MICHAEL THOMAS MARSHALL

Southwest Geographic Science Team, US Geological Survey, Flagstaff, AZ 86001, Phone: +1-9285567215, Cell: +1-8589226533 Fax: +1-9285567169, Email: mmarshall@usgs.gov

EXPERTISE

Remote Sensing and Geographic Information Science (GIS)
Process-based Modeling and Statistics
Agricultural, Climate and Hydrologic Sciences

EDUCATION

University of California, Santa Barbara, Santa Barbara, CA
PhD in Geography, 2010
Dissertation: *Modeling Evapotranspiration in sub-Saharan Africa: A Tool for Food Security Analysis*

Clark University, Worcester, MA
MA in Environmental Science and Policy, 2005
Thesis: *Using Modeled Soil Loss to Estimate Phosphorus Load in Lake Victoria*

University of California, San Diego, San Diego CA
BS in Physics, 1999

POSTDOCTORAL TRAINING

Mendenhall Research Fellow, Southwest Geographic Science Team, USGS, Flagstaff, AZ, 2011-present: hyper- spatial and spectral remote sensed mapping and validation of crop yield, evapotranspiration, and water productivity for irrigated crops in California's Central Valley.

EMPLOYMENT HISTORY

- Graduate Student Researcher, Climate Hazard's Group (FEWSNET), UCSB, Santa Barbara, CA, 2006-2010
- Remote Sensing Consultant, NASA Goddard Space Flight Center, Washington, DC, 2009-2010
- Project Leader, International Student Volunteers, Chiang Mai, Thailand, 2007
- Teaching Assistant, Department of Geography, UCSB, Santa Barbara, CA, 2005-2006
- Research Associate, Pan-African START Secretariat, University of Nairobi, Nairobi, Kenya, 2005
- Fulbright Research Fellow, Department of Environmental Management, Makerere University, Kampala, Uganda, 2004
- Graduate Student Researcher, Smithsonian Environmental Research Center, Edgewater, MD, 2003
- Research Assistant, George Perkins Marsh Institute, Worcester, MA, 2002-2003
- Teaching Assistant, Department of Physics, Clark University, Worcester, MA, 2002-2003
- Residential Instructor, Trio-Outreach, UCSD, San Diego, CA, 2002
- Tutorial and Media Specialist, Learning Center, Antelope Valley College, Lancaster, CA, 2002
- Agricultural Extentionist, U.S. Peace Corps, Lushoto, Tanzania, 1999-2001
- Math Teacher and Counselor, Academy by the Sea, Carlsbad, CA, 1999

- Librarian's Assistant, Wanda Kirk Library, Rosamond, CA, 1996-1998
- Science and Math Lab Technician, Antelope Valley College, Lancaster, CA, 1995-1997

FELLOWSHIPS / AWARDS

- International Network of Research on Coupled Human and Natural Systems (CHANS) Fellowship, 2012
- Mendenhall Research Fellowship, 2011-2013
- UC Graduate Research Mentorship Fellowship, 2009
- Switzer Environmental Fellowship, 2009
- UCSB Graduate Student Travel Grant, 2009
- Jack and Laura Dangermond Travel Award, 2006 & 2008
- Luce Environmental Science to Solutions Fellowship, 2008-2010
- California Space Grant, 2007
- Fulbright Graduate Research Fellowship, 2004
- National Center for Atmospheric Research Travel Award, 2004
- Smithsonian Graduate Research Fellowship, 2003
- Returned Peace Corps volunteer Fellowship, 2002-2003

PUBLICATIONS

1. Brown, M., K. de Beurs, and M.T. Marshall. 2012. Global phenological response to climate change in crop areas using remote sensing vegetation, humidity, and temperature over 26 years. *Remote Sensing of Environment*, 126: 174-183.
2. Hughes, S., A. Yau, L. Max, N. Petrovic, F. Davenport, M. Marshall, et al. 2012. A framework to assess national level vulnerability from the perspective of food security: The case of coral reef fisheries. *Environmental Science & Policy*, 23: 95-108.
3. Thenkabail, P.S., J.W. Knox, M. Ozdogan, M.K. Gumma, R.G. Congalton, Z. Wu, C. Milesi, A. Finkral, M. Marshall, et al. 2012. Assessing Future Risks to Agricultural Productivity, Water Resources and Food Security: How Can Remote Sensing Help? *Photogrammetric Engineering & Remote Sensing*, 78: 773-782.
4. Marshall, M.T., et al. 2012. Combining Surface Reanalysis and Remote Sensing Data for Monitoring Evapotranspiration in sub-Saharan Africa. (*In Review Hydrology and Earth Systems Science*)
5. Marshall, M., et al. 2012. Using Modeled Soil Loss to Predict Phosphorus Load in Lake Victoria Basin. (*In Review Applied and Environmental Soil Science*)
6. Marshall, M.T., et al. 2012. Examining Evapotranspiration Trends in Africa. *Climate* Dynamics, doi: 10.1007/s00382-012-1299-y.
7. Funk, C., G. Eilerts, J.Verdin, J.Rowland, and M.Marshall. 2011. A Climate Trend Analysis of Sudan. U.S. Geological Survey Fact Sheet 2011-3072, Washington D.C.

