

Explore Geo Costa Rica

GEOLOGICAL TEAM BUILDING



Pre Stack Solution AS, Norway and its Costa Rica' department in collaboration with Totobe Resort, Costa Rica invite for Geological Team Building Trips: Geo Thermal Costa Rica



Costa Rica Geology and Volcanoes

Costa Rica is well-known around the world for its absence of army, high level of biodiversity and being one of the happiest countries in the world. Besides, Costa Rica is the limit of a convergent plate border between the Cocos and Caribbean Plates, causing an active volcanic arc with active tectonics associated and many other geological features. In other words, Costa Rica is a "playground" for geologists and explorers interested in solving the "geological puzzle".



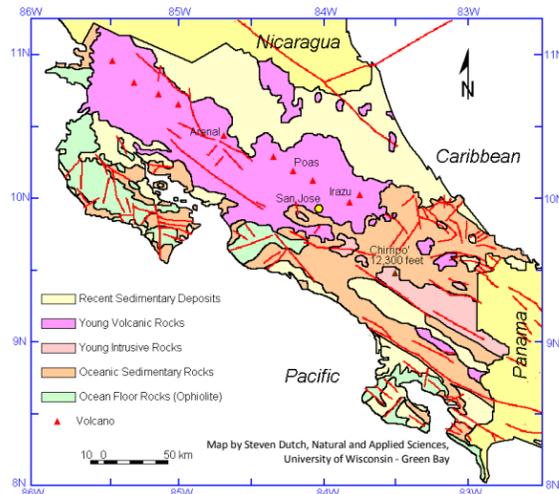
Andres Ulloa, Geophysicist, Chief of PSS-Geo Costa Rica department, Geo Costa Rica Trip Instructor, going down to crater of the volcano. During his PhD work he visited almost all known caves in Costa Rica, discovered and studied new minerals which are added to the world minerals classification today. Photo: Ronald Ramirez Trescott.

The oldest rocks here are around 180 million years old and are chunks of uplifted ocean floor called ophiolites. Various marine sedimentary rocks overlie the ophiolites and are in turn covered by younger volcanic rocks and recent deposits. The Sierra de Talamanca exposes the eroded roots of a former volcanic chain. Major volcanism ceased in southern Costa Rica around 8 million years ago and the intrusive rocks are mostly younger than 5 million years. The process of subduction would have resulted in metamorphism but there are almost no metamorphic rocks at the surface in Costa Rica. They are probably still buried deep in the crust.

Many important deposits of hydrocarbons throughout the world are associated with karstified formations and exhibit highly varying properties (e.g., porosity, permeability, flow mechanisms). Hence, an interesting application is to use the hypogenic speleogenesis models in which H₂S dissolution mechanisms are involved, as well as analogous models for understanding carbonate reservoirs.

Irazú volcano and its caves in Costa Rica

Irazú Volcano is the highest volcano in Costa Rica (altitude 3432 m asl), part of an andesitic shield located in the southeast of the Central Volcanic Range. It has been hiding the most amazing volcanic caves discovered in the region. The NW sector of the Irazú volcano is the least explored and studied due to factors such as difficult access and hazardous, unstable terrain. These conditions allowed the caves to remain hidden for many years. In 2011, together with the local caving group (Grupo Espeleológico Anthros), we organized the first speleological exploration that led to one of the greatest discoveries of caves in Costa Rica. Influenced by the active volcano, the caves at the Irazú volcano present the highest mineral diversity in the region, and probably rank amongst the highest in the world. The first results about the mineralogy of Cueva los Minerales were published by Andres Ulloa et al. (2013), in which different cave minerals (speleothems) and mineralogy relating to sulphates and one native element (Sulphur) was reported. Twenty one different minerals were reported relating to sulphates and one native element (Sulphur). Five of these were reported for the first time as cave minerals in the world. This was a very significant finding that makes these caves unique in the world of vulcanospeleology. More detailed mineral analyses are presently being carried out in Spain in collaboration with the University of Valladolid, the University of Almeria and the Unidad Asociada Uva-CSIC- al centro de Astrobiología CSIC-INTA "ERICA".



