

Activities Report: 1 July 2007 - 30 June 2008

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 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 and by offering hands-on training for field personnel.

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 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

Mr. Richard Kennedy, PMP

RJK Consulting
Berlin, MA

Professor Witold F. Krajewski

Department of Civil and Environmental
Engineering and IIHR-Hydrosience and
Engineering, 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

Disaster Management Protocols

Ocean Wave Modeling and Prediction Systems

Personnel

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

Mr. Robert Jubach, General Manager

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

Ms. Theresa Carpenter, PhD Candidate and Hydrologic Engineer II

Dr. Fang-Yi Cheng, Postdoctoral Associate (starting 5/7/08)

Ms. Barbara Hansen, Administrative Associate

Dr. Eylon Shamir, Hydrologic Engineer II

Mr. Cristopher Spencer, Computer Programmer/Analyst I

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

Dr. Steven Taylor, PhD Candidate and Hydrologic Scientist thru 12/31/06, Visiting Post-Doctoral Scientist 1/1/07 – 4/15/07, and Consultant 4/16/07 – 7/31/08.

Dr. Jianzhong Wang, Atmospheric Scientist II (through 3/28/08)

Ms. Sheila Ragan, Ocean Point Financial Systems, HRC Senior Accountant (contractor) starting 10/3/06.

Projects Funded

ACP, Autoridad del Canal de Panama, *Implementation of Orographic Precipitation Model in the PANMAP Software (MM5).*

ACP, Autoridad del Canal de Panama, *Panama Maintenance 2008 and Meteorological Model.*

ACP, Autoridad del Canal de Panama, *Review of the State Space Sacramento (SS-SAC) parameters of the National Weather Forecast System (NWSRFS) and Panama Forecast (PANFCST) computer model, refine the calibration and update the parametric databases, 5/08 – 8/08.*

ACP, Autoridad del Canal de Panama, *Water Resources Advisory Committee Oversight of the Flood Frequency Estimation, 5/10/07 – 5/30/08.*

Barons Advanced Meteorological Services, LLC (BAMS) (subcontract from Lockheed Martin Corporation), *Support to the Romania DESWAT Project, Flash Flood Guidance Task, Revised FFP, 5/05 – 11/08.*

Barons Advanced Meteorological Systems, LLC (BAMS) / Lockheed Martin, *Destructive Waters (DESWAT) – Hydrological Model Calibration and Validation for Romania, 05/01/05 – 11/08.*

Barons Advanced Meteorological Systems, LLC (BAMS), Romania Travel / Time / Materials / FFG.

Bermuda Weather Service, *Regional Wave Model for Bermuda, 10/30/06 – 4/30/07.*

California Energy Commission, *Implications of Climate changes for Northern California Water Resources Management for the Later Part of the 21st Century, 12/4/07 – 12/4/09.*

Kennedy/Jenks Consultants, *Water Supply Reliability Plan Update and Optimization Model Project – Castaic Lake Water Agency, 7/08 – 11/08.*

NASA, *Seasonal Climate Predictions and Water Resources Management Theoretical and Numerical Research, (GAPP), 4/15/04 – 04/14/08.*

South African Weather Service, *Development and Implementation of a Flash Flood Warning System for the Republic of South Africa, 8/1/08 – 6/30/10.*

