

## Nathaniel A. Brunsell

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CONTACT INFORMATION Department of Geography  
University of Kansas  
417 Lindley Hall  
1475 Jayhawk Blvd.  
Lawrence, KS 66045-7613 USA  
Voice: (785) 864-2021  
E-mail: brunsell@ku.edu

RESEARCH INTERESTS Biometeorology, scaling processes from leaf to pixel, remote sensing of the surface energy balance, turbulence measurements using large aperture scintillometry and eddy covariance, ecological consequences of regional climate change, surface-precipitation feedbacks, application of non-linear time series analysis to meteorological datasets

EDUCATION **Ph.D.**, Biometeorology, 2003  
Utah State University, Logan UT  
Dissertation: An examination of scale issues involved with remotely sensed data  
**B.S.**, Earth and Planetary Sciences, 1997  
University of New Mexico, Albuquerque, NM  
Undergraduate Honors Thesis: The effect of topography on precipitation

PROFESSIONAL EXPERIENCE Assistant Professor, 2004 - Present  
Department of Geography - Atmospheric Sciences Program,  
University of Kansas  
Postdoctoral Research Associate, 2002 - 2004  
Department of Civil and Environmental Engineering,  
Duke University

PEER-REVIEWED PUBLICATIONS **Submitted**

Logan, K., **N. A. Brunsell**, A. R. Jones and J. J. Feddema: 2009, Assessing spatiotemporal variability of drought in the U. S. Central Plains. *Journal of Arid Environments*, in review.

**Brunsell, N. A.**, A. R. Jones, T. L. Jackson and J. J. Feddema: 2009, Seasonal trends in air temperature and precipitation in IPCC AR4 GCM output for Kansas, USA: evaluation and implications. *International Journal of Climatology*, in review.

**Brunsell, N. A.**, P. P. B. Pontes, and R. A. C. Lamparelli: 2009, Remotely sensed phenology of coffee and relationship to yield Southern Minas Gerais, Brazil. *International Journal of Remote Sensing*, in review.

## Published/In-press

- [17] Jones, A. R. and **N. A. Brunsell**: 2009, A scaling analysis of soil moisture-precipitation interactions in a regional climate model. *Theoretical and Applied Climatology*, in press.
- [16] Jones, A. R. and **N. A. Brunsell**: 2009, Energy balance partitioning and net radiation as controls on soil moisture-precipitation feedbacks. *Earth Interactions*, in press.
- [15] Baum, K. A., J. M. Ham, **N. A. Brunsell**, and P. I. Coyne: 2008, Surface boundary layer of cattle feedlots: implications for emission measurement. *Agricultural and Forest Meteorology*, 148, 1882-1893.
- [14] Lash, R. R., **N. A. Brunsell** and A. T. Peterson: 2008, Spatiotemporal environmental triggers to Ebola and Marburg virus transmission. *GeoCarto International*, 23, 451-466.
- [13] **Brunsell, N. A.**, J. M. Ham and C. E. Owensby: 2008, Assessing the multi-resolution information content of remotely sensed variables and elevation for evapotranspiration in a tall-grass prairie environment. *Remote Sensing of Environment*, 112, 2977-2987.
- [12] Lyon, S., F. Dominguez, D. Gochis, **N. Brunsell**, C. Castro, F. Chow, D. Fuka, Y. Hong, P. Kucera, S. Nesbitt, Y. Fan, N. Salzmann, J. Schmidli, P. Snyder, A. Teuling, T. Twine, G. Lee, S. Levis, J. Lundquist, G. Salvucci, A. Sealy, T. Walter: 2008, Coupling terrestrial and atmospheric water dynamics to improve prediction in a changing environment. *Bulletin of the American Meteorological Society*, 89, 1275-1279.
- [11] Young, C. B. and **N. A. Brunsell**: 2008, Evaluating NEXRAD precipitation estimates for the Missouri River Basin: an analysis using daily raingage data. *Journal of Hydrologic Engineering*, 13, 549-553.
- [10] **Brunsell, N. A.** and C. B. Young: 2008, Land surface response to precipitation events using MODIS and NEXRAD data, *International Journal of Remote Sensing*, 29, 1965-1982.
- [9] **Brunsell, N. A.**: 2006, Characterization of land-surface precipitation feedback regimes with remote sensing. *Remote Sensing of Environment*, 100, 200-211.
- [-] French, A. N., F. Jacob, M. C. Anderson, W. P. Kustas, W. Timmermans, A. Gieske, B. Su, H. Su, M. F. McCabe, F. Li, J. Prueger, and **N. Brunsell**: 2005, Erratum: surface energy fluxes with the Advanced Thermal Emission and Reflection Radiometer (ASTER) at the Iowa SMACEX site (USA). *Remote Sensing of Environment*, 99, 471.

