

WWTAC09

IWA Speciality Conference:  
2<sup>nd</sup> International Symposium on

Water and Wastewater  
Technologies  
in Ancient Civilizations

May 28<sup>th</sup> | 29<sup>th</sup> | 30<sup>th</sup> | Bari | Italy **2009**

*Organized by:*



International  
Water Association

*In collaboration with:*



FederUtility

*With the contribution of:*

**AQP SpA** of Bari

## Organizers

- (a) FederUtility (Rome, Italy)
- (b) N.AG.RE.F. National Agricultural Research Foundation (Iraklio, Greece)
- (c) IWA International Water Association (London, UK)
- (d) Federculture (Rome, Italy)
- (e) IRSA - CNR (Rome, Italy)
- (f) All Associazione Idrotecnica Italiana (Rome, Italy)
- (g) AQP Acquedotto Pugliese SpA (Bari, Italy)
- (h) Fondazione AMGA (Genoa, Italy)
- (i) EUREAU European Union of National Associations of Water Suppliers and Waste Water Service (Brussels, Belgium)
- (j) UTILITATIS (Rome, Italy)
- (k) Hellenic Union of Water Supply and Sewerage Services (Larissa, Greece)

## Organising Committee

- Renato Drusiani, FederUtility, Rome, Italy
- Pietro Laureano, IPOGEA, Matera, Italy
- Andreas N. Angelakis, N.AG.RE.F., Iraklio, Greece
- Lorenzo Bardelli, UTILITATIS, Rome, Italy
- Osvaldo Conio, Fondazione AMGA, Genoa, Italy
- Giovanni De Feo, University of Salerno, Italy
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- Mooyoung Han, Seoul National University, Korea
- Dimitris Koutsoyiannis, Technical University of Athens, Greece
- Antonio Lopez, IRSA - CNR, Bari, Italy
- Pierluigi Martini, All, Rome, Italy
- Vito Palumbo, AQP SpA, Bari, Italy
- Nikolaos Paranychianakis, Technical University of Crete, Chania, Greece
- Adrian Puigarnau, IWA, London, UK
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- Miquel Salgot, University of Barcelona, Spain
- Marco Tallini, University of L'Aquila, Italy
- Anastasia Zourou, Cultural Association Ithaki, Rome, Italy

## Programme Committee

- Renato Drusiani, FederUtility, Rome, Italy
- Pietro Laureano, IPOGEA, Matera, Italy
- Andreas N. Angelakis, N.AG.RE.F., Iraklio, Greece
- Rania A. Abdel Khaleq, Ministry of Water and Irrigation, Amman, Jordan
- Mohamed Bazza, FAO, Cairo, Egypt
- Amos Cecchi, Publiacqua SpA, Florence, Italy
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- Fekri Hassan, University College London, UK
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- Joan Rose, University of Michigan, USA
- Miquel Salgot, University of Barcelona, Spain
- Marco Tallini, University of L'Aquila, Italy
- Andrea Tilche, European Commission, EU

## Agenda

Thursday, 28<sup>th</sup> May

## Morning session

Scuderia Hall

- 11.00 *Welcome address*  
Silvia Godelli, *Mediterranean and Culture Councillor, Apulia Region*
- 11.15 **INTRODUCTORY THEMES**  
*Chairman and introducer*  
Paul Reiter, *Director of IWA*
- A brief history of water supply and wastewater management in Ancient Greece*  
Andreas N. Angelakis, *President of EUREAU and Hellenic Union of Water Supply and Sewerage Services, Larissa, Greece*
- Ancient water management techniques to contrast drought and desertification in the Mediterranean*  
Pietro Laureano, *IPOGEA Foundation*
- History of the water supply of Rome as a paradigm of water services development in Italic Peninsula*  
Pierluigi Martini, *President of Associazione Idrotecnica Italiana*  
R. Drusiani, *Water Director of FederUtility*
- 12.15 **INFRASTRUCTURES: BUILDING, DEVELOPMENT AND MANAGEMENT (part I)**  
*Chairmen*  
Renato Drusiani, *Water Director of FederUtility*  
Andreas N. Angelakis, *President of EUREAU and Hellenic Union of Water Supply and Sewerage Services, Larissa, Greece*
- Distribution and characteristics of ancient underground aqueducts in Italy*  
Mario Parise, *Italy*
- The ancient water supply of Jerusalem in the biblical times. Some controversial issues*  
Hillel Shuval-Hadassah, *Israel*

*The Ancient Aqueduct from Serino to Beneventum, in Southern Italy: a technical and historical approach*

