Use Land Cover Change and Irrigation Impacts on the Atmosphere: Results from the Great Plains Irrigation Experiment (GRAINEX),” **Department of Geography and Geospatial Sciences, South Dakota State University**, Brookings, SD, September 28, 2022. (Invited talk)

Paper, titled, “Effects of Irrigation on Diurnal Mesoscale Circulations: Results from GRAINEX,” was presented at the **102nd Annual Meeting of the American Meteorological Society**, Houston, TX, January, 23-27, 2022 (Authors: Chris Phillips, U. S. Nair, R. Mahmood, E. Rappin, and R. A. Pielke Sr.)

Paper, titled, “A Large Eddy Simulation Examination of the Diurnal Planetary Boundary Layer Evolution over a Land-Use Gradient during the GRAINEX Experiment,” was presented at the **102nd Annual Meeting of the American Meteorological Society**, Houston, TX, January, 23-27, 2022 (Authors: E. Rappin, R. Mahmood, U. S. Nair, and R. A. Pielke Sr.)

Paper, titled, “From User Needs to Operations: Improving the NCEI and RCC Product Suite,” was presented at the **102nd Annual Meeting of the American Meteorological Society**, Houston, TX, January, 23-27, 2022 (Authors: Michael J. Brewer, M. A. Palecki, A. DeGaetano, R. Mahmood, K. Eggleston, C. J. Stiles, N. Umphlett, W. Pettee, and B. Sorensen)

Paper, titled, “The Great Plains Irrigation Experiment (GRAINEX): Selected Results,” was presented at the **GLASS/GHP Irrigation Cross-Cut kick off meeting**, November 4-5, 2021. (Invited talk)

Paper, titled, “The Great Plains Irrigation Experiment (GRAINEX): Selected Results,” was presented at the **Department of Atmospheric Science, University of Alabama in Huntsville, AL**, September 8, 2021. (Invited talk)

Paper, titled, “Observational and Modeling Analysis of Land-Atmosphere Interactions over Adjacent Irrigated and Rainfed Cropland During the GRAINEX Field Campaign,” was presented at the **European Geophysical Union General Assembly**, Virtual, April 29-30, 2021. (Authors: Eric Rappin, Rezaul Mahmood, Udaysankar Nair, and Roger A. Pielke Sr.)

Paper, titled, “Extreme Precipitation Climatology of the Missouri River Basin from 1950 to 2019,” was presented at the **101st Annual Meeting of the American Meteorological Society**, Virtual, January, 10-15, 2021. (Authors: Paul Flanagan and R. Mahmood).

Paper, titled, “Summertime Atmospheric Impacts of Near-Future Land-Use Land Cover Change in the North-Central United States,” was presented at the **101st Annual Meeting of the American Meteorological Society**, Virtual, January, 10-15, 2021. (Authors: Paul Flanagan, R. Mahmood, T. Sohl, M. Svoboda, B. Wardlow, M. Hayes, and E. Rappin).

Paper, titled, “Impact of Anthropogenic Climate Change on Future U.S. Great Plains Wet and Dry Years,” was presented at the **101st Annual Meeting of the American Meteorological Society**, Virtual, January, 10-15, 2021. (Paul Flanagan, J. B. Basara, E. R. Martin, R. Mahmood, and J. Furtado)

Paper, titled, “The Great Plains Irrigation Experiment (GRAINEX): Land Cover Change and Assessing Irrigation Impacts on the Planetary Boundary Layer Atmosphere,” was presented at the **Earth Observation Laboratory/National Center for Atmospheric Research, Boulder, CO**, May 12, 2020. (Invited talk)

Paper, titled, “Land Use Land Cover Change and Irrigation Impacts on the Planetary Boundary Layer Atmosphere,” was presented at the **International Conference on Earth and Environmental Sciences & Technology for Sustainable Development**, Dhaka, Bangladesh, January 25-30, 2020. (Keynote speech)

Paper, titled, “Meso-scale Weather and Climate Observations in the United States” was presented at the **International Conference on Earth and Environmental Sciences & Technology for Sustainable Development**, Dhaka, Bangladesh, January 25-30, 2020. (Invited talk)

Paper, titled, “A Hydrometeorological Assessment of the Historic 2019 Flood of Nebraska and Iowa,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: P. X. Flanagan, R. Mahmood, N. Umphlett, E. Hacker, C. Ray, W. Sorensen, Crystal J. Stiles, David Pearson, Paul Fajman).

Paper, titled, “The American Association of State Climatologists' Recommendations and Best Practices for Mesonets,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: C. A. Fiebrich, J. R. Atkins, K. R. Brinson, N. L. Edwards, S. A. Foster, R. Mahmood, Christopher A. Redmond, Megan Marie Schargorodski, Jeffrey A. Andresen, Xiaomao Lin)

Paper, titled, “Primary Atmospheric Drivers of Dry and Wet Periods over the United States Great Plains within CMIP5 Models,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: P. X. Flanagan, J. B. Basara, E. R. Martin, R. Mahmood, J. C. Furtado)

Paper, titled, “Observational and Modeling Analysis of Land-Atmosphere Coupling over Adjacent Irrigated and Rainfed Cropland During the GRAINEX Field Campaign,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: E. Rappin, R. Mahmood, U. S. Nair, R. A. Pielke, W. O. J. Brown, J. Wurman, Karen Kosiba, Aaron Kaulfus, Chris Phillips, Joseph A. Santanello, E. J.



