



International Union of Geological Sciences (IUGS),

Initiative on Forensic Geology (IFG)

4th Iberoamerican Seminar on Forensic Geosciences

Puerto Vallarta, México, 27 to 29 October 2019



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GEOCIENCIA Y SOCIEDAD

**International Union of Geological Sciences (IUGS),
Initiative on Forensic Geology (IFG)
4th Iberoamerican Seminar on Forensic Geosciences
Puerto Vallarta, México, 27 to 29 October 2019**

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INTRODUCTION

The 4th Iberoamerican Seminar on Forensic Geology, was held in Puerto Vallarta, Mexico, on 28 to 29 October 2019. This took place in association with; Reunion Annual de la Unión Geofísica Mexicana (RAUGM); Universidad Antonio Nariño (Colombia); the Brazilian Federal Police and Forensic Geoscience (Italy). For over ten years, members of the International Union of Geological Science (IUGS), Initiative on Forensic Geology (IFG), have organised all of four events in the Iberoamerican Seminar on Forensic Geology' theme.

The 1st Iberoamerican Seminar on Forensic Geology, was held at the Universidad Nacional de Colombia, Facultad de Ciencias, Department of Geosciences and the Instituto Nacional de Medicina Legal (National Institute of Legal Medicine, the Colombian Forensic Laboratory), in collaboration with the Colombian Federal Police. It took place from 30 March to 3 April 2009, in Bogota, Colombia.

The 2nd Iberoamerican Seminar on Forensic Geology, was held in association with the Brazilian Federal Police (BFP), Geological Society of London, Forensic Geoscience Group. This took place at Nacional Institute of Criminalistics (INC), Brasilia, Brazil, from the 2 to 4 October 2013.

The 3rd Iberoamerican Seminar on Forensic Geology, was held in association with the Program Nacional de Ciencia y Justicia, Universidad Antonio Nariño, Universidad Nacional de Río Cuarto, Conicet, Geoscienze Forense, APCF and the Brazilian Federal Police. This took place at La Plata, Argentina, from 30 November to 1 December 2017.

The 4th Iberoamerican Seminar on Forensic Geology focussed on the applications of geology to assist the police and law enforcement agencies investigate crimes throughout Mexico and Latin America. In these regions, forensic geologists also support the judicial system and assist with criminal and civil investigations. Those that attended included academics, researchers and practitioners in; forensic geology, forensic geoscience, forensic archaeology, forensic taphonomy, police and law enforcement.

The presentations delivered included examples of good practice, new and innovative techniques in forensic geology. These were focussed on the conventional three-fold division of forensic geology, that is; 'The Search', 'The Scene' and 'The Sample'. In particular, this included the use of ground penetrating radar in the search for graves. The processes of human decomposition and preservation were also discussed from a search and crime scene examination perspective. The session also included the delivery of the Geoforensic Search Strategy (GSS), which is an innovative search method, developed in the United Kingdom over a period of approximately 25 years, during the search for a suspected homicide grave. This combined mineral exploration and engineering geology ground investigation methods with conventional police search tactics. Since the 1960's, thousands of people have been reported missing throughout Mexico and Latin America.

Many of the missing were associated with drug cartels, gangs and political regimes that operates in the past. GSS has been applied throughout Latin America to search for missing persons. In addition, numerous operational cases were presented to the delegates where forensic geologists have positively contributed to police and law enforcement investigations around the world. These were also several presentations and considerable discussions on the application of forensic geology to minerals, mining and metals industry and geoenvironmental geoforensics. Whilst mining and minerals has generated vast wealth this also attracts criminal activities. As such, presentations were provided demonstrating how forensic geologists are increasingly supporting investigations of illegal mining, theft, fakery, adulteration, substitution, smuggling and conflict minerals. The role of forensic geology in environmental investigations was also demonstrated following the investigations of the tailing's dam failures in Brazil. This included the Brumadinho and Mariana dam disasters, which occurred in 2019 and 2015, respectively. These caused widespread environmental damage and loss of lives.

Training was provided to the conference delegates, comprising; practitioners, academics, researchers and students, on ground search techniques, crime scene examination and the recovery of geological trace evidence from a car. This took place on the beach adjacent to the Pacific Ocean and within the ground of the hotel. The growing interest and significance of forensic geology in Mexico and Latin America was also demonstrated by the main, invited, keynote presentation being on forensic geology.