[8] French, A. N., F. Jacob, M. C. Anderson, W. P. Kustas, W. Timmermans, A. Gieske, B. Su, H. Su, M. F. McCabe, F. Li, J. Prueger, and **N. Brunsell**: 2005, Surface energy fluxes with the Advanced Thermal Emission and Reflection Radiometer (ASTER) at the Iowa SMACEX site (USA). *Remote Sensing of Environment*, 99, 55-65.

[7] White, M.A., **N. Brunsell**, and M.D. Schwartz: 2004, Vegetation phenology in global change studies. In *Phenology: An Integrative Environmental Science*. M.D. Schwartz, editor. Kluwer Academic Publishers, New York, NY. 453-466.

[6] **Brunsell, N. A.** and R. R. Gillies: 2003, Length scale analysis of surface energy fluxes derived from remote sensing. *Journal of Hydrometeorology*, 4, 1212-1219.

[5] **Brunsell, N. A.** and R. R. Gillies: 2003, Determination of scaling characteristics of AVHRR data with wavelets: Application to SGP97, *International Journal of Remote Sensing*, 24, 14, 2945-2957.

[4] **Brunsell, N. A.** and R. R. Gillies: 2003, Scale issues in land-atmosphere interactions: implications for the remote sensing of the surface energy balance, *Agricultural and Forest Meteorology*, 117, 3-4, 203-221.

[3] **Brunsell, N. A.** and R. R. Gillies: 2002, Incorporation of surface emissivity into a thermal atmospheric correction, *Photogrammetric Engineering and Remote Sensing*, 68, 12, 1263-1269.

[2] **Brunsell, N.** and Gillies, R.: 2001, The effect of emissivity on evaporation, in *Remote Sensing and Hydrology 2000: Proceedings of a Symposium Held at Santa Fe, New Mexico, April 2000*. eds: M. Owe, K. Brubaker, J. Ritchie and A. Rango, 267, 276-280.

[1] Menking, K. M., R. Y. Anderson, **N. A. Brunsell**, B. D. Allen, A. L. Ellwein, T. A. Loveland and S. W. Hostetler: 2000, Evaporation from groundwater discharge playas, Estancia Basin, central New Mexico. *Global and Planetary Change*, 25, 133-147.

INVITED  
PRESENTATIONS

[8] **Brunsell, N. A.**: 2008, Assessing the predictability of the water cycle: a multiscale framework. *Seminars in Ecology and Evolutionary Biology*, Kansas State University. Manhattan, KS.

[7] **Brunsell, N. A.**: 2008, Regional and local impacts of climate change. *The heat is on: confronting climate change in the classroom*. Lawrence, KS.

[6] **Brunsell, N.**, S. Billings, J. Ham, J. Nippert, J. Blair and K. Price: 2008, Modeling biogeochemical cycles in the central Great Plains. *Second Annual Kansas EPSCoR Ecoforecasting Meeting*, Lawrence, KS.

[5] **Brunsell, N. A.** and J. J. Feddema: 2008: Kansas and Climate Change. Presentation to the Kansas Energy Commission, Greenhouse Gas Policy Committee. February 21, 2008.

[4] **Brunsell, N. A.:** 2008, Trading carbon for water: assessing climate change in Kansas. KU Commons: University Lecture Series. University of Kansas.

[3] **Brunsell, N. A.:** 2007, Understanding water cycle dynamics for increased predictability: where are we? WyGIS Geospatial Forum. University of Wyoming.

[2] **Brunsell, N. A.:** 2007, Carbon and water cycling. The Role of Ideas in U.S. Climate Change Policy. 20 Oct, Lawrence, KS.

[1] Feddema, J. J. and **N. A. Brunsell:** 2007, Environmental impact of global warming on the state of Kansas. 2007 State of the State Kansas Economic Policy Conference. Kansas E3: Energy, the Environment, & Economics. 11 Oct, Lawrence, KS.

CONFERENCE  
PROCEEDINGS  
AND  
PRESENTATIONS

[27] Ham, J., J. Nippert, J. Blair, K. Arnold, and **N. A. Brunsell:** 2008, Sensor networks for measuring spatial variability in the landscape energy balance. 2008 GSA-SSSA-ASA-CSSA-GCAGS-HGS Joint Annual Meeting, 5-9 October, Houston, TX.

