

Ram L. Ray

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I. EDUCATION

Institution and Location	Degree	Year	Major Program
University of New Hampshire, USA	Ph.D.	2009	Civil Engineering
Vrije University, Belgium	M.Sc.	2004	Soil Science
Tribhuvan University, Nepal	B.E.	1993	Civil Engineering

II. HONORS/AWARDS

- NASA Earth System Science Fellowship, USA, 2005-2008
- Vlaamse Interuniversitaire Raad (VLIR) Scholarships, Belgium, 2002-2004
- Tribhuvan University Merit Scholarships, Nepal, 1989-1992
- Excellent job performance award from DDC Sarlahi, Nepal, 2001

III. RESEARCH AND PROFESSIONAL EXPERIENCE

- 2013 – Present, Research Scientist, Prairie View A&M University, Prairie View, TX
- 2011- 2013, Postdoctoral Researcher, University of California, Merced
- 2009-2011, Postdoctoral Researcher, San Diego State University and UC San Diego, CA
- 2005-2009, Graduate Research Assistant, University of New Hampshire, Durham, NH
- 2002-2004, Graduate Research Fellow, Ghent University & Vrije University, Belgium
- 1996-2002, Civil Infrastructure Engineer, DOLIDAR, Government of Nepal
- 1993-1996, Civil Engineer, TAEC Consult P. Ltd. Nepal

IV. FUNDINGS/ACTIVE GRANTS

- 2017-2019: Real-time site specific irrigation scheduling tools for agricultural crops and urban landscape in Texas using mobile web app., **Co-PI**: \$591,622 (USDA-NIFA).
- 2014-2017: Impact of anthropogenic and natural changes on natural resources and the environment: **Co-PI**: \$321,800 (USDA-NIFA).
- 2015-2017: Integrated approach to develop, test and disseminate optimum water and nitrogen practices for a sustainable environment in a changing climate: Co-PI: \$171,570 (Texas A&M University System).
- 2016: An experimental approach to study water quality and water conservation in an agricultural watershed. **PI**: \$20,000 (Office of Research, Prairie View A&M University).
- 2016: Study on climate change impacts on agriculture and evaluation of adaptation measures in Texas. **Co-PI**: \$20,000 (Office of Research, Prairie View A&M University).

V. PENDINGS GRANTS

- An Integrated Approach to Study and Disseminate the Impact of Climate Change on Agricultural and Water Quality: **RL. Ray (PI)**, A. Fares, R. Awal, P Ampim, N. Daniels and S. Woldesenbet. Funding Agency- USDA-NIFA: \$595,751

VI. PANELIST

- Panelist of the NASA New Investigator Program (NIP) Review Panel
- Panelist of the NASA Terra-Aqua Land Review Panel
- Panelist of NSF CyberSEES Panel
- Panelist NASA Climate Assessment Products and Indicators Panel
- Panelist NASA Postdoctoral Program Review Panel

VII. PROFESSIONAL LICENSURE

- Professional Engineer, Texas Board of Professional Engineers, License No: 126870
- Professional Civil Engineer, Nepal Engineering Council, License No: 2022
- EIT: License No: 149247

VIII. RESEARCH INTERESTS

Water Resources, Hydrology, Ecohydrology: Hydrology-land surface-atmosphere interactions, Soil water dynamics, Experimentation/instrumentation, Landcover change impacts on agricultural water resources, irrigation/crop water requirements, Land surface dynamics, watershed hydrology and modeling, Remote sensing and GIS applications; Soil Carbon Sequestration

Hydroclimatology: Climate change impact on water resources, parameterization of land surface characteristics in hydrology, Agricultural water resources management using remote sensing, GIS, and climate forecasts

Geomorphology: Natural hazard and risk analysis using GIS/remote sensing and spatial statistical analysis, Fluvial geomorphology, Flood hydrology, Flood risk analysis, Flood hazards and Control

IX. TEACHING EXPERIENCE

- 2011-2012, Lecturer, UC Merced, courses taught-Climate and Hydrology & Mountain Hydrology
- 2010, Lecturer, San Diego State University, course taught-Environmental Engineering
- 2007-2008, Guest Lecturer, University of New Hampshire, courses taught-Engineering Hydrology, GIS & Water Resources
- 2006 & 2008, Graduate Teaching Assistant, lab taught-Fluid Mechanics

