
Activities Report: 1 July 1998 - 30 June 1999

General Description of HRC

The Hydrologic Research Center (HRC) is a publicly-supported non-profit research corporation. HRC was established in July of 1993 in San Diego, California. In October 1998, the Internal Revenue Service affirmed the non-profit status of HRC beyond the advanced ruling period of 5 years. HRC's purpose is to advance the science and engineering of hydrology through research and development work, and to provide technology transfer and hydrologic training services. The National Science Foundation is HRC's Oversight Agency.

HRC realizes its purposes:

By performing basic and applied research in areas of hydrology, water resources, hydrometeorology and hydroclimatology

By publishing research and development results in technical reports, refereed journal papers, monographs, books, and written accounts of technical national and international meetings.

By organizing short courses, workshops, and summer schools on hydrologic topics for Government Agencies, graduate and undergraduate University students, and teachers of Science.

By providing summer research training for graduate and undergraduate students of collaborating Universities.

By offering post-doctoral research positions for advanced training of new Ph.D's.

By accepting visiting scholars, and establishing collaborative research and exchange programs with hydrologic research organizations both in the U.S. and abroad.

HRC's Board of Directors consists of:

Dr. Konstantine P. Georgakakos

Scripps Institution of Oceanography, University of California, San Diego

Professor Witold F. Krajewski

Department of Civil and Environmental Engineering and Iowa Institute of Hydraulic Research, The University of Iowa.

Professor Anastasios A. Tsonis

Department of Mathematical Sciences, University of Wisconsin - Milwaukee

Areas of research, development, and technology transfer include:

Hydrologic Science and Engineering

- (a) Floods, Flood Warning and Flood Control
- (b) Droughts
- (c) Processes of the Global Hydrologic Cycle
- (d) Remote Sensing of Hydrologic State Variables and Fluxes
- (e) Hydrology of Environmental Pollution and Restoration
- (f) Energy Production by Hydrologic Systems
- (g) Hydrologic Applications of Artificial Intelligence

Hydrometeorology

- (h) Precipitation and Surface-Runoff Processes

Hydroclimatology

- (i) Land-Surface/Atmospheric Interactions
 - (j) Hydrology of the Interaction of Land and Ocean
 - (k) Hydrologic and Water Resources Impacts of Climate Variability and Change

Personnel

Dr. Konstantine P. Georgakakos, Managing Director and Senior Research Scientist

Dr. Stuart S. Schwartz, Hydrologic Engineer II (through February 1999)

Mr. David Jackson, Manager, Finance & Administration

Ms. Corinne Rice, Administrative Associate

Dr. Guleid Artan, Postdoctoral Research Associate (through October 1998)

Ms. Theresa Carpenter, Hydrologic Engineer I

Dr. Dimitris Tsintikidis, Remote Sensing Specialist

Ms. Diane Smith, Hydrologic Scientist I

Mr. Jason A. Sperfslage, Computer Programmer/Analyst II

Mr. Michael J. Burin, Research Assistant Scientist (through October 1998)

Projects Funded

Bureau of Reclamation: *Real-Time Operations Model for Folsom Dam.*

Bureau of Reclamation: (Addendum) *Gauging Hourly Precipitation Within the Folsom Lake Watershed.*

Food and Agriculture Organization (FAO): Phase I: *Enhancing Effectiveness of the MFS through Improved Satellite Rainfall Estimates.*

Food and Agriculture Organization (FAO): Phase II: *Enhancing Effectiveness of the MFS through Improved Satellite Rainfall Estimates.*

NOAA, National Weather Service, Office of Hydrology: *Distributed Hydrologic Model Sensitivities.*

NOAA, National Weather Service, Office of Hydrology: *Sacramento Calibration Technology Transfer, Phase II.*

NOAA, National Weather Service, Office of Hydrology: *IHFS Implementation and Testing for a Watershed in Panama.*

NOAA, National Weather Service, Office of Hydrology: *Selection of Raingauge Locations for Radar Rainfall Estimates in a Mexican Catchment.*

NOAA, National Weather Service, Office of Hydrology: *Weather Radar Data Analysis for Hydrologic Applications in Mexico.*

NOAA, Office of Global Programs, with GIT and SIO/UCSD: *Improvements to Water Resources Management due to Climate Forecasts.*

PCC (Panama Canal Commission): *Training: Software and Methods of Rainfall and Flow Forecasting.*

The University of Iowa/GCIP, *Formulate Performance Measures and Establish an Evaluation Framework for the use of Probabilistic Forecasts in Water Resource Management.*

US/Israel Binational Science Foundation, w/Hebrew University: *Temporal and Spatial Aggregation of Meteorological Radar Data, A New Approach in Flood Prediction and Basin Hydrology.*

NASA/NSF, w/U of Iowa & U. of Louisville: *Short-Term Quantitative Precipitation Forecasting Using Multi-Sensor Remote Sensing and ETA Data Assimilation.*

UCSD Subcontract/NOAA: *California Applications Project: Folsom Lake.*

USGS/GA Tech: *Water Resources Sector National Assessment of the Potential Consequences of Climate Variability and Change for the United States.*

Publications and Presentations

Copies of the publications listed may be obtained by writing to: Director, Hydrologic Research Center, 12780 High Bluff Drive, Suite 250, San Diego, CA 92130.

