

**FERNANDO R. MIRALLES-WILHELM**  
**PH.D., P.E., BCEE, D.WRE, PMP**

**Associate Professor**  
**Department of Civil and Environmental Engineering**  
**Director, Applied Research Center**  
**Florida International University**  
**Miami, Florida, USA**

**Education**

Ingeniero Mecanico,  
Universidad Simon Bolivar,  
Caracas, Venezuela, 1987.

Master of Science,  
University of California,  
Irvine CA, 1989.

Ph.D. Water Resources,  
MIT, Cambridge MA, 1992

**Registration**

Professional  
Engineer, Florida,  
2000

Professional  
Engineer,  
Massachusetts,  
1994

Dr. Miralles is a water resources engineer with 15+ years of experience in surface and groundwater hydrology, potable and wastewater systems, transport and physical, chemical and biological processes in aquatic ecosystems, water resources in urban and watershed scale systems, pipeline hydraulics, stormwater management, water distribution system analysis and water quality control. He has also been a member of the faculty at the Massachusetts Institute of Technology, Northeastern University, the University of Miami and Florida International University. He has conducted and/or directed water resources and hydraulics projects in the states of Florida, California and New York, and in Puerto Rico, Venezuela, Colombia, Brazil, Nicaragua, Spain, Panama, El Salvador, Iraq, Qatar, Israel, Jordan, the United Kingdom and Taiwan.

**Academic Experience**

**FLORIDA INTERNATIONAL UNIVERSITY (JUNE 2005 – PRESENT)**

**2007 – pres: Director, Applied Research Center (ARC)**

Dr. Miralles has served as Director of the Applied Research Center at FIU since January 2006 (interim until May 2006, appointed full time since May 2007). In this role, he directs a staff of 40 full time researchers (soft money funded entirely) on projects in environmental management, fossil and renewable energy, military programs and small business services for clients in the federal (Dpet. Of Energy, Dept of Defense) and private sectors. This center is also home to 100+ students who work on ARC funded projects for heir undergraduate and graduate degrees, from bachelors to masters to doctoral dissertations. In this position, Dr. Miralles reports directly to FIU's Vice President for Research.

**2005 – pres: Associate Professor, Civil and Environmental Engineering**

- ENV5930 Ecohydrology (Fall 2005)
- CWR5251 Environmental Hydraulics (Fall 2006)
- CWR3103 Water Resources Engineering (Spring 2007, Spring 2008)
- EGN5455 Numerical Methods in Engineering (Fall 2007)

**UNIVERSITY OF MIAMI (AUGUST 2000 – MAY 2005)**

**2001 – 2005: Assistant Professor, Civil, Architectural and Environmental Engineering**

- CAE630 Environmental Fluid Mechanics (Fall 2003)
- CAE340 Introduction to Environmental Engineering (Spring 2004)
- CAE695 Ecohydrology (Fall 2004)
- CAE330 Fluid Mechanics (Fall 2004, Spring 2005)
- CAE240 Environmental Pollution (Spring, 2005)
- MAC582 Groundwater Modeling (Spring 2001)
- AMP515/MGG515 Environmental Hydrology (Fall 2001, Spring 2003)
- ARC223 Architecture and the Environment (Fall 2002, Fall 2003)

**NORTHEASTERN UNIVERSITY (JANUARY 1996 – JULY 2000)**

**1996 – 2000: Assistant Professor, Civil and Environmental Engineering**

- CIV 3301 Surface Water Hydrology and Contaminant Transport (Fall 1997/1998/1999)
- CIV 3302 Groundwater Hydrology and Contaminant Transport (Winter 1998/1999/2000)
- CIV 3303 Groundwater Modeling (Spring 1998/1999/2000)
- CIV 3348 Fate and Transport of Contaminants in Surface Water (Spring 1997)
- CIV 3355 Surface Water Hydrology (Winter 1997)
- CIV 3358 Flow Through Porous Media (Winter 1996, Fall 1996)
- CIV 3360 Groundwater Modeling (Spring 1996, Winter 1997)
- CIV 1320 Hydraulic Engineering (Spring 1996, Summer 1996)
- CIV 1310 Fluid Mechanics (Fall 1996)
- CIV 1188 Science and Technology of Environmental Issues (Spring 2000)