X. ADVISING

UNDERGRADUATE STUDENT'S PROJECTS

- Study the impact of drought on groundwater storage in the state of Texas
- Influence of rain on water and energy balance components at the land surface

GRADUATE STUDENTS (MASTER)

1. Remilekun Sobayo (Co-Advisor), M.S. Electrical Engineering, “Deep learning for soil moisture estimation from thermal images”, Aug 2017.
2. Ademola O. Ibrinke (Co-Advisor), M.S. Civil and Environmental Engineering, “Evaluation of land-use and climate change effects on carbon dioxide flux in Texas using satellite measurements”, Aug 2017.
3. Abayomi Adekanmbi (Co-Advisor), M.S. Computer Science, “A web application for visualizing and predicting groundwater storage in Texas” Ongoing.

XI. PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

- Member of American Geophysical Union since 2005
- Member of Institute of Electrical and Electronics Engineers (IEEE) since 2007
- Life member of Nepal Engineers’ Association since 1993
- Associate Member of American Society of Civil Engineers (ASCE) since 2010
- Member of SIGMA XI since 2011
- Member of Soil Science Society of America since 2016

XII. PROFESSIONAL SERVICE

Reviewer in Journals:

- Nature, Journal of Hydrology, Hydrologic Engineering, Natural Hazard, Advances in Water Resources, Hydrology Research, Remote Sensing of Environment, Irrigation Science, American Water Resources Association, KSCE Journal of Civil Engineering, Journal of Mountain Science, Engineering Geology, Natural Hazards and Earth System Sciences.

XIII. TRAINING/WORKSHOPS

- Water Quality Analysis Simulation Program (WASP) workshop held at Atlanta Federal Center (Host: EPA Region 4), Atlanta, Georgia: Aug 1-5, 2016.
- Eddy Covariance Training course held at LI-COR Biosciences Lincoln, Nebraska: Jan 12-14, 2016.
- “Utilization of cyberinfrastructure-based data systems and tools in geoscience education and research”. Training Participant. Organized by Cyberinfrastructure Summer Institute for Geoscientists (CSIG’10) to be held at the **San Diego Supercomputer Center (SDSC)** on the campus of University of California, San Diego (UCSD): Aug 9-13, 2010.
- “Use of Response Surface Methods (RSM) and other methods for modern Design of Experiments (DOE) using JMP software”. Invited Participant. Organized by **Statistical Analysis Software (SAS)** in San Diego, CA, USA: Mar, 2010.

XIV. PUBLICATIONS

BOOK CHAPTERS

- **Ray, R.L.**, and Dogan A. 2016. Contemporary Methods for Quantifying Submarine Groundwater Discharge to Coastal Areas, In A. Fares (ed.), **Emerging Issues in Groundwater Resources**. Springer International Publishing, New-York, USA. 498 pp.

REPORTS

1. Ampim, P., Wollesenbet, S., **Ray, R.L.**, Awal, R., and Fares, A. (2016). Response of goat lagoon manure sludge microbes to IBT2 treatment in-situ and in the laboratory at Prairie View A&M University. 18 pp.
2. Conklin, M., Bales, R., Saksa, P., Martin, S., and **Ray, R.L.** (2015). Water-Sierra Nevada Adaptive Management Project. In: Learning how to apply adaptive management in Sierra Nevada forests: An integrated assessment, Battles, et al. 872pp.
3. Guo Q., Zhou Y, **Ray R.L.**, Zhu J., and Bales R.C. (2012). Sequoia and Kings Canyon National Parks: Vulnerability of giant sequoia to moisture stress under a changing climate. National Park Service: 120 pp.

