

# Christopher Charles Funk

Affiliated Research Professor, Department of Geography, UC Santa Barbara  
Director, Climate Hazards Center  
4716 Ellison Hall, University of California, Santa Barbara  
Santa Barbara, CA, 93106-4060  
Tel: (805)-893-4223 Cell: (805) 722-2017 [chrisfunk@ucsb.edu](mailto:chrisfunk@ucsb.edu)  
[chc.ucsb.edu](http://chc.ucsb.edu)

## Education

### Ph.D.

UCSB Geography: Modeling patterns of interannual variability in sub-Saharan Africa rainfall to support Food Security (December, 2002).

### M.A.

UCSB Geography: VDELB: An internal gravity wave based diagnostic precipitation model (June, 1999)

### B.A.

University of Chicago Fundamentals/Philosophy of Science (June, 1989)

## CURRENT EMPLOYMENT

### Director (Affiliated Research Professor VII)

UCSB Geography Climate Hazard Center, 2008 to present

As Director of the Climate Hazards Center (CHC), I work with Greg Husak, Shradhanand Shukla and Frank Davenport to plan, oversee, and participate in the research of a ~23 person team (<https://chc.ucsb.edu/people>) focused on developing improved early warning, environmental monitoring and climate/land change science. The CHC develops new scientific approaches and new scientific datasets to help us describe and understand the Earth while minimizing the loss of life and livelihoods. My position involves basic research which informs the development of long term research strategies. This long term planning guides remote sensing strategies, algorithm development, and a deeper understanding of climate variability and change as well as potential opportunities for drought prediction and climate attribution. Daily advisement is provided to CHC-affiliated researchers, graduate students, post-docs, programmers and early warning specialists. I provide high level inputs into USAID development projects, FEWS NET, the Bill and Melinda Gates Foundation, and US Climate Change activities, while providing mentoring and training in the United States and Africa. New insights into African drought helped support lifesaving interventions in 2011, 2012, 2014, 2015, 2016 and 2017, 2020-2022.

## Past Employment

### Assistant Director, UCSB Geography Climate Hazard Group (CHC), 2003-2009

- Associate Research Professor, Department of Geography, UC Santa Barbara
- Co-managed international 13 member staff. PI or Co-PI on 7 grants.
- Improved hydrologic early warning systems and forecasts.

### Senior Scientist (SAIC), USGS FEWS NET – EROS Data Center, 2001-2003

- Science coordinator for 5 international FEWS NET scientists.
- Developed new environmental monitoring tools
- Carried out climate modeling and forecasting to support Famine Early Warning.

*Duties:* Science coordinator for 6 international FEWS NET scientists. Developed new

environmental monitoring tools, e.g., the Forecast Interpretation Tool, facilitating the use of seasonal climate forecasts by FEWS NET food security analysts. Carried out climate modeling and forecasting to support Famine Early Warning.

**Accomplishments:** Established USGS FEWS NET Special reporting. Produced 9 reports and 3 publications. Climate modeling identified anthropogenic drought and impacts in vulnerable areas of eastern Africa. Forecast 2002/03 drought in Southern Africa, leading directly to timely decision-making for sustained emergency food aid programs by USAID and the World Food Program. Improved early warning monitoring and forecasting.

DATES From: 1997 To: 2001

**Graduate Researcher/Instructor**, University of California, Santa Barbara Geography Dept

**Duties:** Developed geo-spatial rainfall modeling techniques, analyzed African climate variability & drought for FEWS NET, taught Tropical Meteorology, Physical Climatology, Geographic Computing.

**Accomplishments:** 7 peer reviewed publications. EPA STAR Doctoral Fellowship. NDVI-ENSO teleconnection paper earned *Letter of the Year* Citation by the Int J Rem Sens. Created the Collaborative Historical African Rainfall Model (CHARM).

## SELECTED HONORS AND AWARDS

March 2022 Drought Predictions Highlighted by [National Geographic](#)  
Feb 2022 Appeared on [PBS Newshour](#) (Madagascar Drought)  
Dec 2021 Appeared on Guardian Science [Podcast](#), East African Drought Forecasts  
April 2021 Interviewed by [KEYT](#) on Drought Flood Fire.  
April 2021 Cambridge Festival presentation on [Drought Flood Fire](#).  
Nov 2020 Interviewed in USGS 'Eyes on Earth' story on 'Insuring West Africa's Crops'  
Oct 2020 Published [Worldview](#) in Nature  
Oct 2020 U. of Minnesota [news article](#) on new daily temperature product  
July 2020 Featured in Current article [Pandemic Famine Response](#)  
July 2020 Featured in interview on [KCLU](#) 'Researchers help African scientists prevent famine'  
June 2020 Somalia research featured in National Geographic story on [impacts on women](#)  
April 2020 Featured in Science story on the [World's Leading Hunger famine prediction model](#)  
July 2019 Interview [video](#) from USGS 'Eyes on Earth' Series  
January 2019 Became Chief Editor for 'Frontiers in Climate Services'  
January 2019 UCSB Nexus [story on the Climate Hazards Center](#)  
October 2018 [KEYT Interview](#) on IPCC 1.5C report  
July 2018 [KEYTV Interview](#) on tracking global heat waves  
July 2018 [KCRW Interview](#) on why heat waves are getting worse  
July 2018 Invited panelist WCRP Grand Challenge on Weather and Climate Extremes  
March 2018 Story on '[Climatologists render skillful predictions of drought that help avert famine](#)'  
March 2018 Research mentioned in NYT Story '[Hotter Drier Hungrier](#)'  
Feb 2018 "[Climate Extremes: Patterns and Mechanisms](#)" earns 2018 PROSE Award  
Dec 2017 Selected Panelist for BAMS Climate Attribution Issue Media Release  
Oct 2017 UCSB Current story on '[Planning for the Future](#)' and GEC article  
June 2017 Climate Hazards Group awarded Inspiring Service Emerald award  
Mar 2017 Featured on KCRW's To the Point story on '[Fighting back Famine in Somalia](#)'  
Mar 2017 UCSB Current story on '[Learning from History](#)' and NASAS SERVIR award.  
Mar 2017 VoA Research special [on African Climate Change](#)  
Jan 2017 Research featured in NYT [editorial](#) on Madagascar drought  
Dec 2016 Research contributes to NYT Article '[Road on Fire](#)'  
Dec 2016 USGS [Featured Story](#) - Warmer Ocean Waters Seen to Spur Drought in Africa

Nov 2016 Nominated for SAMMIE Service to America for 2015 Ethiopia drought monitoring  
 Aug 2016 Invited as editor for Nature Scientific Data  
 July 2016 Interviewed by Voice of America regarding [potential La Niña drought](#)  
 June 2016 Article in The Conversation discusses helping [Africa cope with Natural Disasters](#)  
 April 2016 CHIRPS data featured as a tool [revolutionize climate adaptation](#)  
 May 2015 USGS News Release [Heat Accelerates Dry in California Drought](#)  
 Feb 2015 USAID Food for Peace Facebook chat on African climate change and food security.  
 Sept 2014 BAMS climate attribution issue released, media coverage on CA article follows.  
 May 2014 Article on CHIRPS in the [Environmental Monitor](#)  
 May 2014 USGS Top Pick on CHIRPS data set “[The State of Rain](#)”  
 Feb 2014 Featured as a ‘Working Geographer’ in a Geography text book by Nelson Publishing  
 June 2012 USGS topline [story](#) on American and African drought.  
 May 2012 USGS science [pick](#) - Evapotranspiration studies could help keep Africa’s Sahel green  
 Apr 2012 USGS science [pick](#) - Poor Spring Rain Projected in Africa -  
 Nov 2011 USGS topline [story](#) – Helping to save lives in Africa  
 Nov 2011 Mali paper featured in [Nature Climate Change](#)  
 Nov 2011 Research featured in article at [thinkprogress.org](#)  
 Sep 2011 Interviewed by Jai Ranganathan for Miller-McCune [Podcast](#)  
 Aug 2011 Research featured in article in [Huffington Post](#)  
 Aug 2011 USGS [Top Line Story](#) – USGS Science supports famine declaration  
 Aug 2011 Research featured in NY Times [blog](#) by Andrew Revkin  
 Aug 2011 Nature Worldview [piece](#) – We thought trouble was coming  
 May 2011 Research featured in [Geospatial Revolution](#) -  
 Mar 2011 Real world Geographer – [National Geographic](#):  
 Mar 2011 Research featured on [Solve Climate News](#)  
 Feb 2011 Nature Climate Change Research [Highlight](#)  
 Jan. 2011 [USGS](#) and [UCSB](#) Climate Dynamics press release  
 Nov 2009 NASA [Article](#) on "Remote Sensing of Agriculture for Food Security Monitoring"  
 Oct 2009 Research presented to the House Foreign Affairs committee  
 Aug 2009 Earthzine [article](#) on reaching the Millennium Development Goals  
 Feb. 2009 Earth Observer [article](#) on forecasting and earlier early warning .  
 Dec 2008 Zimbabwe MODIS analysis featured in EARTH magazine  
 Aug 2008 [UCSB](#) & [NASA](#) Proceedings paper press releases  
 Mar 2008 BBC [interview](#)  
 Feb 2008 Science Perspectives [piece](#)  
 Jan 2008 National Geographic News [Article](#)

### Current Grants and Awards

Co-PI *Early Identification and Forecasts of Reduced-Yield Agricultural Seasons in the Developing World*, April 2019-March 2024.

PI NASA, *Ag Out - An Enhanced IMERG-based Agricultural Outlook System to Support Food Security and Agriculture in the Developing World*, May/2019 – 4/2022.

Co-PI DARPA *High-Expressivity World Modeling for Food Security*, 3/2018-2/2021

Co-PI DFNAS1 NASA *Using Earth Observations and Statistical Models to Enhance Drought, Food Security, and Agricultural Outlooks in Eastern and Southern Africa*, 11/21/19-11/20/22

Co-PI NASA (HARVEST) - *NASA Food Security and Agriculture Consortium (FSAC)* 11/1/17 to 10/31/22

Co-PI SHNAS3 *Connecting West Africa users to cutting edge resources: Integrating satellite observations and sub-*

*seasonal climate forecasts to enhance agricultural and pastoral water-management decision-making using 21st century agro-pastoral water deficit predictions, 11/19 to 10/22*

### **Past Grants**

Co-PI NSF INFEWS/T1: *Understanding multi-scale resilience options for climate vulnerable Africa*, UCSB sub-contract, 10/2016-9/2019. PI Ben Zaichick JHU.

Co-PI, NASA SERVIR, *Enhancing Eastern and Southern Africa climate services by increasing access to remote sensing and model datasets*, 6/2016-7/2019, PI Shukla.

Co-PI, NASA NNX15AL46G, *Predicting Middle Eastern and African Seasonal Water Deficits using NASA Data and Models*, 4/2015-3/2019.

USGS coordinator, USGS cooperative agreement: *Identification of Seasonal and Decadal Drought Through Monitoring and Modeling*, 2/2014-2/2019. PI: Husak, Co-PI Michaelsen.

PI USAID Global Climate Change, *Projecting Future Impacts of Drought on Crop Production and Water Availability*, 6/2016-5/2018. James Verdin also PI.

PI, NASA NNX13AQ95A, *Leveraging CMIP5 and NASA/GMAO Coupled Modeling Capacity for SERVIR East Africa Climate Projections*, 8/2013-1/2017. Co-PI Husak.

Co-PI, USAID, *Planning for Resilience in East Africa through Policy, Adaptation, Research and Economic Development*, 10/2013-9/2018.

Co-I, NASA, *Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa under Evolving Climate Conditions to Support Adaptation Strategies*, PI: Tadesse.

PI NASA NNX16AM02G *Rainfall Climatology and Forecasts for Predicting Crop Yields in Ethiopia*, \$234K, 8/2016-8/2018, Co-PI Husak

USGS coordinator, USGS cooperative agreement: *Innovations for an Integrated Approach to Climate Analysis and Food Security Monitoring*, 12/12/2012-2/11/2014, PI: Husak, Co-PI Michaelsen.

USGS coordinator, USGS cooperative agreement: *Monitoring and Forecasting Climate, Water and Land Use for Food Production in the Developing World*, 10/2008-9/2013. PI: Husak, Co-PI Michaelsen.

Co-PI, NASA, *A Long Time-Series Indicator of Agricultural Drought for the Greater Horn of Africa*, 10/2013-9/2016. PI: Verdin.

PI, NOAA, NA11OAR4310151, *A Global Standardized Precipitation Index supporting the US Drought Portal and the Famine Early Warning System Network*, 9/2011-8/2014. Co-PIs Husak, Michaelsen, Carr.

Co-PI, NASA, *A Land Data Assimilation System for Famine Early Warning*, 7/2012-8/2015. PI: Verdin.

Co-PI, USAID GCC, *Building Africa's capacity to analyze and adapt to climate change*, 10/2012-9/2015. PI: Verdin.

Co-PI, USGS, *Spatially Explicit Modeling and Monitoring of Hydroclimatic Extremes: Reducing the Threat to Food Security in the Developing World*, 10/1/2003-9/2008. PI: Michaelsen.

PI, NASA, *Analyzing persistent tropical and sub-tropical precipitation variations using quasi-global satellite rainfall, evaporation and moisture transports*, 3/2007-3/2009.

CO-PI, USGS, *Agro-meteorological monitoring in Afghanistan*

PI, USDA, *Estimating cropped area in Niger with remotely sensed imagery*, 7/2006-7/2012, Co-PI Michaelsen.

PI, UMASS, *Empirical and diagnostic analysis of the influence of the Madden Julian Oscillation in Central*

*America*, 9/2005-11/2008

PI, NASA, *Developing an Improved Drought Early Warning Data Portal*, 10/2008-9/2009.

PI, NOAA, *Applying Climate Information in Central America*

Co-PI, USDA, *Enhancing Water Table Monitoring in Afghanistan*

PI, NOAA, *Enhancing Caribbean Climate Services to Support Disaster Risk Reduction*, 10/2011-9/2014. Co-PI Pulwarty.

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- P149. Harrison, L., Funk, C., & Peterson, P. (2019). Identifying changing precipitation extremes in Sub-Saharan Africa with gauge and satellite products. *Environmental Research Letters*, 14(8), 085007.
- P150. Funk, C., P. Peterson, M. Landsfeld, F. Davenport, A. Becker, U. Schneider, D. Pedreros, A. McNally, K. Arsenault, L. Harrison, and S. Shukla, 2019: Algorithm and data improvements for version 2.1 of the Climate Hazards Center's Infrared Precipitation with Stations Data Set. In: *Satellite Precipitation Measurement. Adv. Global Change Res.*, Vol. 67, V. Levizzani, C. Kidd, D. B. Kirschbaum, C. D. Kummerow, K. Nakamura, F. J. Turk, Eds. : *Satellite Precipitation Measurement*, 978-3-030-24567-2, 454386\_1\_En, (23).
- P151. Funk C, Harrison L, Alexander L, Peterson P, Behrangi A and Husak G (2019) Exploring trends in wet-season drought indices and quantifying potential temperature impacts in dry regions, *ERL, Environmental Research Letters* 14.11 (2019): 115002.
- P152. Alexander, Lisa V., Hayley J. Fowler, Margot Bador, Ali Behrangi, Markus G. Donat, Robert Dunn, Chris Funk et al. "On the use of indices to study extreme precipitation on sub-daily and daily timescales." *Environmental Research Letters* 14, no. 12 (2019): 125008.
- P153. Davenport, Frank M., et al. (2019) Using out-of-sample yield forecast experiments to evaluate which earth observation products best indicate end of season maize yields. *Environmental Research Letters* 14.12: 124095.



