
Activities Report: 1 July 1994 - 30 June 1995

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. Its 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 Cognizant Agency.

HRC realizes its purposes:

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 (formerly with the Iowa Institute of Hydraulic Research, The University of Iowa).

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 Geosciences, 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

Hydrometeorology

- (g) Precipitation and Surface-Runoff Processes

Hydroclimatology

- (h) Land-Surface/Atmospheric Interactions
- (i) Hydrology of the Interaction of Land and Ocean
- (j) Hydrologic Impacts of Global Climate Change

Personnel

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

Mr. David Jackson, Manager Finance & Administration

Dr. Alexandre K. Guetter, Postdoctoral Research Associate

Dr. Dimitris Tsintikidis, Postdoctoral Research Associate (as of 5/15/95)

Mr. Jason A. Sperflage, Programmer/Analyst I

Projects Funded

National Science Foundation: *The use of satellite rainfall estimates with real-time flood prediction models for large catchments.*

National Science Foundation: *1993 Midwestern floods.*

National Science Foundation: *Hydroclimatology of the continental U.S. boundary outflow.*

National Science Foundation: *Measurement and predictability of local convective rainfall.*

National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Office of Hydrology: *Hydrologic modeling.*

National Aeronautics and Space Administration (NASA): *Stochastic dynamical modeling of space time rainfall.*

National Science Foundation: *California flash floods of winter 1995.*

Food and Agriculture Organization (FAO) of United Nations: *Review of the Nile Forecast System.*

Food and Agriculture Organization (FAO) of United Nations: *Validation and testing of the Nile Forecast System.*

Publications and Presentations

Copies of the publications listed may be obtained by writing to: Director, Hydrologic Research Center, 12780 High Bluff Drive, Suite 260, San Diego, CA 92130.

Research Papers in Journals

Bae, D.H., and K.P. Georgakakos, 1994: "Climatic Variability of Soil Water in the American Midwest: 1. Hydrologic Modeling," Journal of Hydrology, 162, 355-377.

Bae, D.H., Georgakakos, K.P., and Nanda, S.K., 1995: "Operational Forecasting with Real-Time Databases," in ASCE J. Hydraulics Division, 121(1), 49-60.

Cayan, D.R., and K.P. Georgakakos, 1995: "Hydroclimatology of Continental Watersheds, 2, Spatial Analyses," Water Resources Research, 31(3), 677-697.

Georgakakos, K.P., and D.H. Bae, 1994: "Climatic Variability of Soil Water in the American Midwest: 2. Spatio-temporal Analysis," Journal of Hydrology, 162, 379-390.

Georgakakos, K.P., Bae, D.H., and D.R. Cayan, 1995: "Hydroclimatology of Continental Watersheds, 1, Temporal Analyses," Water Resources Research, 31(3), 655-675.

Georgakakos, K.P., Carsteanu, A.A., Sturdevant, P.L., and J.A. Cramer, 1994: "Observation and Analysis of Midwestern Rainrates," Journal of Applied Meteorology, 33(12), 1433-1444.

Roads, J.O., S.-C. Chen, A.K. Guetter, and K.P. Georgakakos, 1994: "Large-Scale Aspects of the United States Hydrologic Cycle," Bulletin of the American Meteorological Society, 75(9), 1589-1610.

Georgakakos, K.P., 1996: "On the Establishment of a U.S. National Center for Hydrologic Research and Technology Transfer," Journal of Hydrology, 172, 15-21.

Georgakakos, K.P., and O.W. Baumer, 1995: "Measurement and Analysis of On-Site Soil Moisture Data," Journal of Hydrology, (*accepted*).

Guetter, A.K. and K.P. Georgakakos, 1995: "Large-Scale Properties of Simulated Soil-Water Variability," Journal of Geophysical Research, (*accepted*).

Guetter, A.K. and K.P. Georgakakos, 1995: "Are the El Niño and La Niña Predictors of the Iowa River Seasonal Flow?" Journal of Applied Meteorology, (*accepted*).

Book Reviews and Editorials

Georgakakos, K.P., 1995: "FRIEND: Flow Regimes from International Experimental and Network Data," a book (525 pp.) review in the Bulletin of the American Meteorological Society, 76(5), 773-774.

Krajewski, W.F., and K.P. Georgakakos, 1994: "Editorial for Special Issue on Precipitation," Journal of Applied Meteorology, 33(12), 1381.