- U.S. National Oceanic and Atmospheric Administration, Climate Program Office, *Constraining the Tropical Pacific's Role in Low-Frequency Climate Change of the Last Millennium*, 5/31/06 – 5/31/09.
- U.S. National Oceanic and Atmospheric Administration, *Operational Multiscale Forecast and Reservoir Management in Northern California*, 9/1/07 – 8/31/10.
- U.S. National Oceanic and Atmospheric Administration, collaboration with U.S. NWS, University Corporation for Atmospheric Research (UCAR), *Towards Development of a Rapid Response Local Wave Model for the Melbourne, Florida, National Weather Service Forecast Office*, (NWS), 8/1/07 – 7/30/08.
- U.S. National Oceanic and Atmospheric Administration, *The Paleoclimate Reconstruction (PR) Challenge: A community program to benchmark methods used to reconstruct the last 1-2000 years*, 7/1/08 – 6/30/11.
- U.S. National Oceanic and Atmospheric Administration, *Characterizing Uncertainty in Upstream Regulation Actions for Operational Ensemble Streamflow Prediction*, 4/1/08 – 3/31/10.
- U.S. National Weather Service (subcontract through Riverside Technology, inc.), *Asia Flood Net Flash Flood Warning System for the Mekong River Basin, Phase 3*, 8/22/07 – 8/21/09.
- U.S. National Weather Service (subcontract through Riverside Technology, inc.), *Riverside SE Asia FFG Enhancement*, 5/7/08 – 8/31/09.
- U.S. National Weather Service (subcontract through Riverside Technology, inc.), *Support for Early Warning System and Risk Assessment with a Multi-Hazard Approach in Central America*, 4/24/08 – 12/31/08.
- U.S. National Weather Service (subcontract to UCAR), *Development of CAFFG Online Training Program*, 6/3/08 – 11/1/08.
- U.S. National Weather Service (subcontract to Varone Consulting), *Support to USAID India Disaster Management Support Project, Climate Forecast System*, 7/1/07 – 12/31/08.
- University Corporation for Atmospheric Research (UCAR), *Towards Development of a Rapid Response Local Wave Model for the Melbourne, Florida, National Weather Service Forecast office*, (collaboration with U.S. NWS), 8/1/07 – 7/30/08.
- University of California San Diego, *Climate Change and California Coastal Sea Level and Waves, Task 2 – Wave Projections*, 5/1/08 – extension requested through 11/1/08.
- University of California San Diego, *Evaluation of an Operational Regional Wave Model for the Southern California Bight, Phase 2*, 10/1/06 – 10/31/08.
- University of California San Diego – NOAA/JIMO, California Applications Project (CAP), *Northern California Regional Water Resource Prediction Management*, 6/1/03 – 6/30/08.

Waterway Research Institute, Sejong University, *Development and Application of a State Estimator for a Distributed Storage Function Hydrologic Model of the Nakdong River Basin*, 7/1/07 – 9/30/08.

Proposals Pending

ACP, Autoridad del Canal de Panama, *Projections of Severe Storm Events for the Panama Canal Watershed*, 2007-2008.

California Energy Commission, California Department of Water Resources, National Oceanic and Atmospheric Administration, *Integrated Forecast and Reservoir Management for Northern California (INFORM) II: Operational Assessments, Adjustments and Applications*, 3.25 years from start.

NASA, *Guiding Reservoir Management in California under Climate Variability and Change Using NASA GISS ModelE and the INFORM system (w/ NASA GFSC & Georgia Tech)*, 2/1/09 – 1/31/13.

NASA, *Using Remote Sensing Products to Improve Panama Canal Operations (w/ U. of Connecticut)*, 2/1/09 – 1/31/13.

USAID/OFDA, *Joint Proposal with WMO for Global FFGS Implementation*, 11/1/08 – 10/31/13. Grant Awarded to WMO July 2008, HRC agreement with WMO is pending.

U.S. National Weather Service (subcontract to Varone), *Support to the NWS for the Development of a Flash Flood Warning System for the Aburra Valley, Colombia*, 9/1/08 – 12/1/08.

University of California San Diego – NOAA/JIMO, California Applications Project (CAP), *Northern California Regional Water Resource Prediction Management*, 6/1/03 – 12/31/08.

Publications

Contributions to Books and Special Issues

Georgakakos, K.P., 2007: "Flash flood forecasting and warning," *Chapter 3, WMO Flood Forecasting and Warning Manual*, World Meteorological Organization, Geneva, Switzerland, 30 pp.

Georgakakos, K.P., 2008: "Forecasting Flash Floods," *Chapter 44, WMO Guide to Hydrologic Practices*, World Meteorological Organization, Geneva, Switzerland, 18pp., (in press).