- P154. Shukla, S., Roberts, J., Hoell, A., Funk, C. C., Robertson, F., & Kirtman, B. (2019). Assessing North American multimodel ensemble (NMME) seasonal forecast skill to assist in the early warning of anomalous hydrometeorological events over East Africa. *Climate Dynamics*, 53(12), 7411-7427.
- P155. Kew FS, Philip SY, Hauser M, Hobbins M, Wanders N, van Oldenburgh GJ, van der Wiel K, Veldkamp T, Kimutai J, Funk C, Otto F (2020) Impact of precipitation and increasing temperatures on drought in eastern Africa, *Earth Systems Dynamics*.  
<https://esd.copernicus.org/preprints/esd-2019-20/>
- P156. Trambauer P, Tijssen A, Werner M, Maskey S, Svoboda M, Tadesse T, Veldkamp T, Funk C, Shukla S, Hallegatte S (2019) *Assessing Drought Hazard and Risk : Principles and Implementation Guidance*, <https://www.gfdr.org/en/publication/assessing-drought-hazard-and-risk>
- 2020 -----
- P157. Arsenault KR et al. (2020) The NASA hydrological forecast system for food and water security applications. 2020. DOI: 10.1175/BAMS-D-18-0264.1
- P158. Williams, E., Funk, C., Shukla, S., & McEvoy, D. "Quantifying Human-Induced Temperature Impacts on the 2018 United States Four Corners Hydrologic and Agro-Pastoral Drought." *Bulletin of the American Meteorological Society* 101.1 (2020): S11-S16.
- P159. Peng J., Dadson S, Hirpa F, Dyer E, Lees T, Miralles D.G., Vicente-Serrano S.m., Funk C., (2020) A pan-African high-resolution drought index dataset, *Earth System Science Data*, *Earth System Science Data*, 12, 753-769.
- P160. Funk C and Shukla S, *Drought Early Warning and Forecasting: Theory and Practice* (2020) Elsevier Press. ISBN 0128140119, 238 pages.
- P161. Shukla S, Arsenault KR, Hazra A, Peters-Lidard C, Koster RD, Davenport F, Magadzire T, Funk C, Kumar S, McNally A, Getirana A, Husak G, Zaitchik B, Verdin J, Nsadisa FD, and Becker-Reshef, I (2020) Improving early warning of drought-driven food insecurity in southern Africa using operational hydrological monitoring and forecasting products. *Natural Hazards and Earth System Sciences*. DOI: <https://doi.org/10.5194/nhess-20-1187-2020>.
- P162. Helman, D., Zaitchik, B. F., & Funk, C. (2020). Climate has contrasting direct and indirect effects on armed conflicts. *Environmental Research Letters*. 15 (2020) 104017.
- P163. Verdin A, Funk C, Peterson P, Landsfeld M, Tuholske C, Grace K (2020) Development and validation of the CHIRTS-daily quasi-global high-resolution daily temperature data set, *Scientific Data*, 7 (1), 1-14.
- P164. Blakeley S, Husak G, Harrison L, Funk C, Osgood D, Peterson P and Adoum A (2020) Identifying precipitation and reference ET patterns and trends in West Africa to support drought insurance, *Remote Sensing*, 12(15), 2432.
- P165. Enenkel, M., Brown, M. E., Vogt, J. V., McCarty, J. L., Bell, A. R., Guha-Sapir, D., ... & Anderson, M. (2020) Why predict climate hazards if we need to understand impacts? Putting humans back into the drought equation. *Climatic Change*, 1-16.
- P166. Funk, Chris. "Ethiopia, Somalia and Kenya face devastating drought." *Nature* 586.7831 (2020): 645-645.
- P167. Phuong Loan, N., Bador, M., Alexander, L. V., Lane, T. P., & Funk, C. C. (2020). On the robustness of annual daily precipitation maxima estimates over Monsoon Asia. *Frontiers in Climate*, 2, 13.
- P168. Geleta TD, Korecha Dadi D, Feyisa DH, Gizaw AW (2021) Long-term land use land cover change in urban centers of Southwest Ethiopia from the Climate Change perspective *Frontiers in Climate*. <https://doi.org/10.3389/fclim.2020.577169>.

- P169. Shukla S, Husak G, Turner W, Funk C, Davenport F, Harrison L, Krell N (2020) A slow rainy season onset is a reliable harbinger of drought in most food insecure regions in Sub-Saharan Africa, *PLOS ONE*, 16(1), e0242883.
- P170. Shukla S, Landsfeld M, Anthony M, Budde M, Husak G, Rowland J and Funk C (2021) Enhancing the application of Earth Observations for improved environmental decision-making using the Early Warning eXplorer (EWX), *Frontiers in Climate*, <https://doi.org/10.3389/fclim.2020.583509>.
- P171. Seregina LS, Fink AH, van der Linden R, Funk C, Pinto JG (2021) Using seasonal rainfall clusters to explain the interannual variability of the rain belt over the Greater Horn of Africa, *Int. J. Climate*, <https://doi.org/10.1002/joc.6802>. 41, E1717-E1737
- P172. Kew FS, Philip SY, Hauser M, Hobbins M, Wanders N, van Oldenburgh GJ, van der Wiel K, Veldkamp T, Kimutai J, Funk C, Otto F (2020) Impact of precipitation and increasing temperatures on drought in eastern Africa, *Earth Systems Dynamics*. 12 (1), 17-35.
- P173. Verdin A, Grace K, Davenport F, Funk C and Husak G (2021) Can we advance individual-level heat-health research through the application of stochastic weather generators?, *Climatic Change*, 164 (1), 1-13.
- P174. Shukla S, Macharia D, Husak G, Landsfeld M, Nakalembe CL, Blakeley SL, Adams E (2021) Enhancing access and usage of earth observations in environmental decision-making in Eastern and Southern Africa through capacity building, *Frontiers in Sustainable Food Systems*, 5, 67.
- P175. Grace K, Verdin A, Dorélien A, Davenport F, Funk C, Husak G (2021) Exploring Strategies for Investigating the Mechanisms Linking Climate and Individual-Level Child Health Outcomes: An Analysis of Birth Weight in Mali, *Demography* 58 (2), 499-526.
- P176. Funk C, Hoell A, and Mitchell D (2021) How combining "Models Of" and "Models For" climate extremes can help us provide better climate services, *Frontiers in Climate, Frontiers in Climate Services*, June 2021, <https://www.frontiersin.org/articles/10.3389/fclim.2021.680291/full>.
- P177. Funk C, Turner W, McNally A, Hoell A, Harrison L, Galu G, Slinski K, Way-Henthorne J, Husak G (2021) An Agro-Pastoral Phenological Water Balance Framework for Monitoring and Predicting Growing Season Water Deficits and Drought Stress, *Frontiers in Climate*, v3(88), <https://www.frontiersin.org/article/10.3389/fclim.2021.716568>, DOI=10.3389/fclim.2021.716568.
- P178. Funk C, Way-Henthorne J and Turner W (2021) Phenological Water Balance Applications for Trend Analyses and Risk Management, *Front. Clim.*, 20 September 2021 | <https://doi.org/10.3389/fclim.2021.716588>
- P179. Funk, C., (2021) Drought, Flood, Fire: How Climate Change Contributes to Recent Catastrophes, Cambridge Press, editor: Matt Lloyd. June 2021, ISBN 9781108885348, DOI: <https://doi.org/10.1017/9781108885348>.
- P180. Tuholske C, Caylor K, Funk C, Verdin A, Sweeney S, Grace K, Peterson P, and Evans T. (2021) Global Urban Population Exposure to Extreme Heat, *Proceedings of the National Academy of Sciences*, 114.81.
- P181. Davenport FM, Shukla S, Turner W, Funk C, Krell N, Harrison L, Husak G, Lee D, Peterson S (2021) Sending out an SOS: using start of rainy season indicators for market price forecasting to support famine early warning, *Environmental Research Letters*, 16 (8), 084050.
- P182. Kew SF, Philip SY, Hauser M, Hobbins M, Wanders N, Van Oldenburgh GJ, Van Der Wiel K, Veldkamp TIE, Kimutai J, Funk C, Otto FEL (2021) Impact of precipitation and increasing temperatures on drought trends in eastern Africa, *Earth System Dynamics* 12 (1), 17-35.
- P183. Shukla S, Husak G, Turner W, Davenport F, Funk C, Harrison L, and Krell N (2021) A slow rainy season onset is a reliable harbinger of drought in most food insecure regions in Sub-Saharan Africa, *Plos one* 16 (1), e0242883.

- P184. Sarmiento DP, Slinski K, McNally A, Funk C, Peterson P, & Peters-Lidard C.D (2022) Daily precipitation frequency distributions impacts on land-surface simulations of CONUS. *Frontiers in Water*, 92. <https://doi.org/10.3389/frwa.2021.640736>.
- P185. Nicholson, S.E., Fink A.H., Funk C., Klotter, D.A. and A.R. (2022) Meteorological causes of the catastrophic rains of October/ November 2019 in equatorial Africa. *Global and Planetary Change*, Volume 208: 103687.
- P186. Funk et al. (2022) Introducing and evaluating CHIMES - Timely station-enhanced Integrated Multi-satellite Retrievals for Global Precipitation Measurement, *Bulletin of the American Meteorological Society*, 103 (2), E429-E454. <https://journals.ametsoc.org/view/journals/bams/103/2/BAMS-D-20-0245.1.xml>

#### In Press

- P187. Vincent KE, Archer ERM, Soares MB, Dougill AJ, Funk CC (2022) Extreme events in the developing world, *Frontiers in Climate*, section Climate Services, In Press.

#### In Review -----

- P188. Adloff M et al. (2020) Groundwater availability in East African drylands dominated by increasing intense short rains, *Nature Sustainability*, In Review.
- P189. Harrison L, Landsfeld M, Husak G, Davenport F, Shukla S, Turner T, Peterson P, and Funk C (2022), CHIRPS-compatible NCEP GEFS Precipitation Forecasts for Advancing Early Warning Capabilities, *Scientific Data*, In Review
- P190. Lee D et al. (2022) Operational maize yield forecasts for Sub-Saharan Africa using Earth observation data and machine learning, *Global Food Security*, In Review.

#### TECHNICAL PRESENTATIONS

- Funk**, C., and Willmott, C. W., 1997: A comparison of precipitation interpolation methods. Association of American Geographers Annual Meeting, Fort Worth, Texas.
- Funk**, C., Curtin, K., Goodchild. M. F., Montello, D., Norohna, V., 1998: Formulation and test of a model of positional distortion fields. Third International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences, Quebec City, Canada, May, 1998.
- Funk**, C., Michaelsen, J. and Verdin, J., 2000: Famine Early Warning System in Africa and method for high resolution precipitation and NDVI forecasting. Denver University Geography Department, April 13th, 2000. **Invited** Presentation.
- Funk**, C. 2000: Multiscale Precipitation Forecasting. EPA Science to Achieve Results Workshop Washington DC.
- Funk**, C., 2001: EPA Science to Achieve Results Workshop. Mechanisms of Interannual Variability in African Rainfall and Vegetation, Silver Springs, Maryland. July 2001.
- Funk**, C., Michaelsen J., and Verdin, J., 2001: The Collaborative Historical African Rainfall Model: Synopsis and Applications; Vulnerability Assessment and Mapping Workshop for Southern Africa, EROS Data Center, Sioux Falls, South Dakota. November 11th, 2001.
- Funk**, C.; Michaelsen, J.; Verdin, J.; Husak, G.; Magadzire, T., 2002: Maps of the Future: Precipitation Forecasts and the Famine Early Warning System. Utah Geography Department, Feb 17th 2002. **Invited** Seminar.
- Funk**, C., Husak, G., Verdin, J., Michaelsen, J., 2002: The FEWS-NET Agroclimatology Toolkit; Ninth Greater Horn of Africa Climate Outlook Forum, Eldoret, Kenya. April 10th, 2002.
- Verdin, J., **Funk**, Senay, G., C., Michaelsen, J., 2002: Agrometeorological Drought Scenarios for the Limpopo Basin of Mozambique, Mozambique Drought Atlas Workshop, Maputo, Mozambique, June 19th, 2002.

- Husak, G., **Funk** C., Michaelsen, J., Verdin, J., 2002: The Forecast Interpretation Tool; The USGS FEWS NET AgroClimatology Training Workshop, Harare, Zimbabwe, September 9th-10th, 2002.
- Husak, G., **Funk** C., Michaelsen, J., Verdin, J., 2002: Role of the GIS in Forecasting; The Southern African Climate Outlook Forum, Harare, Zimbabwe, September 4th-6th, 2002.
- Funk**, C., Michaelsen, J., Verdin, J., Rowland, J., Husak, G., Magadzire, T., 2003: What does FEWS NET need from the El Niño Forecast Community? All FEWS NET meeting; Washington D.C. January 16th, 2003.
- Funk**, C., Michaelsen, J., Verdin, J., Rowland, J., Husak, G., Magadzire, T., Senay, G., Artan, J., 2003: Climatology and Rainfall Estimation to Support Food Security, International Research Institute for Climate Prediction; Lamont Doherty Earth Observatory, Palisades, NY. January 14th, 2003. **Invited Talk.**
- Funk**, C. and H. Gadain, 2003: Data and Techniques to assist RVF/Forage Model Development; Livestock Experts Workshop, Nairobi Kenya, April 2nd, 2003.
- Funk**, C., 2004: Forecasting the Water Requirement Satisfaction Index, Climate Outlook Forum, San Jose Costa Rica. August 2004.
- P191. **Funk**, C., Pedreros, D., L. Aguilar, and Senay, G. 2004: Led 4-day forecast interpretation training workshop, S
- In Press ----
- P192. Grace, K., A. Verdin, A. Dorelien, F. Davenport, G. Husak, C. Funk (2020) Exploring strategies for investigating the mechanisms linking climate and individual-level child health outcomes: an analysis of birth weight in Mali, Demography, In Press.
- P193.
- P194. Nicholson SE, Fink AH, Funk C, Klotter D and AR Satheesh (2020) Meteorological causes of the catastrophic rains of October/November 2019 in equatorial Africa, J. of Global and Planetary Change, In Press.
- P195. Sarmiento DP, Slinski K, McNally A, Funk C, Peterson P , Peters-Lidard CD (2021) Daily rainfall frequency distributions impacts on land-surface simulations of CONUS, Frontiers in Water, In Review.
- P196. Davenport F et al. (2021) Using Start of Rainy Season Indicators for Market Price Forecasting to Support Famine Early Warning, Environmental Research Letters. In Review.
- P197.
- an Jose Costa Rica. August 2004.
- Funk**, C., 2004: Rainfall estimation efforts in 2004. FEWS NET Science Workshop, Sioux Falls, SD, October, 2004.
- Funk**, C., 2004: Statistical Models of NDVI Change using precipitation and relative humidity. FEWS NET Science Workshop, Sioux Falls, SD, October, 2004.
- Funk**, C., 2005: FEWSNET research related to Central Southwest Asia. Workshop on the Hydrology of Central Southwest Asia. Annual Meteorological Society annual meeting, San Diego. Jan 15th, 2005.
- Verdin, J., **Funk**, C., Magadzire, T., Michaelsen, J., and Husak, G. 2005: Monitoring and Forecasting Drought in Southern Africa during the 2002-2003 season. Poster. Annual Meteorological Society annual meeting, San Diego. Jan 14th, 2005.
- Funk**, C. and Brown M., 2005: An empirical study of the links between NDVI and atmospheric variables in Africa with applications to forecasting vegetation change and precipitation. American Meteorological Society annual meeting, San Diego. Jan 14th, 2005.
- Funk**, C., Techniques for providing precipitation time-series for river basins in Afghanistan, USGS Afghanistan Water Team meeting, USGS EROS, Sioux Falls, South Dakota. September, 2005.
- Funk**, C., Remotely Sensed Aids to Cropped Area and Production Estimates, Famine Early Warning System Network 2005 Science meeting, Sept. 2005.
- M.E. Brown, C.C. **Funk**, T. Boudreau and C.J. Tucker., Multiple Roles of Satellite Data in Livelihood-Based Famine Early Warning for Decision Makers, US Climate Change Science Program's Climate Science in Support of Decision Making Workshop, Arlington Virginia, 10/2005.
- Funk**, C., Recent dryness in eastern subtropical Africa, Drought and Agricultural Monitoring meeting, USGS Menlo Park, Dec 6th 2005.
- Funk**, C. and Husak, G. Workshop Coordinators, Drought and Agricultural Monitoring meeting, USGS Menlo Park, Dec 6th 2005.
- Funk**, C., Verdin, J., Senay, G., Techniques for monitoring and predicting water vulnerability with an application in Ethiopia, American Geophysical Union Fall Meeting in San Francisco, December 2005.

Freund, J.T., Husak, G., **Funk**, C., Brown, M. E., Galu, G., Identifying the Impact of Natural Hazards on Food Security in Africa: Crop Monitoring Using MODIS NDVI Time-Series, American Geophysical Union Fall Meeting in San Francisco, December 2005.

Brown, M and **Funk**, C., Inter-seasonal NDVI Change Projections for Food Security and Disease Early Warning in Africa, American Geophysical Union Fall Meeting in San Francisco, December 2005.

Advisor, Contributions of Remote Sensing for Decisions about Human Welfare, National Research Council meeting, January 30-31, 2006 in the National Academies of Science Keck Center, 500 5th Street NW, Washington DC, 1/2006.

**Funk**, C., "Famine Early Warning Science", UCSB Back-to-School Night, 10/27/2006.

Verdin, K., Pedreros, D., Godt, J., Verdin, J., Worstell, B., **Funk**, C., Global Slope Dataset for estimation of landslide occurrence resulting from earthquakes Global Slope Dataset for estimation of landslide occurrence resulting from earthquakes, ESRI Users Conference 2006 -- San Diego Convention Center, 8/2006.

**Funk**, C., Remotely Sensed Aids to Cropped Area and Production Estimates, Famine Early Warning System Network Science Meeting, 9/2006.

**Funk**, C., Decision support for earlier warning and long range humanitarian planning, FEWS NET Team Meeting, USAID, Washington DC., 10/2006.

**Funk**, C., Trends in Food Security and Climate Change in Africa, UCSB Back-to-school Night, 10/2006.

**Funk**, C., Recent Climate Hazard Group Research. FEWS NET Science Meeting, 11/2006.

Brown, M., Choularton, R. and **Funk**, C., Natural Disaster Scenarios in the Food Security Early Warning Contingency Planning Process: the Role of Remotely Sensed Vegetation and Rainfall Data, Fall meeting of the American Geophysical Society in San Francisco CA December 11-15, 2006.

**Funk**, C., Artan G., Monitoring large-basin low-frequency hydrologic variability in sub-Saharan Africa, Fall meeting of the American Geophysical Society in San Francisco CA, December 11-15, 2006.

**Funk**, C., Drought Tendencies in Eastern And Southern Africa, USGS EROS Data Center, Sioux Falls, SD. 12/2006, **Invited** noontime seminar.