Kim, Patricia Lawston)

Poster, titled, “The Impacts of Irrigated and Rainfed Agriculture on Near Surface Atmosphere: Preliminary Results from GRAINEX,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: E. Lachenmeier, R. Mahmood, T. Franz, Michael Hayes, E. Rappin, U. S. Nair, R. A. Pielke Sr., Aaron Kaulfus, Chris Phillips, William OJ Brown, Steven P Oncley)

Poster, titled, “Impacts of Future Land-Use Land-Cover on Boundary Layer Development in the North-Central United States,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: P. X. Flanagan, R. Mahmood, T. Sohl, M. D. Svoboda, B. Wardlow, M. J. Hayes)

Poster, titled, “Modeling Irrigation Impacts on Atmospheric Conditions during the 2012 Historic Drought,” was presented at the **100th Annual Meeting of the American Meteorological Society**, Boston, MA, January, 11-16, 2020 (Authors: Kierstin Rene Blomberg, P. X. Flanagan, R. Mahmood, C. M. Rowe, and M. J. Hayes)

Paper, titled, “The Great Plains Irrigation Experiment—GRAINEX,” was presented at the **99th Annual Meeting of the American Meteorological Society**, Phoenix, January, 6-10, 2019 (Authors: Eric Rappin, Rezaul Mahmood, U. S. Nair, R. A. Pielke Sr., C. Phillips, A. Kaulfus, W. O. Brown, S. P. Oncley, J. Wurman, K. Kosiba, J. A. Santanello, E. J. Kim, and R. Bindlish)

Poster, titled, “EMESH: A Low-Cost, High-Density Environmental Monitoring Network for Research and Applied Use,” was presented at the **99th Annual Meeting of the American Meteorological Society**, Phoenix, January, 6-10, 2019 (Authors: Chris Phillips, U. Nair, A. Kaulfus, Rezaul Mahmood, E. Rappin, R. A. Pielke Sr., and J. A. Santanello Jr.)

Paper, titled, “The Great Plains Irrigation Experiment (GRAINEX) – Investigating the Impacts of Irrigation on Regional Weather,” was presented at the **Annual Meeting of the American Geophysical Union, Washington DC**, December 10-14, 2018 (Authors: Patricia Lawston, U. Nair, R. Mahmood, E. Rappin, C. Phillips, A. Kaulfus, R. A. Pielke Sr., J. Santanello, E. Kim and R. Bindlish)

Poster, titled, “The role of soil moisture over irrigated land on precipitation in the northern Great Plains at convective scales” was presented at the **98th Annual Meeting of the American Meteorological Society**, Austin, TX, January 7-11, 2018 (Authors: Eric Rappin, R. Mahmood, U. Nair, and R. Pielke Sr.).

Poster, titled, “A comparison of air temperatures at irrigated and nonirrigated sites in Andalusia, Spain.” was presented at the **98th Annual Meeting of the American Meteorological Society**, Austin, TX, January 7-11, 2018 (Authors: Logan Mitchell\*, R. Mahmood, P. Ordóñez, A. I. Quintanar, and C. Ochoa-Moya).

Poster, titled, “Influence of “small” elevation changes on mesoscale temperature variations” was presented at the **98th Annual Meeting of the American Meteorological Society**, Austin, TX,

January 7-11, 2018 (Authors: Nathan Crowds and R. Mahmood)

Poster, titled, “Characterizing temporal changes of agricultural particulate matter number concentrations,” was presented at the **Annual Meeting of the American Geophysical Union**, New Orleans, LA, December 10-14, 2017 (Authors: Pierce Larkin, Gregory Docekal, R. Mahmood and Philip J. Silva)

Poster, titled, “Utilization of weather and climate monitoring and forecasting data for public health climate change capacity building in Kentucky,” was presented at the **69<sup>th</sup> Annual Conference of Kentucky Public Health Association**, Owensboro, KY, April 11-13, 2017 (Authors: Janie Cambron, Cynthia Lamberth, R. Mahmood, Andrew Quilligan, Nathan Crowds\*, Eric Rappin, and Benjamin Scott).

Paper, titled, “Synoptic Conditions, land cover and equivalent temperature variations in Kentucky” was presented at the **102<sup>nd</sup> Annual Meeting of the American Association of Geographers**, Boston, MA, April 5-9, 2017 (Authors: Dolly Na-Yemeh\*, R. Mahmood, Gregory Goodrich, Kevin Cary, and Joshua Durkee).

Paper, titled, “Geoprofiles and data about data” was presented at the **47<sup>th</sup> Student Research Conference**, WKU, Bowling Green, KY, March 25, 2017 (Authors: Dolly Na-Yemeh\*, R. Mahmood, Gregory Goodrich, Kevin Cary, and Joshua Durkee).

Poster, titled, “An analysis of Urban Heat Islands in Kentucky” was presented at the **97<sup>th</sup> Annual Meeting of the American Meteorological Society**, Seattle, WA, January 22-26, 2017 (Authors: Logan Mitchell\* and R. Mahmood).

Poster, titled, “At-Risk populations due to ammonia pollution from concentrated animal feeding operations in western Kentucky” was presented at the **102<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Louisville, KY, November 4-5, 2016 (Authors: Austin Wardall\*, R. Mahmood and Jun Yan).

Paper, titled, “Synoptic conditions and equivalent temperature variations in Kentucky” was presented at the **102<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Louisville, KY, November 4-5, 2016 (Authors: Dolly Na-Yemeh\* and R. Mahmood).

Paper, titled, “Land Cover Change, Irrigation, and their impacts on climate” was presented at the **University of Nebraska-Lincoln**, September 28, 2016. (invited)

Poster, titled, “Elevation and Mesoscale Temperature Variations” was presented at the **National Conference of Undergraduate Research (NCUR)**, UNC - Asheville, NC campus, April 7-9, 2016 (Authors: Nathan Crowds\* and R. Mahmood).

Paper, titled, “Meso-scale equivalent temperature in Kentucky” was presented at the **96<sup>th</sup> Annual Meeting of the American Meteorological Society**, New Orleans, LA, January 10-14, 2016. (Authors: Keri Younger\*, R. Mahmood, Gregory Goodrich, Roger Pielke Sr., Joshua Durkee, and Xingang Fan)

Paper, titled, "Agriculture-driven Land Use Land Cover Change and Climate" was presented at the **Annual Meeting of the American Geophysical Union**, December 14-18, 2015. (invited)

Paper, titled, "Climatic impacts of land cover change" was presented at the **University of Oklahoma**, September 18, 2015. (invited)

Paper, titled, "Climatic impacts of land cover change" was presented at the **National Autonomous University of Mexico (UNAM)**, August 28, 2015. (invited)

Paper, titled, "Kentucky Mesonet: An Infrastructure for Weather and Climate Observation" was presented at the **Kentucky Department of Public Health**, Frankfort, Kentucky, June 29, 2015. (invited)