[26] **Brunsell, N. A.,** J. M. Ham and C. B. Young: 2008, A wavelet based information theory approach to assess scaling of evapotranspiration. CUAHSI Biennial Colloquium on Hydrologic Science and Engineering, 14-16 July, Boulder, CO.

[25] **Brunsell, N. A.,** A. P. Barros and T. A. Rahn: 2008, Determination of the areal averaged fluxes in CLASIC: a synthesis of methodologies. 28th Conference on Agricultural and Forest Meteorology, 28 Apr-2 May, Orlando, FL.

[24] Buck, T. A. and **N. A. Brunsell:** 2008, Soil moisture controls on carbon and water cycling. 28th Conference on Agricultural and Forest Meteorology, 28 Apr-2 May, Orlando, FL.

[23] Ham, J. M., **N. A. Brunsell** and K. B. Arnold: 2008, Effect of landscape position on carbon and water fluxes from tallgrass prairie. 28th Conference on Agricultural and Forest Meteorology, 28 Apr-2 May, Orlando, FL.

[22] **Brunsell, N. A.,** T. L. Buck, K. Arnold and J. M. Ham: 2007, Variation in scintillometer and eddy tower footprints and implications for the validation of satellite derived energy fluxes in heterogeneous terrain. AGU Fall Meeting, 10-14 Dec, San Francisco, CA.

[21] Jones, A. R. and **N. A. Brunsell:** 2007, Investigation of the impacts of spa-

tial variability of soil moisture on convective precipitation in the central plains. AGU Fall Meeting, 10-14 Dec, San Francisco, CA.

[20] Arnold, K., J. Ham and **N. Brunsell**: 2007, Energy balance closure when using eddy covariance: How good is good enough? American Society of Agronomy, 4-8 Nov, New Orleans, LA.

[19] Ham, J., **N. Brunsell**, K. Arnold, and K. Baum: 2007, Effect of sampling frequency and integration interval on eddy covariance measurements of heat, water vapor, and CO<sub>2</sub> fluxes. American Society of Agronomy, 4-8 Nov, New Orleans, LA.

[18] **Brunsell, N. A.** and J. M. Ham: 2007, Scaling evapotranspiration in prairie ecosystems: remote sensing, modeling and field measurements. American Ecological Engineering Society, 21-25 May, Manhattan, KS.

[17] **Brunsell, N. A.** and A. R. Jones: 2007, Determining the spatial variability of water and carbon cycling, First Annual Kansas EPSCoR Ecoforecasting Meeting, 21 Apr, Manhattan, KS.

[16] **Brunsell, N. A.** and J. M. Ham: 2006, Spatial scaling of water and energy fluxes in a tall-grass prairie. AGU Fall Meeting, 5-9 Dec, San Francisco, CA.

[15] Young, C. B. and **N. A. Brunsell**: 2006, Which is better: NEXRAD or Gage? AGU Fall Meeting, 5-9 Dec, San Francisco, CA.

[14] **Brunsell, N. A.** and J. M. Ham: 2006, Scaling surface energy fluxes in a tall-grass prairie using large aperture scintillometer and MODIS data. 27th Conference on Agricultural and Forest Meteorology, 22-26 May, San Diego, CA.

[13] Young, C. B., T. M. Brown and **N. A. Brunsell**: 2006, Evaluation of NEXRAD operational estimates of intense rainfall using a dense network of ALERT raingages. AGU Joint Assembly, 23-26 May, Baltimore, MD.

[12] Young, C. B. and **N. A. Brunsell**: 2005, Evaluation of NEXRAD precipitation estimates for the Missouri River Basin using daily raingage data. AGU Fall Meeting, 5-9 Dec, San Francisco, CA.

[11] **Brunsell, N. A.** and J. M. Ham: 2005, Water and heat fluxes from a large aperture scintillometer in an ungrazed prairie. Ameriflux Annual Science Meeting, 18-20 October, Boulder, CO.

[10] **Brunsell, N. A.** and C. B. Young: 2005, Assessing spatial-temporal variability of vegetation-precipitation interactions with combined NEXRAD and MODIS data. AGU Joint Assembly, 23-27 May, New Orleans, LA.

[9] **Brunsell, N. A.**: 2005, Quantifying the dominant time scales of land-surface precipitation feedbacks. AAG Annual Meeting, 5-9 April, Denver, CO.