**Funk**, C., "Kicking off the CAN", Science workplan for MFR forecasting of precipitation and vegetation, NASA DSS Planning meeting, USGS EROS Data Center, 12/2006.

**Funk**, C., Husak, G., Michaelsen, J., Love, T. and Pedreros, D. (2007) Third generation rainfall climatologies: satellite rainfall and topography provide a basis for smart interpolation. Crop and Rangeland Monitoring Network for the Greater Horn of Africa Workshop, Nairobi Kenya, March 2007.

**Funk** C. & M. Budde, National MODIS NDVI-based production anomaly estimates for Zimbabwe, Crop and Rangeland Monitoring Network for the Greater Horn of Africa Workshop, Nairobi, Kenya. March 2007.

**Funk** C., NASA-Supported Climate Early Warning, USGS FEWS NET Science Meeting, August 6-7, 2007, NOAA Earth System Research Laboratory, Boulder, Colorado.

**Funk** C., Verdin J., Brown, M., Galu G. Long term trends in climate and related vulnerabilities, USGS FEWS NET Science Meeting, August 6-7, 2007, NOAA Earth System Research Laboratory, Boulder, Colorado.

**Funk** C., Rainfall Estimate Enhancement, USGS FEWS NET Science Meeting, August 6-7, 2007, NOAA Earth System Research Laboratory, Boulder, Colorado.

**Funk** C., Reduced onshore moisture transports threaten food insecure eastern and southern Africa Organizer, Earth System Research Laboratory Workshop, Climate Change and Predictability: Implications for Food Security in Africa and Beyond, NOAA/ESRL. Friday August 3rd, 2007, **Invited Talk**.

Husak, G.J., Marshall, M., **Funk**, C., Pedreros, D., Michaelsen, J., Harrison, L., Developing Cropped Area Estimates for Niger From Multi-sensor Satellite Imagery, EOS Trans. AGU 88(52), Fall Meet. Suppli., B13D-1532, December, 15, 2007.

Freund, J.T., **Funk**, C., Budde, M.E, Michaelsen, J., MODIS NDVI-Based Crop Production Estimates for Zimbabwe in 2006/07, EOS Trans. AGU 88(52), Fall Meet. Suppli., B13D-1533, December, 15, 2007.

Brown, ME, **Funk**, CC, Galu, G, Choularton, R., Integrating earth observations and model results provides earlier Famine Early Warning, EOS Trans. AGU 88(52), Fall Meet. Suppli., H31L-05. December, 17, 2007.

**Funk**, C., Dettinger, M., Verdin, J., Examining the potential impact of a warming ocean on food insecure Africa: concerns and mechanisms for abrupt climate change, EOS Trans. AGU 88(52), Fall Meet. Suppli., GC33A-0946, December, 17, 2007.

**Funk**, C. & Verdin, J., Climate Change, Agricultural Capacity and trends in African Food Security, AAAS symposium on Climate Change and African Food Security, Boston, February 17th, 2008

**Funk**, C. Using TRMM for drought monitoring, NIDIS Knowledge Assessment Workshop: Contributions of Satellite Remote Sensing to Drought Monitoring, Boulder, Co, Feb. 7th, 2008. **Invited** Panelist/Presenter.

**Funk**, C., Huffman, G., Verdin, J., Verdin, K., Climatologically Assisted Satellite Estimation, 3rd International

- TRMM Meeting, Las Vegas, NV, Feb. 5th 2008.
- Climate Change: Our Health in the Balance-Panel Discussion, Ventura, CA, (2008) KEYT news coverage. March 16, 2008.m **Invited** Panelist.
- Funk**, C., Improving agro-climatic hydrologic modeling in Africa through the use of high-resolution climatologies, NASA Precipitation Monitoring Mission, Science Team Meeting, Fort Collins, CO, 8/2/2008
- Funk**, C., Early Warning Decision Support, Climate Change, and the Early Warning Explorer, IRI, Palisades, NY, 10/15/2008. **Invited** Lecture.
- Funk**, C. & Verdin, J. An integrated climate service strategy for African drought monitoring and prediction: linking information to action, Fall meeting of the American Geophysical Society in San Francisco CA December 11-15, 2008.
- Funk**, C., USGS Drought monitoring consultancy to India (12 talks), 1/10/2009-1/21/2009.
- Funk**, C., Validation of Satellite Estimates for Africa, **Invited** Panelist, International Workshop on satellite rainfall estimation for drought early warning, Joint Research Centre, Ispra, Italy, 2/2009.
- Verdin, J., **Funk**, C., M. Dettinger, M. Brown (2009) Estimating probabilistic rainfall and food security outcomes for eastern and southern Africa, Annual Meeting of the Canadian Geo-physical Union, Toronto, Canada, May 27th, 2009.
- Funk**, C., Integrated monitoring with climate projections, Boulder, Co, USGS FEWS NET Science Meeting, 6/15/2009.
- Funk**, C., Climate Change, Agriculture and Alternatives to Marine Production, 6th WIOMSA Symposium, Reunion, August 27th 2009, **Invited** presentation.
- Funk**, C., USGS Climate Change Science for Famine Early Warning, USGS Main Office, Geography Discipline, Reston, 8/11/2009, **Invited** lecture.
- Funk** C., Integrating Trend Analyses into Famine Early Warning, Denver University, 9/15/2009, **Invited** Seminar
- Funk** C. and Verdin, J., Climate change Impacts on Food Security: Findings and Workplan, The Global Water Initiative - Implications of Climate Change and Variability on African Water Resources, September 21-23 2009, University of Cambridge, United Kingdom, **Invited** Presentation
- Funk** C (2009) Walker, Hadley, Supply, Demand, Geospatial Modeling and Preventing Famine, UCSB Spatial Seminar, Sept 14th 2009.
- Funk** C (2009) Understanding the Role of Water Vapor Transport Anomalies in Asian and African Monsoon Droughts Using New Satellite Observations NASA Precipitation Monitoring Mission meeting, Salt Lake City, Oct. 27 2009 .
- Verdin J. and C. **Funk**, How famine early warning can highlight priorities for climate change adaptation, American Meteorological Society, January, 2009.
- Funk** C (2009) Climate Change Research Plan, FEWS NET Remote Monitoring Meeting, Geography Department, University of California Santa Barbara, California February 23-24, 2010
- Funk** C (2009) Enhanced Precipitation Datasets, FEWS NET Remote Monitoring Meeting, Geography Department, University of California Santa Barbara, California February 23-24, 2010
- Funk**, C., Verdin, J., Rowland J. (2010) Understanding and adapting to climate impacts on food security, USGS Climate Change Conference, Broomfield, Co, March 9-11.
- Funk**, C. , J. Verdin, C. Peters-Liddard, S. Yatheendradas, A. McNally (2010) A Land Data Assimilation System for Famine Early Warning, 3rd USGS Modeling Conference: Understanding and Predicting for a Changing World, 7-11 June 2010 Broomfield, Colorado
- Funk** C., 2010, Precipitation Indices for the Americas, Workshop on Re-establishing the Caribbean Regional Climate Outlook Forum, Shell Suites, University of the West Indies, Cave Hill Barbados June 21-23, 2010, **Invited** Presentation.
- Funk**, C. and Greg E., Update on the Early Warning Explorer, USGS FEWS NET Science Meeting, Boulder, CO, 8/27/2010
- Funk**, C., Eastern African Climate Change Analyses to Guide Adaptation, Kenya Mission, Nairobi, Sept. 7th 2010
- Funk**, C., Eastern African Climate Change Analyses to Guide Adaptation, 25th East African Climate Outlook Forum, Kisumu, Kenya, Sept. 10th 2010, **Invited** Presentation.
- Marshall, M T, **Funk**, C C, Michaelsen, J (2010) Spatio-temporal Characteristics of Actual Evapotranspiration Trends in sub-Saharan Africa, H24B-06, 12/14/2010, Moscone South, San Francisco, 2010. Presentation.
- Thorpe, AK, Bradley, ES, **Funk**, C, Roberts, DA, Leifer I, Dennison, PE, Margulis, J Poster, Mapping methane from marine and terrestrial hydrocarbon seepage using AVIRIS, A53D-0283, 12/17/2010, Moscone



- South, San Francisco, 2010. Poster
- Pedrerros, D, Michaelsen, J , Carvalho, L V, **Funk**, C C, Husak, G J, The Effect of El Niño on Agricultural Water Balances in Guatemala, AGU Fall Meeting, NH21A-1401, change adaptation with insights from famine early warning (**Invited**), H211-03, 12/14/2010, Moscone South, San Francisco, 2010. Poster
- Funk**, C C, Verdin, J P, Informing climate change adaptation with insights from famine early warning, H211-03, Tuesday 12/14/2010, 3022 Moscone West. **Invited** Presentation.
- McNally, A., S. Yatheendradas, H. Jayanth, C. Peters-Lidard, C. **Funk**, J.P Verdin, J. Michaelsen. Improving agricultural drought monitoring in Africa with unbiased rainfall fields and detailed land surface physics, Presented by A. McNally at American Geophysical Meeting: Drought and Food Security, 14 December 2010 San Francisco.
- Harrison, L., Michaelsen, J., **Funk**, C., Tarnavsky, E., Marshall, M., Brown, M. (2011) Temperature-driven PET Projections, AMS 2011 Annual Meeting, 25th Conference on Hydrology Tuesday, Jan 25 2011, Seattle, WA.
- Soni Yatheendradas, Christa Peters-Lidard, Amy McNally, Chris **Funk**, James Verdin, Harikishan Jayanthi (2011) Enhancing the Famine Early Warning Systems Network (FEWS NET) over Africa by tracking agricultural drought using NASA product-based FEWSNET Land Data Assimilation System (FLDAS) NASA Water Resources Applications Program, Washington DC, April 21st 2011.
- Funk**. C. (2011) Monitoring Drought Across Many Scales, DDAD2011, Purdue University, June 21-22nd, **Invited** keynote and panelist.
- Funk** C. (2011) FEWS NET Climate Change Datasets, Analyses and Plans, Third International Crop and Rangeland Monitoring meeting, Nairobi, Kenya, September 28th. Session chair and keynote presenter.
- Funk** C. (2011) Evaluating the drought monitoring capabilities of rainfall estimates for Africa, Third International Crop and Rangeland Monitoring meeting, Nairobi, Kenya, January 26th. Session chair and presenter.
- Funk** C. and Verdin J. (2011) Understanding and Adapting to More Frequent Droughts in Eastern Africa, World Climate Research Programme meeting, Denver, Co, October 26th. **Invited** Poster.
- Jayanthi, H., McNally A., **Funk** C., Verdin J. (2011) Application of the LIS to drought monitoring, November 16th, PECORA, Washington DC.
- Rowland J., **Funk**, C., Galu G., Magadzire, Drought and famine early warning in the Horn of Africa, COP 17 side event, 2011, Durban, South Africa.
- Dettinger, M. D., Earman, S., & **Funk**, C. C. (2011, December). Climate Change and Groundwater-Implications for Global Food and Water Security. In AGU Fall Meeting Abstracts (Vol. 1, p. 01). Abstract Number
- McNally, A., Yatheendradas, S., Jayanthi, H., **Funk**, C. C., & Peters-Lidard, C. D. (2011, December). Validating modeled soil moisture with in-situ data for agricultural drought monitoring in West Africa. In AGU Fall Meeting Abstracts (Vol. 1, p. 1323). Abstract Number
- Funk**, C. C., Mishra, V., & Davenport, F. (2011, December). Hydrologic and Undernourishment Trends In Food Insecurity Hotspots. In AGU Fall Meeting Abstracts (Vol. 1, p. 04). Abstract Number GC11C-04. **Invited Talk**.
- Funk**, C. C., Williams, A. P., Mishra, V., Barlow, M. A., Hoerling, M. P., & Hoell, A. (2011, December). Potential Change in the Indian Monsoon Circulation. In AGU Fall Meeting Abstracts (Vol. 1, p. 0158). Abstract Number A31F-0158. **Invited**.
- Pedrerros, D., **Funk**, C., Michaelsen, J., Peterson, P., Verdin, A., Magadzire, T., & Rodriguez, M. (2011, December). Validation of the FEWS NET Satellite Estimated Rainfall Enhancement Process. In AGU Fall Meeting Abstracts (Vol. 1, p. 0098). Abstract Number A31C-0098.
- Thorpe, A. K., Roberts, D. A., Dennison, P. E., Bradley, E. S., & **Funk**, C. C. (2011, December). Detection of trace gas emissions from point sources using shortwave infrared imaging spectrometry. In AGU Fall Meeting Abstracts (Vol. 1, p. 0366). Abstract Number A13E-0366.
- Dennison, P. E., Qi, Y., Thorpe, A. K., Pardyjak, E., Roberts, D. A., Bradley, E. S., & **Funk**, C. C. (2011, December). High Spatial Resolution Mapping of Power Plant Carbon Dioxide Plumes Using Imaging Spectrometer Data. In AGU Fall Meeting Abstracts (Vol. 1, p. 05). Abstract number A41H-05.
- Budde, M. E., Rowland, J., Senay, G. B., **Funk**, C. C., Pedrerros, D., Husak, G. J., & Bohms, S. (2011, December). New and Improved Remotely Sensed Products and Tools for Agricultural Monitoring Applications in Support of Famine Early Warning. In AGU Fall Meeting Abstracts (Vol. 1, p. 0558). Abstract Number B13B-0558.
- Funk**, C. Hoell, A. and Michaelsen, J. (2012) Exploring the recent intensification of the Walker Circulation, and its implications for climate change and prediction, **Invited** seminar, UCSD Scripps Institute,

3/31/2012.

- Funk** C. and Eilert G. (2012) African food security is a feature of US national security, National Research Council, National Academy, Washington DC., March 30th 2012. **Invited** presentation.
- Funk** C. (2012) Rainfall Outlook for 2012 - FEWS NET main office, Washington DC, March 29th 2012. **Invited** presentation.
- Funk** C. (2012) The Intensified Walker Circulation, USGS Climate and Landuse Webinar series, April 18th 2012. **Invited** presentation.
- Funk**, C. (2012) Developing Integrated Climate Services, **Invited** seminar, Environmental Engineering Seminar Series, UC Irvine, 5/25/2012.
- Funk**, C., A. Hoell, J. Verdin, J. Rowland, G. Husak (2012) Geospatial Hydroclimatology - Pacific SST Impacts, National Research Program, USGS EROS, Sioux Falls, SD, September 19, 2012.
- Funk** C. and G. Galu Custom seasonal forecasts for GHA (2012) FEWS NET Science Meeting October 2-3, 2012 University of California, Santa Barbara - Agricultural Drought: New Directions in Risk Assessment, Monitoring, and Forecasting, October 2nd, 2012.
- Funk**, C. and G. Eilerts, G. Galu (2012) PREPARED and CC adaptation outreach, FEWS NET Science Meeting October 2-3, 2012 University of California, Santa Barbara
- Funk** C. and J. Rowland (2012) Update on Climate Change Fact Sheet series, FEWS NET Science Meeting October 2-3, 2012 University of California, Santa Barbara, Agricultural Drought: New Directions in Risk Assessment, Monitoring, and Forecasting, October 2nd, 2012.
- Funk** C. (2012) Using Climate Change Analyses to Guide Adaptation, UCSB CHC-Michigan State University working group discussions, Santa Barbara, CA, September 27th 2012.
- Funk** C. (2012) Roundtable Discussion on the Future of Food, Annual Meeting of the Society for Environmental Journalists, Lubbock, TX, October 10th 2012. **Invited** panelist.
- Funk** C. (2012) Future Climate, John Hopkins University, Climate Dynamics Of Tropical Africa, Baltimore, MD, November 16th 2012. **Invited** keynote speaker.
- Robertson, F. R., Roberts, J. B., **Funk**, C. C., Lyon, B., & Ricciardulli, L. (2012, December). Upper-Ocean Heat Balance Processes and the Walker Circulation in CMIP5 Model Projections. In AGU Fall Meeting Abstracts (Vol. 1, p. 1244). Abstract Number GC51E-1244.
- Budde, M. E., Rowland, J., Senay, G. B., **Funk**, C. C., Husak, G. J., Magadzire, T., & Verdin, J. P. (2012, December). Monitoring Global Food Security with New Remote Sensing Products and Tools. In AGU Fall Meeting Abstracts (Vol. 1, p. 04). Abstract Number B53H-04.
- Mahowald, N. M., Harrison, L. S., Shukla, S., & **Funk**, C. C. (2012, December). Can earth system models be used for impact studies?. In AGU Fall Meeting Abstracts (Vol. 1, p. 02). Abstract Number GC32B-02.
- Shukla, S., **Funk**, C. C., Dettinger, M. D., & Robertson, F. R. (2012, December). Evaluation of CMIP5 models in the context of food security assessments in Sahel and Eastern Africa. In AGU Fall Meeting Abstracts (Vol. 1, p. 0965). Abstract Number GC41B-0965.
- Funk**, C. C., & Dettinger, M. D. (2012, December). Water Vapor, Differential Rates of Warming, Available Potential Energy, and the Hadley Circulation. In AGU Fall Meeting Abstracts (Vol. 1, p. 1264). Abstract Number GC53A-1264. **Invited Talk**.
- Pricope, N. G., Michaelsen, J., Husak, G. J., **Funk**, C. C., & Lopez-Carr, D. (2012, December). Emerging landscape degradation trends in the East African Horn. In AGU Fall Meeting Abstracts (Vol. 1, p. 07). Abstract number GC53E-07.
- Husak, G. J., & **Funk**, C. C. (2012, December). Agricultural Early Warning Informing Humanitarian Response in East Africa for 2012. In AGU Fall Meeting Abstracts (Vol. 1, p. L05). Abstract Number H31L-05.
- Barlow, M. A., **Funk**, C. C., & Hoell, A. (2012, December). West Pacific Trends and the Walker Circulation. In AGU Fall Meeting Abstracts (Vol. 1, p. 07). Abstract Number GC44D-07.
- Pedrerros, D. H., **Funk**, C. C., Husak, G. J., Michaelsen, J., Peterson, P., Lasndsfeld, M., ... & Rodriguez, M. (2012, December). Developing New Rainfall Estimates to Identify the Likelihood of Agricultural Drought in Mesoamerica. In AGU Fall Meeting Abstracts (Vol. 1, p. 1596). Abstract Number NH21B-1596.
- Harrison, L. S., Michaelsen, J., **Funk**, C. C., Carvalho, L. V., Still, C. J., McNally, A., & Peters-Lidard, C. D. (2012, December). Identifying surface response to drought and heat with a land surface model and NDVI. In AGU Fall Meeting Abstracts (Vol. 1, p. 0247). Abstract Number A13D-0247.
- Thorpe, A. K., Dennison, P. E., Roberts, D. A., Bradley, E. S., & **Funk**, C. C. (2012, December). Airborne mapping of methane, carbon dioxide, and water vapor plumes using imaging spectrometry. In AGU Fall Meeting Abstracts (Vol. 1, p. 01). Abstract Number A41N-01.
- McNally, A., **Funk**, C. C., Yatheendradas, S., Michaelsen, J., Cappelarere, B., Peters-Lidard, C. D., & Verdin, J. P. (2012, December). Improving agricultural drought monitoring in West Africa using root zone soil

