

7th International Symposium On Vulcanospeleology

Santa Cruz de La Palma, Canary Islands
November 1994

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1996

Cover:

Galería de los Ingleses, the deepest branch of Cueva del Viento, Tenerife, Canary Islands (Photograph: J.S. Socorro)

Edición realizada con la colaboración de:

Federación Española de Espeleología

Federación Canaria de Espeleología.

Amelia Romero, editora

Avda. de los Tilos, 21

Sant Cugat del Vallés (Barcelona)

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Diseño de la portada: Pedro Oromí Masoliver

Depósito Legal: B-27.846-1996

ISBN: 84-8255-020-9

Printed in Spain

Impreso en FORIMPRES, S.A.

Prat de la Riba, 57

08849 Sant Climent de Llobregat (Barcelona)

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REPORT ON THE 7TH SYMPOSIUM ON VULCANOSPELEOLOGY

William R. Halliday

National Speleological Society representative

The multidisciplinary 7th International Symposium on Vulcanospeleology convened on November 4, 1994 in Santa Cruz de La Palma, Canary Islands, Spain. Attendance was about 40, plus numerous spouses. Countries represented were Austria, England, France, Hungary, Italy, Japan, Netherlands, Norway, Portugal, Spain, Switzerland, Russia, and the United States. Organizing institutions were Grupo de Espeleología Junonia¹, Federación Canaria de Espeleología, and the Universidad de La Laguna. Scientific chairman and president was Pedro Oromí, Depto. de Biología Animal, Universidad de La Laguna. Vicepresidents were Manuel Rosales Martín, president of the Federación Canaria de Espeleología, and Conny Spelbrink of Grupo Junonia. The latter was Symposium Organizer. In addition to creating a well-run symposium, she was notably effective in obtaining complimentary receptions enjoyed almost every night of the meeting and field excursions.

Major earth science papers were presented by Yuri Slezin and I. Tsyurupa on *Lava caves in Kamchatka*, Ronald Greeley on *Erosion by lava tubes*, Takashi Ohsako on *Relation between the volcanic activity of the Mt. Hachijo-Fuji and volcanic caves on Hachijo-jima Island*, Paulo A.V. Borges on *Conservation status of Azorean lava tubes and pits*, Ana Luisa Medina and J.M. González on *Aspectos generales sobre las cavidades volcánicas de Monte Suswa y Tsavo (Kenya)*, Pedro Oromí (with the late Juan J. Hernández Pacheco) on *New discoveries of lava tubes related to Cueva del Viento in Icod de los Vinos (Tenerife)*, István Eszterhás on *Natur- und künstersprüingliche Risse in den vulkanischen Gesteine*, Paolo Forti et al. on *The peculiar mineralogic site of the Alum Cave, Vulcano, Sicily*, Manuel Rosales on *La espeleología en Canarias*, and this reporter on *Recent vulcanospeleological progress in Hawaii*.

Poster sessions included *The MCI Cave on Mt. Etna and its peculiar metastable speleothems*, by Paolo Forti et al., *Using remotely-sensed images to study the vulcanology of the Canary Islands*, by Allison Reid, *Cueva Petrólea, a newly discovered branch of Cueva del Viento system*, by Nieves Zurita et al., *La Galería Hernández Pacheco, un nuevo descubrimiento en el complejo de la Cueva del Viento*, by co-workers of the late Hernández Pacheco, and *Cueva del Bucio lava tube (Tenerife, Canary Islands)* by Lucas Sala et al. A notable illuminated 27-pannel exhibit of the Museo de Ciencias Naturales of Tenerife on lava tube caves also was on hand.

Of special interest was the first oral presentation on Russian volcanic caves given outside the former U.S.S.R. Slezin is undertaking a systematic study of the caves of Kamchatka. He described several caves and systems, including a fragmented labyrinth and chain of collapsed sinks with homeothermic phenomena. The town of Prychiv has been plagued with subsidences of houses and its airport's runway into lava tube caves almost filled with sand or artificial fills. In 1975-76 he and co-workers observed the development of lava tube caves through outflow of lava from inflated lava steps. Also they have mapped and studied caves in the 1739 flows. Their sampling of molten lava at depths of up to 0.5 m has shown up to 34 volumes per cent of H₂.

