

# Inland Geological Society

March 2010

Newsletter of the Inland Geological Society

Volume 26 No. 3

**This Meeting:**

**Tuesday,  
March 2<sup>nd</sup>**

**Time:**

**Social: 5:15pm  
Dinner: 6:15pm  
Lecture: 7:15pm**

**Location:**

**UC Riverside  
900 University Ave  
Geology Building  
Riverside, CA  
92507**

(Map on Pg.5)

**Coming to  
Dinner?**

**Please RSVP:**  
**By Friday 02/26  
(951) 782-3295  
dlass@  
waterboards.ca.gov**

**In this Issue:**

- March Speaker—Dr. Paul Marinos..... 1-3
- Upcoming Events/IGS Meeting Schedule..... 4
- Current IGS Officers ..... 5
- **LSA MEETING LOCATION MAP** ..... 5

**March Speaker:**

**Dr. Paul Marinos**

**2010 AEG Jahns Distinguished Lecturer**

**Geology of Athens, Greece: A Case Study of Urban Geology for  
Land Use, Construction of Major Engineering Structures, Hazard  
Assessment and Sustainable Development**

Abstract

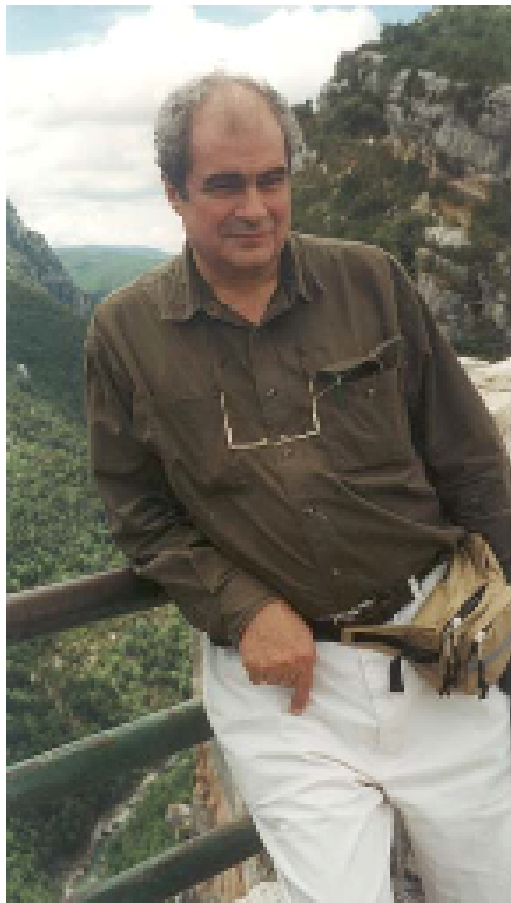
Unlike most capital cities, Athens does not have a history of continuous expansion; it is one characterized by the glory of the golden age of the 5th century BC, followed by decline and near annihilation and then resurgence in the 19th century when it became the capital of independent Greece. This was associated with increasing demands for expansion and the subsequent land use.

A brief review of the way that the ancient Athenians practiced geology in founding their city is presented. Particular attention is given to the building materials and the quarrying of marbles for monuments such as those on the Acropolis and the Parthenon which enjoys the reputation of being the most perfect Doric temple ever built (438BC). Water shortage due to climatic and hydrogeologic conditions imposed the 6th century BC Solonian rules for ground water management. To face groundwater scarcity Athenians constructed impressive aqueducts collecting water from the foothills of adjacent mountains with 20 km long tunnels, developed mainly during roman times (c 150AC), draining the surrounding poor aquifers. The lecture follows the generic outline of the "Cities of the World" series of AEG. The geological model of the city is defined based on the geologic history and evo-

lution. The alpine series of a flysch type slightly metamorphosed formation is the main bed rock of central Athens, named "the Athens schist". This is a highly heterogeneous folded and sheared formation providing weak rock masses. In the surroundings of the city post tectonic neogene, mainly marly, and quaternary deposits are developed. This development is modelled by a neotectonic structure with its activity to be demonstrated by the recent 1999 earthquake. The engineering geological Paul Marinos – 2010 Jahns Distinguished Lecturer and geotechnical data have been stored and processed through a relational database system, developed by the Geotechnical Division of the School of Civil Engineering of the National Technical University of Athens, providing information for the engineering behaviour of ground in all parts of the city.