- moisture estimates derived from NDVI. In AGU Fall Meeting Abstracts (Vol. 1, p. 02). Abstract Number GC44A-02.
- Husak, G. J., **Funk**, C. C., Verdin, J. P., Rowland, J., & Budde, M. E. (2012, December). Remote Sensing and Capacity Building to Improve Food Security. In AGU Fall Meeting Abstracts (Vol. 1, p. 05). Abstract Number ED22A-05.
- Funk**, C. and Dettinger M. (2012) Water Vapor, Differential Rates of Warming, Available Potential Energy, and the Hadley Circulation, poster, AGU, 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Co-Chair - Variations in Surface Wind Patterns and the Walker Circulation: Observations and Model Predictions I, AGU, 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Co-Chair - Observed and Projected Climate Change Impacts on Water Resources and Agriculture I, AGU, 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Funk**, C. and G. Husak, J. Michaelsen, A. Hoell, and J. Verdin , 2013: East African Drought Prediction and Humanitarian Responses in 2012, Annual Meeting of the American Meteorological Society, Austin TX, 7 January 2013.
- Funk**, C. and M. Barlow and A. Hoell , 2013: Low Frequency Variations in the Hadley and Walker Circulations, Annual Meeting of the American Meteorological Society, Austin TX, 9 January 2013.
- Funk**, C. and Verdin J. , 2013: Science strategies to support the USAID PREPARED project, PREPARED kickoff meeting, 3/29/2013-4/2/2013, Arusha, Tanzania.
- Funk** C. , 2013: SST Signals Contributing To East African drying, NOAA ESRL science planning meeting, Boulder, CO, August 14th-15th, 2013.
- Funk**, C. , 2013: KPFA roundtable discussion on Climate Change and Food. August 23rd 2013. **Invited** panelist.
- Funk**, C. and Verdin J. , 2013: Developing a climate trend analysis toolset and training program for East African Community scientists, USAID PREPARED project, Nairobi, Kenya, September 1st-4th, 2013. **Invited** Presentation.
- Funk**, C. , 2013: The FEWS NET Land Data Assimilation System, Lincoln Nebraska, NASA Applied Sciences Water Resources Workshop, Tuesday Sept. 24th, 2013.
- McNally, A., Shukla, S., **Funk**, C. C., Husak, G. J., Arsenault, K. R., Peters-Lidard, C. D., & Verdin, J. P. (2013, December). Agricultural drought analysis and famine early warning with the FEWS NET land data assimilation system. In AGU Fall Meeting Abstracts (Vol. 1, p. 1084). Abstract Number GC13B-1084.
- Verdin, A., Rajagopalan, B., & **Funk**, C. C. (2013, December). Improving High-resolution Spatial Estimates of Precipitation in the Equatorial Americas. In AGU Fall Meeting Abstracts (Vol. 1, p. 04). Abstract Number H41M-04.
- Funk**, C. C., Hoerling, M. P., Hoell, A., Verdin, J. P., Robertson, F. R., Alured, D., & Liebmann, B. (2013, December). Exploring Western and Eastern Pacific contributions to the 21st century Walker circulation intensification and teleconnected precipitation declines. In AGU Fall Meeting Abstracts (Vol. 1, p. 02). Abstract Number GC14B-02. **Invited** Presentation.
- Funk**, C. C., Shukla, S., Hoerling, M. P., Robertson, F. R., Hoell, A., & Liebmann, B. (2013, December). Predicting and attributing recent East African Spring droughts with dynamical-statistical climate model ensembles. In AGU Fall Meeting Abstracts (Vol. 1, p. 0967). Abstract Number GC51B-0967.
- Verdin, J. P., Rowland, J., Senay, G. B., **Funk**, C. C., Budde, M. E., Husak, G. J., & Jayanthi, H. (2013, December). Earth Observations for Early Detection of Agricultural Drought in Countries at Risk: Contributions of the Famine Early Warning Systems Network (FEWS NET). In AGU Fall Meeting Abstracts (Vol. 1, p. L06). Abstract Number B33L-06.
- Peterson, P., **Funk**, C. C., Husak, G. J., Pedreros, D. H., Landsfeld, M., Verdin, J. P., & Shukla, S. (2013, December). The Climate Hazards group InfraRed Precipitation (CHIRP) with Stations (CHIRPS): Development and Validation. In AGU Fall Meeting Abstracts (Vol. 1, p. 1417). Abstract Number H33E-1417.
- Rajagopalan, B., Verdin, A., Mendoza, P. A., Kleiber, W., McCreight, J. L., Wood, A. W., ... & **Funk**, C. C. (2013, December). Bayesian Methods for Hydrometeorological Modeling and Forecasting. In AGU Fall Meeting Abstracts (Vol. 1, p. 06). Abstract number H11K-06.
- Pedreros, D. H., Magadzire, T., **Funk**, C. C., Verdin, J. P., Peterson, P., Landsfeld, M., & Husak, G. J. (2013, December). Building Climate Service Capacities in Eastern Africa with CHIRP and GeoCLIM. In AGU Fall Meeting Abstracts (Vol. 1, p. 02). Abstract Number ED22A-02.
- Shukla, S., **Funk**, C. C., Verdin, J. P., & Peters-Lidard, C. D. (2013, December). Food and water security scenarios for East Africa over next 20 years. In AGU Fall Meeting Abstracts (Vol. 1, p. 06). Abstract number GC11E-06.

- Funk**, C. (2014, August) New Frontiers in Seasonal Prediction in Africa, NASA IDS: Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa, The First Participatory Research Workshop and Project Meeting, August 11 - 12, 2014, Sheraton Hotel, Addis Ababa, Ethiopia. (**Invited**).
- Shukla S, **Funk** CC, Peterson PJ, Landsfeld MF, Pedreros DH, Verdin JP, Rowland JD, Romero BE, Husak GJ, Michaelsen JC, Verdin AP , 2014: The Climate Hazards Group InfraRed Precipitation with Stations (CHIRPS) dataset: quasi-global precipitation estimates for drought monitoring, Presented at "Trending Now: Water" 7th International Scientific Conference on the Global Energy and Water Cycle, July 15th, The Hague, Netherlands.
- Funk** C , 2014: CHIRPS: a new 1981-now, 0.05 degree rainfall monitoring product for drought early warning, Chris **Funk**, Conference On: Information for Meeting Africa's Agricultural Transformation and Food Security Goals (IMAAFS) October 2nd, 2014, UNCC Conference Centre, Addis Ababa, Ethiopia (**Invited Talk**).
- Funk** C , 2014: Advancing FEWS NET gradient-based Climate Science, FEWS NET Science Meeting: New Science to enable us to place droughts in historic context, November 19-20, 2014, NOAA Earth System Research Laboratory, Boulder, Colorado.
- Funk** C and Galu G , 2014:, An integrated drought prediction system for Eastern Africa to support food security, Global Drought Information System International Meeting, Dec 11th, CalTech, Padasena, CA. (**Invited Talk**).
- Funk** C and Hoell A , 2014: Attribution of Recent Droughts in California and the south-central US, USGS Climate Change and Land Use Meeting, Reston VA, April 30th.
- Tadesse T, Zaitchik BF, Habib S, **Funk** CC, Senay GB, Dinku T, Policelli F, Block P, Baigorria GA, Beyene S, Wardlow B and Hayes MJ , 2014:, GC52B-06, Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa Under Evolving Climate Conditions to Support Adaptation Strategies, Dec 19th, AGU, Moscone Center, San Francisco.
- Funk** C, Hoerling MP, Hoell A, Liebmann B, Verdin JP and Eilerts G , 2014:, GC51F-04, Exploring Pacific Climate Variability and Its Impacts on East African Water Resources and Food Security, Dec 19th, AGU, Moscone Center, San Francisco (**Invited Talk**).
- Pricope NG, Husak GJ, **Funk** CC and Lopez-Carr D , 2014:, H51T-01, The Climate-Population Nexus in the East African Horn: Emerging Degradation Trends in Rangeland and Pastoral Livelihood Zones, Dec 19th, AGU, Moscone Center, San Francisco (**Invited Talk**).
- Verdin, JP, Galu G, Magadzire T, Pedreros DH, **Funk** CC, Budde ME, Husak GJ, Peterson P, Landsfeld MF and White L , 2014: B43G-06, Building Capacity for Production of Gridded Precipitation Products in the East Africa Community, Dec 18th, AGU, Moscone Center, San Francisco. Poster.
- Budde ME, Galu G, **Funk** CC, Verdin JP and Rowland J , 2014:, B33E-0224, Famine Early Warning Systems Network (FEWS NET) Contributions to Strengthening Resilience and Sustainability for the East African Community, Dec 17th, AGU, Moscone Center, San Francisco. Poster.
- Pedreros DH, Rojas A, **Funk** C, Peterson P, Landsfeld MF and Husak GJ , 2014:, GC33C-0534, The Use of CHIRPS to Analyze Historical Rainfall in Colombia, Dec 18th, AGU, Moscone Center, San Francisco. Poster.
- Funk** CC, Stone D, Herring S and Hoell A , 2014:, Session Chairs, GC33H, The Emerging Science of Climate Attribution, Detection, and Trend Analysis I, Dec 17th, AGU, Moscone Center, San Francisco.
- Shukla S, Hoell A, Roberts JB, **Funk** cc and Robertson FR , 2014:, H32C-06, Skill Assessment of National Multi-Model Ensemble Forecasts for Seasonal Drought Prediction in East Africa, Dec 17th, AGU, Moscone Center, San Francisco.
- Funk** CC, Peterson P, Shukla S, Husak GJ, Landsfeld MF, Hoell A, Pedreros DH, Roberts JB, Robertson FR, Tadesse T, Zaitchik BF, Rowland J and Verdin JP , 2014: GC31D-05, Improved Rainfall Estimates and Predictions for 21st Century Drought Early Warning, Dec 17th, AGU, Moscone Center, San Francisco (**Invited Talk**).
- Peterson P, **Funk** CC, Landsfeld MF, Husak GH, Pedreros DH, Verdin JP, Rowland J, Shukla S, McNally A, Michaelsen J and Verdin A , 2014:, H24C-03, The Climate Hazards Group Infrared Precipitation with Stations (CHIRPS) Dataset: Quasi-Global Precipitation Estimates for Drought Monitoring and Trend Analysis, Dec 16th, AGU, Moscone Center, San Francisco.
- Hoell, A., Shukla S, Barlow M and **Funk** C. , 2014: H23N-1066, A Decade of Drought: Southwest Asia during the 2000s, AGU, Tuesday, December 16, Moscone West, Poster Hall.
- Mahowald NM, Lo F., Zheng Y., Harrison L., **Funk** CC , 2014:, B14A-08, Leaf Area Index in Earth System Models: Evaluation and Projections, Dec. 16th, Moscone West. AGU.
- Davenport F and **Funk** CC , 2014:, GC14B-07, Are Maize Yields Robust to Climate Change? An Analysis at

- Regional and Micro Scales in Kenya, Moscone West 3003, December 15th, AGU, San Francisco (**Invited Talk**).
- Husak GH, Budde ME, Rowland J, Verdin JP, **Funk**, CC and Landsfeld MF, 2014: A13H-3275, An Updated Decision Support Interface: A Tool for Remote Monitoring of Crop Growing Conditions, Moscone South, Dec 15th, Moscone Center, San Francisco
- Funk** C., Mishra V., and Shukla S., 2014: Session Conveners - AGU - GC12B Observed and Projected Climate Change Impacts on Water Resources and Agriculture I, Dec 15th, Moscone Center, San Francisco.
- Funk** C, Peterson P, Shukla S, Husak G, Landsfeld M, Hoell A, Pedreros D, Roberts JB, Robertson FR, Tadesse T, Zaitchik BF, Rowland J, and J. Verdin, 2015: Improved rainfall estimates and predictions for 21st century drought early warning, Thursday, 8 January 2015, American Meteorological Society Annual Meeting, Phoenix AZ.
- Funk** C, 2015: Exploring Pacific climate variability and its impacts on East African Water Resources and Food Security, Wednesday, 7 January 2015, American Meteorological Society Annual Meeting, Phoenix AZ.
- Hoell, A and **Funk** C, 2015: Decadal and Multi-decadal Contributions to the Anomalous Zonal Tropical Pacific Temperature Gradient and the Associated Global Impacts, Wednesday, 7 January 2015, American Meteorological Society Annual Meeting, Phoenix AZ.
- Hoell A, **Funk** C and Barlow M 2015: The Potential Predictability of Sub-Monthly Variability Over the Northwest Indian Ocean Rim Using the Madden Julian Oscillation, Thursday, 8 January 2015, American Meteorological Society Annual Meeting, Phoenix AZ.
- Shukla S, Roberts JB, **Funk** CC, Robertson FR, and A. Hoell, 2015: Seasonal Drought Prediction in East Africa: Can National Multi-model Ensemble Forecasts Help? Thursday, 8 January 2015, American Meteorological Society Annual Meeting, Phoenix AZ.
- Funk** C., Hoell A., Pedreros P., Peterson P and White L, 2015: African Regional Data Issues, the World Climate Research Program Grand Challenge meeting on Climate Extremes, Sydney Australia, Feb 25th, 2015. **Invited Talk**.
- Funk**, C. 2015: Drought Causes, The AGU Chapman conference on the California Drought, Irvine, CA, April 20-22 2015. **Invited Talk**.
- Funk**, C. 2015: New Early Warning and Environmental Monitoring Research. Sioux Falls, SD, EROS center. **Invited Talk**.
- Funk**, C. 2015: Technical guidance on developing agro-climatic forecasts to support improved famine early warning. April 8<sup>th</sup> 2015, USAID, Washington DC.
- Funk**, C. 2015: Led week long 40-hour training on GeoMod – a tool for building East African climate change scenarios in Nairobi Kenya. August 10<sup>th</sup>-14<sup>th</sup>, International Centre for Climate and Prediction, Nairobi, Kenya. **Invited Training** in support of USAID PREPARED project.
- Funk**, C. 2015. Using GeoMod to build African climate change scenarios, FEWS NET Science meeting, October 15<sup>th</sup>, Santa Barbara CA.
- Landsfeld, M. L., Daudert B., Friedrichs M., Morton C., Hegewisch K., Husak GJ, **Funk** CC, Peterson P., Huntington JL, Verdin JP, Williams EL, An Agro-Climatological Early Warning Tool Based on the Google Earth Engine to Support Regional Food Security Analysis, Thursday, 17 December 2015, AGU Fall Meeting San Francisco (poster)
- Harrison L, **Funk** CC, Verdin JP, Pedreros DH, Shukla S, Husak GJ, Contrasting rainfall declines in northern and southern Tanzania: Potential differential impacts of west Pacific warming and east Pacific cooling, GC31H-08, Wednesday, 16 December 2015
- Pedreros DH, **Funk** CC, Brown ME, Korecha D, Seid Y, Exploring Agro-Climatic Trends in Ethiopia Using CHIRPS, GC41B-1100, Thursday, 17 December 2015 (poster)
- Funk** C. and Hoell A, Exploring the active role of water vapor in creating more extreme SSTs and climate variations, GC43D-04, Thursday, 17 December 2015
- Hoell A, Barlow M, **Funk** C, Cannon F, A Physical Model for Extreme Drought over Southwest Asia, GC44A-05, Thursday, 17 December 2015
- Funk** C., Buja L., Mishra V, Shukla S, Session Chair. Observed and Projected Climate Change Impacts on Water Resources and Agriculture I, II, III, Friday, 18 December 2015
- Kelly C, **Funk** CC, McNally A, and Shukla S, Climate Change And Hydrologic Instability In Yemen (Invited), Friday, 18 December 2015, GC54A-02.
- Husak GH, Hobbins M, Verdin JP, Peterson P, **Funk** CC, Using the SPEI to Estimate Food Production in East Africa, H13G-1622, Monday, 14 December 2015 (poster)
- Walsh MK, Brown ME, Backlund PW, Antle JM, Carr ER, Easterling WE, **Funk** CC, Murray A, Ngugi M,