Paper, titled, "An assessment of 26 April 2011 Pre-Frontal Squall Line in Kentucky" was presented at the **94<sup>th</sup> Annual Meeting of the American Meteorological Society**, Atlanta, GA, February 2-6, 2014. (Authors: Emily Thornton\*, R. Mahmood and Joshua Durkee)

Poster, titled, "The impacts of land cover change on local precipitation over the Land Between the Lakes region", was presented at the **94<sup>th</sup> Annual Meeting of the American Meteorological Society**, Atlanta, GA, February 2-6, 2014. (Authors: Jesse N. Winchester\*, R. Mahmood, W. Rodgers, E. Rappin, J. Durkee, F. Hossain, and A. Degu)

Poster, titled, "Station exposure and resulted bias in temperature observations: A comparison between the Kentucky Mesonet and ASOS Data" was presented at the **94<sup>th</sup> Annual Meeting of the American Meteorological Society**, Atlanta, GA, February 2-6, 2014. (Authors: J. Kyle Thompson\*, R. Mahmood and S. A. Foster)

Paper, titled, "Influence of karst landscape on weather systems: A WRF model study on responses for different land and soil types" was presented at the **94<sup>th</sup> Annual Meeting of the American Meteorological Society**, Atlanta, GA, February 2-6, 2014. (Authors: Chris M. Johnson\*, X. Fan, R. Mahmood, C. Groves, J. Polk, and J. Yan)

Paper, titled, "Soil moisture modifications associated with land cover changes and their impacts on weather and climate" was presented at the **Annual Meeting of the American Geophysical Union**, San Francisco, CA, December 9-13, 2013.

Paper, titled, "Impacts of land use and land cover change on climate" was presented at the **Department of Earth and Environmental Science, Vanderbilt University**, Nashville, TN, October 18, 2013. (**Invited**)

Paper, titled, "Climatic impacts of land cover change" was presented at the **Department of Geography, Texas A&M University**, College Station, TX, September 27, 2013. (**Invited**)

Paper, titled, "Meso-scale weather and climate observation in Kentucky" was presented at the **Department of Atmospheric Science, The University of Alabama in Huntsville**, Huntsville,

AL, September 4, 2013. (**Invited**)

Paper, titled, “The Impacts of Urbanization on Daily Precipitation Trends in the Kentucky-Ohio River Valley” was presented at the **93<sup>nd</sup> Annual Meeting of the American Meteorological Society**, Austin, TX, January 5-10, 2013. (Authors: Andrew Fultz\*, R. Mahmood and Joshua Durkee)

Paper, titled, “Modeling Urban Impacts on Regional Weather of Central U.S.,” was presented at the **93<sup>nd</sup> Annual Meeting of the American Meteorological Society**, Austin, TX, January 5-10, 2013. (Authors: Laura J. Schisler\*, R. Mahmood, J. Young, and X. Fan)

Paper, titled, “Land Cover Change and Its Impacts on Climate” was presented at the **Institute of Atmospheric Physics, Chinese Academy of Sciences**, May 28, 2012, Beijing, China. (**Invited**)

Paper, titled, “Kentucky Mesonet: An Introduction” was presented at the **Institute of Atmospheric Physics, Chinese Academy of Sciences**, May 28, 2012, Beijing, China. (**Invited**)

Paper, titled, “Kentucky Mesonet: An Overview and Update”, was presented at the **92<sup>nd</sup> Annual Meeting of the American Meteorological Society**, New Orleans, LA, January 22-26, 2012.

Paper, titled, “An analysis of WRF Physics Parameterization Scheme Combinations for the January 29 and 30th 2008 Ohio Valley Squall Line Event” , was presented at the **92<sup>nd</sup> Annual Meeting of the American Meteorological Society**, New Orleans, LA, January 22-26, 2012. (Authors: Mitchell Gaines\*, R. Mahmood and Ronnie Leeper)

Paper, titled, “Kentucky Mesonet: Weather and Climate Data Resources Unique to Kentucky”, was presented at the **Climate Change and Small Grains Production Workshop**, University of Kentucky, Lexington, Feb. 20-21, 2012. (**Invited**)

Poster, titled, “An Analysis of WRF Physics Parameterization Schemes for the January 29 and 30th 2008 Ohio Valley Squall line Event”, was presented at the **107<sup>th</sup> Annual Meeting of the American Association of Geographers**, Seattle, WA, April 12-16, 2011. (Authors: Mitchell Gaines\*, R. Mahmood and Ronnie Leeper)

Poster, titled, “Synoptic Analysis of Historic May 2010 Flood”, was presented at the **107<sup>th</sup> Annual Meeting of the American Association of Geographers**, Seattle, WA, April 12-16, 2011. (Authors: Lee Campbell\*, Kyle Berry\*, Dustin Jordan\*, Joshua Durkee, Greg Goodrich, R. Mahmood and Stuart Foster)

Poster, titled, “Impact Analysis of the May 2010 Mid-South Flood”, was presented at the **2011 National Severe Weather Workshop**, Norman, OK, March 3-5, 2011. (Authors: Kyle Berry\*, Lee Campbell\*, Dustin Jordan\*, Joshua Durkee, Gregory Goodrich, Rezaul Mahmood, and Stuart Foster)

Poster, titled, “**Synoptic Analysis of 2010 Mid-South Flood**”, was presented at the **2011 National Severe Weather Workshop**, Norman, OK, March 3-5, 2011. (Authors: Lee

Campbell\*, Kyle Berry\*, Dustin Jordan\*, Joshua Durkee, Gregory Goodrich, Rezaul Mahmood, and Stuart Foster)

Poster, titled, “Impacts of Land-use and Land Cover Change on Eastern Kentucky Flash Floods”, was presented at the **65<sup>th</sup> Annual SEDAAG Meeting**, Birmingham, Alabama, November 20-23, 2010. (Authors: William Rodgers\* and R. Mahmood)

Poster, titled, “A Synoptic Analysis of the Historic 2010 Mid-South Flood”, was presented at the **65<sup>th</sup> Annual SEDAAG Meeting**, Birmingham, Alabama, November 20-23, 2010. (Authors: Kyle Berry\*, Lee Campbell\*, Dustin Jordan\*, Joshua Durkee, Gregory Goodrich, R. Mahmood, and Stuart Foster)