Giovanni De Feo, C. Malvano, S. De Gisi, O. De Biase, *Italy*

*Urban water reservoirs in the land of the Bible during the Iron Age (1000 BC - 586 BC)*  
Tsvika Tsuk, *Israel*

*Water supply of Bologna (Italy) by Roman Aqueduct: history, morphology and hydraulics, from ancient times to the present day*  
Renato Drusiani, G. Leoni, D. Demaria, N. Lembo, *Italy*

13.30 Working Lunch

## Afternoon session

- 14.30 **INFRASTRUCTURES: BUILDING, DEVELOPMENT AND MANAGEMENT (part II)**  
*Chairmen*  
Pietro Laureano, *IPOGEA Foundation*  
Albert Koenig, *University of Hong Kong, China*
- Irrigation and reclamation in Ancient Greece*  
Theologos Mimides, K. Mandalaka, K. Pylarinou, *Greece*
- Evolutionary tendencies in water management in Prehispanic societies of Northwest Argentine*  
Alejandra Vanina Volpedo, F.L. Scartascini, A. Fernández Cirelli, *Argentina*
- Surface water management and supply in Ancient Iran*  
Marzieh Mosayebi, *Iran*
- Historical, biological and morphological aspects of the Roccarainola Qanat in the district of Naples*  
Giovanni De Feo, S. De Gisi, C. Malvano, D. Capolongo, S. Del Prete, M. Manco, F. Maurano, E. Tropeano, *Italy*

*The development of irrigation canals and its influence on agricultural society in Taiwan from 1624*

Tzu-Yi Pai, Y.-T. Tung, *China*

*Groundwater exploitation for public and private uses in the towns of the roman province: the emblematic example of Formia (Latium Adiectum - Central Italy)*

Marco Tallini, S. Ciccone, A. Di Leo, *Italy*

*The aqueduct of Claudius in the Pallavicina estate, the Aqueduct of Septimius Severus at Albano and the Aqueduct of Malaffitto Alto at Ariccia (Alban Hills, Rome).*

*Recent excavations data*

Anastasia Zourou, *Italy*

*A multi-disciplinary approach to water supply system of the Roman city of Aptera, Crete, Greece*

Petros Gikas, Y. Christodulakos, V. Gikas, A.N. Angelakis, *Greece*

*Technical-historical investigation regarding the Siphon bridge over the Geirato River*

Stefano Marchetto, C. Gambaro, J.V. Clari, *Italy*

*Ancient water supply system of the Old Town of Lijiang, Yunnan Province, China*

Albert Koenig, S.C.C. Fung, *China*

*The Roman Aqueduct and the Helvius' Fountain in Sant'Egidio del Monte Albino, in Southern Italy: a hystorical and morphological approach*

Giovanni De Feo, S. De Gisi, C. Malvano, A. Tortora, S. Del Prete, F. Maurano, E. Tropeano, *Italy*

17.45 End of the afternoon session

20.30 Monopoli (Bari)  
*Masseria "Il Melograno"*  
**Gala Dinner**

Friday, 29<sup>th</sup> May

Morning session

Scuderia Hall

#### 08.45 TECHNOLOGICAL ASPECTS AND HYDRAULIC ENGINEERING

*Chairmen*

Walter Dragoni, *University of Perugia, Italy*

Anna Stradaridaki, *University of Crete, Greece*

*Genius techniques for ground water management and supply in Ancient Iran*

Mohsen Maleki, *Iran*

*Design and functions of hydraulic works in Pisac, Inca*

Tetsuya Kusuda, R. Kondo, H. Harada, A. Sakoda, P. Kaulicke, J. Zapata, *Japan*

*The greatest water reservoirs in the ancient Roman world and the "Piscina Mirabilis" in Misenum*

Giovanni De Feo, S. De Gisi, C. Malvano, O. De Biase, *Italy*

*Fountains in the streets of Pompeii: the evaluation of the outlet velocity and of the expected flowrate from the features of fifteen fountains*

Maria Carmela Monteleone, *United Kingdom*

*Relocation of a 2500-year-old hydraulic structure in the Valley of Dorudzan in the Fars Province of Iran*

Mohammad Jafar Malekzadeh, *Iran*

*Modelling ancient water distribution systems with modern hydraulic design software*

Derek Clarke, P. Andrews, E. Messeth, J. Deom, R. Sala, *United Kingdom*

*Aspects of hydraulic engineering concerning inverted siphons used in roman age*

Fiorina De Novellis, G. Temporelli, *Italy*

*The Karez of the Sauran Region*

Derek Clarke, R. Sala, J.M. Deom, *United Kingdom*

*Rain gauge and rain gauge network system in Korea*

Mooyoung Han, H. Kim, *Korea*

*Seawater fishponds and fish farming in the villae maritimae of the late Roman Republic: impact of Karst groundwater and submarine springs (Sperlonga - Formia Coastline, Central Italy)*  
Marco Tallini, S. Ciccone, A. Di Leo, Italy