- Barrett CB, Ingram JSI, GC53H-01: Global Food Security in a Changing Climate: Considerations and Projections (**Invited**) Friday, 18 December 2015
- Funk C**, Hoell A, Shukla S, Kelley C, Harrison L, Recent potentially predictable droughts associated with the west Pacific warming mode and ENSO, H21O-01, Tuesday, 15 December 2015 (**Invited**)
- Shukla S, **Funk CC**, Zaitchik BF, Narapusetty B., Arsenault KR, Peters-Lidard CD, H52A-05: Seasonal Scale Water Deficit Forecasting in East Africa and the Middle East Region Using the NMME Models Forecasts, Friday, 18 December 2015
- Verdin, JP, Peters-Lidard C, McNally A, Arsenault, K., Wang S, Kumar S, Shukla S, **Funk CC**, Fall G, Karsten L, Land Surface Modeling Applications for Famine Early Warning H52E-06: Land Surface Modeling Applications for Famine Early Warning (**Invited**), Friday, 18 December 2015
- Peterson P, **Funk CC**, Landsfeld MF, Pedreros DH, Shukla S, Husak GJ, H41D-05: The Climate Hazards Group InfraRed Precipitation with Stations (CHIRPS) v2.0 Dataset: 35 year Quasi-Global Precipitation Estimates for Drought Monitoring Thursday, 17 December 2015
- Shukla S, Husak GJ, **Funk CC**, Verdin JP, Incorporating Medium-Range Weather Forecasts in Seasonal Crop Scenarios over the Greater Horn of Africa to Support National/Regional/Local Decision Makers, PA51A-2198, Friday, 18 December 2015 (poster)
- Brown ME, Antle JM, Backlund PW, Carr ER, Easterling WE, Wallsh M, Ammann CM, Barrett CB, Bellemare MF, Dancheck V, **Funk C**, Grace K, GC54A-01: Climate Change and Global Food Security: Food Access, Utilization, and the US Food System (**Invited**) Friday, 18 December 2015
- Funk C**, 2016: Temperature and Drought Contributions to Migration and Failing States, The Anacapa School, Santa Barbara, CA. January 2016. **Invited Presentation.**
- Funk C**, 2016: New USGS research works across scales to save lives, EROS Center, Sioux Falls SD, January 2016.
- Funk, C.** 2016: CHIRPS and Climate Services to Support Resilient Development and Improved Agricultural Monitoring, Ethiopia. **Invited Talk** and advisement in support of President Obama's Climate Services for Resilient Development pilot project in Ethiopia. February 2016.
- Funk C**, New science for improved hydrologic early warning and prediction, UC Irvine Civil and Environmental Engineering seminar Series, April 15<sup>th</sup> 2016. **Invited Colloquium.**
- Funk C**, 2016: Synopsis of Recent Research, Stanford Earth Science Seminar, Stanford, Palos Alto, CA, April 27<sup>th</sup> 2016. **Invited Colloquium.**
- Funk C**, 2016: FEWS NET Science Briefing: La Niña outlook for 2016 and 2017, Washington DC, USAID, May 19<sup>th</sup> 2016. **Invited Colloquium.**
- Funk C**, 2016: Niger Climate Resilience, presentation, Federal Working Group on Climate Resilient Development, July 30<sup>th</sup> 2016.
- Funk C**, 2016: Recent advances by the FEWS NET science team contribute to improved early warning in Africa and Latin America, EROS noon seminar, Sioux Falls SD, **Invited Presentation.** September 6<sup>th</sup> 2016.
- Funk C.**, CHIRPS and FEWSNet's use of satellite rainfall products for early drought warning, International Precipitation Working Group Meeting, Bologna Italy, October 6<sup>th</sup>, 2016. **Invited Presentation.**
- Funk C**, James P Verdin, Gideon Galu, Denis Macharia, Shraddhanand Shukla, Laura Harrison, Amy McNally, Christa D Peters-Lidard, Franklin R Robertson, Jason B Roberts, Diego H Pedreros, Gregory J Husak, Pete Peterson, Seth Peterson, Greg Ederer, Martin Francis Landsfeld (2016) GC43F-03: Advancing Integrated African Early Warning Science and Climate Services (**Invited**) Thursday, 15 December 2016 14:10 - 14:30 Moscone West - 3003
- McNally A, McEvoy D, Huntington JL, Husak GJ, **Funk CC**, Senay GB, Verdin JP, Jansma T, Dewes C (2016) GC43F-02: What role does evaporative demand play in driving drought in Africa? Thursday, 15 December 2016 13:55 - 14:10 Moscone West - 3003.
- Shukla S, Hobbins M, McEvoy D, Husak GJ, Dewes C, McNally A, Huntington JL, **Funk CC** and Verdin JP (2016) H14B-04: Monitoring and Forecasting Reference Evapotranspiration for Food Security Assessments Monday, 12 December 2016 16:45 - 17:00 Moscone West - 3016
- Dinku T, **Funk CC**, Tadesse T (2016) H12D-01: Validation of CHIRP Satellite Rainfall Estimates over Africa, Monday, 12 December 2016 10:20 - 10:35 Moscone West - 3022
- Landsfeld MF, Hegewisch K, Daudert D, Morton C, Husak GJ, Friedrichs M, **Funk CC**, Huntington JL, Abatzoglou JT, Verdin JP (2016) PA14B-05: Generating Southern Africa Precipitation Forecast Using the FEWS Engine, a New Application for the Google Earth Engine Monday, 12 December 2016 17:00 - 17:15 Moscone South - 309.
- Budde ME, **Funk C**, Husak GJ, Peterson P, Rowland J, Senay GB, Verdin JP (2016) GC51F-03: Earth



- Observations for Early Detection of Agricultural Drought: Contributions of the Famine Early Warning Systems Network (FEWS NET) Friday, 16 December 2016 08:30 - 08:45 Mosone West – 3003
- Funk C.**, Shukla S., Galu G and Husak G, **Invited GeoMod Training**, Maanzoni Kenya, Feb 19<sup>th</sup>-March 4<sup>th</sup> 2017.
- Funk C.**, Advances in Earth Science to support improved humanitarian early warning in a warming world: application – Somalia, **Invited Colloquia**, Vanderbilt University, March 14<sup>th</sup> 2017.
- Funk C.**, Relating unusually warm Indo-Pacific SSTs to recent African Droughts: Opportunities and strategies for prediction and improved Food Security Outlooks, FEWS NET Science Meeting, Washington DC, September 7, 2017.
- Funk C.**, Non-stationarity in Precipitation Estimates, FEWS NET Science Meeting, Washington DC, September 7, 2017.
- Funk C.**, CHIRTSmax - A Satellite Based Tmax Environmental Record, FEWS NET Science Meeting, Washington DC, September 7, 2017.
- Herring S., **Funk C.**, King A.; **Media Release, Invited Panelist**, BAMS 2016 Climate Extremes Issue, AGU Annual Meeting, New Orleans, December 13, 2017.
- Funk C.**, Pomposi C, Brown M, Davenport F, Observed and Projected Climate Change Impacts on Water Resources and Agriculture IV, **Session Chair**, AGU Annual Meeting, New Orleans, December 13, 2017.
- Funk C.**, Hoo Jinho, Pomposi C, Climate Extremes: Patterns, Mechanisms and Attribution I, **Session Chair**, , AGU Annual Meeting, New Orleans, December 15 2017.
- Husak G., Turner W, McNally A, **Funk C.**, Talk, Comparison of Agricultural Drought Indicators over West Africa, AGU Annual Meeting, New Orleans, December 11, 2017.
- Harrison L, Blakeley SL, Hobbins M, Dewes C, **Funk CC**, Shukla S, Husak GJ, GC33B-1069: Drivers of atmospheric evaporative demand during African droughts, AGU Annual Meeting, New Orleans, December 11, 2017.
- Nobre G, Davenport F, Veldkamp T, Jongman B, **Funk CC**, Husak GJ, Ward P, Aerts J. GC34B-01: A triangular climate-based decision model to forecast crop anomalies in Kenya, AGU Annual Meeting, New Orleans, December 11, 2017.
- Arsenault KR, Shukla S, Getirana A, Peters-Lidard CD, Kumar S, McNally A, Zaitchik BF, Badr H, **Funk CC**, Koster RD, H22F-05: Using Satellite Data and Land Surface Models to Monitor and Forecast Drought Conditions in Africa and Middle East, AGU Annual Meeting, New Orleans, December 11, 2017.
- Dinku T, **Funk CC**, Tadesse T, Ceccato P, Validation of the CHIRPS Satellite Rainfall Estimates over Eastern of Africa, AGU Annual Meeting, Poster, New Orleans, December 11, 2017.
- Peters-Lidard CD, Arsenault KR, Shukla S, Getirana A, McNally A, Koster RD, Zaitchik BF, Badr SH, Roningen S, Kumar S, **Funk CC**, Seasonal scale water deficit forecasting in Africa and the Middle East using NASA's Land Information System (LIS), Poster, AGU Annual Meeting, New Orleans, December 11, 2017.
- Funk CC**, Verdin J, Thiaw WM, Hoell A, Korecha D, McNally A, Shukla S, Arsenault KR, Magadzire T, Novella N, Peters-Lidard CD, Robjohn M, Pomposi C, Galu G, Rowland J, Budde ME, Landsfeld MF, Harrison L, Davenport F, Husak GJ, Endalkachew E, IN54A-01: Enhancing Famine Early Warning Systems with Improved Forecasts, Satellite Observations and Hydrologic Simulations (**Invited Talk**), ,AGU Annual Meeting, New Orleans, December 11, 2017.
- Funk C.**, Monitoring and Predicting Hydroclimatic Extremes (**Invited Presenter and Panelist**) Earth Observations for Food Security and Agriculture Consortium: Identifying Opportunities to Advance the Application of Earth Observations in USAID Programs, 19 December 2017, 9:00am-4:30pm, 555 12th St NW, Washington, DC.
- Funk** and co-chairs, GC11B: Climate Extremes: Patterns, Mechanisms, and Attribution I-III,
- Funk** et al. and co-authors, Consistent with recent observations, a climate change meta-ensemble robustly projects 2020-2039 climate hazards associated with El Nino and La-Nina related sea surface temperature extremes (Invited), GC31A: Climate–Hydrology–Human Interactions and Their Implications on Hydroclimate Extremes in a Changing Environment I, AGU, Washington DC, Wednesday Dec 12, 8:15-8:30.
- Funk** and co-chairs (2017) GC54A Observed and Projected Climate Change Impacts on Water Resources, Agriculture, and Health I, AGU Dec 14th, Salon B, 4:00-6:00, (posters 8:00-12:00), Hall A-C.

- Peters-Lidard C.D., K. R. Arsenault, S. Shukla, A. Getirana, A. McNally, R. D. Koster, B. F. Zaitchik, H. S. Badr, J. M. Roning, S. Kumar, and C. C. **Funk** (2018) Seasonal-Scale Water Deficit Forecasting in Africa and the Middle East Using NASA's Land Information System (LIS), AMS Annual meeting, Monday, 8 January 2018 Exhibit Hall 3 (ACC) (Austin, Texas)
- Funk** C., J. P. Verdin, W. M. Thiaw, A. Hoell, S. Shukla, A. McNally, G. Galu, N. S. Novella, D. Korecha, K. R. Arsenault, M. Robjohn, J. Rowland, M. Budde, C. Peters-Lidard, T. Magadzire, E. Bekele, L. S. Harrison, P. Peterson, C. Pomposi, and G. Husak (2018) Enhancing Famine Early Warning Systems with Improved Forecasts, Satellite Observations, and Hydrologic Simulations (**Invited Presentation**) Monday, 8 January 2018: 9:00 AM, AMS Annual Meeting, Room 18B (ACC) (Austin, Texas)
- Jayanthi H, G. Husak, C. C. **Funk**, J. P. Verdin, M. T. Hobbins, T. Magadzire, A. Adoum, and G. Galu (2018) Satellite WRSI-Based Drought Vulnerability Functions and Agricultural Drought Risks Using Paired CHIRPS and Reference ET GRIDS in Senegal, Monday, 8 January 2018, AMS Annual Meeting, Exhibit Hall 3 (ACC) (Austin, Texas)
- Peterson P., S. Peterson, A. Meiburg, C. C. **Funk**, J. Michaelson, F. Davenport, G. Husak, S. Shukla, D. Pedreros, D. Macharia, N. Mata, K. Knapp, and T. Dinku (2018) A New 34-Year Satellite-Based Monthly Tmax Climate Data Record, the Climate Hazards Infrared/MERRA2 Tmax with Stations: CHIMERRAS Tmax, Monday, 8 January 2018, AMS Annual Meeting, Exhibit Hall 3 (ACC) (Austin, Texas)
- Landsfeld M, C. C. **Funk**, L. S. Harrison, P. Peterson, S. Shukla, and G. Husak (2018) Combining GEFS with CHIRPS Precipitation Estimates to Bias Correct Precipitation Forecasts for Food Security Analysis Monday, 8 January 2018, AMS Annual Meeting, Exhibit Hall 3 (ACC) (Austin, Texas)
- McEvoy D, S. Shukla, M. Hobbins, G. Husak, J. Huntington, C. C. **Funk**, D. Macharia, and J. Verdin (2018) Examining the Value of Global Seasonal Reference Evapotranspiration Forecasts to Support FEWS NET's Food Insecurity Outlooks Monday, 8 January 2018, AMS Annual Meeting, Exhibit Hall 3 (ACC) (Austin, Texas)
- Harrison L.S. , S. L. Blakeley, M. Hobbins, C. Dewes, C. C. **Funk**, S. Shukla, P. Peterson, and G. Husak (2018) Drivers of Atmospheric Evaporative Demand during African Droughts Monday, 8 January 2018, AMS Annual Meeting, Exhibit Hall 3 (ACC) (Austin, Texas)
- Nicholson S.E., A. H. Fink, C. C. **Funk**, and T. A. Vaughan (2018) Re-Examining the ITCZ as a Control on Rainfall and Its Variability in Equatorial Africa, Wednesday, 10 January 2018: 11:45 AM, AMS Annual Meeting, 616 AB (Hilton) (Austin, Texas).
- Zaitchick, B and Funk C., Workshop coordinators, Innovations at the Nexus of Food Energy and Water Systems (UC Santa Barbara, Jan 17-18 2018).
- Funk**, C. (2018) CHG Research Relevant to Ethiopia, January 18<sup>th</sup> 2018, UC Santa Barbara INFIEWS Workshop Jan 17 2018.
- Funk** C. (2018) Why we should be worried about the 2018 long rains (**Invited Talk**) Nairobi Kenya, February 6<sup>th</sup> 2018, East African pre-Climate Outlook Fora technical analysis workshop.
- Funk** C, Husak G, Davenport F and Shukla S. (2018) Climate Hazards Group overview, DARPA World Modelers Program kickoff meeting, Earthscape, Arizona. February 10<sup>th</sup> 2018.
- Funk** C. (2018) Climate Change and Crisis in East Africa (**Invited Colloquia**) Direct Relief International, Santa Barbara, CA, May 2<sup>nd</sup> 2018.
- Funk** C (2018) **Invited Colloquia** – Unravelling the East African climate paradox and CHG data resources, Karlsruhe Institute of Technology, 6 July 2018, Karlsruhe Germany.
- Funk** C (2018) **Invited Panelist**: Workshop on "Precipitation Extremes", joint organization by the WCRP Grand Challenge on Weather and Climate Extremes and the GEWEX Global Data and Analysis Panel (DWD, Offenbach, Germany, 9-11 July 2018). \*\*\*
- Funk** C (2018) Do Climate Change Models Predict more extreme 2020-2039 Climate Hazards?, UC Santa Barbara noon-time colloquia (**invited**, but also local ☺), July 6<sup>th</sup> 2018, UC Santa Barbara Earth Research Institute.