Poster, titled, “Urbanization and its Impacts on Precipitation Around Three Urban Centers in the Kentucky-Ohio River Valley”, was presented at the **65<sup>th</sup> Annual SEDAAG Meeting**, Birmingham, Alabama, November 20-23, 2010. (Authors: Ryan Torres\*, R. Mahmood and Joshua Durkee)

Poster, titled, “Economic Impacts of Drought on Kentucky’s Agriculture”, was presented at the **65<sup>th</sup> Annual SEDAAG Meeting**, Birmingham, Alabama, November 20-23, 2010. (Authors: Kortney Craft\*, R. Mahmood and Stephen King)

Poster, titled, “An Analysis of WRF Physics Parameters for the January 29<sup>th</sup> and 30<sup>th</sup> 2008 Ohio Valley Squall Line Event”, was presented at the **65<sup>th</sup> Annual SEDAAG Meeting**, Birmingham, Alabama, November 20-23, 2010. (Authors: Mitchell Gaines\*; R. Mahmood and Ronnie Leeper)

Paper, titled, “An Analysis of WRF Physics Parameters for the January 29<sup>th</sup> and 30<sup>th</sup> 2008 Ohio Valley Squall Line Event”, was presented at the **96<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Bowling Green, KY 12-13 November, 2010. (Authors: Mitchell Gaines\*, R. Mahmood and Ronnie Leeper)

Paper, titled, “Historic 2010 Mid-South Flood”, was presented at the **96<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Bowling Green, KY 12-13 November, 2010. (Authors: Lee Campbell\*, Kyle Berry\*, Dustin Jordan\*, Josh Durkee, Greg Goodrich, R. Mahmood and Stuart Foster)

Paper, titled, “Economic Impacts of Drought on Kentucky's Agriculture” was presented at the **96<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Bowling Green, KY 12-13 November, 2010. (Authors: Kortney Craft\*, R. Mahmood and Stephen King)

Poster, titled, “A Hazards Analysis of the Historic 1-2 May 2010 Mid-South Flood” was presented at the **96<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Bowling Green, KY 12-13 November, 2010. (Authors: Kyle Berry\*, Lee Campbell\*, Dustin Jordan\*, Josh Durkee, Greg Goodrich, R. Mahmood and Stuart Foster)

Paper, titled, “Sensitivity of planetary boundary layer atmosphere to changes of land use/land cover, vegetation fraction, and soil moisture in Western Kentucky, USA”, was presented at the **106th Annual Meeting of the American Association of Geographers**, Washington, DC, April 14-18, 2010. (Authors: Ronnie Leeper\*\*, R. Mahmood, and Arturo Quintanar\*\*)

Poster, titled, “Impacts of land-use and land cover change on eastern Kentucky flash floods”, was presented at the **106th Annual Meeting of the American Association of Geographers**, Washington, DC, April 14-18, 2010. (co-authored with William Rodgers\*, R. Mahmood and Ronnie Leeper\*\*)

Poster, titled, “Sensitivity of Planetary Boundary Layer to Varying Volumetric Soil Moisture”, was presented at the **106th Annual Meeting of the American Association of Geographers**, Washington, DC, April 14-18, 2010. (Authors: Astrid Suarez-Gonzalez\*, R. Mahmood, A. I. Quintanar\*\*, A. Beltran-Przekurat, and R. A. Pielke Sr.)

Poster, titled, “Ensemble forecast spread induced by soil moisture changes”, was presented at the **90th Annual Meeting of the American Meteorological Society/22nd Conference on Climate Variability and Change**, Atlanta, GA, 17-21 January, 2010 (Authors: A. I. Quintanar\*\* and R. Mahmood).

Paper, titled, “The influence of karst hydrology on local planetary boundary layer”, was presented at the **90th Annual Meeting of the American Meteorological Society/24th Conference on Hydrology**, Atlanta, GA, 17-21 January, 2010 (Authors: R. D. Leeper\*\* and A. I. Quintanar\*\*).

Paper, titled, “The Kentucky Mesonet: Perspectives on data access, distribution, and use for a mesoscale surface network”, was presented at the **90th Annual Meeting of the American Meteorological Society/26th Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology**, Atlanta, GA, 17-21 January, 2010 (D. M. Grogan\*\*, S. Foster and R. Mahmood).

Paper, titled, “Quality Assurance Methods for the Kentucky Mesonet”, was presented at the **90th Annual Meeting of the American Meteorological Society/15th Symposium on Meteorological Observation and Instrumentation**, Atlanta, GA, 17-21 January, 2010 (Authors: Megan M. Ferris\*\*, S. Struebig, M. Grogan\*\*, S. Foster and R. Mahmood).

Poster, titled, “Equipment and instrumentation used at a Kentucky Mesonet environmental monitoring station ”, was presented at the **90th Annual Meeting of the American Meteorological Society/15th Symposium on Meteorological Observation and Instrumentation**, Atlanta, GA, 17-21 January, 2010 (Authors: Stephen Struebig\*\*, D. Grabowski\*\*, S. A. Foster and R. Mahmood).

Poster, titled, “Site identification and selection for the Kentucky Mesonet”, was presented at the **90th Annual Meeting of the American Meteorological Society/15th Symposium on Meteorological Observation and Instrumentation**, Atlanta, GA, 17-21 January, 2010 (Authors: James Kyle Thompson\*, R. Mahmood and S. A. Foster).

Poster, titled, “Impacts of temporal and spatial resolutions of model initialization data”, was presented at the **90<sup>th</sup> Annual Meeting of the American Meteorological Society/14<sup>th</sup> Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)**, Atlanta, GA, 17-21 January, 2010 (Authors: T.J. Malone\*, R. Mahmood, R. D. Leeper\*\*, and A. I. Quintanar\*\*).

Poster, titled, “A sensitivity study of energy fluxes and evaporation from a waste lagoon to different stability model formulations”, was presented at the **90<sup>th</sup> Annual Meeting of the American Meteorological Society/12<sup>th</sup> Conference on Atmospheric Chemistry**, Atlanta, GA, 17-21 January, 2010 (Authors: William N. Rodgers\*, A. I. Quintanar\*\*, R. Mahmood, J. Loughrin, and N. Lovanh).