The geologic constraints include the geologic aspects of natural risks that may be present in the metropolitan area: ground instability where applicable, earthquake induced geologic effects such as ground motion amplification or liquefiable soils and erosion processes with solid transport risk from the adjacent mountains. Erosion risk maps were prepared by processing lithologic, geomorphologic, hydrologic, and hydrogeologic data through GIS. These maps are most useful in the case of land management after wildfires. The ground zoning for seismic hazards was based on the ground categories provided by the Greek Seismic Code, taking into account basic engineering geological characteristics of soils such as lithology, thickness, density and consistency.

Resources such as building material, quarrying and environmental constraints are discussed. The hydrogeologic model is presented. The water supply of greater Athens is secured from a system of dams, some as far as 200km far from the city. A brief geological account is given on the weak foundations and the water tightness of these dams. Management of solid wastes and the choice of appropriate site for landfills is a priority issue at present.



A site specific assessment of ground conditions, using rock mass classification was applied successfully for the metro works of Athens. The method considers the rock mass competence for boring on the basis of criteria related to lithology, tectonic deformation (fracturing-folding- shearing), weathering and rock mass classification rating as well as the geometrical-structural position around the tunnel and ground water criteria. Experiences from this construction and how weak zones in the "Athens' schist" were crossed by the boring machines, either rock shielded or an earth pressure balanced TBMs, are highlighted.

In conclusion the various ways in which the citizens of Athens are made aware of the geological conditions of their city are discussed.

### **Biography:**

Dr Paul Marinos has been named the 2010 Jahns Distinguished Lecturer. The Association of Environmental & Engineering Geologists (AEG) and the Engineering Geology Division of the Geological Society of America (GSA) jointly established the Richard H. Jahns Distinguished Lectureship in 1988 to commemorate Jahns and to promote student awareness of engineering geology through a series of lectures offered at

various locations around the country. Richard H. Jahns (1915 – 1983) was an engineering geologist who had a diverse and distinguished career in academia, consulting and government.

Dr Paul Marinos received a Mining Engineering degree from the School of Mines of the National Technical University of Athens, Greece in 1966, a postgraduate degree in Applied Geology from the University of Grenoble, France, and his Doctorate in Engineering Geology from the same University in 1969. He worked for French and Greek design and construction companies until 1977 and then was elected as Professor at Democritus University in Northern Greece. Since 1988 Dr Marinos has been Professor of Engineering Geology in the School of Civil Engineering in the National Technical University of Athens and has served as head of the Geotechnical Section of the School for several years. From 2001 to 2004 and from 2006 to 2008 he was the Director of a Graduate Course in Tunneling and Underground Construction. He was a visiting Professor in the Geology Department of the University of Grenoble (1987) and of the School of Mines in Paris (2003). Paul Marinos – 2010 Jahns Distinguished Lecturer

Dr Marinos is a member of AEG and GSA and fellow of the Geological Society of London. He is a past President of the International Association of Engineering Geology and the Environment (IAEG), immediate past president of the Geological Society of Greece and honorary member of the International Association of Hydrogeologists (IAH).

Dr Paul Marinos has received several awards, including the Hans Cloos medal of IAEG, and the Andre Dumont medal of the Geological Society of Belgium. He was selected for the presentation of named lectures, including the 6th Glossop Lecture in London (2002), the 19th Rocha Lecture in Lisbon (2002), the 33rd Cross Canada Lectures Tour (2005), and the Rock Mechanics annual Lecture in Madrid (2006).