- Funk** C., DARPA Annual Meeting, Climate Hazards Group - World Modelers Demo, Washington DC, July 31st, 2018
- Funk** C and co-authors (2018) A Climate Hazards Perspective On Attributing And Predicting ENSO-Related Droughts, NOAA Climate Diagnostics Workshop, October 29<sup>th</sup> 2018, Santa Barbara CA.
- Funk** C and Peterson P (2018) The new CHIRTSmax product, Innovations at the Nexus of Food Energy and Water Systems, **November 2018**, November 11, 2018.
- Funk** C (2018) Climate Models Anticipate Imminent Increases in ENSO Extremes and Associated Drought Risks, **Invited Talk**, Southern African Development Community Webinar Series, jointly hosted with the SADC Climate Services Center. December 5<sup>th</sup> 2018.
- Funk** C (2018) Forecasting Droughts and Food Disruptions, MIT Climate Change and National Security Workshop, December 7<sup>th</sup>, MIT, Boston MA. **Invited Presentation. \*\*\***  
<http://news.mit.edu/2019/workshop-explores-national-security-repercussions-climate-change-0222>.
- Funk** C and co-chairs (2018) GC11B, CGC12B, GC13B: Climate Extremes: Patterns, Mechanisms, and Attribution I, II, II, **chaired** session at AGU, Walter E Washington Convention Center, New Orleans, Dec. 10 2018.
- Husak G, **Funk** C, and co-authors (2018) GC21D-1127 Investigating the Inputs to SPEI and Their Importance in Identifying Agroclimatic Hazards, Poster, Walter E Washington Convention Center, New Orleans, Dec. 11 2018.
- Blakely S, **Funk** C and co-authors (2018) PA22A-04 How Index Insurance is impacted by Climate Variability, a West African Example, Talk, Walter E Washington Convention Center, New Orleans, Dec. 11 2018.
- Funk** C, Power S, Stevenson S, Lea DW, Hoell A, Rajagopalan, Shukla S (2018) GC31A-02 Consistent with recent observations, a climate change meta-ensemble robustly projects 2020-2039 climate hazards associated with El Nino and La-Nina related sea surface temperature extremes (**invited talk**) Walter E Washington Convention Center, New Orleans, Dec 12 2018.
- Davenport F, **Funk** C and co-authors (2018) GC43I-1655 What is the Best Earth Observation Product for Predicting Regional Grain Yields in Food Insecure Countries? Poster, Walter E Washington Convention Center, New Orleans, Dec. 13 2018.
- Harrison L, **Funk** C and co-authors (2018) GC54A-08 Recent Water Availability Trends and Mid-21st Century Projections in East Africa Talk, Walter E Washington Convention Center, New Orleans, Dec. 13 2018.
- Peterson P, **Funk** C and co-authors (2018) H41H-10: Exploring Global Precipitation Extremes with CHIRPS v2.0, Talk, Walter E Washington Convention Center, New Orleans, Dec. 13 2018.
- Funk** C and co-authors (2018) PA43F-1408: How attribution science can inform improved famine prevention in Africa, Poster, Walter E Washington Convention Center, New Orleans, Dec. 13 2018.
- Funk** C. and co-chairs (2018) GC54A Observed and Projected Climate Change Impacts on Water Resources, Agriculture, and Health, Walter E Washington Convention Center, New Orleans, Dec. 14 2018.
- Peterson P, C. C. **Funk**, S. Peterson, S. Shukla, F. Davenport, J. Michaelsen, M. Landsfeld, G. Husak, L. S. Harrison, J. Rowland, M. Budde, K. R. Knapp, S. E. Nicholson, and T. Dinku (2019) The 1983-2016 Climate Hazards Infrared, MERRA High Resolution Tmax with Stations (CHIRTSmax) Climate Data Record, AMS Annual Meeting, WEDNESDAY, JANUARY 9, 2019, Phoenix, AZ.
- Pomposi C, S. Shukla and C. C. **Funk** (2019) 13A.1 Seasonal Variability of Early and Late Onset Monsoon Seasons in the Sahel, AMS Annual Meeting, THURSDAY, JANUARY 10, 2019, 10:30 AM - 10:45 AM, 32nd Conference on Climate Variability and Change, Phoenix, AZ.
- Funk** CC, S. E. Nicholson and A. Fink (2019) 13A.6A Moving Beyond the East African Climate Paradox, AMS Annual Meeting, THURSDAY, JANUARY 10, 2019, 11:45 AM - 12:00 PM, 32nd Conference on Climate Variability and Change, Phoenix, AZ.

- Peterson P, C.C. **Funk**, R. Roca, L. S. Harrison, G. Husak, L. V. Alexander, C. Hillbruner, J. Rowland, and M. E. Budde (2019) 14.2 Exploring Global Precipitation Extremes with CHIRPS v2.0 (**Invited Presentation**), AMS Annual Meeting, Thursday, January 10, 2019 03:45 PM - 04:00 PM North 127ABC, Phoenix AZ.
- Funk** C, M Etten-Bohm, and L. H. Chuquihaaccha (**Chairs**) (2019) Session 12C: El Niño-Southern Oscillation (ENSO) Dynamics, Diversity, Prediction, and Impacts AMS Annual Meeting, Phoenix, Arizona January 2019.
- Funk** C (2019) Combining satellite rainfall observations with weather model predictions to produce integrated monitoring products, **Invited Talk**, Southern African Development Community Webinar Series, jointly hosted with the SADC Climate Services Center. May 15<sup>th</sup> 2019.
- Funk** C (2019) Kenya Deep Dive, Aspen Global Change Institute Food Shocks Workshop, Aspen Global Change Institute, **Invited Talk**, May 22 2019, Aspen Colorado.
- Funk** C (2019) Drought, Fire, Flood: Monitoring and Modeling more Frequent Catastrophes, **Walter Orr Roberts Memorial Public Lecture (Invited Public Keynote)** Aspen Global Change Institute, May 23 2019, Aspen Colorado, <https://www.agci.org/event/19s2wor>. \*\*\*
- Funk** C., Rowland J, Budde M, Husak G and Peterson S (2019) Drought Early Warning Science Advances, EROS **Invited Seminar**, July 10<sup>th</sup> 2019, Sioux Falls SD.
- Funk** C. (2019) Context/monitoring - sources of predictive skill and opportunities for integrating observations and forecasts, FEWS NET Work Plan Coordination Meeting, Boulder C), **Invited Presentation**. September 4<sup>th</sup> 2019.
- Funk** C, Improving climate services in developing nations with Ag Out - an enhanced IMERG-based Ag Outlook System, **Invited Presentation**. NASA Global Precipitation Monitoring Mission annual meeting, Indianapolis, IN, November 7<sup>th</sup> 2019.
- Peterson P and **Funk** C, Ag Out - An Enhanced IMERG-based Agricultural Outlook System to Support Food Security and Agriculture in the Developing World, poster, Indianapolis, IN, November 8<sup>th</sup> 2019.
- Funk** C, Developing Science-Based Strategies for Incorporating Machine Learning into Famine Early Warning, UCSB/FEWS NET Machine Learning for Food Security Workshop, Santa Barbara CA, October 17, 2019.
- Funk** C, Filtering in space and time to improve African crop yield estimates, UCSB/FEWS NET Machine Learning for Food Security Workshop, Santa Barbara CA, October 17, 2019.
- Funk** CC, Husak GJ, Veldkamp T, Brown JF, Wylie BK, Dwyer JL, Shukla S, Peterson P, Rowland J, Senay GB and Budde ME, Sources of predictive skill, and how to use them to support effective drought early warning, American Geophysical Union Fall Meeting, San Francisco, December 9, 2019.
- Peterson P, **Funk** C, Huffman G.J., Landsfeld M.L., Ruane A.C., Limaye A.S., Phillips M, and Husak GJ, Latest Climate Hazards Center (CHC) products for drought and agro-climatological monitoring and forecasting: AGMERG, CHIRPS v2.1 and CHIRPS-GEFS, American Geophysical Union Fall Meeting, San Francisco, December 10, 2019.
- Pedrerros, DH, Korecha D, **Funk** C, Husak G.J, Analysis of Belg Rainfall Trend over Agropastoral Regions of Ethiopia, American Geophysical Union Fall Meeting, San Francisco, December 10, 2019.
- Husak GJ, Shukla S, McNally A and **Funk** C, An Analysis of Bias-corrected Monthly Forecasts - Potential Perils and Improvements, American Geophysical Union Fall Meeting, San Francisco, December 10, 2019.
- Funk** C, Shukla S, Aerts J, and Verdin A, **session chairs**: Observed and Projected Climate Change Impacts on Water Resources, Agriculture, and Health I & II, American Geophysical Union Fall Meeting, San Francisco, December 11, 2019.
- Funk** CC, Verdin A, Knapp KR, Grace G, Zaitchik BF, Funk A and Peterson P, New satellite-enhanced daily air temperature estimates indicate rapidly increasing exposure to extremes in Africa, Asia and South America, American Geophysical Union Fall Meeting, San Francisco,

December 11, 2019

- Verdin A, Grace K, **Funk** CC, Davenport F and Husak G.J., Advancing Climate-Health Research with Stochastic Weather Generators, American Geophysical Union Fall Meeting, San Francisco, December 11, 2019
- Shukla S, Adoum A, Husak GJ, Davenport F, Turner W.A., Grace K, **Funk** C and McNally A, Application of subseasonal climate forecasts for improving food insecurity early warning in West Africa, American Geophysical Union Fall Meeting, San Francisco, December 11, 2019
- Funk** C, Herring S, Wang SY, Yoon JH, **session chairs:** Climate Extremes: Patterns, Mechanisms, and Attribution I, II and III, American Geophysical Union Fall Meeting, San Francisco, December 12, 2019
- Krell N, Davenport F, Peterson S, Shukla S, Husak GJ, Turner W, **Funk** C and Caylor K.K., To What Extent Does Climate Variability Explain Farmers' Planting Decisions in Central Kenya?, American Geophysical Union Fall Meeting, San Francisco, December 12, 2019
- Verdin A, **Funk** CC, Peterson P, Peterson S, Grace K and Funk A, Validation of a New Quasi-Global Very High-Resolution Daily Temperature Dataset, American Geophysical Union Fall Meeting, San Francisco, December 12, 2019.
- Tuholske C, **Funk** CC, Caylor KK, Evans T and Sweeney S, A Fine-Resolution, Global Comparison of Urban Exposure to Extreme Temperatures, American Geophysical Union Fall Meeting, San Francisco, December 12, 2019.
- Shukla S, Macharia D, Husak GJ, **Funk** C, Landsfeld M.F., Kimani M.N., Kabatha P, Peterson P and Adams E.C., Enabling access and usage of earth observations in environmental decision making in Eastern and Southern Africa through capacity building. American Geophysical Union Fall Meeting, San Francisco, December 13, 2019.
- Green R.K., Caylor KK, **Funk** CC and Roberts DA, Drought Projection and Modeling Causal Feedbacks with Earth Observations in East Africa, American Geophysical Union Fall Meeting, San Francisco, December 13, 2019.
- Landsfeld MF, Peterson P, Harrison L, Husak GJ, **Funk** C, Sonnier A and Way-Henthorne J, Quality control of multi-source in situ precipitation measurements: Filtering and processing techniques used in CHIRPS, American Geophysical Union Fall Meeting, San Francisco, December 13, 2019.
- Funk** CC, Husak G, McNally A, Arsenault K, Harrison L, Combining Sources of Predictive Skill to Support Effective Drought Early Warning (**Invited Presentation**) Annual Meeting of the American Meteorological Society, Boston, MA, January, 16, 2020.
- Seregina LS, van der Linden R, Fink AH, **Funk** CC, and Pinto JG, Using Seasonal Rainfall Clusters to Explain the Interannual Variability of the Rain Belt over the Greater Horn of Africa Annual Meeting of the American Meteorological Society, Boston, MA, Monday, January 13, 2020
- Arsenault KR, Hazra A, Shukla S, McNally A, Getirana A, Peters-Lidard CD, Kumar SV, Koster R, Zaitchik BF, Slinski K, **Funk** CC, and Verdin JP, NASA's Seasonal Hydrological Forecast System for Improved Food Insecurity Early Warning in Africa, Annual Meeting of the American Meteorological Society, Boston, MA, January 14, 2020
- Funk** CC, and Fink A, Can Thermodynamic Intensification of the Global Walker Circulation Help Resolve the East African Climate Paradox? Annual Meeting of the American Meteorological Society, Boston, MA, January, 13, 2020.
- Galu G and **Funk** C, Climate Information Services for Agriculture and Food Security, **Invited Presentation.** World Meteorological Society Climate Information Services Best Practices Workshop, Pune India, February 13th, 2020.
- Funk** C, Concerning Trends and CHC Strategies, UCSB Workshop with Science writer Paul Voosen, Feb 13th, 2020.
- Funk** C, Strategies and Resources for Monitoring and Coping with Climate Change and Variability (with a focus on eastern and southern Africa), (**Invited Keynote Address**), Bill and Melinda

Gates Foundation Climate Change Learning Workshop, April 13th, 2020.

- Funk C**, Predictability of consecutive eastern East African OND and MAM droughts  
(**Invited presentation**) THE FIFTY SIXTH GREATER HORN OF AFRICA CLIMATE  
OUTLOOK FORUM (GHACOF56), Nairobi Kenya, August 26th 2020 (remote  
presentation).
- Funk CC**, Peterson P, Huffman GJ, Landsfeld MF, Davenport F, Peterson S, Pedreros DH, Ruane  
AC, Mutter C, Shukla S, Turner W, Harrison L, Sonnier A and Husak GJ, Introducing and  
evaluating AgMERC - Timely station-enhanced Integrated Multi-satellite Retrievals for Global  
Precipitation Measurement, October 21st, 2020, **Invited Presentation**. NASA Precipitation  
Monitoring Mission Annual Science Team Meeting (remote presentation).
- Funk C**, Ruane A, Jahn M, Fukagawa N, Hertel T, Panel: NextGen Modeling for Food Systems,  
Shocks and Security. **Invited Panelist**. Ag Modeling Intercomparison Project (AgMIP) 8th  
annual conference on Food Systems, Shocks, and Actions (remote presentation).
- Funk C (invited panelist)**, Groves D, Silva P, van Breda A, A world of water: Reimagining  
Resilience, MIT Water Summit, Panel on Disaster resilience, November 13th, 2020.
- Funk C.**, Invited Discussant for invitation-only meeting, Earth Observations, Agriculture, Food  
Systems and National Security: A Roadmap for US Federal Agencies. Nov, 16th, 2020.
- Funk C.**, C. Leigh Anderson, Kelsey Figone, Tiffany Ha, Ethiopia Case Study, Center for Risk  
and Inclusion in Food Systems Workshop, **Invited Presentation**, virtual seminar. Univ.  
Washington, Evans School of Public Policy and Governance.
- Funk C.**, Magadzire T, Husak G, Climate Hazards Center Overview and Products, Virtual  
Meeting with Zimbabwe Meteorological Department, December 8<sup>th</sup>, 2020.
- Funk CC**, Herring S, Hoell A, Mitchell D, (**session chairs**) Climate Extremes: Patterns,  
Mechanisms, and Attribution I, II and III, December 14th, 2020, American Geophysical  
Union Annual Meeting.
- Davenport D, Landsfeld MF, Shukla S, Husak GJ, Macharia D and **Funk CC**, Building Earth  
Observation Based Systems for Grain forecasting and Agricultural Outlooks in Eastern and  
Southern Africa, December 17th, 2020, American Geophysical Union Annual Meeting.
- Green RK, Caylor KK, **Funk CC**, Roberts A, Seasonal Vegetation-Hydrological Coupling across  
Land Covers in East Africa, December 16th, 2020, American Geophysical Union Annual  
Meeting.
- Tuholske C, Caylor KK, **Funk CC**, Verdin A, Sweeney S, Peterson P, Evans T, Grace K, Global  
Urban Population Exposure to Extreme Heat, December 14th, 2020, American Geophysical  
Union Annual Meeting.
- Funk CC**, Peterson P, Huffman GJ, Landsfeld MF, Davenport F, Peterson P, Pedreros DH,  
Ruane AC, Husak GJ, Way-Henthorne J, Turner W, Sonnier A and Shukla S, Introducing  
and evaluating two new satellite-gauge gridded precipitation products: CHIRPS3.0 and  
AgMERC, December 16th, 2020, American Geophysical Union Annual Meeting.
- Shukla S, K Arsenault, A Hazra, K Slinski, C **Funk**, C Peters-Lidard, ... Multistage and Scale  
Drought Prediction to Support Food Insecurity Early Warning (**Invited Presentation**), 101st  
American Meteorological Society Annual Meeting, Monday, Jan 11, 2021. Virtual.
- Funk**, C and P. Peterson, G. J. Huffman, M. Landsfeld, F. Davenport, S. Peterson, D. Pedreros,  
A. Ruane, C. Mutter, S. S. Shukla, W. Turner, and A. Sonnier, Introducing and Evaluating  
AgMERC—Timely Station-Enhanced Integrated Multisatellite Retrievals for Global  
Precipitation Measurement, 101st American Meteorological Society Annual Meeting,  
Thursday, Jan 14, 2021, Virtual.
- Sarmiento DP, and K. Slinski, A. McNally, C. **Funk**, and P. Peterson, Impacts of Variations in  
Daily Rainfall Frequency Distribution on Land-Surface Simulations Over CONUS, 101st  
American Meteorological Society Annual Meeting, Friday Jan 15, 2021, Virtual.
- Funk C** (2021) Amazing Planet (... but in peril...), For Laguna Blanca School, March 1<sup>st</sup>, Virtual.
- Funk C** (2021) Horn Climate & Security: Scientific Overview, International Crisis Group Annual