PEER-REVIEWED JOURNAL PUBLICATION

1. Ze-Zhong, M., **Ray, R.L.**, and He, Y. *In review*. Spatial and temporal distributions of evapotranspiration in the Three Gorges Reservoir region of China. *Environmental Earth Sciences*
2. **Ray, R.L.**, Jacobs, J.M., and Douglas, E.M. *In review*. Modeling regional landslide susceptibility using dynamic soil moisture profile. *Journal of Mountain Science*.
3. Umair, M., Kim, D., **Ray, R.L.**, and Choi, M. (2018). Land surface parameterization for CLM and VIC using remote sensing products. *Science of the Total Environment*. 633:470-483.
4. Sobayo, R., Wu, H.H., **Ray, R.L.**, and Qian, L. (2018). Deep learning for soil moisture estimation from thermal images. *IEEE, Data Intelligence and Security*. DOI: 10.1109/ICDIS.2018.00041
5. **Ray, R.L.**, Fares, A., and Risch, E. (2018). Effects of drought on crop production and cropping areas in Texas. *Agricultural Environmental Letters*, 3(1), DOI:10.2134/acl2017.11.0037.
6. Su, Y., Bales, R.C., Ma, Q., Nydick, K., **Ray, R.L.**, Li, W., and Guo, W. (2017). Emerging stress and relative resiliency of Giant Sequoia groves experiencing multi-year dry periods in a warming climate. *Journal of Geophysical Research: Biogeosciences*, 122. <https://doi.org/10.1002/2017JG004005>.
7. Lal, R., Mohtar, R., Assi, A.T., **Ray, R.L.**, Bayabil, H., and Jahn, M. (2017). Soil as a basic nexus tool: Soils at the center of the Food-Energy-Water Nexus. *Current Sustainable/Renewable Energy Reports*, DOI 10.1007/s40518-017-0082-4.
8. **Ray, R.L.**, Fares, A., He, Yiping and Temimi, M. (2017). Evaluation and inter-comparison of satellite soil moisture products over Texas, US using in situ observations. *Water*, 9, 372: DOI: 10.3390/w9060372
9. Kim, D., **Ray, R.L.**, and Choi, M. (2017). Simulations of energy balance components at mountainous watershed by Land Surface Models. *Environmental Earth Sciences*, DOI: 10.1007/s12665-017-6655-0
10. **Ray, R.L.** (2016). Moisture Stress Indicators in Giant Sequoia Groves in the Southern Sierra Nevada, California, US. *Vadose Zone Journal*. DOI:10.2136/vzj2016.03.0018
11. Kim, D., **Ray, R.L.**, Kang, S., and Choi, M. (2016). Estimation of land surface energy flux using CLM and VIC model. *Journal of Wetlands Research*, 18(2): 166-172.

12. **Ray, R.L.**, Beighley, R.E., and Yoon, Y. (2016). Integrating runoff generation and flow routing in the Susquehanna River Basin to characterize key hydrologic processes contributing to maximum annual flood events. *Journal of Hydrologic Engineering*, 21(9): DOI: 10.1061/(ASCE)HE.1943-5584.0001389.
13. Choi M., Kustas W.P., and **Ray R.L.** (2012). Evapotranspiration models of different complexity for multiple land cover types. *Hydrological Processes*, 26:2962-2972.
14. **Ray R.L.**, Jacobs J.M., and Ballesterio T.P. (2011). Slope stability analysis using dynamic safety factors approach. *Natural Hazards*, 59:1317-1337.
15. Beighley R.E., **Ray R.L.**, He Y., Schaller L., Durand M., Andreadis K.M., and Alsdorf D.E. (2011). Comparing satellite derived rainfall datasets using the Hillslope River Routing (HRR) model in the Congo Basin. *Hydrological Processes*, 25:3216-3229.
16. **Ray R.L.**, Jacobs J.M., and Cosh M. (2010). Landslide susceptibility mapping using downscaled AMSR-E soil moisture: A case study from Cleveland Corral, California, US. *Remote Sensing of Environment*, 114: 2624-2636.
17. **Ray R.L.**, Jacobs J.M., and de Alba P. (2010). Impact of unsaturated zone soil moisture and groundwater table on slope instability. *Journal of Geotechnical and Geoenvironmental Engineering*, 136(10):1448-1458.
18. **Ray R.L.** and De Smedt F. (2009). Slope stability analysis using GIS on a regional scale: A case study from Dhading Nepal. *Environmental Geology*, 57: 1603-1611.
19. Douglas E.M., Jacobs J.M., Sumner D.M., and **Ray R.L.** (2009). A comparison of models for estimating potential evapotranspiration for Florida land cover types. *Journal of Hydrology*, 373 (3-4): 366-376.
20. **Ray R.L.** and Jacobs J.M. (2007). Relationships among remotely sensed soil moisture, precipitation and landslide events. *Natural Hazards*, 43(2):211-222.

