General Description of HRC

The Hydrologic Research Center (HRC) is a publicly-supported non-profit research corporation. It has been more than 12 years since 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 science cooperation, and to provide technology transfer and hydrologic training services. The National Science Foundation and the National Oceanic and Atmospheric Administration have served as HRC's Oversight Agencies.

HRC realizes its purposes:

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

By designing and implementing prototype hydrologic projects for technology transfer and science cooperation.

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 in the U.S. and abroad.

HRC's Board of Directors consists of:

Dr. Konstantine P. Georgakakos  
HRC and 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

Hydroclimatolgy

(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. Nicholas E. Graham, Climate Applications Manager, and Senior Research Scientist

Dr. Eylon Shamir, Postdoctoral Associate, Hydrologic Modeling and Prediction

Dr. Jianzhong Wang, Postdoctoral Associate, Hydrometeorology

Ms. Theresa Carpenter, PhD Candidate and Hydrologic Engineer

Mr. Jason A. Sperflslage, Programmer/Analyst

Mr. Steven Taylor, PhD Candidate and Hydrologic Scientist

Ms. Corinne Rice, Administrative Associate

Ms. Debra Champagne, HRC Senior Accountant (contractor)

Projects Funded
ACP, Autoridad del Canal de Panama: *PANMAP Upgrade to LINUX Operating System*, 05/01/05 – 09/03/05.

ACP, Autoridad del Canal de Panama: *Continued Consultation Support for PANMAP Operations*, 12/01/04 – 09/01/05.

ACP, Autoridad del Canal de Panama: *Continued Maintenance and Development Services for Operational Hydrometeorological Forecast System*, 11/19/03 – 11/19/04.

Arizona Department of Water Resources (ADWR): *Generation of Likely Scenarios of Future Streamflow for Santa Cruz Active Management Area*, 02/01/05 – 08/01/05.

Baron Advanced Meteorological Systems, LLC (BAMS) / Lockheed Martin: *Destructive Waters (DESWAT) – Romania Flash Flood Guidance System*, 05/01/05 – 03/31/07.

Baron Advanced Meteorological Systems, LLC (BAMS) / Lockheed Martin: *Destructive Waters (DESWAT) – Hydrological Model Calibration and Validation for Romania*, 05/01/05 – 03/31/07.


NOAA, Office of Global Programs: *Understanding and Predicting Decadal Variations in ENSO Impacts*, 03/1/01 - 08/31/04.

NOAA, Office of Global Programs: *Ensemble Simulations of Observed Climatic Variability: Verification Methods and Forecast Applications*, 03/1/01 - 08/31/04.

NOAA, National Weather Service: *Uncertainty in Distributed Model Simulations and Potential Benefits of Agricultural Use*: 08/01/03 - 07/31/04.


NOAA/NWS-USAID: *Central America Mitigation Initiative (CAMI)*, 09/30/02 – 06/30/04.

NOAA, Office of Global Programs: *Seasonal Climate Prediction and Management of the Panama Canal: Estimating the Benefits of Using Climate Forecast Information*, 06/01/04 – 08/31/05.

NSF: *Cold Microphysical Effects on Surface Rainfall Variability in the Tropics*, 05/01/02 – 10/31/04
NSF:  *SGER: Surveying the Southern California Flash Floods of January 2005, 04/15/05 – 03/31/06.*

UCSD – NOAA/JIMO, California Applications Project (CAP): *Northern California Regional Water Resource Prediction Management, 06/01/03 – 06/30/06.*

University of Arizona: *Natural Spatiotemporal Variability of Climate over the Western United States in the Late Holocene, 08/01/02 – 07/31/05.*

**Publications and Presentations**

*Contributions to Books and Special Issues*


*Research Papers in Journals*


Abstracts, Presentations and Conference Proceedings


HRC Technical Reports


Educational, Science Cooperation and Technology Transfer Activities

- Dr. Georgakakos was appointed to the National Academy of Science/National Research Council Committee on “Integrated Observations for Hydrologic and Related Studies,” and attended the first workshop in Washington, D.C., on February 22, 2005.

- Dr. Georgakakos was appointed to the National Academy of Science/National Research Council Committee on “Estimating and Communicating Uncertainty in Weather and Climate Forecasts,” and attended the first workshop on 27-28 April 2005.”

- Dr. Georgakakos, along with Dr. Graham, gave a presentation to the offices of USAID/OFDA in Washington titled, “Central America Flash Flood Guidance System – CAFFG,” on December 8, 2004.