8. Marshall, M.T., et al. 2011. Testing a high-resolution satellite interpretation technique for crop area monitoring in developing countries. *International Journal of Remote Sensing*, 32: 7997-8012.

9. Funk, C., J. Michaelsen, and M. Marshall. 2011. Mapping recent decadal climate variations in Eastern Africa and the Sahel, in Remote Sensing of Drought: Innovative Monitoring Approaches, edited by M. Anderson and J. Verdin, p. 270, Taylor and Francis, London, United Kingdom.

10. Marshall, M.T. 2011. Agricultural Drought Monitoring in Kenya Using Evapotranspiration Derived from Remote Sensing and Reanalysis Data, in Remote Sensing of Drought: Innovative Monitoring Approaches, edited by M. Anderson and J. Verdin, p. 270, Taylor and Francis, London, United Kingdom.

11. Wandiga, S., M. Opondo, D. Olago, A. Githeko, F. Githui, M. Marshall, et al. 2010. Vulnerability to epidemic malaria in the highlands of Lake Victoria basin: the role of climate change/variability, hydrology and socio-economic factors. *Climate Change*, 99: 473-497.

12. Husak, G. J., M. T. Marshall, et al. 2008. Crop Area Estimation using High and Medium Resolution Satellite Imagery in Areas with Complex Topography. *Journal of Geophysical Research*, 113, D14112, doi: 10.1029/2007JD009175.

13. Olago, D., M. Marshall, et al. 2007. Climatic, Socio-economic and Health Factors Affecting Human Vulnerability to Cholera in the Lake Victoria Basin, East Africa. *Ambio*, 36: 350-358.

PRESENTATIONS

1. Marshall, M., et al. 2012. Improving Biomass Estimation in Agricultural Areas Using Combined Hyperspectral Techniques. Paper presented at *ASPRS 2012 Annual Conference*, Sacramento, CA.

2. Marshall, M., et al. 2012. Standardized Precipitation and Evaporative Stress Index for Agricultural Drought Monitoring in sub-Saharan Africa. Paper presented at 92nd *AMS Annual Meeting*, New Orleans, LA.

3. Marshall, M., 2011. Agriculture in a changing climate: a case for supplemental irrigation in Africa. Paper presented at *NCAR Climate and Adaptation in Developing Countries Colloquium*, Boulder, CO.

4. Marshall, M., et al. 2010. Spatio-temporal Characteristics of Actual Evapotranspiration Trends in sub-Saharan Africa. Paper presented at *AGU Annual Fall Meeting*, San Francisco, CA.

5. Marshall, M., et al. 2010. A Historical Record of Actual Evapotranspiration in Sub-Saharan Africa using Climate Reanalysis and Remote Sensing Data. Paper read at 90th *AMS Annual Meeting*, Atlanta, GA.

6. Marshall, M., et al. 2009. Combining Remote Sensing and Surface Reanalysis Data to Estimate Evapotranspiration in sub-Saharan Africa. Poster read at *AGU Annual Fall Meeting*, San Francisco, CA.

7. Marshall, M., et al. 2009. Testing Land Surface and Remote Sensing Data in sub-Saharan Africa for use in Evapotranspiration Modeling. Paper read at *8th International Association of Hydrological Science Conference*, Hyderabad, India.

8. Budde, M.E., C. Funk, and M.Marshall. 2009. Identification of seasonal vegetation trends for rainfed agricultural systems in Africa using the NDV-derived Σv (sum v) metric. Poster read at *5th International Workshop on the Analysis of Multi-temporal Remote Sensing Images*, Groton, CT.