Irazú volcano and caves map



perspectives in mineralogical and geomicrobiological studies in volcanic caves

Mineralogy in volcanic caves and geomicrobiology are relatively new, yet extremely promising research areas. In the last decade, there have been an increasing number of geomicrobiological studies that showed the role of microorganisms on speleothem formation, speleogenesis and interaction between microbes and minerals. The science of geomicrobiology recognized that microorganisms

are promoters of redox reactions that can influence geological formation (Ehrlich, 1996). In caves or other dark environments, such as deep-sea hydrothermal vents, energy can be produced efficiently by chemolithoautotrophy (Engel, 2007). One interesting aspect of vulcanospeleology is the possibility to extend the field of study to other planets and moons, particularly our moon, Mars, Venus, and Jupiter's moon Io (Léveillé & Datta, 2010). Most of the caves on Earth are dissolution caves. But in the solar system most of them are probably volcanic caves; an assumption made based on the predominance of basalts on planets and moons and the lack of solvents (e.g. liquid water). If life exists on other planetary bodies of the solar system, it will most likely be found in subterranean environments due to planetary challenging surface conditions (Boston et al. 1992). For this reason, caves serve as terrestrial analogs for extraterrestrial subterranean microbial ecosystems (Lavoie et al., 2010).

Rincon de la Vieja Volcano



Andrés sampling a geysermite for mineral analyses. Use of mask is necessary in some parts of the cave because of high concentration of volcanic gases. Photo: Scott Trescott



Cave explorations, Venado

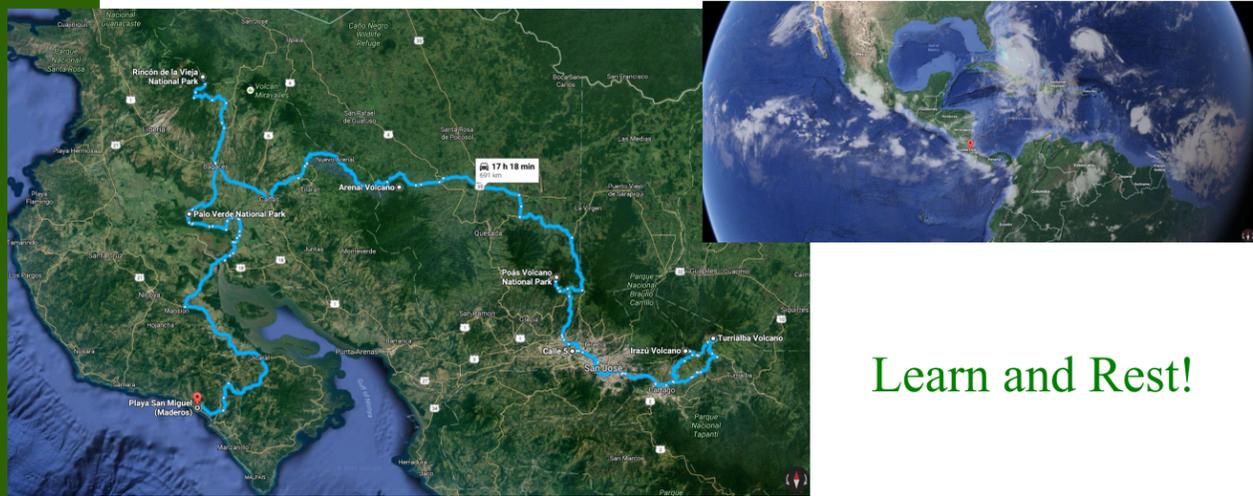


Volcano Poas



Gringo Loco

Best Routs to fill the Spirit!



Learn and Rest!

Volcano Arenal



One of the routes:

- Arrival in San Jose, Hotel.

1st day – Museum Pre- Columbian Gold. Volcano Irazu, Cave, Volcano Turrialba. Back to San Jose. Ice Breaker dinner.

The Irazu Volcano is located in the Central Valley near the capital city of San Jose. Irazu has two main craters, one containing a green-tinted lake. It's accessible from San Jose by a road that leads straight up to the crater's summit. The volcano's summit is usually cloud-covered, and it is the tallest volcano in Costa Rica.

The Turrialba Volcano, also near San Jose, is more difficult to access. The hike to the top, where motorized vehicles are not permitted, can take between 1 and 3 hours. The surrounding park sees less tourists than other parks in the country and the trails tend to be more rustic and challenging. However, the incredible views throughout the park are well worth the effort!

2nd day –Volcano Poas. Volcano Arenal. Hotel.