Georgakakos, K.P., 1995: "Editorial for Special Issue on Soil Moisture," Journal of Hydrology, (*accepted*).

Contributions to Books

Georgakakos, K.P., Bae, D.H., Mullusky, M.G., and A.P. Georgakakos, 1995: "Hydrologic Variability in Midwestern Drainage Basins: Diagnosis, Prediction and Control," Chapter II.2 in Global Change II, A Midwest Perspective, Folk, E., ed., SPB Academic Publishing, Amsterdam, The Netherlands, 61-90. (Refereed publication.)

Georgakakos, K.P., Sharifi, M.B., and Sturdevant, P.L., 1995: "Analysis of High-Resolution Rainfall Data," Chapter III.5 in Advances in Water Resources

Modeling, ed. Z. W. Kundzewicz, Cambridge University Press, New York, 114-120, (*in press*). (Refereed publication.)

Georgakakos, K.P., and W.F. Krajewski, 1995: "Worth of Radar Data in the Real-Time Prediction of Mean Areal Rainfall by Nonadvective Physically-Based Models," Chapter IV.2 in Advances in Water Resources Modeling, ed. Z. W. Kundzewicz, Cambridge University Press, New York, 168-180, (*in press*). (Refereed publication.)

Reprints and Conference Proceedings

Corominas, J., and K.P. Georgakakos, eds., 1994: Report of the Proceedings of the US-Spain Bilateral Workshop on Natural Hazards, Barcelona, Spain, June 8-11, 1993, National Science Foundation, 389 pp. (Available from the Iowa Institute of Hydraulic Research, The University of Iowa, Iowa City, Iowa 52242.)

Corominas, J. and K.P. Georgakakos, 1994: "Executive Summary," Report of the Proceedings of the U.S.-Spain Workshop on Natural Hazards, Barcelona, Spain, 8-11 June 1993, eds. J. Corominas and K.P. Georgakakos, Iowa Institute of Hydraulic Research, The University of Iowa, Iowa City, Iowa, 1-3.

Georgakakos, K.P., 1995: "Key Developments in Operational Flood Prediction," Report on the Proceedings of US-Spain Bilateral Workshop on Natural Hazards, Barcelona, Spain, June 8-11, 1993, eds. J. Corominas and K.P. Georgakakos, Iowa Institute of Hydraulic Research, The University of Iowa, Iowa City, Iowa, 120-142.

Georgakakos, K.P., 1995: "Mid Continental Floods," Proceedings of the 1995 U.S. National Science Foundation Grantees Workshop, U. of Nevada, Reno, 27-28 April 1995, 5.1-5.4.

Georgakakos, K.P. and D.R. Cayan, 1994: "Soil Water - Atmosphere Interactions in the Midwestern United States," Poster presented at the 1994 Fall AGU Meeting, San Francisco, 5-9 December 1994. Abstract in Eos, 75(44) - Supplement, 217.

Georgakakos, K.P., and D.R. Cayan, 1995: "Mid-Continental Warm Season Feedback of Soil Moisture," Preprints of the 1995 AMS Conference on Hydrology, Dallas, Texas, 15-20 January 1995, American Meteorological Society, Boston, Massachusetts, 108-110.

Georgakakos, K.P., and A.K. Guetter, 1995: "Spatio-Temporal Scaling of Catchment Soil Water in the Central United States," Preprints of the 1995 AMS Conference on Hydrology, Dallas, Texas, 15-20 January 1995, American Meteorological Society, Boston, Massachusetts, 37-38.

Georgakakos, K.P., and W.F. Krajewski, 1995: "Statistical-Microphysical Models for Tropical Rainfall Fields," Abstract in Reprints of Fifth Conference on Precipitation: Space-Time Variability and Dynamics of Rainfall, Elounta, Crete, Greece, 16-18 June 1995, University of Minnesota, Department of Civil Engineering, Minneapolis, Minnesota, 1.4.

Guetter, A.K., and K.P. Georgakakos, 1994: "Potential Evapotranspiration and Atmospheric Circulation Variability of the Continental United States." Poster presented at the 1994 AGU Fall Meeting, San Francisco, December 5-9. Abstract in Eos, 75(44)-Supplement, 217.

Guetter, A.K., and K.P. Georgakakos, 1995: "Association of the U.S. Regional Streamflow and the El Nino - Southern Oscillation," Preprints of the 1995 AMS Conference on Hydrology, Dallas, Texas, 15-20 January 1995, American Meteorological Society, Boston, Massachusetts, 181-185.