Research Papers in Journals

Georgakakos, K.P., "Flooding Attributable to El Nino," World Meteorological Organization Bulletin, 47(4), 356-360, October 1998.

Georgakakos, K.P., A.P. Georgakakos and N.E. Graham, "Assessment of Benefits of Climate Forecasts for Reservoir Management in the GCIP Region," GEWEX News, 8 (3), 5-7, August 1998.

Kim, J., N.L. Miller, A.K. Guetter, and K.P. Georgakakos, "River Flow Response to Precipitation and Snow Budget in California During the 1994-1995 Winter," Journal of Climate, 11, 2376-2386, September 1998.

Pandey, G.R., Cayan, R.C., and Konstantine P. Georgakakos, "Precipitation Structure in the Sierra Nevada of California During Winter," Journal of Geophysical Research – Atmospheres, 104 (D10), 12019-12030, May 1999.

Tsintikidis, D. and K.P. Georgakakos, "Microphysical and Large-Scale Dependencies of Temporal Rainfall Variability over a Tropical Ocean", Journal of the Atmospheric Sciences, (56) 724-748, March 1, 1999.

Tsintikidis, D. and G.J. Zhang, "A Numerical Study on the Coupling between Sea Surface Temperature and Surface Evaporation," Journal of Geophysical Research-Atmospheres, 103(D24), 31763-31774, December 27, 1998.

Carpenter, T.M, J.A. Sperflage, K.P. Georgakakos, T. Sweeney and D.L. Fread, "National Threshold Runoff Estimation Utilizing GIS in Support of Operational Flash Flood Warning Systems," Journal of Hydrology, 1999, accepted.

Schwartz, S.S. and D.Q. Naiman, "Planning Level Estimates of Contaminant Loads: Bias and Confidence," Water Resources Research, 1999, accepted.

Pandey, G.R., Georgakakos, K.P., and D.R. Cayan, "Precipitation Modeling in Mountainous Regions, A Review," Journal of Geophysical Research – Atmospheres, 1999, in press.

Tsintikidis, D., K.P. Georgakakos, G.A. Artan and A.A. Tsonis, "Mean Areal Rainfall Estimation and Hydrologic Response using METEOSAT Data over the Blue Nile Region," Journal Hydrology, 1999, in press.

Georgakakos, K.P., and A.A. Tsonis, "The Observation of Aperiodic Flow," Physical Review Letters, 1999, in review.

Schwartz, S.S., "Multiobjective Management of Potomac River Consumptive Use," American Society of Civil Engineers, 1999, in review.

Preprints and Conference Proceedings

Carpenter, T.M., J.A. Sperflage and K.P. Georgakakos, "National Threshold Runoff Estimation in Support of Distributed Flash Flood Warnings," Third National Conference of the National Hydrologic Warning Council, May 11-14, 1999, San Diego, California.

Georgakakos, K.P., J.A. Sperflage and D. Tsintikidis, and W.F. Krajewski and A. Kruger, "Operational Rainfall Estimation and Forecasting for Flash Flood Warnings in Panama, Third National Conference of the National Hydrologic Warning Council, May 11-14, 1999, San Diego, California.

Georgakakos, K.P., J.A. Sperflage and T.M. Carpenter, "State Space Sacramento Forecast Model," Third National Conference of the National Hydrologic Warning Council, May 11-14, 1999, San Diego, California.

Georgakakos, A.P., Yao, H., and K.P. Georgakakos, "Vulnerability of River basin Management to Climate Variability and Change," AWRA Specialty Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States, May 10-12, 1999, Atlanta, Georgia.

Georgakakos, A.P., and K.P. Georgakakos, "Issues Associated with the Use of GCM Forecast information for the Operational Management of Multipurpose Reservoirs," AWRA Specialty Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States, May 10-12, 1999, Atlanta, Georgia.

Georgakakos, K.P., Smith, D., Georgakakos, A.P., and K. Brumbelow, "Sensitivity of Soil Moisture and Crop Yield to Climate Variability and Change," AWRA Specialty Conference on Potential Consequences of Climate Variability and Change to Water Resources of the United States, May 10-12, 1999, Atlanta, Georgia.