Alejandra Baena and Alastair Ruffell are acknowledged for their support in compiling and reviewing this booklet of abstracts. Prof Carlos Martin Molina Gallego has been instrumental in leading the development of forensic geology in Latin America for over 15 years. He is an IUGS-IFG officer for Latin America and has supported IUGS-IFG since its establishment. He is highly regarded and internationally respected as one of the leading forensic geologist in the world. At the 4th Iberoamerican Seminar on Forensic Geology he was presented with an award from the Initiative on Forensic Geology, in recognition of his outstanding international contributions to forensic geology and for his efforts in developing and promoting forensic geology throughout Latin America.



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Soil Forensics: From the Crime Scene Examination to the Laboratory Analysis

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Forensic geologists deal with different type of crimes (against people, environment, cultural heritage, etc.), which can request the use of a wide range of techniques and involve different geological materials. Regardless the type of crime and its narrative, the forensic geologists' approach to the scene of the crime is based on the same fundamental principles that are to study, to recognise, to analyse, and to interpret the geographical, physical and geological features of the environment where the crime had been place. Forensic geologists have to be able to search and to collect suitable information from the environment in order to put them in the specific criminal context.

The judicial site survey and the soil gathering are ones of the most sensitive activities that forensic geologists carry out during the inquiries. During these stages, the probative validity of soil evidence could depend on: (i) the way the sample was gathered and preserved; (ii) all those activities carried out from the seizure and preservation of items, to the collection of soil from them; (iii) undervaluation of the potentiality of soil analyses during the firsts stage of investigation and no knowledge of the requirements of their application. For these reasons, the optimal judicial soil survey and gathering of soil samples are possible when those who perform the collection of evidence are highly specialized in forensic geology techniques, and are perfectly informed of the crime, so that they are aware of what, where and how to collect soil evidence.

The soil analysis must be performed in forensic laboratories. Although a standard reference procedure is not yet established, forensic laboratories specialized in soil analysis implement their procedures based on a logical analytical sequence and the optimization of techniques to get results that are unique as possible and representative of the specific characteristics of the examined samples.

In general, all procedures include preliminary analytical techniques that provide general guidance on the characteristics of the soil sample, and detailed analytical phases that can give more detailed information on the individual particles that compose it. The optimum progression of the analytical techniques depends on a number of factors such as the amount of available sample and the results obtained in the earliest analytical steps. In general, the results of the preliminary examinations can suggest the most appropriate analysis to be performed in the subsequent procedural steps.

Finally, we must bear in mind that soils have a heterogeneous composition (inorganic, organic and anthropogenic fraction) which requires a great number of targeted analysis to obtain information as possible suitable for the comparability of multiple samples, and for the determination of a likely area of origin. For this reason, when studying soil for forensic purposes a multidisciplinary approach is necessary and should be normal practice adopted in forensic laboratories. Any element presents in the soil, and any scientific skill can provide a puzzle piece to soil study, and can be a good marker to determine the level of comparability between soil samples or to identify a likely micro-environment of origin.

From Macro to Micro: Forensic Geoscientists at Crime Scenes

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As expert witnesses, forensic geoscientists can greatly aid and assist judges and juries by explaining technical matters in easily comprehensible terms. Ideally, this may facilitate the settling of disputes that involves scientific and/or technical information. This should be no different than settling other disputes between parties. However, not all parties, juries, lawyers and judges are knowledgeable about the issues before them, particularly those that relate to forensic geoscience and geoscientific methods and principles.

How can a forensic geoscientific expert clearly and effectively explain and present forensic geological data and results? The presentation of geoscientific evidences in a court must consider the non-expert nature of the judges, prosecutors, attorneys, and juries and avoid unduly influencing them. There is an existential risk to courts from the so-called 'CSI effect'. This international effect suggests that television program and their spin-offs, wildly exaggerate and glorify forensic science, affect the public and courtroom trials either by; (a) hinder the prosecution by creating greater expectations about forensic science than can be delivered or (b) influence the defence by exaggerated the capabilities and reliability of the forensic sciences. For this reason, protocols, standard operating procedures and guidelines are fundamental for a crime scene investigations and ground searches for burials.

Although these procedures and best practices are well defined, not all of the stages are always correctly followed and appreciated by practitioners. Moreover, the lack of protocols during investigations in some country is usually evident at the very beginning of an investigation, during the preliminary investigations.