[8] Lash, R. R., **N. A. Brunsell**, A. T. Peterson and B. Coles: 2005, Spatiotemporal context of Ebola and Marburg hemorrhagic fever outbreaks in Africa. AAG Annual Meeting, 5-9 April, Denver, CO.

[7] Prueger, J.H., W. P. Kustas, L. E. Hipps, J. L. Hatfield, A. Cahill, C. Williams, J. Albertson, W. E. Eichinger, D. I. Cooper, and **N. Brunsell**: 2004, Spatial variability of turbulent fluxes across a corn/soybean production region in central Iowa. 26th Conference on Agriculture and Forest Meteorology, 23-27, August, Vancouver, BC, Canada.

[6] **Brunsell, N. A.** and J. D. Albertson: 2003, Separating soil- atmosphere and canopy-atmosphere contribution to CO<sub>2</sub> exchange. SERC-NIGEC Annual Meeting, 21-22 October, Indianapolis, IN.

[5] **Brunsell, N. A.** and J. D. Albertson: 2003, Assessing the spatial scales of surface atmosphere interactions. AGU Fall Meeting, 8-12 December, San Francisco, CA.

[4] **Brunsell, N. A.** and J. D. Albertson: 2003, Effects of surface heterogeneity on scalar and flux profiles in the atmospheric boundary layer. EGS-AGU-EUG Joint Assembly, 6-11 April, Nice, France.

[3] **Brunsell, N. A.**, R. R. Gillies, B. Lapenta, and S. Dembeck: 2003, Aggregation of remotely sensed vegetation and derived latent heat flux. 83rd AMS Annual Meeting, 9-13 February, Long Beach, CA.

[2] **Brunsell, N. A.**, and R. R. Gillies: 2002, Length scales of remotely sensed vegetation, surface radiometric temperature, and derived surface energy fluxes. 25th Conference on Agricultural and Forest Meteorology, 20-24 May, Norfolk, VA.

[1] **Brunsell, N. A.**, K. M. Menking, R. Y. Anderson, and B. D. Allen: 1998, Atmospheric and hydrologic estimates of evaporation for the Estancia basin playa complex. New Mexico Geological Society Spring Meeting, 9 April, Socorro, NM.

NON-PEER  
REVIEWED  
PUBLICATIONS

[4] Feddema, J. J., **N. A. Brunsell**, T. L. Jackson and A. R. Jones: 2008, Climate change in Kansas. Technical report for the Climate and Energy Project of the Land Institute. 10 pages.

[3] Young, C. B., T. M. Brown, and **N. A. Brunsell**: 2008, Evaluation of NEXRAD operational precipitation estimates in Kansas. Technical report for the Kansas Department of Transportation. 108 pages.

[2] **Brunsell, N. A.**: 2007, Book Review - Global Warming: Understanding the Forecast by David Archer, Palios, doi:10.2110/palo.2007.BR011.

[1] Brown, J. C., M. Purcell, and N. Brunsell: 2007, Scale, Problems of. Encyclopedia of Environment and Society. ed. by Paul Robbins. SAGE Publications.

LARGE-SCALE FIELD CAMPAIGN EXPERIENCE **Cloud and Land Surface Interaction Campaign (CLASIC)** in Oklahoma, 2007.

**Soil Moisture Experiments 2002 (SMEX'02)** in Iowa, 2002.

WORKSHOP PARTICIPANT **NCAR Junior Faculty Forum:** Coupling terrestrial and atmospheric water dynamics to improve predictability in a changing environment. Boulder, CO. 9-11 July, 2007.

**Geography Faculty Development Alliance.** Boulder, CO. 4-11 June, 2005.

AWARDS American Society for Photogrammetry and Remote Sensing. Lecia Geosystems Award for best scientific paper in remote sensing. Second Place, 2003.

FUNDING **Currently Funded Projects**

KU biofuels 'feedstock to tailpipe' initiative. Transportation Research Institute. \$516,814. (Co-I, PI S. Williams). 2008-2009.

IGERT: C-CHANGE: Climate Change, Humans, and Nature in the Global Environment. NSF. \$3,200,000. (Participating Faculty, PI: Joane Nagel). 2008-2013.

Understanding and forecasting ecological change: causes, trajectories and consequences of environmental change in the Central Plains. NSF EPSCoR. KU funding: \$3,599,997. (Collaborator, KU PI: L. Krishtalka). 2006-2009.