*The history of the Fontana spring aqueduct and its significance for the water supply of Heraklion city (Crete) through the ages*  
Anna Strataridaki, E.G. Chalkiadakis, N.M. Gigourtakis, Greece

*Water, toilets and public health in the Roman Era*  
Heikki S. Vuorinen, Finland

*Ice wells near the Monastery of Poblet (Tarragona Province, Catalonia, Spain)*  
Miquel Salgot, J.L. de la Peña, Spain

*Analysis of the hydraulics of the irrigation canals of Otrar, Kazakhstan*  
Derek Clarke, P. Andrews, E. Messeth, R. Sala, J.M. Deom, United Kingdom

*Historical development bathrooms (toilets) and other sanitary and purgatory structures in Greece*  
George Antoniou, A.N. Angelakis, Greece

*Infiltration galleries in the upper Scrivia Valley*  
Claudia Lasagna, M. Pittaluga, O. Conio, P. Canevaro, Italy

*Communal rainwater cisterns in the Cyclades-Greece. The case of Chora on Amorgos*  
George Antoniou, Greece

*Technical Investigation of Amir Ancient Dam-Bridge on Kor River in Iran*  
Masomeh Zand, M. Javan, Iran

*First results of a study of the Etruscan Tunnel and other hydraulic works on the "Ponte Coperto" stream (Cerveteri, Rome, Italy)*  
Walter Dragoni, P. Bersani, A. Canalini, Italy

14.00 Working Lunch

## Afternoon session

15.00 **WATER CULTURE, MYTHOLOGY, ...**

*Chairmen*  
Giovanni De Feo, University of Salerno, Italy  
Petros Gikas, University of Crete, Greece

*Water, an integral part in every aspect of ancient Greek's life*  
Theologos Mimides, M. Karamesouti, K. Pylarinou, K. Mandalaka, Greece

*Water supply and sanitation in ancient Peru: Pre-Columbian cultures and the Incas*  
Alexander Reyes-Knoche, Germany

*Water, human & imaginary*  
Sandrine Xanthoulis, Belgium

*Aboriginal people mutual aid for water supply in Taiwan. From ancient to modern time*  
Tzu-Yi Pai, Y.-T. Tung, China

*Water, myth of justice and the rule of Law - essentials for civilizations in antiquity*  
Staffan Michelson, Sweden

16.15 **ENVIRONMENTAL ASPECTS, URBAN DEVELOPMENT, HEALTH**

*Chairmen*  
Anastasia Zourou, Cultural Association Ithaki, Rome, Italy  
Miquel Salgot, University of Barcelona, Spain

*Urban landscape of the water travelling in Madrid*  
Roberto Villamayor Fernández, Spain

*Medical properties of the thermo-mineral waters in the Levant in antiquity*  
Estie Dvorjetski, United Kingdom

*Two thousand years of rainfall record of Korea and its implication for climate change adaptation*  
Mooyoung Han, H. Kim, Korea

*Therapeutic uses of ice and cold water throughout the history: a glimpse*  
Miquel Salgot, J.L. de la Peña, Spain

*City drainage in ancient China*  
Pengfei Du, X. Zheng, China

17.45 End of the afternoon session

## Saturday, 30<sup>th</sup> May

08.00 *Guided tour to ancient water supply infrastructures at Matera Stones and return back to Bari.*  
13.00

## Registration

In the same days and venue it will take place the XVI European Conference H2Obiettivo 2000 **Environmental sustainability and quality of water services in the Mediterranean basin**. It will be possible to take part to both events by paying the fee as indicated below.

For more information about the European Conference please visit us at: [www.federutility.it](http://www.federutility.it)

Registration should be made by completing and returning the enclosed registration form to the Organising Secretariat **Noema srl unipersonale**. Registration forms without full payment of the fees will not be accepted. The registration form is also available on the website: [www.noemacongressi.it](http://www.noemacongressi.it)

### Participation only to IWA Speciality Conference Fees (20% vat included)

<b>IWA members</b>	€ 480,00
<b>Non-members</b>	€ 600,00
<b>Students</b>	€ 300,00
<b>Accompanying persons</b>	€ 240,00

### Participation to both IWA Speciality Conference and XVI European Conference H2Obiettivo 2000 Fees (20% vat included)

<b>IWA members</b>	€ 1.400,00
<b>Non-members</b>	€ 1.700,00
<b>Students</b>	€ 650,00

It is possible to register by sending the attached form to the Organizing Secretariat *Noema* to the indicated details.