The criminal burial of objects (such as human remains, explosives, weapons, drugs, etc.) may be associated with serious and organised crimes and can lead to challenging searches, sometimes over vast areas. These types of geoforensic searches are common. A difficulty of locating hidden buried objects means that a speculative based approach is not appropriate. A phased search approach is recommended and based on the recently developed Geoforensic Search Strategy (GSS). This includes a preliminary forensic geology investigation with focus the production of a conceptual geological model in collaboration with law enforcement. The GSS also recommends the use of airborne methods, such as remote sensing followed by the deployment of ground based search assets such as the use of geophysics. Generally, the GSS search philosophy progresses from the non-invasive to the invasive and from the macro to the micro scale. This provides the basis for the delivery of a High Assurance Search (HAS) with minimal destruction of any forensic evidence.

What happens AFTER death? Taphonomy of Human Decomposition and the Role of 'Body Farms'

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Taphonomy is the study of the processes that impact an organism from the time of death to the time of recovery. Research in the field of forensic taphonomy aims to understand the physical, chemical, and biological processes of soft and hard tissue decomposition. Decomposition is inherently impacted by the surrounding environment including, the climate, geology and ecology. Until recently, the only facilities that conducted human decomposition research were based in the continental USA and much of their data could not be extrapolated to other parts of the world due to different environmental variables. A greater understanding of the decomposition process is necessary to assist police and forensic investigators search for, locate, recover, and identify victim remains. However, where environmental conditions vary, accurate advice may not be possible.

This presentation will contrast the opening of two taphonomy facilities in distinctly different environments, namely Australia and Canada, and highlight the challenges of each. One of the unknown concerns at these

outdoor laboratories is the potential for environmental contamination to soil, groundwater and air. Ongoing research at both taphonomy facilities intends to assess these concerns and provide guidelines for establishing future sites on a global scale. The presentation will provide an overview of the need for these facilities elsewhere in the world, the research and training being conducted, as well as examples of how they benefit the scientific and law enforcement community.

Global Advancements in Forensic Geology: Crime Scene Assessment, Examination and Sampling; Geological Evidence Recovery and Analysis; and Ground Searches for Graves and Buried Targets

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Although the origins and applications of geology to police and law enforcement criminal investigations has been documented since the middle part of the 19th Century, during the past few decades there have been significant advances in forensic geology (known also as 'forensic geoscience' or 'geoforensics'). The objective of this presentation is to provide an overview of these recent developments.

Crime scene examination is the application of geological knowledge at crime scenes. A forensic geologist may be required to assist law enforcement at a crime scene to; collect geological samples and provide interpretations of the soil, sediment, rocks, and man-made materials.

Geological trace evidence involves the collection, analysis, interpretation, presentation and explanation of geological evidence. This evidence could become transferred onto the body, person or the clothing of a victim or offender, or onto vehicles, or other objects from and to a crime scene to help with crime reconstruction. This may also be admissible as evidence in a court to support a prosecution or defence.

Ground search for burials are designed and implemented to locate homicide graves or items buried as part of a criminal or terrorist act. As such, searches may be protective or detective and take place in urban, rural or remote locations, on land or in water. The geoforensic search strategy (GSS), which developed over a period of 25 years provides a framework for a high assurance strategy. This is based on law enforcement search methods and an understanding of the ground and target conditions to produce a preliminary conceptual geological model. Upon which, the diggability of the ground, detectability of the target can be evaluated. This then enables the most suitable array of search assets (e.g. remote sensing, drone, geophysics, geochemistry, victim detector dogs and auguring) to be chosen. The GSS provides a

proportionate, pragmatic and cost-effective method for a buried target to be detected and located, or prove (so far as is reasonable practicable) that is not present. The GSS is a blended geological and law enforcement strategies that requires effective collaboration and communication with between the forensic geologist law enforcement officer.

Crime in the minerals and mining industry occurs world-wide, in particular throughout Mexico and South America. This involves criminal and illegal mining, conflict minerals, theft of refinery and smelter products such as mineral concentrates, fraudulent activities including sample switching or adulteration to falsify assays (also known as 'saltation'), cross border minerals smuggling and minerals fakery. These are usually controlled by illegal armed gangs, cartels and organised syndicates. Forensic geologists in collaboration with law enforcement are developing methods to deter or detect these crimes. This includes the adaptation of international guidance, elemental and mineralogical profiling, now used by some companies and governments to track and verify precious metal trading such as, gold and platinum group metals. Other techniques may include; field portable x-ray fluorescence, x-ray diffraction, conventional microscopy, automated scanning electron microscopy, the use of microtaggants and an auditable chain-of-custody.