Editorials in Refereed Journals

Baveye, P.C., L. Charlet, K.P. Georgakakos, G. Syme, 2008: "Maintaining excellence with speedier article publication and a broader scope," *Journal of Hydrology*, 348, v-vi.

Research Papers in Journals

Published and in Press

Bae, D.-H., K.P. Georgakakos, W.-T. Kwon, 2007: "Climatological screening of climate model output with observations for Korean water resources applications," *International Journal of Climatology*, 27(13), 1775-1790.

Georgakakos, K.P. and N. Graham, 2008: "Potential Benefits of Seasonal Inflow Prediction Uncertainty for Reservoir Release Decisions," *Journal of Applied Meteorology and Climatology*, 47(5) 1297-1321, DOI: 10.1175/2007JAMC1671.1.

Graham, N. E. and M. K. Hughes, 2007: "Reconstructing the Mediaeval low stands of Mono Lake, Sierra Nevada, California, USA," *The Holocene*, 17, 8, 1197-1210.

Kedar, S., M. Longuet-Higgins, F. Webb, N. Graham, R. Clayton, C. Jones, 2008: "The origin of deep ocean microseisms in the North Atlantic Ocean," *Proc. Roy. Soc. (A)*, 464, 777-793.

O'Hara, J.K., and K.P. Georgakakos, 2008: "Quantifying the Urban Water Supply Impacts of Climate Change," *Water Resources Management*, doi 10.1007/s11269-008-9238-8 (online).

Shamir, E., D. Meko, N.E. Graham, and K.P. Georgakakos, 2007: "Hydrologic model framework for water resources planning in Santa-Cruz River, Southern Arizona," *Journal of American Water Resources Association*, 43(5) 1155-1170.

Shamir E., J. Wang, and K.P. Georgakakos, 2007: "Probabilistic streamflow generation model for data sparse arid watersheds," *Journal of American Water Resources Association*, 43(5) 1142-1154.

Taylor S.V., D.R. Cayan, N.E. Graham, K.P. Georgakakos, 2008, "Northerly surface winds over the eastern North Pacific Ocean in spring and summer," *J. Geophys. Res.*, 113, D02110, doi:10.1029/2006JD008053.

In Review and Revision

Georgakakos, K.P., 2008: "Analytical evaluation of the performance of threshold-based flash flood warning systems," *Journal of Hydrometeorology*, in revision.

Knowles, N. and K.P. Georgakakos, 2008: "A Describing Function Approach to Aggregating High-Resolution Land-Surface Data for Macroscale Hydrology Modeling," *Water Resources Research*, in revision.

Abstracts, Presentations and Conference Proceedings

Carpenter, T.M., E. Shamir, and K.P. Georgakakos, "Distributed Model Flow Simulation Uncertainty in the DMIP Case Study Watersheds," Abstract and Invited Presentation at the AGU Joint Assembly 2008, Fort Lauderdale, FL, Presentation H54-01, 29 March 2008.

Georgakakos, K.P., “Study of extreme precipitation over the Panama Canal Watershed,” Panama Canal Authority Water Resources Section Seminar, Panama City, Panama, 27 August 2007.

Georgakakos, K.P., “High resolution satellite precipitation products for operational regional flash flood guidance systems,” WMO Workshop on the Evaluation of High Resolution Precipitation Products, Geneva, Switzerland, 3-5 December 2007.

Georgakakos, K.P., “Integrated climate-hydrology forecasts for Northern California reservoirs,” NOAA-NWS CNRFC Workshop on Reservoir Management using Hydrologic Information, Sacramento, CA, 3 April 2008.

Georgakakos, K.P., “Using climate and hydrologic information for water resources planning and management decisions,” UCSD Graduate Seminar Course SIO-209, La Jolla, CA, 2 June 2008.

Graham, N., presentation at European Geophysical Society meeting, “New Perspectives on Medieval Climate,” Vienna, March 2008.