**OTHER ACADEMIC APPOINTMENTS (part-time)**

**1993 - 1994** Lecturer, Massachusetts Institute of Technology (MIT)

- 1.72 Groundwater Hydrology (Fall 1993)
- 1.724 Groundwater Modeling (Spring 1994)
- 1.977 Environmental Restoration Engineering (Fall 1994)

**1995 - 1996.** Visiting Professor, Universidad Simon Bolivar (Venezuela):

- Fate and Transport of Environmental Contaminants (Spring 1996)
- Environmental Thermodynamics (Fall 1995)

### Funded Research Summary Table

Project Title	Role	Sponsor	Dates	Amount
Science of Coupled Aquatic Processes in Ecosystems from Space	PI	NASA	Oct 2008 – Sept 2013	\$5,000,000
Integrated Ecosystem Assessment for Antigua and Barbuda: Identification of Management Options	PI	Stanford Development Foundation	Nov 2006 – Oct 2012	\$ 1,480,000
Biocomplexity of Hydrologically-Controlled Ecosystem: A Comparative Analysis of the Everglades and Cerrado Ecosystems under Water and Nutrients Spatiotemporal Dynamics	PI	NSF	Sept 2003 – Aug 2009	\$ 1,800,000
Stochastic Analysis of Slough and Ridge Spatial variability at the Everglades National Park	PI	National Park Service	Jan 2005 – Jan 2008	\$ 208,533
Marsh-driven modeling of surface water – groundwater interactions	PI	National Park Service	Jan 2005 – Dec 2005	\$100,000
Acquisition of 2 Isotope Ratio Mass Spectrometers	Co-PI	NSF	Jan 2004 – May 2007	\$252,130
Linking Agricultural and Water Resources Decision Making Models Under Climatic Uncertainty	Co-PI	USDA	Jul 2004 – Jun 2006	\$ 204,508
Water Quality Under Climatic Uncertainty	Co-PI	USDA	Jul 2003 – Jun 2005	\$ 238,000
Incorporation of Climate Information into Water Resources Management in South Florida	Co-PI	NOAA	Jul 2002 – Jun 2004	\$ 600,000
Numerical Modeling of Variable Density Flow for Aquifer Storage and Recovery	PI	USGS	Jan 2001 – Jan 2002	\$ 31,635
<b>Subtotal as PI</b>				<b>\$8.6M</b>
<b>Subtotal as co-PI</b>				<b>\$1.2M</b>
<b>TOTAL FUNDING OBTAINED (awards over the past 10 years)</b>				<b>\$9.8M</b>

### Registration

Professional Engineer: Florida (2000), Massachusetts (1994), Venezuela (1987)

## Societies

American Society of Civil Engineers  
Colegio de Ingenieros de Venezuela  
American Academy of Environmental Engineering (Diplomate, 2002)  
American Academy of Water Resources Engineering (Diplomate, 2008)

## Peer-Reviewed Journal Publications

Muneepeerakul, C. P., F. Miralles-Wilhelm, S. Tamea, A. Rinaldo, and I. Rodriguez-Iturbe, Coupled hydrologic and vegetation dynamics in wetland ecosystems, *Water Resour. Res.*, 44, in press, 2008.

Bucci SJ, Scholz FG, Goldstein, G., Hoffman, W., G, Meinzer FC, Franco AC, Giambelluca, T. and Miralles-Wilhelm F. *Controls on stand transpiration and soil water utilization along a tree density gradient in a neotropical savanna*, *Agricultural and Forest Meteorology*, in press, 2008.

Cabral-Cano, E., T.H. Dixon, F. Miralles-Wilhelm, O. Diaz-Molina, O. Sanchez-Zamora and R. Carande, *Space geodetic imaging of rapid ground subsidence in Mexico City*, *Geological Society of America Bull.*, in press, 2008.

The, S.Y., D. DeAngelis, L. Sternberg, F. Miralles-Wilhelm, T. Smith and H. Koh, *A simulation model for projecting changes in salinity concentrations and species dominance in the coastal margin habitats of the Everglades*, *Ecological Modeling*, 213, 245-256, 2008.

Scholz FG, Bucci SJ, Goldstein G, Meinzer FC, Franco AC, Miralles-Wilhelm F. *Temporal dynamics of stem expansion and contraction in savanna trees: withdrawal and recharge of stored water*, *Tree Physiology*, 28, 469-480, 2008.