**Previously Funded Projects**

Assessing climate change in Kansas. The Land Institute. \$36,012. (PI). 2008.

Water and heat fluxes in a prairie ecosystem assessed using scintillometry and physically based modeling. KUCR General Research Fund. \$7,015.00. 2006-2007.

Assessing multi-scale spatial-temporal variability of surface energy fluxes using scintillometry and remote sensing. KUCR New Faculty General Research Fund. \$7,914.56. 2005-2006.

SERVICE **National**

Member of *Agricultural and Forest Meteorology Scientific and Technological Activities Commission (STAC)* for the American Meteorological Society

(2007-2009).

**Editorial board:** Agricultural and Forest Meteorology (2008-Present)

**Session chair:** Areal flux averaging measurements and methods at the 28th Conference on Agricultural and Forest Meteorology, 28 Apr-2 May 2008, Orlando, FL.

**Representative:** KU representative to the Consortium of Universities for the Advancement of Hydrologic Science, Inc. **CUAHSI** (Alternate, 2008-Present).

### University

Research Committee of the University Honors Program (2006-Present)  
Search committee (Kansas Geological Survey, Hydrologist, 2008-2009)

### College

College Academic Misconduct Committee (2006-2009)  
Faculty search committee (Ecology and Evolutionary Biology, Ecological modeler, 2006-2008)

### Department

Faculty affairs committee (2008-Present)  
Graduate student affairs committee (2005-2008)  
Faculty search committee (Geography, Soils/Geomorphologist, 2007-2008)  
Faculty search committee (Geography, Atmospheric scientist, 2006-2007)  
Faculty search committee (Geography, Glaciologist, 2005-2006)  
Undergraduate studies committee (2004-2005)

## TEACHING EXPERIENCE

### Courses

Atmospheric Science 731: Atmospheric Turbulence, Spring 2009  
Atmospheric Science/Geography 521: Microclimatology, Spring 2006, 2008, 2009  
Atmospheric Science 680: Physical Meteorology, Fall (2004-2006)  
Atmospheric Science 642: Remote Sensing of the Atmosphere, Spring (2005-Present)  
Atmospheric Science 697: Senior Seminar, Fall (2004-2006)  
Atmospheric Science 606: Forecasting Practicum, Fall (2004-2006)  
Atmospheric Science 607: Forecasting Intern, Fall (2004-2006)  
Geography 531/731: Land-Atmosphere Interactions, Spring 2005, Fall 2007  
Geography 104: Introduction to Physical Geography, Spring 2007, Fall 2007  
Honors 190: State of Fear: Assessing Climate Change, Fall 2006

### Short Courses

State of Fear: Assessing Climate Change. Duke Talent Identification Program, 2007 (Weekend course for junior high school students at the University of Kansas).

ADVISING

**Graduate Major Advisor**

T. L. Buck - MA, Dept. of Geography, KU (anticipated 2010)

M. Petrie - MA, Dept. of Geography, KU (anticipated 2010)

D. A. Smith - MA, Dept. of Geography, KU (anticipated 2008) - Urban heat island effects on convective precipitation

A. R. Jones - MA, Dept. of Geography, KU (2008, **Honors**) Impacts of soil moisture variability on convective precipitation in the Central Plains through land-atmosphere feedbacks

**Graduate Committee Member**

P. L. Lin - PhD, Dept. of Geography, KU

P. Protti - PhD, Dept. of Ecology and Evolutionary Biology, KU

T. Brown - MS, Dept. of Civil, Environmental and Architectural Engineering (2006)

**Undergraduate Research Advisor**

N. Parks, 2009

M. Maksimowicz, (2008-2009)

T. Buck, 2008

K. Logan, 2008 (**Honors**)

C. Painter (2007-2008)

K. Zimmerman, 2006 (**McNair Scholars Program**)

PROFESSIONAL  
ORGANIZATIONS

American Geophysical Union  
American Meteorological Society  
Association of American Geographers

REVIEWER

**Proposals**

National Science Foundation

**Manuscript Reviewer**

Agricultural and Forest Meteorology, Ecosystems, GeoForum, Geophysical Research Letters, International Journal of Remote Sensing, IEEE Transactions on Geoscience and Remote Sensing, Journal of the American Water Resources Association, Journal of Applied Meteorology and Climatology, Journal of Arid Environments, Journal of Hydrometeorology, Journal of Soil and Water Conservation, Remote Sensing of Environment, Theoretical and Applied Climatology, Water Resources Research