



International Union of Geological Sciences (IUGS)  
Initiative on Forensic Geology (IFG)

## Forensic Geology Training, Aguascalientes, Mexico 19 to 23 July 2010

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**Summary.** Aguascalientes is one of the 32 states that make up Mexico. It is located in the center of the country about 480 km northwest from Mexico City. It is bordered to the north, northeast and west by Zacatecas and to the southeast and south by Jalisco. The population of Aguascalientes is around 1,100,000. Training in Forensic Geology was requested for 29 experts from the General Direction of Expert Services pertaining to the Attorney General of the State Justice (Procuraduría General de Justicia del Estado, PGJE). The training on Forensic Geology was designed and delivered by Carlos Martín Molina Gallego and his team, who are based in Bogota, Colombia, from 19th May to 23 July 2010.

The training was initiated by Dr Aurelio Núñez Salas, General Director of Expert Services. It was attended by professionals in the fields of medicine, chemistry, biology, law, engineering and psychology, among others.

Within the laboratories of the 'General Direction of Expert Services of Aguascalientes' are specialists who work in the field of forensic medicine, chemistry, forensic genetics, criminalistic, theft, land traffic and engineering. However, students and others based in academia also participated in this training.

The 'General Direction of Expert Services of Aguascalientes' perform two principal roles, which are to attend crime scenes and then to carry out laboratory analysis of materials collected from the crime scenes.

Before the training on Forensic Geology was delivered it was submitted for approval to the General Director of Technical Support Executive Secretariat of the National System of Public Security (Dirección General de Apoyo Técnico del Secretariado Ejecutivo del Sistema Nacional de Seguridad Pública).

### **Objectives**

The objectives of the training on Forensic Geology were as follows:

To demonstrate and draw attention to the applications of geology in policing and law enforcement including applications to the investigations of homicide, robbery, kidnapping, sex crimes, fraud, violation of human rights, terrorism and environmental damage.

#### *Specific Objectives*

1. Applications of forensic geology to criminal investigations.
2. Collection of geological materials from crime scenes and chain of custody

3. Analytical methods in forensic geology
4. Interpretation and presentation of geological results and the judicial system

### **Training structure**

#### *Section I: Forensic Geology*

This focused on the applications of forensic geology to criminal investigations. It included the theoretical concepts and fundamental principles of forensic geology, the history of forensic geology, recent international developments (GIN, FGG, FICFG, 1st and 2nd soil forensics international conferences). The value of physical evidence, the origin, properties and distribution of Earth materials and the physical, chemical and mineralogical characteristics of soils.

#### *Section II: Sampling and Analysis in the Laboratory*

This involved the provision of training on the correct procedures for collecting, packaging and transporting geological samples from a crime scene or object for testing and analysis in the laboratory, including appropriate chain of custody (Figure 1).



Figure. 1. Students in the field collecting soil samples

Training was also provided on the use of conventional laboratory techniques in forensic geology which included; stereo microscopy, preliminary tests, Munsell color chart, polarized light microscope, pH meter, texture, particle density, XRD, XRF, SEM, LD, FTIR and the analysis of soil organic matter (Figure 2).



Figure. 2. Practice in the lab with stereo microscopy, Munsell chart, the geotechnical gauge and table from Powers and Krumbein

### *Section III: Interdisciplinary Research in Forensic Geology*

This part of the training demonstrated the requirements for multi-disciplinary collaboration in forensic geology. It drew attention to forensic investigations undertaken in Colombia involving geologists, chemists, dentists, anthropologists and lawyers.

### *Section IV: Geology and Human Rights*

This highlighted the role that geologists can play in the development of a criminal investigation related to Human Rights.

Training and familiarisation on the use of instruments such as geophysics, remote sensing, aerial photographs, archaeological and geohydrology was also provided.

### *Section V: Expert Reporting and Sustainability*

Workshops were held with data and information from actual criminal cases. This allowed the delegates to learn how to develop expert opinions and how this may be presented at a trial (Figure 3).



Figure. 3. Delegates working on an actual case learning how to prepare expert opinion reports and present evidence in court.

### **Training Elements**

The training consisted of the following elements:

- Presentation of the theoretical and fundamental principles of forensic geology
- Practical sessions, both in the field and laboratory
- 2 Workshops
- 5 Videos

### **Duration**

The training was 40 hour long

### **References**

The following were used throughout the training.

- Murray, R. C. 2004. Evidence from the Earth. Mountain Press Publishing Co. Missoula, Montana
- Pye, K. & Croft, D. (eds) 2004. Forensic Geoscience: Principles, Techniques and Applications. Geological Society, London, Special Publications, 232, 11-20
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## Contacts

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Figure 4. Delegates and Forensic Geologists from Colombia, Aguascalientes, Mexico, 19 to 23 July 2010