Wdowinski, S., S. Kim, F. Amelung, T. Dixon, F. Miralles-Wilhelm and R. Sonenshein, *Space-based detection of wetlands' surface water level changes from L-band SAR interferometry*, *Remote Sensing of Environment*, 112, 681-696, 2008.

Sternberg, L., Teh, S. Ewe, S., Miralles-Wilhelm, F. And DeAngelis, D., *Competition between Hardwood Hammocks and Mangroves*, *Ecosystems*, 648-660, 2007.

Vedwan, N., S. Ahmad, F. Miralles-Wilhelm, K. Broad, D. Letson and G. Podesta, *Institutional evolution in Lake Okeechobee management in Florida: Characteristics, impacts and limitations*, *Water Resources Management*, DOI 10.1007/s11269-007-9187-7, 2007.

Scholz, F.G, Bucci, S.J., Goldstein, G. Meinzer, F.C., Franco, A.C. and Miralles-Wilhelm, F., *Removal of nutrient limitations by long-term fertilization decreases nocturnal water loss in savanna trees*, *Tree Physiology* 27: 551-559, 2007.

Scholz, F.G, Bucci, S.J., Goldstein, G. Meinzer, F.C., Franco, A.C. and Miralles-Wilhelm, F., *Biophysical properties and functional significance of stem water storage tissues in neotropical savanna trees*, *Plant, Cell and Environment* 30: 236-248, 2007.

Bucci, S.J., Scholz F.G., Goldstein G., Meinzer F.C., Franco A.C., Campanello P.I., Villalobos-Vega R., Bustamante M. And Miralles-Wilhelm, F., *Nutrient availability constrains the hydraulic architecture and water relations of savanna trees*, *Plant Cell and Environment* 29: 2153-2167, 2006.

Miralles-Wilhelm, F., P. Trimble, G. Podesta, D. Letson and K. Broad, Climate- based estimation of hydrologic inflow into lake Okeechobee, FL, *ASCE Journal of Water Resources Planning and Management*, 131(5), 394-401, 2005.

Wdowinski, S., F. Amelung, F. Miralles-Wilhelm and T. Dixon, Space-based measurements of sheet flow characteristics in the Everglades wetland, FL, *Geophysical Research Letters*, 31, L15503, 2004.

Miralles-Wilhelm, F. and L.W. Gelhar, Comment on Transient Stochastic Analysis of Biodegradable Contaminant Transport: First-Order Decay, *Transport in Porous Media*, 49, 123-125, 2002.

Miralles-Wilhelm, F. and L.W. Gelhar, Stochastic Analysis of Oxygen-Limited Biodegradation in Heterogeneous Aquifers with Transient Microbial Dynamics, *Journal of Contaminant Hydrology*, 42, 69-97, 2000.

Miralles-Wilhelm, Fernando, Lynn W. Gelhar, and Vivek Kapoor, Reply to Comment on Stochastic analysis of oxygen-limit biodegradation in three-dimensionally heterogeneous aquifers, *Water Resources Research*, 34(9), 2427, 1998.

Miralles-Wilhelm, F., V. Kapoor and L.W. Gelhar, Stochastic Analysis of Oxygen-Limited Biodegradation in Three-Dimensionally Heterogeneous Aquifers, *Water Resources Research*, 33(6), 1251-1264, 1997.

Kapoor, V., L.W. Gelhar and F. Miralles-Wilhelm, Bimolecular second-order reactions in spatially varying flows: Segregation induced scale-dependent transformation rates, *Water Resources Research*, 33(4), 527-536, 1997.

Miralles-Wilhelm, F. and L.W. Gelhar, Stochastic Analysis of Transport and Decay of a Solute in Heterogeneous Aquifers, *Water Resources Research*, 32(12), 3451-3459, 1996.

Miralles-Wilhelm, F. and L.W. Gelhar, Stochastic Analysis of Sorption Macrokinetics in Heterogeneous Aquifers, *Water Resources Research*, 32(6), 1541-1549, 1996.

Campo, A. and F. Miralles-Wilhelm, A Study of Laminar Convection in pipes with Circular Transverse Fins at the Outer Surface, *Warme-und Stoffubertragung* 24 47, 1989.

### **Other works, publications and abstracts:**

Bucci, S.J., Scholz F.G., Goldstein G., Meinzer F.C., Franco A.C., Miralles Wilhelm F..Trade-offs and constraints in carbon allocation along Savanna to Rain Forest gradients: Predictions and processes at ecosystem level, ATBC 2006, China.