9. Marshall, M., et al. 2008. Parameterization of a Global Historical Evapotranspiration Model. Poster r at *AGU Annual Fall Meeting*, San Francisco, CA.
10. Marshall, M., et al. 2008. A Review of Evapotranspiration Modeling using Remote Sensing in sub-Saharan Africa. Paper presented at *Hydropredict 2008*, Prague, Czech Republic.
11. Marshall, M., et al. 2006. Crop Estimation Using High Spatial Resolution Satellite Imagery and Area Frame Sampling. Poster read at *AGU Annual Fall Meeting*, San Francisco, CA.
12. Marshall, M. and C. Funk. 2006. Topographic-based Wetness Index for RVF Risk Modeling. Poster read at *Living with Climate Variability and Change: Understanding the Uncertainties and Managing the Risks*, Espoo, Finland.
13. Marshall, M. 2005. The Contribution of Atmospheric Deposition to Nutrient Fluxes in Lake Victoria Basin. Paper read at *Equatorial Africa Macronutrient Atmospheric Deposition Assessment Initiation Workshop*, Nairobi, Kenya.
14. Marshall, M. 2005. Remote Sensing and Geographic Information Systems in Water Resources Management. Paper read at *GIS and Hydrologic Modelling Workshop on the use of USGS GeoSFM in the Greater Horn of Africa*, Nairobi, Kenya.
15. Marshall, M. 2003. Climate Change in Central Massachusetts. Paper read at *Clark University Annual Multidisciplinary Conference*, Worcester, MA.
16. Marshall, M. 2003. Using Modeled Hydrology to Predict Nutrient Discharge: the influence of saturated soils and indices of flow yield. Paper read at *Smithsonian Environmental Research Center Summer Seminar*, Edgewater, MD.

PRESS RELEASES

1. http://www.usgs.gov/blogs/features/usgs_science_pick/evapotranspiration-studies-could-help-keep-africas-sahel-green/

GRANTS

1. 2012. $3500. Principal Investigator. USGS/NAGT Cooperative Field Training Program. *Water productivity mapping for irrigated crops in California using farm-level assessments and remote sensing.*
2. 2011. $150,000. Co-investigator. USGS Powell Center. *Global Croplands and their Water Use for Food Security in the Twenty-first Century.*
3. 2010. $208,000. Principal Investigator. USGS Mendenhall Research Fellowship Program. *Water productivity mapping for irrigated crops in California using farm-level assessments and remote sensing.*
4. 2009. $70,000. Co-investigator. NASA Special Request. *Global Length of Growing Season Changes over 30 years and their Impact on Agriculture and Food Production.*
5. 2007. $1000. Principal Investigator. NASA California Space Grant. *Mapping Rift Valley Fever Exposure in Kenya*

CERTIFICATIONS AND TRAINING

- National Center for Atmospheric Research Climate and Adaptation in Developing Countries Colloquium, 2011
- American Meteorological Society Summer Policy Colloquium, 2009
- National Center for Atmospheric Research Climate and Health Colloquium, 2003

- Peace Corps Training in Community Development: education pedagogy, practical and development theory, cross-culture, and health, 1999
- Regular Tutor Certification, California Reading and Learning Association, 1996

REVIEWER FOR PUBLICATIONS

1. Geoscience and Remote Sensing Letters (1)
2. Journal of Climate (1)
3. Journal of Hydrometeorology (1)
4. Journal of Applied Meteorology and Climatology (1)
5. Natural Hazards (1)
6. Photogrammetric Engineering & Remote Sensing (1)

PROFESSIONAL MEMBERSHIPS

- American Geophysical Union (AGU)
- American Meteorological Society (AMS)
- American Society for Photogrammetry and Remote Sensing (ASPRS)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Association of Hydrological Sciences (IAHS)

WEBPAGES

https://profile.usgs.gov/mmarshall
http://wwwrcamnl.wr.usgs.gov/wrdseminar/playwrd.htm?id=22mar2012
http://chg.geog.ucsb.edu/

CITIZENSHIP

United States of America

PROFESSIONAL REFERENCES

Dr. Prasad Thenkabail, Senior Research Scientist
USGS WR SE GEOG
2255 N. Gemini Dr.
Flagstaff, AZ 86001
Fax: +1-9285567169
Phone: +1-9285567221
Email: *pthenkabail@usgs.gov*

Dr. Joel Michaelsen, Professor of Geography
Department of Geography
UC Santa Barbara
Santa Barbara, CA 93106
Phone: +1-8058802548
Fax: +1-8058932578
Email: *joel@geog.ucsb.edu*

Dr. Christopher Funk, Senior Research Scientist
USGS Center for Earth Resources Observation and Science
UC Santa Barbara
Santa Barbara, CA 93106
Phone: +18057222017
Fax: +1-8058932578
Email: *cfunk@usgs.gov*

Dr. Dar Roberts, Professor of Geography
Department of Geography
UC Santa Barbara
Santa Barbara, CA 93106
Phone: +1-805880253
Fax: +1-8058932578
Email: *dar@geog.ucsb.edu*

Dr. Molly Brown, Senior Research Scientist
Biospheric Sciences Branch
NASA Goddard Space Flight Center
Greenbelt, MD 20771
Phone: +1-3016146616
Fax: +1-3016146695
Email: *Molly.E.Brown@nasa.gov*