Poás Volcano is one of the most popular destinations in the Central Valley. It is one of the world's largest active volcanoes, with sulfuric emissions, active fumaroles, and two crater lakes. The northern lake, called the Laguna Caliente ("hot lagoon") is one of the world's most acidic lakes, in direct contrast to Lake Botos, the southern, which is cold, clear, and surrounded by the beauty of the cloud forest.

Without a doubt, however, the most popular of Costa Rica's volcanic giants is Arenal. Located in the northern part of the country, it towers over the surrounding fertile landscape, surrounded by plantations producing the best coffee in the world. The symmetrical cone-shaped Arenal Volcano erupted in the past an average of 41 times a day. While it currently slumbers, Arenal and its surrounding area are a great base for adventure touring.

3rd day – Rincón de la Vieja Volcano. Hotel.

The largest and arguably most temperamental volcano in the Guanacaste region is the Rincón de la Vieja Volcano. Her temper trickles into the surrounding national park in a series of volcanic hot springs, waterfalls, and bubbling mud pools. Legend has it that a wise old medicine woman lived on the slopes of the mighty volcano until her death. Her presence was so strong in the region that the volcano now bears her name which is literally translated to "the corner of the old lady."

4th day – Palo Verde National Park. Hotel

Located along the banks of the Tempisque River, the Palo Verde National Park is one of the best places in Costa Rica to view native wildlife. In particular, the national park is top notch place for bird watching as the lowlands of the river make ideal wetlands for a variety of aquatic birds. This remote sanctuary spans more than 45,492 acres of land that includes lagoons, mangroves, limestone, grassland and forests. Additionally, Palo Verde protects one of the last remaining deciduous dry forests of the Neotropics.

5th day – Transfer to Playa San Miguel, Totobe Resort

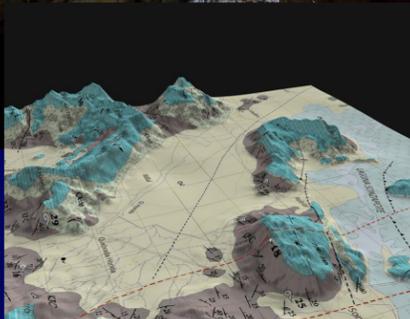
6th day – Beach geological trip. Tortillas camp visit. Totobe

Resort

7th day – Canoeing in Mangroves, half board surfing, riding. Totobe Resort

8th day – Transfer to San Jose. Hotel

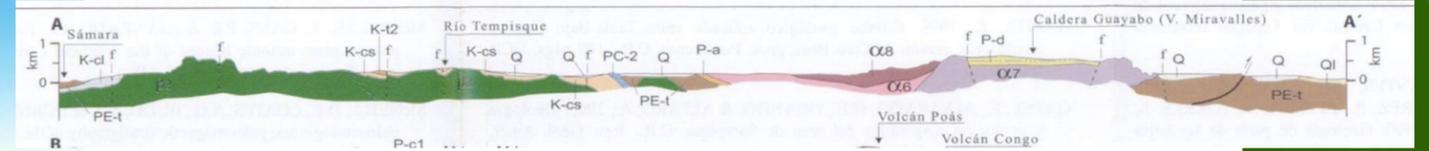
- Departure to Oslo



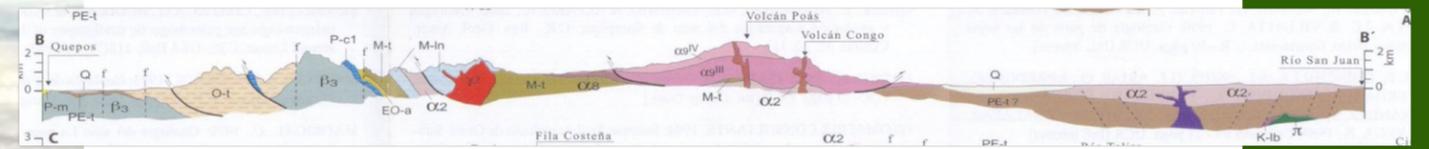
Karst & Birds, Palo Verde



North Costa Rica



Central Costa Rica



At Totobe Resort



Echinoideas and green sea turtle





Duration: approx. 12 days
Transfer: Oslo - San Jose
San Jose - Totobe Resort, San Miguel: Geo Trip
San Miguel - San Jose
San Jose - Oslo

Our guides are scientists.

Accommodation: hotels, resorts
Meal: restaurants
Accommodation and meals will be prepared for you

To order your trip please contact vita@pss-geo.com
Minimum 15 people
Time: June and August



Gringo Loco