Poster, titled, “Sensitivity of planetary boundary layer to varying volumetric soil moisture”, was presented at the **90<sup>th</sup> Annual Meeting of the American Meteorological Society/22<sup>nd</sup> Conference on Climate Variability and Climate Change**, Atlanta, GA, 17-21 January, 2010. (Authors: Astrid Suarez-Gonzalez\*, R. Mahmood, A. I. Quintanar\*\*, A. Beltran-Przekurat, and R. A. Pielke Sr.)

Poster, titled, “Flash Flood Climatology of the Appalachian Mountains: Focus on Eastern Kentucky and West Virginia Summer Rainfall Events”, was presented at the **90<sup>th</sup> Annual Meeting of the American Meteorological Society/18<sup>th</sup> Conference of Applied Climatology**, Atlanta, GA, 17-21 January, 2010. (Authors: Jane Wix\*, R. Mahmood and William Rodgers\*)

Paper, titled, “Seasonal outlook and emergency management”, was presented at the Kentucky Weather Conference, Bowling Green, KY, January 15-16, 2010.

Poster, titled, “Urbanization and its Impacts on Precipitation Around Three Urban Centers in the Kentucky-Ohio River Valley”, was presented at the **64<sup>th</sup> SEDAAG Meeting**, Knoxville, Tennessee, November 21-24, 2009 (Authors: Ryan Torres\*, R. Mahmood and Joshua Durkee).

Poster, titled, “Sensitivity of MM5 and RAMS Meso-scale Models to Soil Moisture Variations”, was presented at the **64<sup>th</sup> Annual SEDAAG Meeting**, Knoxville, Tennessee, November 21-24, 2009. (Authors: Astrid Suarez-Gonzalez\*, R. Mahmood, A. I. Quintanar\*\*, A. Beltran-Przekurat, and R. A. Pielke Sr.)

Poster, titled, “Site identification and selection for the Kentucky Mesonet”, was presented at the **64<sup>th</sup> Annual SEDAAG Meeting**, Knoxville, Tennessee, November 21-24, 2009. (Authors: James Kyle Thompson\*, R. Mahmood and S. Foster)

Poster, titled, “Comparison of Eastern Kentucky and West Virginia Summer Flash Flood Rainfall Events”, was presented at the **64<sup>th</sup> Annual SEDAAG Meeting**, Knoxville, Tennessee, November 21-24, 2009. (Authors: Jane Wix\*, R. Mahmood and William Rodgers\*)

Paper, titled, “Kentucky Mesonet: Background and an update”, was presented at the Annual IFLOWS conference, Prestonbourg, KY, 9-10 November, 2009. (Authors: Stuart Foster, Stephen Struebig\*\*, R. Mahmood)

Paper, titled, “An update from Kentucky” was presented at the **Annual meeting of the American Association of State Climatologists** at Grand Rapids, MI, 7-10 July, 2009.

Paper, titled, “A comparative sensitivity evaluation of the WRF and MM5 models under varied soil moisture condition”, was presented at the **105<sup>th</sup> Annual Meeting of the American Association of Geographers**, Las Vegas, NV, 22-27 April, 2009. (Authors: Ronnie Leeper\*\*, R. Mahmood, and Arturo Quintanar\*\*)

Poster, titled, “Summer Season Flash Flood Climatology for the Appalachian Mountain Region of Eastern Kentucky”, was presented at the Student Research Conference, Western Kentucky University, Bowling Green, KY, March 2009. (Authors: Jane Wix\*, R. Mahmood and Nicholas Rodgers\*)

Poster, titled, “Summer Season Flash Flood Climatology for the Appalachian Mountain Region of Eastern Kentucky”, was presented at the **105<sup>th</sup> Annual Meeting of the American Association of Geographers**, Las Vegas, NV, March 22-27, 2009. (Authors: Jane Wix\*, R. Mahmood and Nicholas Rodgers\*)

Poster, titled, “Soil Moisture Analysis for the 2007 Drought in the Southeastern Region of the United States”, was presented at the 39<sup>th</sup> annual WKU Student Research Conference, Bowling Green, KY, 21 February, 2009. (Authors: Astrid Gonzalez\* and R. Mahmood)

Poster, titled, “Soil Moisture Analysis for the 2007 Drought in the Southeastern Region of the United States”, was presented at the Kentucky-West Virginia LSAMP 2009 Student Research Symposium, Roanoke, WV, 24-25 April, 2009. (Authors: Astrid Gonzalez\* and R. Mahmood)

Presentation, titled, “Applications of Regional Atmospheric Modeling System (RAMS) to Assess Sensitivity of Planetary Boundary Layer to Varying Volumetric Soil Moisture”, was presented at the Kentucky-West Virginia LSAMP 2009 Student Research Symposium, Roanoke, WV, 24-25 April, 2009. (Authors: Astrid Gonzalez\* and R. Mahmood)

Presentation, titled, “Atmosphere and Emissions” was presented at the USDA PIs meeting at Auburn, AL, 22 January, 2009.

Paper, titled, “The Kentucky Mesonet: Background and future applications”, was presented at the **Workshop on Corn and Climate**, Iowa State University, Ames, IA, 9-10 September, 2008. (**Invited Presentation and Panelist**)

Paper, titled, “Data collection and quality assurance of the Kentucky Mesonet” was presented at the **17<sup>th</sup> Conference on Applied Climatology**, Whistler, BC, Canada, 11-15 August, 2008. (Authors: Megan Ferris\*\*, Stuart Foster, R. Mahmood, Dana Grabowski\*\*, Stephen Struebig\*\*, Zach Brown\*\*, Michael Grogan\*\*)



Paper, titled, "Sensitivity of planetary boundary layer variables to anomalous soil moisture conditions: The MM5-based assessment", was presented at the **104<sup>th</sup> Annual Meeting of the American Association of Geographers**, Boston, MA, 14-19 April, 2008. (Authors: Arturo Quintanar\*\*, R. Mahmood, John Loughrin and Nanh Lovanh)

Poster, titled, "Flash Flood Climatology of the Appalachian Region (1978-2005)", was presented at the **104<sup>th</sup> Annual Meeting of the American Association of Geographers**, Boston, MA, 14-19 April, 2008. (Authors: William Rodgers\* and R. Mahmood)

