



www.ehu.es/sem

FROM THE PRESIDENT

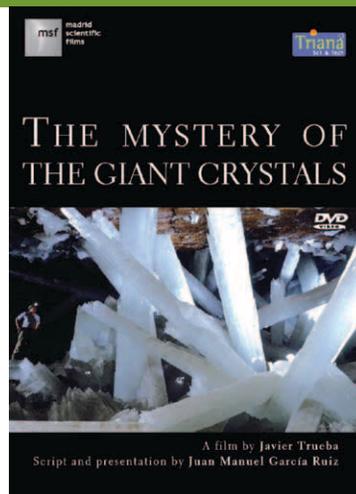


Carlos Ayora

It is an honour for me to chair the Sociedad Española de Mineralogía. As I take over the leadership, I am happy to see that the Society is in excellent condition. The last annual meetings of the Society have been very successful in terms of participation and debate. Also, the Society's publications, *Macla* and *Seminarios*, have achieved a remarkable level of quality. In addition, my predecessors have succeeded in connecting the SEM with other scientific societies, especially through participation in the *European Journal of Mineralogy* and *Elements*. The success of a scientific society is based on the generous dedication of its members. At this moment, I want to thank our colleagues for the effort they have made and congratulate them sincerely. The new team will try to continue the task of promoting mineralogy, petrology and geochemistry, both in our country and through international collaborations.

In a context of economic recession like the one we are now going through in Spain, strong public support to basic science is not to be expected. Traditional issues, such as clays, mineral deposits and heritage conservation, are well developed in our Society and will quite predictably carry on. However, we must pay attention to new fields of application which have appeared in recent years and which portend future activity. In our last Society meetings we have learned how industry and medicine are continually developing nano- and biomaterials, often based on nature's structures, where mineralogy plays a relevant and inspiring role. Environment is no doubt the field with the highest level of activity and in which mineralogy and geochemistry make outstanding contributions. The study and evolution of atmospheric particulate matter, as well as water and soil contamination and their remediation, are fields in which mineral stability and water-gas-mineral interactions are decisive. Although the Spanish government has abandoned plans for a geological repository of radioactive waste, there is still plenty of urban and industrial waste repositories where controlling clay and cement mineralogy and the interaction of these materials with water is essential to ensure watertightness. As in many other countries, CO₂ deep-injection tests in saline formations have been started here. Once more, mineralogy and geochemistry are highly relevant, not only for understanding the ultimate mineralization of carbon as carbonates, but also to forecast the impact of mineral dissolution/precipitation on hydraulic properties, which is key to injection and storing. As a result, in times of economic difficulties, numerous opportunities still exist, which can lead to high-quality research in mineralogy. We must keep on sharpening our wits.

Carlos Ayora
SEM President



GIANT CRYSTALS OF GYPSUM: GOOD SCIENCE AND GOOD PUBLIC OUTREACH

Large crystals of selenite, a variety of gypsum, were very valuable in Roman times because they were used for covering the windows of *therma* and palaces. Roman stone masons took advantage of selenite crystal cleavage to create smooth surfaces. In the case of gypsum, that cleavage is the pinacoid (010), which corresponds to the plane parallel to the layers of water molecules in the crystal structure. According to Pliny the Elder, the largest crystals of selenite and those of highest quality were found in Segobriga, Spain, and this town remained the main source of this product until the introduction of flat-glass technology by the Romans at the end of the first century. Amazing as these crystals are, they cannot compare, either in size or in quality, with the crystal wonderland recently discovered in Naica, a mining town located 112 km southeast of Chihuahua City in northern Mexico.

The limestone of Naica Mountains contains one of the most important lead and silver deposits in the world and which has been exploited since the 19th century. During more than 150 years of mining, cavities containing large gypsum crystals were accidentally discovered. In 2000, during exploration activities at level -290 m, a new cavity was unveiled, called the Cave of Crystals. The floor was covered with stubby crystals up to two meters in size, and the limestone walls and ceiling were dotted with crystals and exhibited a red coating containing celestite and iron oxide, among other minerals. Even more amazing, giant elongated crystals of gypsum up to eleven meters in length – called beams by the miners – cross the room cavity from side to side.

Very often, beautiful crystals in mineral collections represent the first contact school children and the general public have with mineralogy and the Earth sciences. Targeting this audience, our colleague Juan Manuel García Ruiz has produced a remarkable piece of science outreach. With the aid of Javier Trueba, a well-known film-maker, he has produced a 50-minute movie (<http://elmisteriodeloscrystallesgigantes.com>) that not only reveals the magnificence of the crystals but also gives a rigorous explanation of their formation. Fluid inclusion analysis has shown that the crystals grew from low-salinity solutions at a temperature of ~54 °C, slightly below the temperature (58 °C) at which the solubility of anhydrite equals that of gypsum. Sulphur and oxygen isotope compositions and other analyses indicate that Naica's gypsum megacrystals formed when the rocks cooled below 58 °C, thus triggering the dissolution of anhydrite in the mine and the precipitation of gypsum from solution. The small number of crystals in the caves may be explained by formation under very low supersaturation conditions within the very narrow temperature range indicated by the fluid inclusions. Finally, this film is a call to preserve our geological heritage for present and future generations.

Carlos Ayora