This presentation will also provide an overview on the ongoing professionalisation of forensic geology, the establishment and progress of formal international working groups, such as the International Union of Geological Sciences (IUGS), Initiative on Forensic Geology (IFG). The need for regulation, accreditation, training and continuation of professional development within the forensic geology professional is also highlighted. Operational case examples are provided throughout with emphasis on Mexico and South America.

Geoforensic Methods for Countering Fraud and Theft in the Minerals, Metals and Mining Industry

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Modern civilisation could not exist as we know it without mineral resources, which underpin most aspects of our lives. Mining and the minerals produced has generated vast wealth around the world. We have been reliant on mineral resources for several thousands of years. However, mining and the minerals and metals produced has also underpinned criminal activities. These involve illegal armed gangs, cartels and organised syndicates that are also associated with other crimes. The minerals specific crimes may include; criminal and illegal mining, conflict minerals, fakery, scams, theft, substitution and adulteration. The objective of this paper is to provide an overview and appreciation of these types of crimes throughout the world. The

methods available to deter, detect and mitigate these risks are also presented. These include for example; the use of international codes and best practise guidance aimed at discouraging crimes and bringing transparency into the mining industry and the management of the minerals supply chain using for example; chain-of-custody, sample management, tracking, tagging, elemental and mineral profiling and the use of covert techniques combined with conventional law enforcement surveillance methods and tactics.

The Geoforensic Search Strategy (GSS): An Integrated Geological a Police Search Method to Locate Burials for Homicide Graves and Contraband Associated with Counter Terrorism and Serious and Organised Crime

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The Geoforensic Search Strategy (GSS) developed over a period of 25 years during the search for a homicide grave in remote location in England. GSS brought together fundamental mineral exploration and engineering geology ground investigation methods combined with police search strategies and tactics resulting in a blended approach. From a geological perspective the GSS was based on the production of a Conceptual Geological Model (CGM), and the collation and evaluation of exiting geological data and information, supplemented by a reconnaissance walk over inspection of the search area. This incorporated an understanding of the geomorphology, hydrogeology and enabled the logistical and practicable aspects of the search to be determined. The CGM provided a preliminary assessment of the diggability of the ground, detectability of the target and the choice of search assets likely to locate the grave or buried item, such as forensic geophysics or remote sensing. From a police and law enforcement perspective, the GSS became further enhanced following the considerations of; behavioural profiling, victimology assessments, the deployment of detector dogs and strategic planning. GSS provides a High Assurance Search (HAS) for an offensive (detective) or protective (defensive) search to locate or verify the absence of a desired buried target. The objective of this paper is to provide an overview of the history of search and explain the development and evolution of GSS illustrated by case operational case examples. Furthermore, the results of experimental and future potential search methods are provided, such as the detection of leachate and volatile organic compounds, which may potentially be associated with human decomposition to assist with open areas searches.

Experimental Research on Techniques to Determine the Origins of Soil Samples with Palynology

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Forensic palynology is a branch of forensic science and plays an important role in criminal cases. More attention has been paid to pollen analysis in recent years. Three characteristics are the theoretical basis for origins research. Firstly, pollen is usually numerous with small size and different types; secondly, pollen has spatial indication, forming the special pollen assemblage in the local place; lastly, pollen has time indication that the assemblage and content of pollen in soil, air and other media are positively correlated with the flowering period of plants. Therefore, pollen of different species can be identified according to its shape, size, surface ornamentation, polarity, germination organs and other appearance characteristics. Different geographical locations, natural environments and seasons can be inferred based on pollen assemblage and content.

Soil samples including 5 provinces from temperate region and warm temperate zone-subtropical region in China were analysed. Types of soil samples include forest areas, farmland areas, grass areas and desert areas. Experiments were conducted to analyse pollen in soil samples, which provided scientific data to establish an association between pollen and soil areas. The results showed different areas and different types of soil samples have different information about pollen assemblage and content which could be used to infer the origin of the soil samples.