Paper, titled, "Simulating Near-Surface and Atmospheric Responses to changes in Land-Cover and Vegetation Fraction", was presented at the **104<sup>th</sup> Annual Meeting of the American Association of Geographers**, Boston, MA, 14-19 April, 2008. (Authors: Ronnie Leeper\*, R. Mahmood, and Arturo Quintanar\*\*)

Poster, titled, "Near-surface and atmospheric response to modeled land use and vegetation fraction changes", was presented at the **62<sup>nd</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Charleston, SC 18-20, November, 2007. (Authors: Ronnie Leeper\*, R. Mahmood and Arturo Quintanar\*\*)

Poster, titled, "Flash floods in the Appalachian region", was presented at the **62<sup>nd</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Charleston, SC 18-20, November, 2007. (Authors: William Rodgers\* and R. Mahmood)

Paper, titled, "Implementation of the communications and technology infrastructure to support the Kentucky Mesonet" was presented at the **93<sup>rd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Louisville, KY 8-10 November, 2007. (Authors: D. Michael Grogan\*\*, Zachary Brown\*\*, Stuart A. Foster and R. Mahmood)

Paper, titled, "Installation and maintenance of scientific instrumentation as part of the Kentucky Mesonet", was presented at the **93<sup>rd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Louisville, KY 8-10 November, 2007. (Authors: Stephen Struebig\*\*, Dana Grabowski\*\*, Stuart A. Foster and R. Mahmood)

Paper, titled, "Near-surface and atmospheric response to modeled land-Use and vegetation fraction changes", was presented at the **93<sup>rd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Louisville, KY 8-10 November, 2007. (Authors: Ronnie D. Leeper\*, R. Mahmood and Arturo I. Quintanar\*\*)

Paper, titled, "The MM5-based assessment of sensitivity of planetary boundary layer variables to anomalous soil moisture conditions", was presented at the **93<sup>rd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Louisville, KY 8-10 November, 2007.

Paper, titled, "Impact of Vegetation Roughness Parameters Changes In Boundary Layer Variables" was presented at the NSF funded Workshop on **Detecting the Atmospheric Response to the Changing Face of the Earth: A Focus on Human-Caused Regional Climate Forcings, Land-Cover/Land-Use Change, and Data Monitoring**, August 27-29, 2007

Boulder, CO. (Authors: Arturo Quintanar\*\*, R. Mahmood, John Loughrin, and Nanh C. Lovanh)

Paper, titled, “Numerical Modeling of Near-Surface and Atmospheric Response to Land-Use and Fractional Vegetation Coverage Change” was presented at the NSF funded Workshop on **Detecting the Atmospheric Response to the Changing Face of the Earth: A Focus on Human-Caused Regional Climate Forcings, Land-Cover/Land-Use Change, and Data Monitoring**, August 27-29, 2007 Boulder, CO. (Authors: Ronnie Leeper\*, R. Mahmood and Arturo Quintanar\*\*)

Illustrated Paper, titled, “Pacific Decadal Oscillation, Streamflow, and Precipitation in the Mammoth Cave/Upper Green River Watershed, KY”, was presented at the **103<sup>rd</sup> Annual Meeting of the American Association of Geographers**, San Francisco, CA, 17-21 April, 2007. (Authors: Christopher Westendorf\*, NSF-REU participant; and R. Mahmood)

Poster, titled, “Temporal Shifts in Seasonal High (Peaks) and Low (Dips) Diurnal Temperature Range”, was presented at the **103<sup>rd</sup> Annual Meeting of the American Association of Geographers**, San Francisco, CA, 17-21 April, 2007. (Authors: Nicholas Lawalin\* and R. Mahmood)

Poster, titled, “Increase in Near Surface Atmospheric Moisture Content Due to Land Use Changes”, was presented at the **103<sup>rd</sup> Annual Meeting of the American Association of Geographers**, San Francisco, CA, 17-21 April, 2007. (Authors: Ronnie Leeper\* and R. Mahmood)

Paper, titled, “Spatio-Temporal Variations of Observed Soil Moisture in Nebraska During the Warm Season”, was presented at the **103<sup>rd</sup> Annual Meeting of the American Association of Geographers**, San Francisco, CA, 17-21 April, 2007. (Authors: Ashley Littell\* and R. Mahmood)

Poster, titled, “Flash Floods in the Appalachian Region (1993-2005)”, was presented at the **103<sup>rd</sup> Annual Meeting of the American Association of Geographers**, San Francisco, CA, 17-21 April, 2007. (Authors: William Rodgers\* and R. Mahmood)

Paper, titled, “Kentucky Mesonet: Instrumentation and an update” was presented at the **87<sup>th</sup> Annual meeting of the American Meteorological Society/16<sup>th</sup> Conference on Applied Climatology**, San Antonio, TX 21-26, January, 2007.

Paper, titled, “Shifts in the U. S. seasonal daily temperature range (DTR) peaks and dips in the 20th century” was presented at the **87<sup>th</sup> Annual meeting of the American Meteorological Society/16<sup>th</sup> Conference on Applied Climatology**, San Antonio, TX 21-26, January, 2007.

Paper, titled, “The development of GeoProfiles for United States Historical Climatology Network stations in Kentucky” was presented at the **87<sup>th</sup> Annual meeting of the American Meteorological Society/16<sup>th</sup> Conference on Applied Climatology**, San Antonio, TX 21-26, January, 2007. (Authors: Stuart Foster and R. Mahmood)

Paper, titled, “Exploring spatial and temporal variability of DTR among USHCN stations in the Ohio River Valley” was presented at the **87<sup>th</sup> Annual meeting of the American Meteorological Society/16<sup>th</sup> Conference on Applied Climatology**, San Antonio, TX 21-26, January, 2007. (Authors: Stuart Foster and R. Mahmood)

Paper, titled, “Building the Foundation of the Kentucky Mesonet” was presented at the **92<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Morehead, KY 9-11 November, 2006. (Authors: Stuart Foster and R. Mahmood).