Scholz, F.G., Bucci, S.J., Goldstein, G., Meinzer, F.C., Miralles Wilhelm, F., Franco, A.C., Ecophysiological processes in Brazilian savannas: A multiscale analysis, ATBC 2006, China.

Miralles-Wilhelm, F., P.J. Riordan, R.H. Fitzgerald and B.M. Harley, Intrinsic Biodegradation of Benzene in a Contaminated Aquifer: A Case Study Illustrating the Application of Numerical Modeling, *Bioremediation of Contaminated Soils*, Chapter 22, 2000.

Miralles-Wilhelm, F., Stochastic Analysis of Intragrain Diffusion and Nonlinear Sorption in Heterogeneous Aquifers, *Bioremediation of Contaminated Soils*, Chapter 45, 2000.

Miralles-Wilhelm, F., The role of university partnerships on global infrastructure megaprojects: The South American Riverway System, *I International SARS Conference*, Caracas, Venezuela, March 2000.

Heywood, B.J., Miralles-Wilhelm, F., R.H. Fitzgerald and B.M. Harley, A particle-based numerical approach to model nonlinear sorption isotherms in groundwater, *IV International Symposium on Environmental Geotechnologies*, University of Massachusetts-Amherst, August 1998.

Stochastic Modeling of Bioremediation in Heterogeneous Aquifers with Transient Microbial Kinetics, In-Situ and On-Site Bioremediation: Volume 5, *Fourth International Symposium on Bioremediation*, 1997.

Miralles-Wilhelm, F., L.W. Gelhar and V. Kapoor, Effects of Heterogeneities in Field-Scale Biodegradation in Groundwater, *EOS Trans. AGU*, 71(43), 1304, 1990.

Miralles-Wilhelm, F., R.H. Rangel and W.A. Sirignano, An Analysis of Molecular Mixing in a Vortical Structure: Bias in PDF measurement, *AIAA 27th Aerospace Sciences Meeting*, Paper 89-0489, Reno, Nevada, 1989.

### **Conferences/Short Courses Taught**

Miralles-Wilhelm, F., R.H. Rangel and W.A. Sirignano, An Analysis of Molecular Mixing in a Vortical Structure: Bias in PDF measurement, *AIAA 27th Aerospace Sciences Meeting*, Paper 89-0489, Reno, Nevada, 1989.

Miralles-Wilhelm, F., L.W. Gelhar and V. Kapoor, Effects of Heterogeneities in Field-Scale Biodegradation in Groundwater, *EOS Trans. AGU*, 71(43), 1304, 1990.

Contaminant biodegradation in aquatic systems, University of Adelaide, Australia, November 1992.

Modeling geochemical and microbiological processes in the subsurface, University of Puerto Rico, Puerto Rico, December 1992.

Conceptual and numerical models of sorption and biodegradation applied in environmental remediation projects, INTEVEP, S.A., Caracas, Venezuela, January 1993.

Stochastic modeling of sorption and biodegradation in groundwater, Tufts University, Boston, February 1993.

Stochastic modeling of geochemical and microbiological processes in three dimensional heterogeneous aquifers, University of Miami, Miami, June 1994.

Three-dimensional groundwater modeling of chemical and biological process, University of Florida, Gainesville, October 1994.

Hazardous Waste Remediation Technologies, Massachusetts Institute of Technology, Cambridge, June 1996.

Stochastic Modeling of Bioremediation in Heterogeneous Aquifers with Transient Microbial Kinetics, In-Situ and On-Site Bioremediation: Volume 5, Fourth International Symposium, New Orleans, 1997.

#### **GRADUATE STUDENTS SUPERVISED**

At FIU: Cora Martinez (PhD), Celeste Diaz (PhD), Mauro Nalesso (PhD), Yao Yan (PhD), Onza Mahmoudi (MS), Luam Azmera (MS), Srikanth Pilli (MS)

At UM: Fabian Scholz (PhD), Sandra Bucci (PhD), Marcelo Lago (PhD), Bernardo Bieler (MS)

At UN (all MS): Herbert Bodensiek, Brian Heywood, Segun Aiyetigha, Maged Kamel, Christopher Feeney, Emre Ozcan, Farnaz Haghseta, Juan Carlos Perez, Luis Galeano, Ralph Grieco, Paul Doucette, Robert Hicks.