The typical palynological assemblages summarized are as follows. The first category is samples from temperate regions which have four different types of soil samples. 1) The assemblages in forest soil samples are typically characterized by relatively high abundance of Pinaceae, more types of broad-leaf trees which are Betulaceae and Juglandaceae, Artemisia and Chenopodiaceae herbaceous types, Aleuritopteris Grevilleoides as mainly Fern. 2) There are few palynological types in agricultural soil samples which have different palynological assemblage characteristics in different areas, but over all most of them are Chenopodiaceae and Asteraceae. 3) The obvious characteristics in grassland soil samples are the pollen content with higher Chenopodiaceae, Artemisia and Asteraceae. There are also typical grassland constituents such as Ranunculaceae, Caryophyllaceae, Poaceae and so on. 4) The palynological assemblage in desert soil samples is usually characterized by the absolute advantage of pollen content of a typical desert

plant, for example, the high proportion of Ephedra, Chenopodiaceae and Tamaricaceae. The other category, the palynology assemblage in warm temperate zone and subtropical zone is obviously different from that in temperate zone. In the palynology assemblage in forest soil samples and farmland soil samples, Pinaceae, Myrtaceae, and Taxodiaceae are absolutely dominant. This research obtained some preliminary regional conclusions, but considering China is a vast country, the experiments on the source of palynology in soil samples need more systematic and comprehensive research.

Geophysical and Remote Sensing Techniques Evaluation as Assistants in Forensic Archeological Investigations

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In this work, we present obtained results in a test field, in which burials are simulated at different depths and with different characteristics, and in which, periodically and systematically, prospective surveys of capacitive electrical resistivity tomography (TREC), conductivity surveys (CMD) and Ground Penetration Radar (GPR) were conducted, during a nine-month period.

It is sought, through the obtained results, to analyze and evaluate the use of different geophysical methods and propose a functional methodology that optimizes obtaining information, such as the geometry and physical properties of buried objects and structures, applied to the forensic archeology. Geophysical methods are an important tool in forensic archeology studies, since, being non-invasive methods, they help to characterize the interest area, reducing the loss of material information and optimizing the search and excavation time by providing physical evidence.

Geophysical Characterization of a Mass Grave in El Vergel Funeral Park, Morelia Michoacán, Mexico

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We present a geophysical characterization of a mass grave located in El Vergel Funeral Park, in the southern part of the City of Morelia Michoacán, Mexico. The study includes the combination of Electric Resistivity Tomography (ETR) methodologies in 2D and 3D modalities and Ground Penetration Radar (GPR) with the objective of generating high-resolution images with Wenner-Schlumberger electrode arrays, parallel equatorial and Minimum coupling and check the functionality of these techniques in a real and controlled forensic context.

This study emerges as a response to the need to complement the techniques of searching clandestine graves and recovering missing persons, a task that has been left mainly by groups of search engines and personnel that employ invasive techniques such as the T-rod. This is why it is important to implement tools that complement the search techniques. Shallow exploration geophysics and in particular the 3D ETR technique is a rarely used tool within the forensic field in Mexico.

Towards the Application of Artificial Intelligence to Clandestine Graves Detection

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In many Latin American countries, there is a significant number of missing people and some of them have been victims of enforced disappearance. Currently, in Colombia, there are about 75,000 missing people. It is estimated that approximately 21,000 of these are enforced disappearance many of them due to conflict with illegal armed groups. This problem is also present in 89 countries around the world. Several countries have reported findings of a variety of both individual and mass burials, at different depths and depositional environments. The search for burial sites in Colombia, such as mass and individual graves, in the vast majority of cases, is still undertaken in the traditional methods, which corresponds to take trial excavations

and using a steel soil probe in places where eyewitnesses indicate that there could be a grave. Therefore, criminal investigations often have failed and the searching commission teams had no positive findings in more than 90%, in sites where probably there is a human remains or relevant evidence. That situation does not contribute to the forgiveness of the Colombian community.

The geophysics high-resolution methods are proposed to be included in the searching procedures to find missing people in Colombia. For instance, GPR and Electric Resistivity Tomography allow exploring broad and deep areas through the analysis of the abrupt changes of electric and magnetic properties. However, the data and profiles interpretation has to be made by an expert, considering the complexity of the subsoil composition. Unfortunately, forensic geophysics experts are very scarce. We have proposed the use of novel algorithms for automatic object detection, which allows the data and profile from geophysics methods to be classified to build a virtual learning machine that permits automatic grave detection. The machine may contribute to the works of the searching commission team to find missing people. Likewise, it promotes the appropriate procedures to apply the high-resolution methods.