Dr Marinos and his team conduct research on a variety of applications of geology to engineering, mainly rock mass characterization, weak rock properties and behavior, with special emphasis to tunnel design. His work also covers landslides, dam geology, and engineering in karstic terrain. His other significant interest is the protection of historic monuments and archeological sites. Dr Marinos has authored or co-authored over 300 papers in journals or major conference proceedings. He was a key or invited lecturer in more than 40 conferences or special events. He has given lectures to University Courses or Workshops, among them the Federal Technical University (EPFL) in Lausanne, Switzerland, the Polytechnico of Turin, Italy, the University of Durham, U.K., the University of Coimbra, Portugal, the University of Kobe, Japan, the Black Sea University Romania, the Aristotle University of Thessalonica, Greece, and the Griffiths University, Australia. He has edited proceedings published by international publishers. Dr Marinos is a member of the Editorial Board of a number of prominent journals as “Engineering Geology”, “Bulletin of the International Association of Geology”, “Landslides”, “Environmental Geology”, “Rock Mechanics” and from 2009 “Environmental and Engineering Geosciences”.

### IMPORTANT MEETING NOTICE

Please note that this month's meeting will be an AEG-IGS joint meeting and will be at the University of California, Riverside campus — Geology Building Courtyard. A map of the campus is located at the back of the newsletter.

Dinner: \$25 (\$5 for students)

## Upcoming Meetings/Events

### Rock & Gem Shows—Various locations

Various rock and mineral shows will be throughout So. California. To find one near you, visit [www.rockngem.com/showdates.asp](http://www.rockngem.com/showdates.asp)

### SME—SoCal Section Meeting



Dr. Jeff Gillow, Principal Geochemist of ARCADIS and SME Henry Krumb Lecture Series Speaker, will be giving a talk on "Characterization of Arsenic Geochemistry in the Mojave Mining District of California". The meeting will be on **Tuesday, March 16, 2010** at the Pomona Valley Mining Company in Pomona, CA. For more info., visit [www.smenet.org/](http://www.smenet.org/)



### 2009 GSA Cordilleran Section and Pacific Section AAPG Joint Annual Meeting

The cordilleran section of the GSA and the Pacific Section of the AAPG will be holding their Joint Annual Meeting on **May 27-29, 2010** at the Anaheim Marriott in Anaheim, CA. For more info., visit [www.geosociety.org/](http://www.geosociety.org/)



### South Coast Geological Society

Anthony Severini, President and Owner of Environmental Support Technologies (EST), will be giving a talk on the "Soil Gas Surverys—Do's and Don'ts, Myths and Truths". The meeting will be **Monday, March 1, 2010** at the Doubletree Club Hotel in Santa Ana, CA. For more info., visit [www.southcoastgeo.org](http://www.southcoastgeo.org)

**Congratulations to the UC Riverside Geology Dept. on the completion of the 5 year long renovation of the Geology Building. The Ribbon Cutting was extremely well attended by past graduates and faculty and we had very good attendance by IGS Members.**

## IGS Meeting Schedule

### **April 7, 2010 (Wednesday)**

Meredith Rivin, LSA Associates, Inc.  
TBA

### **May 6, 2010 (Thursday)**

Eldon Gath, Earth Consultants International  
*The Santa Ana Mountains: Indenter-Driven Seismotectonics of the OC*

### **June 2, 2010 (Wednesday)**

Dr. Prem Saint, CSU Fullerton, retired  
*Paleohydrology of the 5000-year old Indus Valley Archeological Sites in the North-West Indian Subcontinent*

### **July 1, 2010 (Thursday)**

Shelby Barker, Kleinfelder  
*An Investigation of the Potential Surficial Recharge in Lucerne Valley Groundwater Basin, Western Mojave Desert, California*

### **August 4, 2010 (Wednesday)**

TBA

## In Memoriam

**On a sad note, we need to record the passing of one of our members, and a long time friend, Richard Garrett. Rich was part of the new Earth Science Program at Cal State Fullerton in the early 1970's, a program that has produced a number of great geologists over the last 40 years. His youngest son, Adam, is one of our student CSUSB members.**

**Our thoughts and condolences go out to his family and friends.**

**Meeting Location:**

*UC, Riverside —  
Geology Building  
(Courtyard)  
900 University Ave.  
Riverside, CA 92521*

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