PUBLICATIONS IN CONFERENCE PROCEEDINGS

1. Awal, R., Fares, A., Cherif, Y., Mohammad, M., **Ray, R.L.** and Johnson, A.B.: Potential Impact of Climate Change on Some Crops' Irrigation Water Requirements at the Brazos Headwaters Basin, Texas, *14th National Watershed Conference*, May 17-20, 2015, Fort Worth, TX
2. **Ray R.L.**, and Jacobs J.M., 2008. Landslide susceptibility mapping using remotely sensed soil moisture. *Proceedings: IEEE International Geosciences and Remote Sensing Symposium (IGARSS)*, Boston, USA, pp. III-47-50, ISBN: 978-1-4244-2808-3.
3. **Ray R.L.**, and Jacobs J.M., 2007. Linking landslides with remotely sensed soil moisture and satellite derived rainfall at Cleveland Corral, El Dorado County in California. *1st North American Landslide Conference*, June 3-8, 2007, Vail, CO (USA), AEG S.P. No. 23, pp. 376- 386, ISBN: 978-0-975-4295-3-2.

PEER-REVIEWED PUBLICATIONS IN PREPARATION

1. **Ray, R.L.**, Griffin, R., Fares, A., Risch, E., Awal, R., El Hassan, A., and Ampim Peter. Root distributions of Collard Greens as affected by manure types, rates and frequency of applications, and rain, anticipated submission Aug, 2018.
2. **Ray, R.L.**, Fares, A., Risch, E., Awal, R., El Hassan, A., and Ampim Peter. Soil CO₂ emissions from an experimental research farm: Effects of organic amendments, temperature, and rain, anticipated submission Aug, 2018.

3. **Ray, R.L.**, Fares, A., Risch, E. Effect of Landuse Change and Drought on Groundwater Storage in Texas, anticipated submission Aug, 2018.
4. Ibrinke, A., **Ray, R.L.**, Kommalapati, R., and Fares, A.L. Evaluation of Land Use and Climate effects on carbon Dioxide Flux in Texas Using satellite Measurements, anticipated submission July, 2018.
5. El Hassan, A., Risch, A., Fares, A., **Ray, R.L.**, Awal, R., Bayabil, H.K. Effects of Land-Use Change on Hydrologic Response to Flooding Events in a Semi Urbanized Watershed using High Resolution Physically Based Distributed Model, anticipated submission Aug, 2018.
6. **Ray R.L.**, Saksa P.C., Bales R.C., and Conklin, M.C. Forest management effects on snow, runoff and evapotranspiration in Sierra Nevada mixed-conifer headwater catchments, anticipated submission July, 2018.

CONFERENCE ABSTRACTS/PRESENTATIONS

1. **Ray, R.L.**, Fares, A., Awal, R., and Risch, E.: Exploring the interactions between land use, climate change and carbon cycle using satellite measurements. Fall Meeting, *American Geophysical Union*, New Orleans, LA, December 11-15, 2017.
2. Awal, R., Fares, A., **Ray, R.L.**, Bayabil, H., and Risch, E. Spatial interpolation of daily reference evapotranspiration in Northwest Texas. ASA, CSSA and SSSA International Annual Meetings: Oct. 22-25, 2017, Tampa, Florida.
3. **Ray, R.L.**, Fares, A., Awal, R., and Risch, E.: Exploring the interactions between land use, climate change and carbon cycle using satellite measurements. Fall Meeting, *American Geophysical Union*, New Orleans, LA, December 11-15, 2017.
4. Awal, R., Fares, A., **Ray, R.L.**, Bayabil, H., and Risch, E. Spatial interpolation of daily reference evapotranspiration in Northwest Texas. ASA, CSSA and SSSA International Annual Meetings: Oct. 22-25, 2017, Tampa, Florida.
5. Adekanmbi, A., Olawale, O., **Ray, R.L.**, Risch, E., and Fares, A. A web-based tool to monitor and visualize groundwater storage in Texas. TAMUS 14th Annual Pathways Student Research Symposium, November 2-3, 2017.
6. Badmus, O., Olawale, O., **Ray, R.L.**, Risch, E., and Fares, A. Impact of hurricane harvey's storm surge on groundwater resources. TAMUS 14th Annual Pathways Student Research Symposium, November 2-3, 2017
7. **Ray, R.L.**, Fares, A., Awal, R., and Risch, E. Monitoring terrestrial carbon cycle in Texas using satellite products. ARD Research Symposium, April 1-4, 2017, Atlanta, GA.
8. Adekanmbi, A., **Ray, R.L.**, Fares, A., and Risch, E. Effect of landuse change and drought on groundwater storage in Texas. ARD Research Symposium, April 1-4, 2017, Atlanta, GA.
9. Jones, K., Taylor, A., **Ray, R.L.**, Risch, E., and Fares, A. Effect of rainfall and temperature on root zone soil moisture profile. ARD Research Symposium, April 1-4, 2017, Atlanta, GA.
10. **Ray, R.L.**, Fares, A., Awal, R., and Risch, E. Assessing the effects of change in impervious areas on flooding in Texas. The Geological Society of America, South-Central Section, 51st annual meeting, March 13-14, 2017, San Antonio, TX.
11. El Hassan, A., Awal, R., Bayabil, H., **Ray, R.L.**, Risch, E., and Fares, A. Modeling the effect of landuse change on hydrologic response of a semi urbanized watershed using a physically based distributed model. The Geological Society of America, South-Central Section, 51st annual meeting, March 13-14, 2017, San Antonio, TX.