Estimation of Asphalt Pavement Volume Using Ground Penetrating Radar

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Due to the complexity, the study of the quantities executed on a paved road or street requires investigation of the thickness of the structural layers of the pavement. It is common to make openings in the pavement to directly measure the extracts, which is destructive and costly to recompose, generating vulnerabilities and still little representative of the whole.

To minimize costs and damage without compromising information gathering, it is suggested to use Ground Penetrating Radar (GPR) associated with prospecting for specimens with extraction probe and thus the quantitative performed against project specifications.

GPR is a method that uses high frequency electromagnetic waves (EM) and excels in shallow investigations due to its high resolution and fast data acquisition. The method consists in the emission of EM wave packets underground made by the transmitting bipolar antenna surface. Signal propagation will depend on electrical

conductivity, dielectric permittivity and subsoil magnetic permeability. The propagation of the EM signal is also subject to the frequency of the transmitted signal and the reflections and diffraction generated by the change in the properties of the materials therein. Thus, reflected and / or diffracted waves are captured by the receiving antenna portion, digitized and recorded in a preprocessing unit.

In the cases dealt with here, we used two devices: OperaDUO from the company IDS (dual frequency antenna, 700 and 250 MHz) and SIR-3000 from the company GSSI coupled to a mini-car with 1600MHz antenna.

After processing, we interpreted GPR data qualitatively and semi-quantitatively. The sections presented reflectors with variations of medium to strong amplitude revealing structures related to the regularization / deposition of materials in the execution of the work. In most of the profiles, the irregular deposition of the materials or the absence of some of them was clearly evidenced.

The use of GPR was positive, because the large amount of information allowed to reconstruct the surfaces and calculate volumes, while other methods only collect punctual samples and extrapolate, besides being a non-destructive examination and a method of rapid execution - in general. In some cases, we have examined a few thousand meters of pavement, including all displacements with both GPRs, in just a few hours.

Analysis of the Results of Geophysical Monitoring to Simulated Graves, Using Georadar, Electrical Tomography and Environmental Variables

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The problem of forced disappearance that Colombia has lived as a result of the armed, political and social conflict in the last 60 years, makes it imperative to find at least 98000 people, of whom their loved ones have no news, but they do have the right to the truth, justice , memory and repair.

Hence the importance of going to geophysics to try more quickly, accurately and economically, to search with methods non-invasive of clandestine graves where the bodies are presumed inhumation; that is why

in Colombia there are two forensic laboratories of geological and environmental contrast, where with human skeletal remains and pigs, 8 graves were simulated in 2013 and 4 in 2014.

This presentation will analyze the results obtained during the monitoring carried out in these experimental places during the year 2018, where Ground Penetration Radar (GPR) was used with antennas of 250 and 500 MHz, and Electrical Resistivity Tomography (ERT) with Wenner's tetrahedral configuration, as well as its relationship with temperature and rainfall.

COURSE ON FORENSIC GEOCIENCES

The 4th Iberoamerican Seminar on Forensic Geology takes place in Puerto Vallarta, Mexico, 27 October to 1 November 2019, in association with the Annual Meeting of Mexican Geophysics, and supported and endorsed by the IUGS Initiative on Forensic Geology, Universidad Autónoma de México, Universidad Antonio Nariño of Colombia and the Polícia Federal de Brazil.

The applications of geology and the associated geosciences are fundamental to the developing and diversifying field of forensic geology throughout Latin America, and globally. Forensic Geology can; play an important contributory role to support the investigation of crime by the police and law enforcement investigators; support the judicial system; assist with criminal and civil investigations; and bring benefits to industry and society.

The aim of this event is to present, discuss, debate and disseminate information and cases on forensic geology with a strong emphasis on Latin America, and to consider new and innovative practices in forensic geology taking place throughout the world. Specialists will be invited from throughout Latin America alongside internationally recognized forensics geologists and scientists from academia, those that are operationally based and law enforcement.

The subject matters likely to be covered include, but are not necessarily limited to: ground searches for burials related to homicide, counter terrorism and serious and organized crime, crime scene examination, soil collection and analysis, forensic geophysics, geomorphology, minerals and mining fraud, remote sensing, environmental geoforensics, the applications of GIS and databases in forensic geology, civil and natural disasters. Abstracts from related fields are also invited, including for example; mycology, taphonomy, entomology, micro paleontology, palynology and archaeology, anthropology.

Special Invitation to the Next Meeting

the 5th Iberoamerican Seminar on Forensic Geosciences

Colombia 2021

We hope see you there!