#### **UNIVERSITY SERVICE**

##### University Committee and Administrative Responsibilities:

FIU-ARC: Director of Research, May 2007 – pres; Jan2006 -May 2007 (interim)

UM-CAE Graduate Program Director, Aug 2004 - June 2005

UM Faculty Senate (RSMAS): Aug 2002 – Aug 2003

UM-CESP Center for Ecosystem Science and Policy Faculty Advisory Committee

UM-RSMAS Academic Committee: Aug 2001- Aug 2002

##### Community Activities:

CUAHSI - Consortium of Universities for the Advancement of Hydrologic Science: UM Representative (2002-2005); FIU Representative (2005-pres).

#### **Professional Experience (as a Consultant)**

##### **FLORIDA INTERNATIONAL UNIVERSITY (JUNE 2005 – PRESENT)**

**Senior Hydrologic Modeler, National Park Service,** Ridge and slough ecohydrological dynamics at the Everglades National Park. In this project, Dr. Miralles leads the development of a numerical model of hydrologic flow, nutrient and sediment transport (with soil accretion) and vegetation dynamics in the ridge and slough systems of the Florida Everglades. The model is being developed to study the potential impacts of hydrologic modifications upgradient on the stability and dynamics of the ridge and slough.

**Senior Hydrologic Modeler, National Park Service,** Ecohydrological modeling of marsh driven operations of pump stations at the Everglades National Park. The main purpose of S-332B and C detention basins is to reduce seepage from the Rocky Glades to the L-31N canal. Two pump stations, S-332B and S-332C, provide water to maintain the water levels in the respective retention basins. Low canal stages over-drain the adjacent Everglades wetlands. This has led to upland species invasions and increased fire risks. On the other hand, high water levels in the detention basins cause adjacent wetlands to be excessively flooded. Therefore, to protect the adjacent wetlands in ENP from excessive flooding and minimize adverse vegetation and water quality impacts, the pump stations should be operated to mimic the natural marsh conditions, except during extreme events.

**Senior Hydrologic Modeler, Kissimmee Basin Modeling and Operations Study (KB MOS):** Working under a contract with the SFWMD, Dr. Miralles is part of a consulting team in charge of developing alternatives for operational changes in the Kissimmee River Basin, encompassing the Upper Chain of Lakes and Lower Basin. In this project, his duties have concentrated on the development and selection of numerical models to screen, formulate and evaluate alternatives, and on the implementation of computer aided participation process for stakeholders in the basin.

#### **UNIVERSITY OF MIAMI (AUGUST 2000 – MAY 2005)**

**Senior Hydrologic Modeler, Immokalee Stormwater Master Plan:** Working under a contract with the SFWMD, Dr. Miralles led the development of a stormwater master planning numerical model in XP-SWMM. In this project, his duties centered on defining the hydrologic parameters for model input, development of criteria for simulation of structural operations and analysis/QA/QC of modeling results, production of final reports and presentations to the client and the public.

**Senior Hydrologic Modeler, City of Doral Stormwater Management Master Plan:** Working under a contract with the City of Doral, Dr. Miralles led the development of a stormwater master planning numerical model in XP-SWMM. In this project, his duties centered on defining the hydrologic parameters for model input, development of criteria for simulation of structural operations and analysis/QA/QC of modeling results, production of final reports and presentations to the client and the public.

**Senior Hydrologic Modeler, Evaluation of Numerical Models for Aquifer Storage and Recovery (ASR):** Working under a contract with the United States Geological Survey, Dr. Miralles led the development of a procedure to evaluate numerical models for variably density groundwater flow with applicability to simulate ASR systems. In this project, his duties centered on defining the criteria for model selection, evaluation of existing numerical models, development of a simulation tool with SEAWAT, production of final reports and presentations to the client and the public.

**Project Manager for Stormwater Management Master Planning for the Miami-Dade Aviation Department (MDAD) in Miami, Florida.** In this capacity, Dr. Miralles is responsible for planning and improvement to stormwater management systems at the Miami International Airport, Opa-locka General Aviation Airport and Kendall-Tamiami Executive Airport.