Poster, titled, “Increase in Near Surface Atmospheric Moisture Content Due to Land Use Changes” was presented at the **61<sup>st</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Morgantown, WV 19-21, November, 2006. (Authors: Ronnie Leeper\* and R. Mahmood)

Poster, titled, “Flash Floods in the Appalachian Region (1993 - 2005)” was presented at the **61<sup>st</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Morgantown, WV 19-21, November, 2006. (William Rodgers\* and R. Mahmood)

Poster, titled, “Diurnal Temperature Range Analysis” was presented at the **61<sup>st</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Morgantown, WV 19-21, November, 2006. (Authors: Nicholas Lawalin\* and R. Mahmood)

Paper, titled, “Spatio-Temporal Variations of Observed Soil Moisture in Nebraska During the Warm Season” was presented at the **92<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Morehead, KY 9-11 November, 2006. (Authors: Ashley Littell\* and R. Mahmood)

Poster, titled, “Flash Floods in the Appalachian Region (1993-2005)” was presented at the **92<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Morehead, KY 9-11 November, 2006. (Authors: William N. Rodgers\* and R. Mahmood)

Poster, titled, “Diurnal Temperature Range Analysis for the Eastern United States in the 20th Century” was presented at the **92<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Morehead, KY 9-11 November, 2006. (Authors: Nicholas Lawalin\* and R. Mahmood)

Poster, titled, “The Influence of Land Use Change on Near Surface Atmospheric Moisture Content” was presented at the **92<sup>nd</sup> Annual Meeting of the Kentucky Academy of Sciences**, Morehead, KY 9-11 November, 2006. (Authors: Ronnie Leeper\* and R. Mahmood)

Paper, titled, “Building the Kentucky Mesonet: A Commitment to the Commonwealth” was presented at the **University of Kentucky, Biosystems and Agricultural Engineering**. December 1, 2006. (Authors: R. Mahmood and Stuart Foster)

Paper titled, “The Kentucky Mesonet: Building Partnerships with Local Communities”, was presented at the **Green River Resource Conservation & Development Council / GRADD**

**Natural Resources Council.** Owensboro, KY, November 14, 2006. (invited; Stuart Foster and R. Mahmood)

Paper, titled, “Kentucky Mesonet: An overview of the current status and future goals” was presented at the **Annual Scientific Symposium of the Ohio River Basin Consortium for Research and Education**, Murray, KY 25-27 October, 2006. (Invited presentation)

Paper, titled, “Agricultural Cool Island” was presented at the **102<sup>nd</sup> Annual Meeting of the American Association of Geographers**, Chicago, IL, 7-11 April, 2006.

Paper, titled, “An assessment of key aspects of warm and cool season severe flash flooding in the southern Appalachians” was presented at the **102<sup>nd</sup> Annual Meeting of the American Association of Geographers**, Chicago, IL, 7-11 April, 2006. (Authors: William Baldwin\* and R. Mahmood)

Poster, Titled, “Relationship Between Mesometeorological Patterns and Ground Ozone Concentration Variability” was presented at the **Nov. 20-22, 2005 60<sup>th</sup> Annual meeting of Southeastern Division, The American Association of Geographers, West Palm Beach, FL** 20-22, November, 2005. (Authors: Dasen Kendrick\* and R. Mahmood)

Paper, titled, “Forecasting, radar and damage analysis of the 13 July 2004 derecho through central Kentucky” was presented at the **91<sup>st</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 10-12 November, 2005. (Authors: Ashley Littell\*, R. Mahmood and Stuart Foster)

Paper, titled, “Relationship between mesometeorological patterns and ground ozone concentration variability” was presented at the **91<sup>st</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 10-12 November, 2005. (Authors: Dasen Kendrick\*, R. Mahmood and Stuart Foster)

Paper, titled, “An assessment of key aspects of warm and cool season severe flash flooding in the Southern Appalachians” was presented at the **21<sup>st</sup> Meeting of the Weather Analysis and Forecasting**, Washington, DC, 1-5 August, 2005. (Authors: William Baldwin\* and R. Mahmood)

Paper, titled, “The evolution of a warm season severe eastern Kentucky flash flood” was presented at the **21<sup>st</sup> Meeting of the Weather Analysis and Forecasting**, Washington, DC, 1-5 August, 2005. (Authors: Christina Henry\* and R. Mahmood)

Paper, titled, “Impacts of irrigation on regional-scale temperature in the Great Plains” was presented at the **101<sup>st</sup> Annual Meeting of the American Association of Geographers**, Denver, CO, 5-9 April, 2005.

Paper, titled, “The life cycle of a warm season severe eastern Kentucky flash flood” was presented at the **101<sup>st</sup> Annual Meeting of the American Association of Geographers**, Denver,

CO, 5-9 April, 2005. (Authors: Christina Henry\* and R. Mahmood)

Paper, titled, “An assessment of May 2, 2002 flash flood of Buchanan County, Virginia” was presented at the **101<sup>st</sup> Annual Meeting of the American Association of Geographers**, Denver, CO, 5-9 April, 2005. (Authors: Jessica Phillips\* and R. Mahmood)

Poster, titled, “Large-scale climate variations and streamflow response in the Green River basin, KY” was presented at the **101<sup>st</sup> Annual Meeting of The American Association of Geographers**, Denver, CO, 5-9 April, 2005. (Authors: Leslie Lyons\* and R. Mahmood)

Paper, titled, “Instrument exposure bias in temperature records” was presented at the **90<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 4-6 November, 2004. (Authors: Stuart Foster and R. Mahmood)

Paper, titled, “The evolution of a severe eastern Kentucky flash” was presented at the **90<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 4-6 November, 2004. (Authors: Christina Henry\* and R. Mahmood)

Paper, titled, “An analysis of May 2, 2002 severe flash flooding of Buchanan county, Virginia” was presented at the **90<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 4-6 November, 2004. (Authors: Jessica Phillips\* and R. Mahmood)

Poster, titled, “Streamflow response in the Green River basin during large-scale climate variations” was presented at the **90<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 4-6 November, 2004. (Authors: Leslie Lyons\* and R. Mahmood)

Poster, titled, “Seasonal variations of significant weather events across south central Kentucky was presented at the **90<sup>th</sup> Annual Meeting of the Kentucky Academy of Sciences**, Murray, KY 4-6 November, 2004. (Authors: Ashley Littell\* and R. Mahmood)

Paper, titled, “Life cycle of a severe eastern Kentucky flash flood” was presented at the **59<sup>th</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Biloxi, MS 21-23, November, 2004. (Authors: Christina Henry\* and R. Mahmood)

Paper, titled, “An investigation of May 2, 2002 flash flood of Buchanan county, Virginia” was presented at the **59<sup>th</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Biloxi, MS 21-23, November, 2004. (Authors: Jessica Phillips\* and R. Mahmood)

Poster, titled, “Large-scale climate variations and streamflow response in the Green River basin” was presented at the **59<sup>th</sup> Annual meeting of Southeastern Division, The American Association of Geographers**, Biloxi, MS 21-23, November, 2004. (Authors: Leslie Lyons\* and R. Mahmood)

Paper, titled, “Assessing bias in evapotranspiration and soil moisture due the use of modeled solar radiation and dew point temperature” was presented at the **100<sup>th</sup> annual conference of the American Association of Geographers** at Philadelphia, Pennsylvania, March 13- March 20, 2004.