12. Abayomi, A., **Ray, R.L.**, Fares, A and Risch, A. Effect of recent torrential rain and drought on groundwater storage in Texas. TAMUS 13th Annual Pathways Student Research Symposium, November 3-4, 2016.
13. Jones, K., **Ray, R.L.**, Risch, E., and Fares, A. The influence of rain on water and energy balance components at land surface. TAMUS 13th Annual Pathways Student Research Symposium, November 3-4, 2016.
14. Upadhyaya, A., **Ray, R.L.**, and Fares, A. Evaluating landuse effects on net ecosystem CO₂ exchange using satellite measurements. TAMUS 13th Annual Pathways Student Research Symposium, November 3-4, 2016.
15. **Ray, R.L.**, Fares, A., He, Y., Awal, R., Johnson, A.B., and Risch, E. Assessment of soil moisture, evapotranspiration and CO₂ levels under different landcovers and environments. ASA, CSSA and SSSA International Annual Meetings: Nov. 6-9, 2016, Phoenix, Arizona.
16. Awal, R., Fares, A., **Ray, R.L.**, Johnson, A.B., and Risch, E. Potential impact of climate change on crop yield of major crops in northern high plains of Texas. ASA, CSSA and SSSA International Annual Meetings: Nov. 6-9, 2016, Phoenix, Arizona.
17. **Ray, R.L.**, He, Y., Fares, A., and Awal, R. Evaluation and inter-comparison of remotely sensed soil moisture from three different satellites. American Water Resources Association, 2016 Summer Speciality Conference, GIS and Water Resources IX, Aug 11-13, 2016, Sacramento, California.
18. Awal, R., Fares, A., **Ray, R.L.**, Johnson, A.B., and Risch, E. Potential Impact of Climate Change on Irrigation Water Requirements for Major Crops in Northern High Plains of Texas. American Water Resources Association, 2016 Summer Speciality Conference, GIS and Water Resources IX, Aug 11-13, 2016, Sacramento, California.
19. Hayes, J., **Ray, R.L.**, and Fares, A. Study the impact of drought on groundwater storage in the state of Texas. TAMUS 12th Annual Pathways Student Research Symposium from October 22-23, 2015.
20. Awal, R., Fares, A., Cherif, Y., Mohammad, M., **Ray, R.L.** and Johnson, A.B.: Potential Impact of Climate Change on Some Crops' Irrigation Water Requirements at the Brazos Headwaters Basin, Texas, *14th National Watershed Conference*, May 17-20, 2015, Fort Worth, TX
21. Ray, R.L., Fares, A., Awal, R., and Johnson, A.: Potential Hydrological Responses, and Carbon and Nitrogen Pools of a Two Distinct Watersheds to Rainfall and Brush Management. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 15-19, 2014.
22. Fares, A., Awal, R., Johnson A.B. and **Ray, R.L.**: Effective Rainfall, Water Yield, and Groundwater Recharge Under Different Crops Across the Brazos Watershed, Texas. *American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and Soil Science Society of America (SSSA) International Annual Meeting* in Long Beach, CA, USA, Nov. 2-5, 2014.
23. Awal, R., Fares, A., **Ray, R.L.**, and Johnson A.B.: Analysis of Streamflow Trends in San Jacinto River Basin, Texas. *Joint 6th International Workshop on Catchment Hydrological Modeling and Data Assimilation (CAHMDA-VI) and the 3rd International Workshop on Data Assimilation for Operational Hydrology and Water Management of the Hydrologic Ensemble Prediction Experiment (HEPEX-DAFOH III)* in Austin, Texas, USA, September 8-12, 2014.
24. Awal, R., Fares, A., Abbas, F., Fares, S., **Ray, R.L.**, and Johnson A.B.: Comparative Study of Laboratory and Field Calibrations of Soil Moisture Sensors. *Third In-situ and Remote Soil*

Moisture Sensing Technology Conference: Challenges and Opportunities in a Changing World in Houston, TX, USA, March 12-14, 2014.