Jubach, R. presented a paper titled “Weather-related Disaster Early Warning and Risk Reduction Activities in Asia” at the 2nd Asian Ministerial Conference on Disaster Risk Reduction, New Delhi.

Jubach, R. presented a paper titled “The Mekong Regional Flash-Flood Guidance and Early Warning System—A Technical Overview” at the Sixth Annual Mekong Flood Forum in Phnom Penh, Cambodia. E. Shamir, C. Spencer, and J. Sperflage were co-authors of the paper.

Shamir, E. attended the Arizona Hydrological Society/Southwest Hydrology Regional Water Symposium, “A model framework for water resources planning in the upper Santa Cruz River, Southern Arizona,” 29 August – 1 September 2007, in Tucson Arizona.

HRC Technical Reports

Georgakakos, K.P.: “Formulation of a System for Flood Forecasting in Korea based on the Storage Function Method and Distributed Filtering Techniques,” *HRC Technical Note No. 32*, Hydrologic Research Center, San Diego, CA, January 2008, 29pp.

Georgakakos, K.P.: “Merging Satellite and Rain gauge Data for Real Time Flash Flood Applications,” *HRC Technical Note No. 33*, Hydrologic Research Center, San Diego, CA, February 2008, 46pp.

Georgakakos, K.P., N.E. Graham, T.M. Carpenter, A.P. Georgakakos, H. Yao, and M. Kistenmacher: “Operational multiscale forecast and reservoir management in Northern California: First year progress report,” *HRC Technical Note No. 34*, Hydrologic Research Center, San Diego, CA, May 2008, 18pp.

Shamir, E. and K.P. Georgakakos: “Addendum A, HRC Technical Report No. 6,” Hydrologic Research Center, San Diego, CA, August 2008, 8pp.

Shamir, E. and K.P. Georgakakos: “Estimating Depth-Duration-Frequency Curves for an Arid region with a Stochastic Precipitation Model and Tree-ring Record Information,” *HRC*

Technical Note No. 30, Hydrologic Research Center, San Diego, CA, December 2007, 35pp.

Sperflage, J., C. Spencer, K.P. Georgakakos, T.M. Carpenter, D. Tsintikidis, W.F. Krajewski, and A. Kruger: "Panama Mean Areal Precipitation (PANMAP) Forecast System Version 2.0 User Guide" *HRC Limited Distribution Report No. 29*, Hydrologic Research Center, San Diego, CA, September 2007, 220pp.

Wang, J.: "Mean Areal Temperature and Mean Areal Precipitation Estimates from Hourly Station Data in Romania," *Technical Report No. 31*, Hydrologic Research Center, San Diego, CA, January 2008, 8pp.

Wang J., E. Shamir, and K.P. Georgakakos: "Study of Extreme Precipitation Over The Panama Canal Watershed," *HRC Technical Report No. 6*, Hydrologic Research Center, San Diego, CA, August 2007, 91pp + 6 Appendices.

Others

Georgakakos, K.P.: "State-Space Sacramento (SS-SAC) Theory and Implementation at the Autoridad Del Canal De Panama (ACP)," *Class Notes*, Hydrologic Research Center, San Diego, CA, July 2008, 56 pp.

Georgakakos, K.P. and F.-Y. Cheng: "MOS analysis of model precipitation fields for each watershed and bias adjustment implementation," *Progress Report HRC PROJECT TN ACP-ORO-2008-02*, Hydrologic Research Center, San Diego, CA, June 2008, 11 pp.

Educational, Science Cooperation and Technology Transfer Activities

T. Carpenter organized and coordinated three seminar courses within the Climate Sciences Division at the Graduate Department of Scripps Institution of Oceanography at UCSD during the Fall 2007 and Winter 2008 academic quarters. The topics of these seminar courses included: Topics in Tropical Meteorology (Fall), Physical Science Basis of the IPCC 4th Assessment Report (Fall), and Communicating the Physical Science of the IPCC 4th Assessment Report (Spring).