#### Participant's registration fee includes:

admittance to all sessions; congress material; DVD-Proceedings (Distributed to participants at the Conference); certificate of attendance; coffeebreaks; lunch on May 28<sup>th</sup> and 29<sup>th</sup>; Gala Dinner on May 28<sup>th</sup>; Post Conference excursion to Matera

#### Students' registration fee includes:

admittance to all sessions; congress material; certificate of attendance; coffee-breaks; lunch on May 28<sup>th</sup> and 29<sup>th</sup>; Post Conference excursion to Matera

**Accompanying person's registration fee includes:** Gala Dinner on May 28<sup>th</sup>; Post Conference Excursion to Matera

## Invoice

Invoice will be sent by mail before the Conference. Invoice must be issued to all registered participants. Please pay attention to properly fill in the "Invoice data" section of the registration form. Incomplete registrations will not be considered.

## Cancellation

In case of cancellation, participation fees will not be refunded.

## Accommodation

### Noema Incoming

Via Orefici, 4 - 40124 Bologna (Italy)  
Phone +39 051 2759252 - Fax +39 051220955  
[info@noemacongressi.it](mailto:info@noemacongressi.it)

A limited number of hotel rooms has been provisionally reserved for Conference participants. It is advisable to book as early as possible to ensure reservation of the preferred hotel by completing and returning the enclosed reservation form.

## Call for sponsor and exhibitions for WWTAC09

Don't miss the chance to expose your company's experience, brand your products, and trade on the opportunities by becoming an Exhibitor or Sponsor of the 2<sup>nd</sup> International Symposium on **Water and Wastewater Technologies in Ancient Civilizations (WWTAC09)**.

If you would like to have more information about sponsoring or exhibiting at Hotel Villa Romanazzi Carducci, please contact:

### Noema

Via Orefici, 4 - 40124 Bologna (Italy)  
Phone + 39 051 230385 - Fax + 39 051 221894  
[info@noemacongressi.it](mailto:info@noemacongressi.it)

## Publication

Selected papers will be peer reviewed for publication in IWA Publishing's journal *Water Science and Technology*. Specifications for the formatting of papers are available on the IWAP website at [www.iwaponline.com/wst/i2a.htm](http://www.iwaponline.com/wst/i2a.htm)



Assonometria dei Sassi (Pietro Laureano, "Giardini di Pietra", Bollati Boringhieri 1993)

## General information

### BARI

Bari, the city that hosts the conference, is renowned worldwide for its artistic and archaeological treasures, in particular the relics of St. Nicholas. Founded by the mythical heroes of the Hellenic world, the city has undergone the influence of its different conquerors, such as Romans, Arabs and Byzantines. Under the Byzantine domination, Bari lived its golden age, reaching the acme of its wealth and prestige, before the Norman invasion. Bari was then conquered by the Angevins, who have been followed by the Aragoneses, the Sforzas and the Borbone until 1813 when, under Napoleon's domination, the King of Naples Gioacchino Murat made the city the provincial capital. Among the most relevant monuments of the city, it is important to remember the Basilica of St. Nicholas, the Cathedral of St. Sabino and the Norman-Hohenstaufen Castle.

### POST CONFERENCE FOR PARTICIPANTS AND ACCOMPANYING PERSONS

#### Saturday, 30<sup>th</sup> May - Matera

Conference participants and their parties are invited to take part to the excursion to Matera, organized on Saturday May 30<sup>th</sup>. Matera, one of the oldest cities in the World, is an exceptional urban structure included in the UNESCO World Heritage List of Cultural Sites. Observing Matera's development, it is possible to reconstruct the evolution of mankind from Palaeolithic to the modern times. To either sides of Civita, the central part of the town, where it is possible to admire the Cathedral, there is a number of cavern houses dug into the rock itself, which are worldwide renowned as the "Sassi", and which used to be densely inhabited in the past. The day trip is included in the conference fee and includes the coach trip to and from Matera, guided tour. Reservations must be made with the relative subscription form.

### SOCIAL PROGRAMME FOR PARTICIPANTS AND ACCOMPANYING PERSONS

#### Thursday, 28<sup>th</sup> May - (Monopoli) Bari

##### Gala Dinner

##### *Masseria Il Melograno*

Dinner will be hosted at Hotel Il Melograno, Monopoli, which has been part of the prestigious Relais & Chateaux group since 1993. It nestles in a position of rare suggestive beauty, amongst

majestic olive trees, in an area of Apulia countryside between green hills and the blue Adriatic sea. The hotel is housed in a XVII century fortified farmhouse, furnished with antiques, precious rugs, paintings and tapestries.