Tsintikidis, D., K.P. Georgakakos and J. A. Sperflage, "Operational Hydrologic Forecasting for the Blue Nile Region using Rainfall Estimates from Meteosat Images," Third National Conference of the National Hydrologic Warning Council, May 11-14, 1999, San Diego, California.

HRC Technical Reports

Georgakakos, K.P., J.A. Sperflage, D. Tsintikidis, T.M. Carpenter, with appendix by W.K. Krajewski and A. Kruger, "Design and Tests of an Integrated Hydrometeorological Forecast System for the Operational Estimation and Forecasting of Rainfall and Streamflow in the Mountainous Panama Canal Watershed," HRC Technical Report No. 2, Hydrologic Research Center, San Diego, California, 142pp, March 1999.

Georgakakos, K.P., D. Tsintikidis, and T. Carpenter, "Analysis for the Estimation of Pixel Scale Rainfall from METEOSAT Images," HRC Limited Distribution Report No. 8, Hydrologic Research Center, San Diego, California, 61pp, 20 February 1999.

Georgakakos, K.P., D. Tsintikidis, J.A. Sperflage, D.E. Smith and T. Carpenter, "Gauging Hourly Precipitation Within the Folsom Lake Watershed," HRC Limited Distribution Report No. 9, Hydrologic Research Center, San Diego, California, 51pp, 31 March 1999.

Sperflslage, J.A., K. Georgakakos, D. Tsintikidis, A. Kruger and W. Krajewski, "PANMAP v.1.0.1 User's Guide," *HRC Limited Distribution Report No. 10*, Hydrologic Research Center, San Diego, California, 68pp, June 1999.

Sperflslage, J.A., and K.P. Georgakakos, "On *threshR* Enhancements Toward Improved Computational Efficiency," *HRC Technical Note No. 8*, Hydrologic Research Center, San Diego, California, 36pp, July 1998.

HRC Video

"NOAA Sacramento Soil Moisture Accounting Model Calibration, Demonstration of an Interactive Approach." *HRC VHS Video Series*. Hydrologic Research Center, San Diego, California, Duration: 5.0 hours, May 1999.

Companion Notebook to NOAA Video Series, "Calibration of the Sacramento Soil Moisture Accounting Model: Demonstration of an Interactive Calibration Approach," 250pp., May 1999.

Educational and Technology Transfer Activities

More than 50 reprints of published and in-press articles were sent out by HRC Staff in response to requests. Mailing of remaining copies of past Activities Reports and Reprints of HRC Staff articles was also complete during this year.

HRC Staff members served as Reviewers for NASA, NOAA, NSF and DOD proposals, and for research papers submitted to Water Resources Research, J. Applied Meteorology, J. Climate, J. Hydrology, ASCE J. Hydrologic Engineering, and J. of Geophysical Research.

As part of a cooperative agreement with the Office of Hydrology, National Weather Service, HRC has produced the second part of a training video series. The focus of the video series is the Calibration of the Sacramento soil moisture accounting model. Dr. Dan Fread and Dr. Eric Anderson of the Office of Hydrology, NWS, and Dr. Konstantine Georgakakos of HRC are lecturers. Mr. Jason Sperflslage of HRC prepared and edited the graphics for the video. The video will be disseminated widely.

HRC's computer network is in the process of being upgraded together with the existing World Wide Web page. The current page may be found at: <http://hrc.ucsd.edu>.

Mr. Sperflslage and Dr. Georgakakos were instructors in short courses offered to Panama Canal Commission Staff on rainfall estimation and forecasting and flash-flood warning system design.

Dr. Georgakakos was involved in Ph.D. Theses Committees at UCSD and the University of Iowa.

Dr. Tsintikidis and Dr. Georgakakos were involved in training Nile Forecast Center Engineers in satellite rainfall estimation methods.

Visitors

Dr. Yahya Abawi, Queensland Centre for Climate Applications, Australia.

Mr. Mamdouh Antar, FAO, Cairo, Egypt.

Dr. Bayoumi Attia, Department of Civil Works and Water Resources, Cairo, Egypt

Dr. Bernstein, Seaspace, San Diego, California.

Mr. Modesto Echevers, Panama Canal Commission, Panama.

Professor Mark French, University of Louisville, Louisville, Kentucky

Dr. Nicolas Graham, International Research Institute, Columbia University – UCSD

Dr. Mircea Grecu, University of Iowa, Iowa City, Iowa

Professor Witek Krajewski, University of Iowa, Iowa City, Iowa

Dr. Simon Mason, International Research Institute, Columbia University - UCSD

Dr. Jozef Roskar, FAO, Cairo, Egypt

Professor Uri Shamir, Technion, Israel.

Professor Anastasios Tsonis, University of Wisconsin, Milwaukee, Wisconsin

Dr. Cintia Uvo, Lund Institute of Technology, Lund University

Mr. Manuel Vilar, Panama Canal Commission, Panama