K. Georgakakos co-advised (w/ Dan Cayan) to completion of Steve Taylor's Doctorate Thesis, at the Scripps Institution of Oceanography, UCSD (January 2008).

K. Georgakakos participated in meetings at the publishing company Elsevier in Amsterdam, The Netherlands, to contribute to the plans for expanding the themes of the papers published in the *Journal of Hydrology*, 29-30 November 2007.

K. Georgakakos participated and contributed to the Geneva, Switzerland Workshop on the Evaluation of High Resolution Satellite Precipitation Products, 3-5 December 2007.

K. Georgakakos organized, developed and taught together with E. Shamir, J. Wang, and R. Jubach, a 3-week course at HRC for 15 visiting scientists from China on the subject: On the Theory and Practice of Flash Flood Guidance, 7 – 27 January 2008.

K. Georgakakos co-chaired (w/ Joel Norris and Dan Cayan) the PhD Thesis Committee and served as the primary research advisor for Theresa Carpenter, at the Scripps Institution of Oceanography, UCSD (completion date in early 2009).

K. Georgakakos chaired the Panama Canal Authority Water Resources Section Water Oversight Committee.

K. Georgakakos was appointed Editor-in-Chief of the *Journal of Hydrology* (Dec 2007 to present). He also serves as Associate Editor of *Advances in Water Resources*.

K. Georgakakos was appointed a member of the Climate Change Technical Advisory Committee of the California Department of Water Resources (2007 – present).

K. Georgakakos participated in and contributed to an Upstream Regulation Meeting organized by the CNRFC, NOAA-NWS, with Utilities and Water Regulation Agencies in Sacramento, CA, 16 May 2008.

HRC had press releases pertaining to the flash-flood and the climate-water resources programs, August 2007, September 2007, and January 2008.

R. Jubach was invited to attend the First Planning Meeting for the Central American Project on Multi-Hazard Early Warning Systems held by the World Meteorological Organization. The project planning committee consists of WMO Secretariat, WMO Region IV President and Disaster Risk Reduction Chairperson, NOAA/NWS, World Bank, and Red Cross. Mr. Jubach was selected as the consultant to the committee and will be funded by NWS and WMO.

R. Jubach was invited to participate in the NOAA/NWS International session on “The Road to a Perfect Forecast and a Perfect Response: Connecting Hydrometeorological Services with the Emergency and Disaster Management Communities.” Mr. Jubach supported the panel on “Proposed Actions and activities to Strengthen the Link between Warning and Response, Template for Central America and the Caribbean” at the session.

R. Jubach presented one day seminars on the flash flood guidance system in Cambodia (2 seminars), Laos, Viet Nam (2 seminars), and Thailand.

R. Jubach was invited by the WMO to participate in the Regional Planning and Advisory Group (RPAG) for the Central America Multi-Hazard Early Warning System at the WMO Region IV Hurricane Committee Meeting in April 2008.

R. Jubach and E. Shamir presented a workshop on the Southern Africa Regional Flash Flood Guidance System as part of the Global Flash Flood Guidance System, 2-4 April 2008, in Pretoria, South Africa, Meeting was coordinated by the WMO and sponsored by USAID/OFDA, nine southern Africa countries were in attendance.

R. Jubach, E. Shamir, and J. Sperflage presented a workshop on implementation of the flash flood guidance system for the Mekong River Basin; 12-16 May 2008 in Ho Chi Minh City, Vietnam, in attendance were representatives from the four Mekong River riparian countries and the Mekong River Commission.

E. Shamir and J. Sperflage attended a meeting with MRC personnel at the Mekong River Commission in Phnom Penh and Vientiane, 25-29 February 2008.

E. Shamir gave a lecture on Global Flash Flood System (GFFS) for the International Hydrologic Analysis and Forecasting Course at COMET-UCAR in Boulder, Colorado, 16 June 2008.