Paper, titled, "Land use change, modification of soil moisture content, and near surface temperature records in the Northern Great Plains" was presented at the **99<sup>th</sup> annual conference of the American Association of Geographers** at New Orleans, Louisiana, March 5- March 9, 2003.

Paper, titled, "An analysis of simulated point Soil Moisture for Three Land Uses Under Contrasting Hydroclimatic Conditions in the Northern Great Plains" was presented at the **57<sup>th</sup> annual conference of the American Association of Geographers, Southeastern Division** at Richmond, VA, November 23-26, 2002.

Poster, titled, "Climate prediction, information, and policy response: a retrospective assessment of drought management in Oklahoma" was presented at the **PI's conference, NOAA-OGP**, South Carolina, September, 2002.

Paper, titled, "Land use change and modification of near surface temperature records in the Northern Great Plains: verification of modeling results" was presented at the **13<sup>th</sup> Conference on Applied Climatology**, Portland, Oregon, May 13-16, 2002.

Paper, titled, "Sensitivity of soil moisture and evapotranspiration to soils and land use heterogeneity" was presented at the **13<sup>th</sup> Conference on Applied Climatology**, Portland, Oregon, May 13-16, 2002.

Paper, titled, "Soil moisture and evapotranspiration in Great Plains: the role of heterogeneous soil physical properties and land uses" was presented at the **56<sup>th</sup> annual conference of the American Association of Geographers, Southeastern Division** at Lexington, KY, November 17-20, 2001.

Paper, Titled, "Understanding soil water climatology of the Northern Great Plains: application of a soil water balance model" was presented at the **97<sup>th</sup> annual conference of the American Association of Geographers** at New York, New York, February 27- March 4, 2001.

Paper, Titled, "Land use change and its impacts on the soil moisture hydrology in the Northern Great Plains" was presented at the **97<sup>th</sup> annual conference of the American Association of Geographers** at New York, New York, February 27- March 4, 2001.

Poster, titled, "Soil moisture monitoring and modeling in the Northern Great Plains", was presented at the **GEWEX/BAHC International Workshop on Soil Moisture**, University of Oklahoma, Norman, Oklahoma, May 15-19, 2000.

Paper, titled, "Application of a soil water balance model to historical soil moisture estimation over eastern Nebraska", was presented at the **12<sup>th</sup> Conference on Applied Climatology**, Asheville, North Carolina, May 8-11, 2000.

Paper, titled, "Daily soil moisture measurement network of the Northern Great Plains: sensors, their calibration, and applications", was presented at the **12<sup>th</sup> Conference on Applied Climatology**, Asheville, North Carolina, May 8-11, 2000.

Paper, titled, "Time of observation and estimation of daily solar radiation for the Northern Great Plains", was presented at the **12<sup>th</sup> Conference on Applied Climatology**, Asheville, North Carolina, May 8-11, 2000.

Paper, titled, "Soil moisture monitoring and modeling in the Plains", was presented at the **International Workshop on Automated Weather Stations for Applications in Agriculture and Water Resources Management: Current Use and Future Perspectives**, University of Nebraska-Lincoln, Lincoln, Nebraska, March 6-10, 2000.

Paper, Titled, "El Nino Related Monsoonal Rainfall Variability in South Asia: Testing of Some Hypotheses" was presented at the **94<sup>th</sup> annual conference of the American Association of Geographers** at Boston, Massachusetts, March 25-29, 1998.

Paper, Titled, "El Nino Related Monsoonal Rainfall Variability in South Asia" was presented at the **93<sup>rd</sup> Annual Conference of the American Association of Geographers** at Fort Worth, Texas, April 1-5, 1997.

Paper, Titled, "Seasonal Distribution of Precipitation Extremes Over the Southern Great Plains", was presented at the **92<sup>nd</sup> Annual Conference of the American Association of Geographers** at Charlotte, North Carolina, April 9-13, 1996.

Paper, Titled, "Model-based Estimates of Impacts of Air temperature Variations on the Boro Rice Phenology in Bangladesh" was presented at the **76<sup>th</sup> Annual Conference of the American Meteorological Society**, Atlanta, Georgia, January 28-February 3, 1996.

Paper, Titled, " Impacts of Air Temperature Fluctuations on the Boro Rice Phenology in Bangladesh: A Model-based assessment" was presented at the **91<sup>st</sup> Annual Conference of the American Association of Geographers** at Chicago, Illinois, March 14-18, 1995.

Paper, Titled, "Impacts of El Nino Related Monsoonal Rainfall Variability and Resultant Rice Productivity in Bangladesh and Eastern India: A Model-based Assessment" was presented at the **Annual Conference of the South West Division, The American Association of Geographers**, held on the 21-22nd October, 1994, Hot Springs, Arkansas.

Paper, Titled, "Systematic Climate Perturbation and Boro Rice Yield in Bangladesh: Application of a Parametric Crop Yield model" was presented at the **90<sup>th</sup> Annual Conference of The American Association of Geographers at San Francisco**, California, 29 March - 2 April, 1994.

Paper, Titled, "Monsoonal Fluctuations and Rice Yield in Bangladesh: Application of a Numerical Crop Yield model" was presented at the **1992 Annual Conference of the Middle States Division, The American Association of Geographers** at Syracuse, New York.

Paper, Titled, " Some Aspects of Variations of Rainfall Over Bangladesh" was presented in the **9<sup>th</sup> Annual Student Conference on water resources organized by the American Water Resources Association** held on the 6th April, 1991 at Syracuse, New York.