Numerous important discoveries in and around Tenerife's Cueva del Viento were described in various papers and posters. Until recently, the combined length of the two main caves (separated only artificially, by someone's excavation of a cellar) was 14.87 km. Cueva del sobrado was connected to the main cave about 5 years ago. Not including Cueva de Felipe Reventón or other isolated segments of the overall system, the length now appears to total over 20 km. A figure of 25 km was mentioned, but it was not clear what was included in this. Some Spanish speleologists apparently do not adhere to IUS standards for determining cave lengths; for example, Lanzarote's Cueva de los Verdes is listed at 6.1 km but this

¹ Junonia was the old Roman name for the island of La Palma

is the length of all the caves in that system, not Cueva de los Verdes alone. In any event, three major branches were found at different levels when an artificially filled pit entrance was excavated in 1994. The lowest - Galería de Hernández Pacheco or Cueva Intuición - extends 1.4 km as a down-slope continuation of Cueva del Sobrado. The others extend up-slope, parallel to the main Sobrado Gallery. Local speleologists have proposed that about ¼ km of the Sobrado section become to show cave.

I reported new world records for mapped length and depth of a lava tube cave — Kazumura Cave, Kilauea volcano, Hawaii. It now is 46.7 km long, with a vertical extent of about 850 m. Also I reported a new depth record for a volcanic pit — Na One Pit, Hualalai volcano, Hawaii, mapped to minus 267 m, and also rediscovery, mapping, and study of the Postal Rift and other caves of Kilauea caldera, Hawaii. I also discuss a new type of volcanic cavity associated with ultramafic xenolith nodule beds on Hualalai volcano, and the role of Hawaii Speleological Survey in thermal erosion studies in Hawaii Volcanoes National Park.

Ron Greeley reviewed geological evidence of thermal and mechanical erosion by lava, best seen to date in caves of Mt. St. Helens, Washington. Regarding the new world data base on lava tube caves at Arizona State University, his physical data files now have information on about 1,000 individual lava tube caves in more than 300 systems in 23 countries. Computerization of the data is proceeding. 616 lava tube caves in more than 200 systems of 18 countries, totalling about 250 km of passages are digitized, and some data and selected maps can be accessed already.

Paolo Forti noted that volcanic caves are the most promising for discovery of new cave minerals, and reported of recent identifications. Takashi Ohsako reported on unusual, glaze-lined caves along a crater rim in a pyroclastic stratum, in addition to more usual types of volcanic caves of such environments.

Paulo Borges reported a well-conceived plan to protect the 100-odd caves of Pico Island as well as others in the Azores. The basic problems are (1) deforestation, (2) poor pasture management, (3) «cattle graveyard effect», (4) tourism impact, (5) water management, and (6) industrial and domestic waste. Their solutions include (1) maintaining a permanent record of the caves and their contents and features, (2) restriction of visitation in selected cases, (3) helping owners building protective rock walls around entrances, (4) educating owners, and (5) long-term efforts to create nature reserves.

Eszterhás described several types of caves in volcanic rock in Hungary, produced by a variety of mechanisms. One is subsidence into underlying solution cavities. Discussion of this broadly favored the idea that this was a surface manifestation of a karstic phenomenon and should not be considered volcanic nor pseudokarstic. Others appear to be tectonic networks and fissure caves. One large rounded cavity opened by a quarry is unexplained. In 1994 Eszterhás published a 72-page paperback book (in Hungarian) entitled *Vulkánoszepeológia*.

In other disciplines, Frank Howarth presented a scholarly *Comparison of the ecology and evolution of cave-adapted faunas in volcanic and karstic caves*. Drawing on data mostly from tropical and subtropical caves, he concluded that, despite their obvious differences in age, morphology and geology, specialized animals living in both types of caves display remarkably similar adaptations. However, troglobites tend to be more plentiful in very old karstic caves, and in lava tube caves 100 to 1000 years old before a soil barrier obstructs pathways of some food sources. He postulates that most of the world's cave species are unknown to science.

Rafael García Becerra reported finding 12 troglobites in a cave of La Palma, as well as 8 trogloniles and 7 troglonenes. Ana Luisa Medina noted that the species they observed in caves of Kenya were not very adapted. Oromí and co-workers found only a small correlation between CO₂ levels and density and richness of troglobites in Cueva del Viento. Oromí also reported finding numerous skeletons of a recently extinct giant rat in a newly opened passage of Cueva del Viento. It also has been found in other Tenerife caves at about the same altitude. Rafael Rodríguez Santana noted incipient modification of somatic characteristics in one Canarian cavernicolous isopod. Lucas Sala and co-workers reported on an abundance of a moth in Cueva de Felipe Reventón, and on a rich troglobitic fauna in a small, almost virgin cave high in a pine forest on Tenerife.