25. Fares, A., Awal, R., Johnson A.B., and **Ray, R.L.**: In-situ Soil Moisture Sensing in Response to Organic Matter Content, Bulk Density, and Inter and Intra-Sensor Variations. *Third In-situ and Remote Soil Moisture Sensing Technology Conference: Challenges and Opportunities in a Changing World* in Houston, TX, USA, March 12-14, 2014.
26. **Ray, R.L.**, Guo, Q., Bales, R., Fares, A., and Awal, R.: Moisture Stress Analysis by Linking Soil and Canopy Moisture in Forested Catchments. *Third In-situ and Remote Soil Moisture Sensing Technology Conference: Challenges and Opportunities in a Changing World* in Houston, TX, USA, March 12-14, 2014.
27. Khadka, D., Fares, A., Abbas, F., **Ray, R.L.**, Fares, S., Valenzuela, H., Awal, R., and Safeeq, M.: Mitigating Temperature Effects on the Performance of a Multisensor Capacitance Probe in Two Hawaiian Tropical Soils. *Third In-situ and Remote Soil Moisture Sensing Technology Conference: Challenges and Opportunities in a Changing World* in Houston, TX, USA, March 12-14, 2014.
28. Saksa P.C., **Ray R.L.**, Bales R.C., and Conklin, M.C.: Impact of forest thinning and climate on transpiration and runoff rates in Sierra Nevada mixed-conifer headwater catchments. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 9-13, 2013.
29. Guo Q., Zhou Y., **Ray R.L.**, and Bales R.C.: Vulnerability of Giant Sequoia to moisture stress in a changing climate using remotely sensed canopy moisture. Southern Sierra Adaptation Workshop, Visalia, CA, Feb. 20-22, 2013.
30. **Ray R.L.**, Saksa P.C., Bales R.C., and Conklin, M.C.: Forest management effects on snow, runoff and evapotranspiration in Sierra Nevada mixed-conifer headwater catchments. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 3-7, 2012.
31. **Ray R.L.**, Bales R.C., and Guo Q.: Moisture stress monitoring in Giant Sequoia Groves. Yosemite Hydro-Climate Meeting, Yosemite National Park, California, October 11-12, 2012.
32. **Ray, R.L.**, Bales R.C., and Conklin M.C.: Hydrologic response of mountain catchments to snow, rain and forest thinning in California's Sierra Nevada. The 2nd International Conference on Geobiology, Wuhan, China, September 4-8, 2012.
33. **Ray, R. L.**, Bales R.C., and Conklin, M.C.: Hydrologic response of Sierra Nevada headwater catchments to rain versus snow inputs using spatially distributed, data-driven hydrologic modeling. CUAHSI 3rd Biennial Colloquium Meeting, Boulder, CO, July 14-18, 2012.
34. Saksa P.C., Bales R.C., and **Ray R.L.**: Forest management for water: a hydro-ecological modeling exercise of headwater catchments in the mixed-conifer belt of the Sierra Nevada. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 5-9, 2011.
35. **Ray, R.L.**, and Beighley, R.E.: Streamflow simulation in a snow affected basin: a case study of the Susquehanna River Basin, USA. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 13-17, 2010.
36. Wilson, C.A., **Ray, R.L.**, Beighley, R.E., and Moglen, G.E.: Predicting peak discharge uncertainty from standard methods due to variability in hydrologic characteristics. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 13-17, 2010.
37. de Linage, C., Lo, M., Famiglietti, J.S., **Ray, R.L.**, and Beighley, R.E.: Using GRACE total water storage changes to constrain river routing models in the Amazon River basin. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 13-17, 2010.