- As part of its educational program, HRC continues to support two Ph.D. candidates at UCSD: Ms. Theresa Carpenter and Mr. Stephen Taylor. Ms. Carpenter completed the Climate Sciences Division Departmental exam successfully and is now working on her PhD Thesis research proposal on flash floods. Mr. Taylor continues his PhD Thesis research on wind wave interactions in the California Bight.
• In July 2004, Mr. Jason Sperfslage traveled to the Instituto Meteorológico Nacional (IMN) in Costa Rica for the on site installation and training of the Central America Flash Flood Guidance (CAFFG) system. The system is now in operation at IMN producing real-time high resolution mean areal precipitation, soil moisture and flash flood guidance estimates for the seven countries of Central America. Public site: http://www.hrc-lab.org/CAFFG

• Mr. Jason Sperfslage and Dr. Georgakakos traveled to Korea for a series of meetings on the development of a flash flood guidance system for the Han River basin in collaboration with Sejong University. They presented an invited seminar at the Korean Meteorological Agency.

• Dr. Eylon Shamir, Mr. Jason Sperfslage and Dr. Georgakakos traveled to Romania to meet with national agencies regarding the development of a flood forecast system for Romania. HRC is collaborating with Lockheed Martin and Baron Advanced Meteorological Systems (BAMS) in this project. HRC will provide technology transfer services in model parameter estimation and in flash flood guidance implementation.

• Dr.’s Eylon Shamir and Georgakakos conducted a field tour of the Santa Cruz River (SCAMA and Mexican Regions), along with ADWR (Arizona Dept of Water Resources) personnel and Mexican officials for the purpose of looking for evidence that might explain the trend of reduction of summer flow peaks at the Buena Vista gauge.

• As part of the NSF SGER grant on southern California flash flooding, HRC staff and local college students conducted field surveys throughout southern California in February and March 2005. The objective of the field campaign was to collect field evidence of the hydrologic impact of the significant rainfall that occurred throughout southern California in January 2005. The target impacts were evidence of landslides and stream flooding. The field campaign also entailed limited stream surveys of representative small streams (drainage areas less than ~50 mi^2) throughout the region. The stream surveys gathered information on the channel bankfull width and depth, channel slope, high water depth, and flood prone area. Three teams were formed for field surveys conducted between February 11-18, consisting of two members from HRC and two additional student team members. The teams deployed to different regions, covering the San Rafael and Santa Ynez mountains (HRC co-leaders S. Taylor and J. Wang), the San Gabriel and western San Bernardino mountains (T. Carpenter and E. Shamir), and San Diego county and eastern San Bernardino mountains (K. Georgakakos and J. Sperfslage). Student team members included: J. Hill, L. Hogarth, B. Munson of USCD, F. Fortunat of Moorpark College, I. Graham of Ventura College, and C. Luttrell of Texas A&M. Additional surveys were conducted by HRC Staff (T. Carpenter, E. Shamir, S. Taylor, J. Wang) on March 2-3, 2005, covering Palomar Mountain in San Diego County, and San Jacinto mountains in Riverside County.

• Theresa Carpenter, Nicholas Graham, Eylon Shamir and Jianzhong Wang were accepted to membership in the San Diego Chapter of Sigma Xi (Scientific Research Society).

• In response to direct requests and as a result of HRC mailing, reprints of current journal articles were disseminated to hundreds of recipients in the US and abroad.

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

Dewey Burchfield, Baron Advanced Meteorological Systems, Raleigh, North Carolina

Tom Burnet, Baron Advanced Meteorological Systems, Raleigh, North Carolina

Janice Davis, Georgia Institute of Technology, Atlanta, Georgia

Robert Jubach, U.S. National Weather Service, Silver Spring, Maryland

Bob Kuligowski, NOAA/NESDIS, Camp Springs, Maryland

John McHenry, Baron Advanced Meteorological Systems, Raleigh, North Carolina

Jeffrey O’Hara, UCSD Graduate Student, San Diego, California

Roderick Scofield, NOAA/NESDIS, Camp Springs, Maryland

Sezin Tokar, USAID, Washington, D.C.

Dimitris Tsintikidis, Dept of the Navy, Space & Naval Warfare Sys Center, San Diego, California

Jim Verdin, USAID, Washington, D.C.

Jeff Vukovich, Baron Advanced Meteorological Systems, Raleigh, North Carolina

Greg Wilson, Baron Advanced Meteorological Systems, Raleigh, North Carolina