- Meeting, Invited Presentation, Climate & Security in the Horn of Africa, Online Workshop - March 15, 16 & 19, 2021.
- Funk C.** (2021) Drought, Flood, Fire. Cambridge Festival. Invited Keynote. March 26<sup>th</sup> 2021. **Invited Presentation.** Virtual, Online event by registration.
- Funk C** (2021) Horn of Africa - Climate and Security: Scientific Overview, International Crisis Group Annual Meeting, Virtual. Invited Presentation. March 13<sup>th</sup> 2021.
- Funk C** (2021) Invited Panelist, Changemakers Series: Local Heroes Combatting Climate Change, Museum of Ventura County, 4/29/2021. Virtual, Online event by registration.
- Adloff M, M Bliss Singer, D McLeod, K Michaelides, N Mehrnegar, C **Funk** (2021) Groundwater storage in the Horn of Africa drylands dominated by seasonal rainfall extremes, EGU General Assembly Conference Abstracts, EGU21-15470. April 2021, Vienna.
- Funk C** (2021) How climate change is contributing to recent catastrophes, and how improved early warning systems can help us respond, UCSB Climate Meeting Talk, April 5<sup>th</sup> 2021.
- Lee D, F Davenport, S Shukla, G Husak, C **Funk** (2021) Maize yield forecast using earth observation data and machine learning for Sub-Saharan Africa, EGU General Assembly Conference Abstracts, EGU21-1442. April 2021, Vienna.
- Funk C**, Huask G, Korecha D and Pedreros D (2021) Assessing the Scientific Benefits of the UCSB/CHC and NMA Partnership, For the 40<sup>th</sup> Anniversary of the Ethiopian National Meteorological Agency, May 5<sup>th</sup> 2021. **Invited Speaker, Addis Ababa.**
- Grace K, Davenport F, Wrigley-Field E, Zaitchick B, **Funk C** (2021) The Impacts of Heat Waves on Child Health in Africa, Annual meeting of Population Association of America, May 8<sup>th</sup>, 2021.
- Funk C** (2021) Drought Flood Fire and 21<sup>st</sup> Century Early Warning System Advances, NSF Convergence meeting - Bringing Land, Ocean, Atmosphere and Ionosphere Data to the Community for Hazard Alerts, 5/24/2021, **Invited Speaker and Panelist.**
- Funk C** and Magadzire T (2021) Climate Hazards Center Overview and Products, Virtual Presentation to Zambia Meteorological Department, June 10<sup>th</sup>, 2021.
- Shukla S, C **Funk**, L Harrison, G Husak and J Way-Henthorne (2021) Multistage and Scale Drought Prediction to Support Food Insecurity Early Warning, Audience – USAID FEWS NET, July 21<sup>st</sup> 2021. Virtual.
- Funk C** (2021) How to translate the finger prints of climate change into more effective early warning: a scientific adventure, University of Texas, July 21<sup>st</sup> 2021. Virtual, **Invited.**
- Funk C** and Magadzire T (2021) Conceptual Frameworks and Methods for anticipating the impact of a warming Indo-Pacific Ocean on our weather and climate, TWENTY FIFTH SOUTHERN AFRICA REGIONAL CLIMATE OUTLOOK FORUM (SARCOF-25), "Impact of warming ocean on our weather and climate", August 27<sup>th</sup> 2021. **Invited.**
- Funk C** (2021) CHIRTSmax and Related Products: How, What, Why and When, Bill and Melinda Gates Foundation invited lecture, August 20<sup>th</sup> 2021. Virtual **Invited Presentation.**
- Funk C** (2021) Drought Flood Fire – Book Release - Chaucers Bookstore, Santa Barbara, August 16<sup>th</sup> 2021.
- Funk C**, Korecha G, Husak G (2021) A Tailored Forecasting Approach Applied To The Long Rains, Ethiopian National Meteorological Agency, Training, September 24<sup>th</sup> 2021, Addis Ababa, Ethiopia (Remote), **Invited Presentation.**
- Funk C** (2021) How thinking about climate change can improve hazard early warning, National Tropical Weather Conference, September 30<sup>th</sup> 2021, **Invited Keynote.**
- Funk C**, Husak G, Shukla S (2021) Climate Hazards Center Overview and Products, October 10<sup>th</sup> 2021, **Invited Presentation** for the Sahel Predictive Analytics Project.
- Funk C**, Williams E and Peterson P (2021) Climate Change outlook and Its Impacts on Rangeland/Grassland, The International Rangeland and Grassland Conference, October 26<sup>th</sup> 2021m Nairobi, Kenya. **Invited Speaker.**



- Funk C** (2021) Adaptation and Early Warning, Daugherty Water for Food Global Institute, Water For Food Symposium - Impact of extreme events on water and food systems and human health session, invited speaker and panelist, October 28th 2021. **Invited Speaker and Panelist.**
- Funk C** and Magadzire T (2021) CHC Science for coping with climate change, 5th AfriGEO Symposium, Session 2: Climate Change, November 17th 2021.
- Funk C** (2021) Early Warning, Climate Change, and Prediction: How Understanding Climate Change can Help Prevent Famine, Rice University, Department of Earth, Environmental, and Planetary Sciences, December 2nd 2021, Invited Colloquium.
- Funk C**, P Peterson, GJ Huffman, K Slinski, L Harrison, DP Sarmiento, Evaluating and Exploring Extreme Precipitation in CHIRPS3, CHIMES, and the Climate Hazards Station Database, AGU Fall Meeting December 2021
- Funk C**, EL Williams, P Peterson, WA Turner, RK Green, S Shukla (2021) Exploring a new set of global vapor pressure deficit observations and projections, accompanied by regional NDVI impact assessments in the southwest US and sub-Saharan Africa, AGU Fall Meeting 2021, December 2021.
- Harrison L, CC **Funk**, A Hoell, S Shukla, GJ Husak, G Galu, D Korecha (2021) Evaluating dynamical and statistical model seasonal precipitation forecasts for East Africa, AGU Fall Meeting 2021
- Landsfeld MF, L Harrison, GJ Husak, WA Turner, CC Funk, S Shukla (2021) The Updated CHIRPS-GEFS Precipitation Data Set Description, Assessment, and Usage in Food-Security Analysis, AGU Fall Meeting 2021, December 2021.
- D Lee, F Davenport, S Shukla, GJ Husak, CC Funk (2021) An operational crop yield forecasting system for Sub-Saharan Africa using earth observation and machine learning, AGU Fall Meeting 2021, December 2021.
- Funk C**, Herring S, Hoell A, Mitchel D (2021) AGU Innovation Session - U43D - Climate Extremes: Mechanisms, Attribution, and Early Warning, three sessions, AGU Fall Meeting 2021, December 16, 2021.
- Funk C**, Herring S, Hoell A, Mitchel D (2021) Introduction and session objective: to foster productive dialog between the climate science, early warning and risk management communities, AGU Innovation Session - U43D - Climate Extremes: Mechanisms, Attribution, and Early Warning, AGU Fall Meeting 2021, December 16, 2021.
- Husak G, S Shukla, **Funk CC**, McNally A, Salvidar R (2021) GC24A-03 - Characterizing and forecasting drought over Eastern East Africa for the OND season, AGU Fall Meeting 2021, December 2021.
- Davenport F, S Shukla, D Lee, MF Landsfeld, Macharia D, Husak G, **Funk CC** (2021) GC25B-0649 - Implementing and Integrating Earth Observation Based Systems for Grain forecasting in Eastern and Southern Africa, AGU Fall Meeting 2021, December 2021.
- Funk C**, Harrison L, Galu G (2021) The Scientific Basis for FEWS NET's East Africa - March-May-Outlook and Assumptions, Presentation to ICPAC, WMO, FAO, WFP and FEWS NET. January 20th 2022.
- Funk C** and Harrison (L) (Predictable) droughts in the Horn of Africa and Links to Climate and Climate Change, **Invited** Presentation to OXFAM. February 23rd 2022.
- Funk C**, Harrison L, Shukla S, Davenport F, Lee D, Peterson P, Tuholske C, Williams E, Turner W, Landsfeld M, Fickas K, Anderson P, Saldivar R, Peterson S and Husak G, Climate Change, Hunger and Harm: how understanding their links is helping the Climate Hazards Center safeguard lives and livelihoods in Africa, UC Santa Barbara Climate presentation, March 4th 2021.

## RENDERING SCIENTIFIC JUDGMENT

### Recent Review Activities:

Note 1 – since 2016 I have served as an editor for Nature Scientific Data, overseeing the review of about five papers a year.

Note 2 – since 2020 I have served as Chief Editor for Frontiers in Climate, Climate Services, overseeing the review of about five papers and ~3 special collections a year

Journal or Agency	Description	Year
Nature	Reviewed paper on using SMAP and prices to model food insecurity	2020
Climate Services	Reviewed paper on climate change impacts on Fiji storm surge	2020
Nature Sci Data	Reviewed paper on high-resolution hyperspectral imagery	2020
Climate Services	Communication structures and decision making in Malawi	2020
Bull. AMS	Reviewed paper on Attribution of 2019 low precipitation in Angola	2020
Climate Dynamics	Reviewed paper on the Indian Ocean branch of the Walker Circulation	2020
John Hopkins Univ	Reviewed Merit of early career researcher	2020
Colombia Univ	External Reviewer for very high-level climate scientist	2020
Cambridge Press	Reviewed climate change book proposal	2020
Nature Sci Data	Reviewed paper on Geocoded Disasters (GDIS) dataset	2020
Univ. New South Wales	Reviewed PhD of Stefan Contractor (REGEN dataset)	2019
Nature Sci Data	Reviewed paper on global curve number dataset	2019
Science Advances	Reviewed on paper describing land-falling droughts	2019
Univ. of Bristol	Reviewed promotion case for prominent climate scientist	2019
Bull. AMS	Reviewed paper on ENSO-related hydroclimatic extremes	2019
IPCC/US	US government reviewer for IPCC report on climate change and land	2019
Univ of Bristol	External Reviewer for mid-level UK Atmospheric scientist	2019
J Climate	Reviewed paper on urbanization and temperature increases in China	2019
Nature Comm	Reviewed paper on African soil moisture controls on carbon sequestration	2019
USGS	Internal review on paper predicting forage conditions in the Sandhills region	2019
Science	Reviewed on paper describing land-falling droughts	2019
Science Advances	Reviewed paper on unprecedented weather extremes	2019
Bull. AMS	Reviewed paper on climate change and ENSO impacts	2018
Univ of Reading	External Reviewer for senior UK Atmospheric scientist	2018
UC San Diego	External Reviewer for a Scripps Institution of Oceanography scientist	2018
J Climate	Reviewed paper on West Pacific SST hot spots and extreme convection	2018

Nature	Reviewed paper on interannual variations in atmospheric carbon variations	2018
J Climate	Reviewed paper on the southern African Angola low	2018
USAID	Reviewed US African Command analysis of Sahel desert extension	2018
WRR	Reviewed paper on Bayesian precipitation estimation in China	2018
Nature Sci Data	Reviewed paper on the The Global Gridded Crop Model Intercomparison	2018
Clim. Change	Reviewed paper on precipitation intensification	2018
Atmospheres	Reviewed paper long-term high-resolution satellite precipitation datasets	2018
Clim Dyn	Reviewed paper on rainfall changes associated with ENSO and IOD	2018
J Climate	Reviewed paper on the influence of Indian Ocean SST bias	2018
USAID	Reviewed study describing new methods for measuring resilience	2017
GRL	Reviewed paper on East African rainfall variability	2017
J. Hydromet	Reviewed paper on East Africa hydro-meteorological trends	2017
Sci Advances	Reviewed paper on the 'Probability of unprecedented climate events'	2017
Nat Sci Data	Reviewed paper on high resolution terrestrial climatologies	2017
Bull. AMS	Reviewed paper on atmospheric stagnation and European temp extremes	2107
MacArthur	Reviewed case for MacArthur fellowship	2017
Clim Dynamics	Reviewed paper on East African climate change simulations	2017
Bull. AMS	Reviewed paper on anomalous Nigerian rainfall onset	2016
Geografiska Ann	Reviewed paper on Ethiopian rainfall trends	2016
Oxfam	Reviewed report on East African climate change	2016
Clim Dyn.	Reviewed paper on 2015/16 Southern African drought	2016
AGU	Reviewed book chapter on changing Australian climate extremes	2016
AGU	Reviewed book chapter on the MJO and precipitation predictability	2016
AGU	Reviewed book chapter on the CA drought dynamics and fire impacts	2016
Nature	Reviewed paper on 'Land carbon sink interannual variability'	2016
Nature Plants	Reviewed paper on Resilience of the Ethiopian coffee sector to climate change	2016
Clim Dynamics	Reviewed paper on Southwest Asia climate change in CMIP5 simulations	2016
ERL	Reviewed paper on genesis of precipitation in water-limited areas	2016
Science Advances	Reviewed paper on multi-year droughts	2016
J. Climate	Reviewed paper on drivers of sub-seasonal East Africa precipitation	2016

Am Ac. Sciences	Reviewed proposal on building resilience to drought in India	2016
J. Climate	Reviewed paper on ENSO-like variability	2016
IRI	External reviewer for Dr. Helen Greatrex	2016
Bull. AMS	Reviewed paper on 2014 climate extremes	2016
Nature	Reviewed paper on climate change and respiration	2015
EU	Reviewed paper on Peruvian biodiversity and climate change	2015
Int. J. Climate	Reviewed paper on pentadal East African rainfall drivers	2015
GRL	Reviewed paper on Pacific SST modes and the blob	2015
Int. J. Climate	Reviewed paper on East African short rains	2015
J Climate	Reviewed paper on global warming mode	2015
Oxfam	Reviewed climate change report for southern Africa	2015
Science Advances	Reviewed paper on Atlantic SST impacts on East Africa drought	2015
USGS	Internal review on paper on flash droughts	2015
Univ of Capetown	External thesis reviewer for Dr. Lawal	2015
NSF	Reviewed proposal on climate change and food security	2015
Clim. Dynamics	Reviewed paper on East Africa drought tendencies	2015
GRL	Reviewed paper on record European temperatures	2015
J. Hydromet.	Reviewed paper on Malawi precipitation	2015
Nat Clim Change	Reviewed paper on changing number of dry days/precip intensity	2015
Int. J Climate	Reviewed paper on East Africa weather extremes	2015
WRR	Reviewed paper on Ethiopia drought monitoring	2015
J Climate	Reviewed paper on East African Prediction	2015
Nature	Reviewed paper on global vegetation changes and global warming	2015
Belmont	Reviewed Water Security Proposal	2015
NSO	Reviewed proposal for the Netherlands Space Organization	2015
PNAS	Reviewed paper on rainfall and 'greening' tendencies over the Sahel	2015
Science Advances	Reviewed paper on paleoclimate changes in East African rainfall	2015
Nature Commun.	Reviewed paper on AMO influences on East Africa rainfall	2015
PNAS	Reviewed paper on rainfall and 'greening' tendencies over the Sahel	2015
Science Advances	Reviewed paper on paleoclimate changes in East African rainfall	2015
Nature Commun.	Reviewed paper on AMO influences on East Africa rainfall	2015
J. Climate	Reviewed paper on ENSO-like SST variability	2015
AMS BAMS	Reviewed climate attribution focusing on the Southern Levant	2015
Netherlands EO	Reviewed proposal on vegetation transects in South America	2015
US Government	Advisor Climate Societal Benefit Area for the Earth Observing Assessment	2015
Nature	Reviewed paper on temperature influences on plant respiration	2015

GRL	Reviewed paper on predicting Indian NDVI	2015
Clim. Dynamics	Reviewed paper on sub-seasonal East African climate variability	2015
J. Climate	Reviewer on paper looking at secular SST warming trends	2014
Int. J. of Climate	Reviewer on paper analyzing East African short rains	2014
GRL	Reviewer for paper linking AMO and Sahel rainfall	2014
GRL	Reviewer for paper on North Pacific Oscillation	2014
IPCC	U.S. Government reviewer for AR5 WGII chapter on Africa	2014
IPCC	U.S. Government reviewer for AR5 WGII chapter on South America	2014
J. Climate	Reviewed paper on predicting Ethiopia rainfall	2014
USGS	Internal review of paper on the changing number of dry days	2014
USGS	Internal review of a paper on VegDRI	2014
J. Hydro. Met	Reviewed paper on Malawi's Shire River fluctuations and climate	2014
WRR	Reviewed paper on prediction of Upper Blue Nile Basin floods	2014
US DOE	Reviewed 7 proposals and acted as panelist for DOE CC Attribution program	2014
Netherlands EO	Reviewed proposal on vegetation productivity in East Africa	2014
USGS Mendenhall	Reviewed applicants for the 2013 Mendenhall Fellowship	2014
Nature	Reviewed paper on days for plant growth under projected climate change	2014
Int. J. of Climate	Reviewed paper on Projected Land Cover Change Effects on East Africa	2013
Clim. Dynamics	Reviewed paper on Indian Ocean forcing of Nile River flows	2013
WRR	Reviewed paper on vegetation monitoring in Ethiopia	2013
Nature	Reviewed paper on the asymmetric influence of nighttime and daytime warming	2013
Int. J. of Climate	Reviewed paper on changes over the Greater Horn of Africa	2013
Reg. Env. Change	Reviewed paper on variability and trends in Omo-Ghibe River Basin	2013
NSF	Reviewed proposal for Belmont Forum and G8 Research Councils	2013
Climatic Change	Reviewed paper on shrinking Congo watersheds	2012
J. of Hydrology	Reviewed paper on ENSO impacts on Mekong Delta	2012
JSTARS	Reviewed paper on Ethiopian Drought Monitoring System	2012
En. MAS	Reviewed paper on Impact of land-use change on groundwater quality	2012
Th. & Ap. Clim	Reviewed paper on Recent Ethiopian Drought tendencies	2012
I J. Env RP Health	Reviewed paper on Blue Nile Climate Resilience	2012
Nat. Clim Asses.	Reviewed US Southwestern Climate Assessment	2011
GRL	Reviewed paper on recent East Africa drought	2011
UNEP GEAS	Reviewed report on 2011 East African drought	2011