### VENUE

#### Villa Romanazzi Carducci

Via G. Capruzzi, 326

70124 Bari (Italy)

Tel. + 39 080 5427400

Fax +39 080 5560297

mercure@villaromanazzi.com

www.villaromanazzi.it

### ACCESS TO BARI

The Conference Venue is located just a few minutes away from the downtown of Bari, 800 metres from the central railway station, 500 metres from the belt road (Tangenziale) and 8 km from the Bari "Palese" airport. Taxi and buses directly link the central railway station with the conference venue. If travelling by car, on the highway and belt road, take the following exits:

- Bari Sud, in highway A14
- Exit n. 10/A Bari Picone direction Centro, from the belt road S.S. 16

### OFFICIAL LANGUAGE

The official Conference language is English. Simultaneous translation will not be provided.

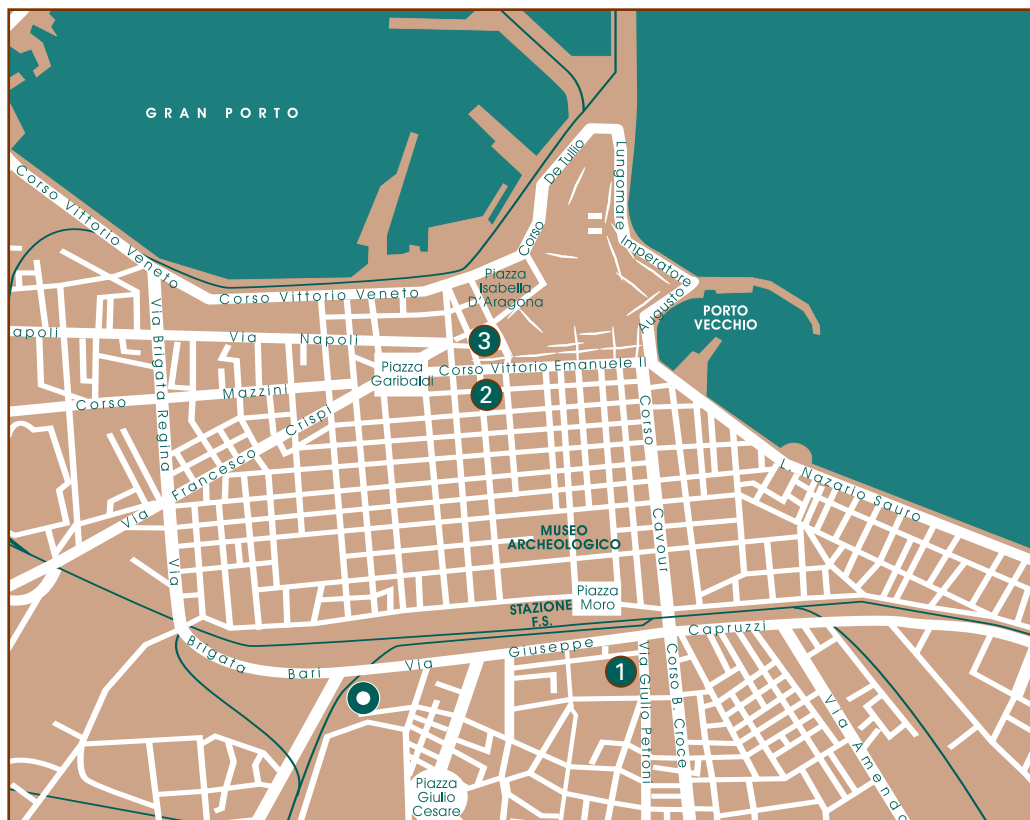
### REFRESHMENTS AND LUNCHES BREAK

Coffee-breaks will be served in the technical-commercial exhibition area. Lunches will be held in Carducci's garden, weather permitting, if not in the Conference venue.



Sasso caveoso (Pietro Laureano, "Giardini di Pietra", Bollati Boringhieri 1993)

## Map of Bari



● Villa Romanazzi Carducci

### Hotel

- 1 Hotel Excelsior
- 2 Hotel Boston
- 3 Hotel Palace

## Symposium Contacts

### Organising Chairman

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To know more about the related XVI European Conference H2Obiettivo 2000 **Environmental sustainability and quality of water services in the Mediterranean basin**, visit us at: [www.federutility.it](http://www.federutility.it)

### Useful phone numbers

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*Cover:*  
Cisterna called Palombaro Lungo in Piazza Vittorio Veneto in Matera. Photography Studio Acito and Partners Matera