E. Shamir is a member in the Advisory Council for the Elementary Institute of Science Commission on Science That Matters the 2008 Water Initiative.

E. Shamir presented a Water Conservation lecture at the Torrey Pines Elementary School.

C. Spencer traveled to the Autoridad Del Canal De Panama offices in Panama City, Panama to carry out on site implementation and training efforts for the deployment of the Panama Mean Areal Precipitation (PANMAP) Forecast System Version 2.0. 27–31 August 2007.

J. Sperflage traveled to the Autoridad Del Canal De Panama offices in Panama City, Panama to carry out on site implementation and training efforts for the deployment of the Panama Mean Areal Precipitation (PANMAP) Forecast System Version 2.0. 20 August – 03 September 2007.

Visitors

Professor Rafael L. Bras, MIT, Cambridge, MA, 11 July 2007

Professor Anastasios A. Tsonis, U of Wisconsin, Milwaukee, 5-9 September 2007

Professor Witold F. Krajewski, U. of Iowa, Iowa City, 5-9 September 2007

Dr. Sukumar Srinivas, Calit2, UCSD, 10 September 2007

Dr. Avinash Tyagi, WMO Water Resources Department, 5 October 2007

15 visiting scientists from China attended training on the subject: On the Theory and Practice of Flash Flood Guidance, 7-27 January 2008:

Mr. Zuhua Chen, Bureau of Hydrology, XuanWu District, Beijing, China

Mr. Boliang Ding, Bureau of Hydrology of Zhejiang Province, HangZhou, China

Mr. Jianwei Hu, Bureau of Hydrology, XuanWu District, Beijing, China

Mr. Dianyong Lan, Bureau of Hydrology and Water Resources of Guangxi Zhuang Autonomous Region, NanNing, GuangXi, China

Mr. Shiqin Li, Bureau of Hydrology of Jiangxi Province, Nanchang, China

Ms. Hongbing Li, Bureau of Hydrology and Water Resources Survey of Sichuan Province, ChengDu, China

Mr. Sijun Li, Bureau of Hydrology of Hubei Province, WuHan, China

Mr. Fengguo Liang, Bureau of Hydrology of Liaoning Province, ShengYang, China

Dr. Zhiyu Liu, Bureau of Hydrology, Ministry of Water Resources, XuanWu District, Beijing, China

Mr. Wenbin Liu, Bureau of Hydrology of Heilongjiang Province, HaErBing, China

Mr. Cangsheng Xue, Bureau of Hydrology of Anhui Province, HeFei, China

Ms. Guilian Yang, Bureau of Hydrology, XuanWu District, Beijing, China
Mr. Qitao Yang, Beijing Hydrological Center, HaiDian District, Beijing, China
Mr. Guoliang Zhou, Bureau of Hydrology, XuanWu District, Beijing, China
Mr. Guangshu Zhuang, Bureau of Hydrology of Guangdong Province, GuangZhou, China

Ms. Kelley Weaver, prospective UCSD student, 11 January 2008

Ms. Andrea Yoder, Program Manager, Elementary Institute of Science Commission On Science That Matters, San Diego, 15, January 2008

Mr. Abelardo Bal, Panama Canal Authority, Water Resources Section, 24-30 January 2008

Professor Forrest M. Holly, Jr., University of Iowa, 28-30 January 2008

Ms. Maritza Chandeck, Panama Canal Authority, Water Resources Section, 11-15 February 2008

Mr. Richard Kennedy, Quinsigamond Community College, Worcester, MA, 7 March 2008

Dr. Fang-Yi Cheng, University of Houston, 27 March 2008

Dr. Phil Arkin, University of Maryland, 4 April 2008

Ms. Karen Franz, Watershed Program Director, San Diego Coastkeeper, 11 April 2008

Mr. Byongju Lee, Sejong University, Seoul, Korea, 22-29 April 2008

Dr. Matei Georgescu, Rutgers University, New Jersey, 19 May 2008

Dr. Shih-Yu Wang, Iowa State University, 22 May 2008