World Bank	Reviewed World Bank 2011 policy brief on East Africa drought	2011
IRI	Reviewed Climate and Society Publication 3	2011
CCAFS	Reviewed proposals on improved African climate monitoring	2011
USGS	USG RGE review panelist	2011
EOS	Book Review: Famine Early Warning Systems and Remote Sensing	2010
USGS	USGS Climate Change Research Strategy	2009
JGR	Reviewed article on Indian Monsoons	2009
NASA PMM	Reviewed proposal on precipitation monitoring	2010
GEC	Reviewed paper on economic impacts of yield reductions	2010
Climatic Change	Reviewed article on phenological change in Africa	2010
Proceedings NAS	Reviewed article on photosynthesis and teleconnections	2009
Taylor Publishing	Reviewed 'Historical context of the climate and oceanography'	2010
GRL	Reviewed article on Sahelian climate shifts	2009
GEC	Reviewed article on soil degradation on long-term food security in China	2008
RSE	Reviewed article on remote sensing and Dengue fever	2008
RSE	Reviewed article on Zimbabwe land degradation	2008
RSE	Reviewed article on NDVI for Modelling Aedes aegypti larval index	2008
Int. J. of Climate	Reviewed 'Physiographically-sensitive mapping'	2007
J. of Arid Env.	Reviewed paper on Zimbabwe drought	2006
J. of Climate	Reviewed Indian Ocean Dipole paper	2005
NOAA/OGP	Reviewed proposal on S. Asia drought monitoring system	2004
J. of Hydrology	Reviewed paper on modeling orographic influences	2004
NOAA/OGP	Reviewed Climate Change/Climate Mitigation proposal	2001

## Leadership and Advisory Activities:

**UCSB Geography department - Full Affiliated Research Professor** 2008-present  
As an affiliated full professor in the UCSB Geography department, I mentor MA/PhD students and post-doctoral researchers, assist in and lead research proposals and projects and teach advanced classes in graduate level statistics and geo-statistics. Since 2009, I have been reviewed by UCSB two times. The first review in 2012 was equivalent to a full external tenure review, and I was advanced to a full researcher position with an accelerated 1-step advance. During the last review in 2015 I was also advanced at an accelerated rate, advancing 2 steps. I have acted as an advisor on nine Ph. D committees and three masters committees. I have acted as advisor for eight post-doctoral researchers. I advise seven early warning scientists in Africa and Central America. Climate Hazard Group doctoral and post-doctoral researchers have gone on to excellent positions with top notch universities and government institutions.

**USGS PREPARED lead climate change scientist** 2011-2018  
Work with EROS EWEM to develop a technology and science strategy supporting the \$40 million dollar PREPARED Project.





### **USGS EROS/Land Change Science - Principal Investigator, Drivers of Drought Project**

2015 to 2020

In collaboration with Jim Rowland (USGS EROS), I lead the Land Change Science 'Drivers of Drought' program. This project uses climate models to perform basic research into the similar Indo-Pacific climate patterns that produce drought in Eastern Africa and the United States, identifies targets for prediction and evaluates the likelihood of climate change impacts. Regional and global data sets, analyses and mapping tools are developed and deployed within the EROS [earlywarning.usgs.gov/fews/](http://earlywarning.usgs.gov/fews/) portal. Since 2011, this work has produced 10 USGS Fact Sheets and reports, a widely-used global precipitation [data set](#), and a web-based environmental monitoring tool – the Early Warning eXplorer ([EWX](#)). The USGS reports describe trends in African climate and food security for adaptation decision makers. The 0.05° daily 1981-present precipitation data set has been especially designed to support drought early warning. Journal articles have explored the interaction of ENSO with global warming and identified enhanced risks for the US and Africa during La Niña conditions. Invited articles have also quantified the potential climate change contributions to recent droughts in California and the Greater Horn of Africa.

### **USGS EROS/Land Change Science – Contributing Scientist, African Capacity Building**

2011 to 2020

Under the leadership of Jim Verdin and Jim Rowland (USGS EROS) and as Co-PI on several NASA and NOAA grants, I work as a contributing scientist on projects focused on building early warning and climate service capacities in Africa and Latin America. These service-oriented activities work to empower African and Central American scientists to support effective disaster risk reduction and climate smart adaptation policies. Most notable on this front has been the EROS EWEM group's participation (~\$3 million dollars) in the five year, \$40 million dollar USAID project for 'Planning for Resilience in East Africa through Policy, Adaptation, Research and Economic Development' in East Africa. Techniques developed for crop modeling and trend analyses have been encapsulated in two USGS [tools](#) originally conceived by me (the GeoWRSI and GeoClim,) and CHC staff have held many training sessions over the past three years using these tools. Capacity building efforts have also supported the NASA [SERVIR](#) project. My expertise in food security has led to my acting as government reviewer on the AR5 IPCC WGII Report Africa and Central America chapters, and as a co-author on the forthcoming USDA report on climate change and global food security.

### **Workshop organizer: IMAAFS**

2014

Work with European counterparts from JRC to organize a large week-long conference in Addis Ababa -- Information for Meeting Africa's Agricultural Transformation and Food Security Goals (IMAAFS).

### **Advisory Board Member – UNEP CLIMWARN project**

2012-2014

Advise CLIMWARN project on best practices for African early warning and drought identification.

### **Member NASA Precipitation Monitoring Mission team**

2007 to 2011

Promote and advance satellite precipitation science

### **Co-Lead - Validation, Crop and Rangeland Monitoring Working Group**

2009-2011

Provide guidance and leadership on international rainfall validation effort with the Joint Research Centre, Ispra Italy.

### **Expert Advisor: European Union Research Committee on drought vulnerability and warning**

Sit on an advisory board of 5-6 leading experts in the field of drought warning and climate research. Provide scientific knowledge and experience guiding climate adaptation and mitigation activities for

and international 19-partner EU Seventh Framework project. 2010-2014.

**Team Member – International Precipitation Working Group** 2015-present  
Provide guidance on applied drought early warning science

**Expert Advisor: USAID Mission Nairobi, consultant on climate** 2010-present  
Provide USAID mission and Feed the Future initiative detailed climate projections.

**Expert Advisor: India Drought Monitoring exchange** 2009  
Act as US/USGS representative in extensive exchange of drought monitoring expertise.

**Task Lead for Rainfall Validation Working Group** 2006-present  
Coordinate discussions and research pertaining to the accuracy of various satellite rainfall estimation techniques in eastern Africa. Part of an international consortium on Crop and Rangeland Management.

**Team member – Rift Valley Fever Project** 2002-2004  
Work with IRI and African institutions to create and coordinate improved Rift Valley Fever forecasting systems

**Expert consultant: African Agro-climate** 2003-present  
On a semi-routine basis (~once per month), advise food security specialists on the African climate conditions and likely food security impacts. This information then feeds into food security alerts and special reports.

**Review panel member: IRI CSP** 2011-present  
Provide expert editorial guidance on International Research Institute for Climate and Society's Climate and Society Publication.

**Expert consultant: Contributions of Remote Sensing for Decisions about Human Welfare**  
Provided inputs for NRC report, representing food security and remote sensing views at this National Research Council meeting, January 30-31, 2006.  
[http://www.nap.edu/catalog.php?record\\_id=11759](http://www.nap.edu/catalog.php?record_id=11759)

**Expert Advisor: Workshop on Re-establishing the Caribbean Climate Outlook Forum**  
Together with NOAA partners, supported Caribbean scientists in setting up a regular climate outlook forum procedure and process. 2010

**Expert Consultant: NAS Workshop on US Priorities for the Climate Change Science**  
Represented international food security and climate change science and concerns at the NAS CCSP meeting and breakout groups. 2007

**Task Lead for Rainfall Validation Working Group** 2006-2010  
Coordinate discussions and research pertaining to the accuracy of various satellite rainfall estimation techniques in eastern Africa. Part of an international consortium on Crop and Rangeland Management

## LECTURESHIPS AND OTHER ACADEMIC SERVICE

### Courses Taught

- UCSB 210C, Analytical Methods in Geography, Spring 2015.
- UCSB 210B, Analytical Methods in Geography, Winter 2015.

- UCSB 280, Seminar in Climate Change, Spring 2013.
- UCSB Geography 210C, Analytical Methods in Geography III. Graduate course in geostatistics and spatial analysis. Spring 2011.
- UCSB Geography 210C, Analytical Methods in Geography III. Graduate course in geostatistics and spatial analysis. Spring 2010.
- UCSB Geography 133, Tropical Meteorology. Advanced undergraduate course. Spring 2003
- UCSB Geography 166, Physical Climatology. Advanced undergraduate course. Spring 2004.
- UCSB Geography 103, Geographic Computing. Fall 2002, Fall 2003.
- UCSB Geography 3B, Physical Geography. Summer 2002.
- Santa Monica College, Physical Geography. Fall 2000, Spring 2001.

### **Current Mentoring activities:**

Post-Doctoral Advisor, Donghoon Lee

- Machine Learning and Yield Estimation

Doctoral Advisor, Rachel Green, UCSB Geography, 2020 -present

- Vegetation Modeling and Prediction

Doctoral Advisor, Will Turner, UCSB Geography, 2019 -present

- Crop water stress modeling and prediction

Doctoral Advisor, Natasha Krell, UCSB Geography, 2017 -present

- Kenya agriculture and hydrology

Doctoral Advisor, Dami Oyelade, UCSB Geography, 2017-present

- Nigerian hydrology, precipitation extremes, urban planning

Doctoral Advisor, Emily Williams, UCSB Geography, 2016-present

- Modeling climate change impacts in Southwest US
- NSF Fellow

Science Advisor: USGS EROS Field Scientists, 2003-present

- Tamuka Magadzire; Gabarone Botswana.
- Alkhalil Adoum, Niamey, Niger.
- Gideon Galu, Nairobi, Kenya.
- Mario Rodriguez, Guatemala City, Guatemala
- Diriba Korecha, Addis Ababa, Ethiopia
- Chris Shitote, Nairobi, Kenya

### **Past Mentoring Activities**

Doctoral Advisor, Alana Ayasse, UCSB Geography, 2017-2021.

- Hyperspectral remote sensing, methane detection

Doctoral Advisor, Cascade Tuholske, UCSB Geography, 2017-2020

- Urban Food Security and Heat Impacts

Post-Doctoral Advisor, Frank Davenport, UCSB Geography, 2014-present

- Spatial econometrics and adaptation

Post-Doctoral advisor: Laura Harrison, UCSB Geography, 2009-2014

- Global adaptation

Post-Doctoral advisor: Catherine Pomposi, UCSB Geography, 2009-2014

- PACE Fellow, African Climate Variability

Doctoral Advisor, Tamuka Magadzire, University of Kwazulu-Natal, South Africa, 2015-2019

- Crop modeling

Doctoral Advisor, Sari Blakely, UCSB Geography, 2015-2020

- Climate and micro-insurance
- Doctoral Advisor, Haline Heidinger Abadia, UCSB Geography, 2015-present
- Climate variability in Peru
- Doctoral advisor: Andrew Verdin, Colorado University, 2011-2016
- Spatial Analysis, hydrology and agro-climatology
- Post-Doctoral Advisor, Colin Kelley, UCSB Geography, 2014-2016
- UCAR PACE Fellow
  - Climate change and predictability in Yemen and the Middle East
- Doctoral advisor: Laura Harrison, UCSB Geography, 2009-2014
- Global temperature-PET relationships, and 2030 PET projections
  - Climate adaptation strategies and re-greening the Sahel
- Post-doctoral advisor: Andrew Hoell, UCSB Geography, 2012-2014
- African climate change and climate modeling
  - Changes in ENSO and ENSO teleconnections
- Post-doctoral advisor: Shrad Shukla, UCSB Geography, 2013-2014
- Hydrologic modeling and prediction for Africa
- Post-doctoral advisor: Kathryn Grace, UCSB Geography, 2010- 2012
- Climate change and health impacts in Kenya
- Post-doctoral advisor: Harikishan Jayanthi, UCSB Geography, 2010- 2012
- FEWS NET LDAS, WRSI and yield reduction modeling
  - Long term trends in WRSI and associated yield impacts
- Post-Doctoral Advisor, Park Williams, 2009-2012
- East African climate trend analysis
  - Long term changes in the Walker circulation
- Ph.D Thesis advisor: Andrew Thorpe, UCSB Geography, 2011-2013
- Clutter matched filter detection of methane
- M.S Thesis advisor: Burke Greer, UCSB Geography, 2011-2013
- Climate Change impacts on Aspen
- Ph.D Thesis advisor: Amy McNally, UCSB Geography, 2009-2013
- FEWS NET LDAS calibration and rainfall unbiasing
  - Integrating LDAS with NDVI, LST, and PAMW soil moisture retrievals
- Ph.D Thesis advisor: Frank Davenport, UCSB Geography 2010-2013
- Panel models for predicting national maize production
  - Spatial transmission of maize price information
- Ph.D Thesis advisor: Roop Saini, U. Mass. Dept. of Atmospheric Science, 2009-2013
- Regional Influence of monsoons in the Current and a Warming Climate
- P.h.D. Thesis advisor: Michael Marshall 2007-2010
- Modeling Evapotranspiration in sub-Saharan Africa: a Tool for Food Security Analysis granted 12/2010
- M.S Thesis advisor: Diego Pedreros, UCSB Geography, 2005-2007
- Trends and ENSO influences in Central American rainfall.

## Information Dissemination

### Climate Hazard Center Blogs

CONCERNS ABOUT THE KENYA/SOMALIA SHORT RAINS, Chris Funk, <https://blog.chc.ucsb.edu/?m=201610>

VERY POOR PASTURE CONDITIONS LIKELY TO PERSIST THROUGH EARLY SPRING, Chris Funk, <https://blog.chc.ucsb.edu/?m=201611>

BELOW NORMAL FORECAST FOR THE 2017 EAST AFRICAN LONG RAINS, Chris Funk, Greg Husak, Diriba Korecha, Gideon Galu and Shrad Shukla, <https://blog.chc.ucsb.edu/?m=201612>

A 2016 CLIMATE REVIEW AND CONTINUED CONCERNS FOR THE 2017 LONG RAINS, Chris Funk, <https://blog.chc.ucsb.edu/?m=201701>

FORECAST FOR BELOW NORMAL SOMALI GU RAINS BASED ON JANUARY SEA SURFACE TEMPERATURES, Chris Funk, Amy McNally, Greg Husak, Laura Harrison, Shrad Shukla, and Nicholas Novella, <https://blog.chc.ucsb.edu/?m=201702>

BELOW NORMAL LONG/GU RAINS APPEARS LIKELY FOR EASTERN EAST AFRICA, Chris Funk, <https://blog.chc.ucsb.edu/?m=201703>

A LATE APRIL ASSESSMENT INDICATES POOR LONG RAINS AND LOW GU HARVESTS FOR SOMALIA, Chris Funk, <https://blog.chc.ucsb.edu/?m=201704>

HOW UNDERSTANDING CLIMATE CHANGE CONTRIBUTED TO SUCCESSFUL PREDICTION OF THE 2016 AND 2017 EAST AFRICAN DROUGHTS, Chris Funk, <https://blog.chc.ucsb.edu/?m=201707>

REFORMULATED NMME SIMULATIONS INDICATE PROBABLE DRYNESS FOR THE 2017 AND 2018 SHORT AND LONG RAINS IN EASTERN EAST AFRICA, Chris Funk, Andy Hoell, Wassila Thiaw, Diriba Korecha, Gideon Galu, Miliaritiana Robjhon, Endalkachew Bekele, Shraddhanand Shukla, Pete Peterson, and James Rowland, <https://blog.chc.ucsb.edu/?m=201710>

CLIMATE CHANGE LIKELY TO CONTRIBUTE TO ANOTHER EAST AFRICAN DROUGHT IN 2018, Chris Funk, <https://blog.chc.ucsb.edu/?m=201801>

AVERAGE TO ABOVE AVERAGE BLUE NILE RIVER FLOW EXPECTED IN 2018, Shrad Shukla, <https://blog.chc.ucsb.edu/?m=201805>

UPDATE ON 2018 BLUE NILE FORECAST, Shrad Shukla, <https://blog.chc.ucsb.edu/?m=201807>

ANNOUNCING THE CLIMATE HAZARDS CENTER, Chris Funk, Juliet Way-Henthorne, Greg Husak, <https://blog.chc.ucsb.edu/?m=201809>

BLENDING CHIRPS DATA AND GEFS FORECASTS FOR AN ENHANCED RAINFALL FORECAST PRODUCT, Martin Landsfeld, Laura Harrison, Chris Funk, Juliet Way-Henthorne, <https://blog.chc.ucsb.edu/?m=201810>

AGRO-CLIMATE ALERT: VERY POOR SOMALI DEYR HARVEST HIGHLY LIKELY, Chris Funk, Gideon Galu, Greg Husak, Will Turner, Juliet Way-Henthorne, <https://blog.chc.ucsb.edu/?m=201811>

A CONCERNING 2018-2019 SOUTHERN AFRICA CROPPING SEASON, Laura Harrison, Chris Funk, Will Turner, and Juliet Way-Henthorne, <https://blog.chc.ucsb.edu/?m=201812>

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