38. Beighley, R.E., Eggert, K.G., **Ray, R.L.**, Wilson, C.A., Greene, M.K., Altman, G.L., Rowland, J.C., Travis, B.J., and Lawrence, D.M.: Coupling hydrologic and hydraulic models in the Mackenzie Basin to quantify the spatial and temporal distribution of surface and subsurface water storages. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 13-17, 2010.
39. Wei, Y., Beighley, R.E., **Ray, R.L.**, Lee, H., Alsdorf, D.E., and Shum, C.: Characterizing terrestrial runoff patterns from the Western US. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 13-17, 2010.
40. Beighley RE, **Ray RL**, Lee H, Alsdorf D, Shum CK, Mocko DM.: Characterizing terrestrial runoff patterns to the Pacific Ocean from Western US. *Ocean Surface Topography Science Team (OSTST) Meeting*, Lisbon, Portugal, October 18-22, 2010.
41. **Ray, R.L.**, and Beighley, R.E.: Linking HRR model with VIC-3L hydrologic model for flow routing in the Susquehanna River Basin. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 14-18, 2009.
42. Beighley, R.E., **Ray, R.L.**, He, Y., Guo, J., and Shum, C.: Integrating GRACE measured water storage change observations into the Hillslope River Routing (HRR) in the Amazon and Congo River Basins. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 14-18, 2009.
43. Beighley, R.E., **Ray, R.L.**, He, Y. and Melack, J.: Quantifying model uncertainty in terrestrial water cycle models due to channel hydraulics, *LTER All Scientists Meeting*, Estes Park, Colorado, September 14-16, 2009.
44. **Ray, R.L.**, and Jacobs, J.M.: Remotely sensed soil moisture and landslide hazards, SMAP Application Workshop, Silver Spring, MD, September 9-10, 2009.
45. **Ray, R.L.**, and Jacobs, J.M.: Landslide susceptibility mapping using remotely sensed soil moisture. *IEEE International Geosciences and Remote Sensing Symposium (IGARSS)*, Boston, MA., July 6-11, 2008.
46. **Ray, R.L.**, and Jacobs, J.M.: Landslide forecasting using microwave remote sensing. Fall Meeting, *American Geophysical Union*, San Francisco, CA, December 10-14, 2007.
47. Ray, R.L., and Jacobs, J.M.: Linking landslides with remotely sensed soil moisture and satellite derived rainfall at Cleveland Corral, El Dorado County in California. *1st North American Landslide Conference*, Vail, Colorado, June 3-8, 2007.
48. **Ray, R.L.**, and Jacobs, J.M.: Surficial slope stability using satellite soil moisture and rainfall, *Geological Society of America*, Northeastern Section-42nd Annual Meeting, University of New Hampshire, Durham, NH, 12-14 March 2007.
49. **Ray, R.L.**, Jacobs, J.M., and Choi, M., Relationships among remotely sensed soil moisture, precipitation and landslide events, Spring Meeting, *American Geophysical Union*, Baltimore, MD, May 23-26, 2006.
50. Jacobs, J.M., Douglas, E.M., **Ray, R.L.**, Mecikalski, J., Sumner, D.M., and Paech, S.: Satellite-based solar radiation and potential and reference evapotranspiration estimates in Florida, Spring Meeting, *American Geophysical Union*, Baltimore, MD, May 23-26, 2006.
51. Choi, M., Jacobs, J.M., Cosh, M.H., **Ray, R.L.**: Soil moisture structure for different soil depths from field to watershed scale during the Soil Moisture Experiment 2005 (SMEX05), Fall Meeting, *American Geophysical Union*, San Francisco, CA, Dec. 5-9, 2005.

XV. INVITED PRESENTATIONS

- Ray, RL, May 27, 2010. Hydrologic simulation in large basins with limited in-situ measurements using the Hillslope River Routing Model. **Hydrologic Research Center**, San Diego, CA, USA.
- Ray, R.L, May 4, 2010. Simulating the hydrologic cycle in large basins with limited in-situ measurements using the Hillslope River Routing Model, Department of Civil and Environmental Engineering, **University of California, Irvine**, CA, USA.

XVI. FIELD EXPERIENCE

- Participated in Soil Moisture Experiment 2005 (SMEX05), Ames Iowa, conducted by USDA and NASA
 - Measured field surface soil moisture.
 - Monitored in soil moisture root zone profiles.
- Collected snow depth, snow water equivalent (SWE), precipitation, soil moisture and other climatic data in combination of field measurements and sensor networks at Last Chance, Sugarpine, Providence watersheds in the Sierra Nevada Mountains.