**Project Manager, Sanitary Sewer Evaluation and Rehabilitation, Municipality of Fajardo, Commonwealth of Puerto Rico.** Dr. Miralles currently serves as project manager for the evaluation and rehabilitation works of the sanitary sewer system of the municipality of Fajardo, working for the Agencia para el Financiamiento de Infraestructura de Puerto Rico (AFI). In this capacity, Dr. Miralles is responsible for the supervision of design and improvements to the existing rainfall-dependent infiltration and inflow (RDI/I) to the sanitary sewer systems, including upgrades to the Luquillo wastewater treatment plant.

#### **NORTHEASTERN UNIVERSITY (JANUARY 1996 - JULY 2000)**

**Project Manager, Water Supply Source Restoration, Guarapiranga Reservoir, Sao Paulo, Brazil.** Dr. Miralles served as project manager for the design of the water and wastewater systems of the Guarapiranga reservoir near Sao Paulo, Brazil. This contaminated reservoir served as a water supply source a significant fraction of the city's population. The project involved the conception and implementation of reservoir management strategies to enhance the water quantity and quality aspects of the water supply system. This project was financed by the World Bank.

**Project Engineer, Llobregat River Strategy Development, Barcelona, Spain.** In Barcelona, Spain, Dr. Miralles served as the project engineer in charge of developing a strategy for the reclamation of the Llobregat river. In addition to decreasing surface water levels and increasing pollution, the project was geared at maintaining an ecological flow of water in the river by using a tertiary treatment effluent, and its recirculation using an artificial wetland, as opposed to the current discharge into the Mediterranean sea.

**Project Director, Water Resources Master Plan, Lake Managua Basin, Nicaragua.** Dr. Miralles served as project director for a water resources master plan in the Lake Managua basin in Nicaragua. This project, financed by the World Bank, incorporated water treatment, distribution and reutilization as well as a tariff system geared at the fast growing population in the basin.

**Surface/Groundwater Management Master Plan Development, El Salvador.** Dr. Miralles was part of a group of technical experts in charge of the development of a surface and groundwater management master plan for El Salvador. This project was financed by the Interamerican Development Bank.

**Project Manager, Environmental Restoration Project, Lake Valencia, Venezuela.** Dr. Miralles was the project manager for a major environmental restoration project in the Lake Valencia basin in Venezuela. This project included the design of a water extraction system from the lake, its allocation to three wastewater treatment systems and its distribution through the network of the city of Valencia. This project was financed by the Interamerican Development Bank for the Ministry of the Environment (MARNR).

#### **CAMP DRESSER & MCKEE INTERNATIONAL (MARCH 1992 - DECEMBER 1995)**

Dr. Miralles served as project manager for the design of the water distribution system of the Guarapiranga reservoir near Sao Paulo, Brazil. This contaminated reservoir served as a water supply source a significant fraction of the city's population. The project involved the conception and implementation of reservoir management strategies to enhance the water quantity and quality aspects of the water supply system. This project was financed by the World Bank.

In Barcelona, Spain, Dr. Miralles served as the project engineer in charge of developing a strategy for the reclamation of the Llobregat river. In addition to decreasing surface water levels and increasing pollution, the project was geared at maintaining an ecological flow of water in the river by using a tertiary treatment effluent, and its recirculation using an artificial wetland, as opposed to the current discharge into the Mediterranean sea.

Dr. Miralles served as project director for a water resources master plan in the Lake Managua basin in Nicaragua. This project, financed by the World Bank, incorporated water treatment, distribution and reutilization as well as a tariff system geared at the fast growing population in the basin.

Dr. Miralles was part of a group of technical experts in charge of the development of a surface and groundwater management master plan for El Salvador. This project was financed by the Interamerican Development Bank.

Dr. Miralles was the project manager for a major environmental restoration project in the Lake Valencia basin in Venezuela. This project included the design of a water extraction system from the lake, its allocation to three treatment systems and its distribution through the network of the city of Valencia. This project was financed by the Interamerican Development Bank for the Ministry of the Environment (MARNR).

Dr. Miralles serves as an advisor to the Mariano Ospina foundation in Colombia, as part of an effort to implement the South American Riverway System (IFSA-SARS project). This project conceives a continuous course of river water flow linking most of the countries in South America, including Venezuela, Colombia, Brazil, Bolivia, Paraguay, Uruguay and Argentina. The project has received financing from multilateral agencies such as the Japanese Global Infrastructure Fund (GIF), the Corporacion Andina de Fomento (CAF) and the Mariano Ospina foundation.