Felipe J. Pais reported on the use of rockshelters and entrance zones of lava tube caverns as habitation sites of aboriginal inhabitants of La Palma. Some cave interments occurred in deeper sections of lava tube caves.

Field excursions were well chosen and well organized. They included Cueva de Todoque, Cueva

del Perdido, Cuevas de Mazo, Cueva del Porís, Hoyo de la Sima, and Búcaro de San Martín on La Palma, Cueva de Don Justo and Cueva del Acanilado on El Hierro, and Cueva del Viento and Cueva de Felipe Reventón on Tenerife. Additional informal excursions included the Peak of El Teide on Tenerife, the remarkable Cueva de la Fajanita on La Palma, and other volcanic features of at least four islands.

Cueva de Todoque is an easy 500 m lava tube cave with sizeable rooms and well preserved lava speleothems. Cueva del Perdido is a small labyrinth with attractive smooth passage walls. Cueva del Porís has about 2 km of passages, much of it requiring crawling. One of the Mazo caves is steeply inclined and spacious; its origin is unclear. The other two are fairly small lava tube caves with considerable variation in passage size. Hoyo de la Sima is the deepest pit on La Palma, 75 m deep and up to 30 m in diameter. Búcaro de San Martín is another vertical shaft, 57 m deep, with two upward leads from an inner chamber. Its first drop is 30 m.

On El Hierro, Cueva de Don Justo is a 6.3-km three-dimensional labyrinth of large and small passages. Lavaballs and secondary mineral deposits locally are prominent. Near the famous Punta de Orchilla lighthouse, Cueva del Acanilado is very different. Only about 400 m long, it begins at the summit of a low lava dome with radiating surface tubes and tongues, and a largely collapsed lava tube leading in almost the opposite direction from Cueva del Acanilado. This dome may be a rootless vent. The cave extends to a seacliff where it ends with at least three adjoining windows. Some ledges are present, but rheogenic features are minimal. Halite and other mineral crusts are prominent. One of its skylights is a long-standing raptor site.

On Tenerife, Cueva del Viento is the second longest lava tube cave in the world, with labyrinthine complexes on several levels and one very long unitary passage. It is the main cave of a larger complex extending both uphill and downhill from the town of Icod de los Vinos. Cueva de Felipe Reventón is an especially complex detached segment of this system. Its three-dimensional labyrinth is extraordinary.

Cueva de la Fajanita has been described as a hollow dike, but its speleogenesis appears to be even more complex. The walls and ceiling of its inner chamber contain numerous dikes of varying size, intruding a body of consolidated red cinder. From its lower, outer end, a stacked tube ascends almost vertically, then levels off before descending steeply to a cliff face 2-level entrance. Near its midpoint a stacked confluent tube angles downward to join the main passage. The lower tube in the main passage has multiple linings of very dense lava consistent with dike material; the upper one characteristically has only a single lining. The cliff face here appears to be a landslide feature.

The meeting and field excursions were very well received by those in attendance. However, attendance was lower and fewer papers were presented than at the 1991 symposium. This was the result of less aggressive solicitation of papers. Also the lack of a guidebook limited participants' understanding of features of the field excursions. Organizers of the 8th International Symposium will want to consider these matters in their planning.

With about 20 members and friends of the IUS Commission on Volcanic Caves in attendance at the meeting of that Commission, a strong preference was voiced for the next symposium to be in Nairobi, Kenya in February 1998. The chairman of the Cave Exploration Group of East Africa (Jim Simons) has proposed this, but without a specific date. The Commission plans to explore the preferred date and firm up a desirable date without known conflicts as soon as possible.

Another Canary Island speleological group is considering organizing a 2nd Encuentro Vulcanoespeleológico de las Islas Atlánticas which would be held before 1998. It would not be an IUS event. Sites would be the islands of Tenerife and Lanzarote.

The Grupo Junonia offered field assistance to volcanologists and vulcanospeleologists wishing to study the caves and volcanic pits of La Palma. Address: c/o Conny Spelbrink, Carretera de Martín Luis 32, 38715 Puntallana, La Palma, Canary Islands, Spain. It turned out to be a remarkably notable site for such studies.

11/23/94

Distribution:

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North American Biospeleological Newsletter

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Volcano Quarterly