Guetter, A. K., and K.P. Georgakakos, and D. R. Cayan, 1994: "Streamflow and Soil Water Content Scales of the Continental U.S." Abstract in Preprints of International GCIP/MAGS Workshop on Scaling in Hydrometeorological Hydrological Processes and Models, Victoria, Canada, September 19-22, 1994.

Guetter, A.K., Georgakakos, K.P., and D.R. Cayan, 1995: "Hydrological and Atmospheric Circulation variability of the Continental United States," Preprints of the 1995 AMS Conference on Hydrology, Dallas, Texas, 15-20 January 1995, American Meteorological Society, Boston, Massachusetts, 13-15.

HRC Technical Reports

Georgakakos, K.P., 1995: "Technical Review of Hydrologic Forecasting Technology in the MFS Project for the Nile River," HRC Limited Distribution Report No. 1, Hydrologic Research Center, San Diego, California, 21 pp.

Georgakakos, K.P., and J.A. Sperflage, 1995: "Hydrologic Forecast System - HFS: A User's Manual," HRC Technical Note No. 1, Hydrologic Research Center, San Diego, California, 17 pp.

Technology Transfer Activities

Approximately 70 reprints of published and in-press articles were sent out by HRC Staff in response to requests.

The first *threshR* Training Workshop was held at the River Forecast Center in Tulsa, Oklahoma, September 1994. The software package *threshR* was developed with NOAA funding to assist in the determination of objective flash flood guidance values for all the

small basins in an RFC region using GIS and hydrologic/hydraulic procedures and digital databases.

Sperflage, J.A., Lead Instructor, threshR Software Demonstration and Training, Modernized Flash Flood Guidance Workshop, Arkansas-Red Basin Regional Forecast Center, National Oceanic and Atmospheric Administration / National Weather Service, Tulsa, Oklahoma, September 14, 1994.

Georgakakos, K.P., and J.A. Sperflage, "Gridded Threshold Runoff," Modernized Flash Flood Guidance Workshop, Arkansas-Red Basin Regional Forecast Center, National Oceanic and Atmospheric Administration / National Weather Service, Tulsa, Oklahoma, September 14-15, 1994.

The HFS software and associated User's Manual were assembled and sent to INTESCA of Spain at cost (2/20/95).

Participated in the Technology Transfer Conference organized by NOAA and made a presentation of applied research and technology transfer activities at HRC (6/6/95-6/7/95). During the meetings with NOAA officials HRC proposed offering a short course in Modern Operational Forecasting and Control in Large River Systems with Reservoirs. The response was encouraging and the short course is tentatively scheduled for late fall of 1996.

Drs. Georgakakos and Guetter delivered lectures on Quantitative Precipitation Forecasting (QPF) and Flash-Flood Guidance at the COMET/UCAR Hydromet Courses in 1994 and 1995. Dr. Georgakakos also delivered an extended lecture on Elements of Operational Hydrology at the COMET/UCAR Mesoscale Analysis and Prediction Class in May 1995.

Other Activities

HRC Staff installed, configured and operated a Vertically Pointing 3-cm Radar (VPR) during the period from February through April 1995 in San Diego, California. The VPR was acquired with funding by the National Science Foundation.

HRC Staff installed and configured the VPR in Iowa City, Iowa for operation during the period from May through October 1995. This was done in collaboration with the Iowa Institute of Hydraulic Research, The University of Iowa.

HRC Staff reviewed a total of 12 papers submitted for publication in the following Journals: Water Resources Research; Journal of Hydrology; Geophysical Research Letters; and ASCE Journal of Water Resources, Planning, and Management.

HRC Staff reviewed a total of 6 proposals submitted to the following Agencies: National Science Foundation; and National Aeronautics and Space Administration.

Visitors

Professor Larry Atkinson, Duke University, North Carolina

Dr. Daniel Cayan, Scripps Institution of Oceanography, UCSD, California

Professor Jordi Corominas, Universitat Politècnica de Catalunya, Barcelona, Spain

Dr. Peter Flatau, Scripps Institution of Oceanography, UCSD, California

Professor David Maidment, University of Texas, Austin, Texas

Dr. Norm Miller, Lawrence Livermore National Laboratory, Livermore, California

Professor Carlos Puente, University of California, Davis, California