



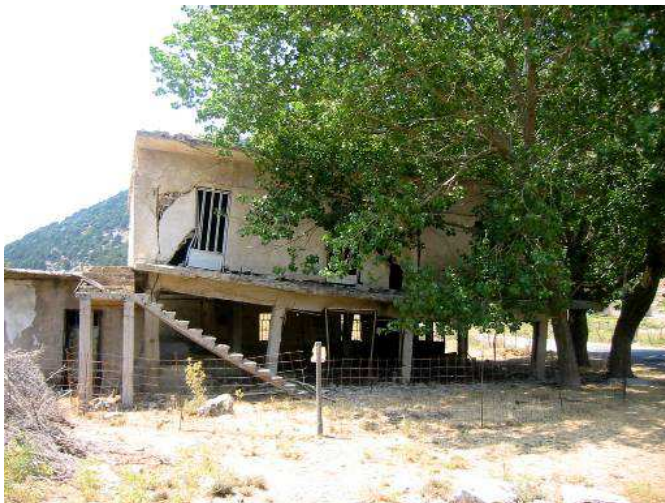
**Information about the Environment and for travelers in Crete:**

**Earthquake on Crete**  
**GEO-Information V: Minerals: Gypsum / Sea salt**



The island Crete is located in one of the seismically most active zones of the entire Mediterranean area, in particular exactly where the annually some centimeters north drifting African plate pushes itself under the Aegean plate which is at the southern edge of the Eurasian plate. This procedure runs intermittent and not without tensions. The rock bodies are flexible only up to a certain degree. Also more or less powerful clods hook themselves into one another. Frictions grow within the range of the sliding surfaces, which unload themselves jerkily after reaching a certain limit value. The Athenian earthquake control room registers monthly up to 500 earth impacts of different strength in the Aegean Sea. The earth's crust is arranged into several differently large continental plates, which swim on the viscous magma of the Earth's mantle, drift against each other or scrape by. If the rock does not withstand the frictions any longer, columns break open. The energy unloads itself and lets the earth's surface quake from an epicenter.

In the last six millennia the island Crete was shaken several times by bad quake. One assumes that the Minoan advanced civilization went down not least due to such a disaster. In the 3<sup>rd</sup> Century BC an enormous quake occurred whereby the western part of the island was raised. Since the 13<sup>th</sup> Century Crete was afflicted by at least six heavy quakes, those a majority of the once magnificent buildings of the Byzantine and Venetian period fall a victim. Considerable damage to property caused the quake in June 1926. To the last spectacular event of this kind happened on the 24<sup>th</sup> of May 1994, when a quake of the strength 6.1 on the upward open judge scale shook the island on the southern edge of Europe. On this Monday morning around ten before ten the population of island was seized by panic. In many places the current supply and the telephone connections broke down. Numerous houses were partially strongly damaged (see fig.). Fortunately no human lives were to be deplored. The last considerable quake happened on the 4<sup>th</sup> of November 2004, with strength of 5.3 on the judge scale. The Epicenter was in the strait between Crete and the Peloponnese, in 45 miles depth. Even if the quake was still noticeable in the 125 miles away Athens, it came only to small damages to property on Crete.



Pictures are showing views of a house on the western edge of the Omalos Plateau damaged during the quake of 1994

## GEO-Information V: Minerals: Gypsum (Anhydrite) / Sea salt

Gypsum is a very frequently occurring mineral from the mineral class „of the sulfates (and relatives)“. Generally gypsum is colorless or white. However it can have, by admission of extrinsic ions or admixtures of different kind (sand, bitumen) a yellowish, reddish, grey or brown color. Its line color is however white. The designation gypsum is used synonymously also for the mono mineral rock. Gypsum has the very small Mohs scale of 2 and is beside halite a standard mineral on the hardness scale after Friedrich Mohs. Its density amounts between 2.2 and 2.4 g/cm<sup>3</sup> and it is contrary to the frequently accompanied mineral halite only with difficulty in water soluble. The solubility in water amounts, depending upon calcium sulfate modification, 2.7 to 8.8 g/l, those of halite is 359 g/l. From pure aqueous solution calcium sulfate crystallizes below 66 C always as gypsum, above 66 C as anhydrite. With presence of other ions, for example sodium, the solubility equilibrium shift.

Gypsum can be subject to a rock-forming process under special natural circumstances. By evaporation of sea water containing calcium sulfate gypsum and anhydrite fall in former time phases of the carbonate precipitation. Primarily gypsum sedimented thereby. The in larger layers and/or aggregates accruing stone is ranked in the petrography among the group of the evaporite and is also well-known under the culture term alabaster. The name gypsum is derived from the Greek noun γύψος („gypsos“, gypsum, chalk), which is for his part taken over from the Semitic language.

Gypsum was used as building material already in the new Stone Age. The Minoan culture used plaster and alabaster instead of marble as floor or wall covering and as component (Palace of Knossos, 2100-1800 BC and Palace of Phaistos) and the Greek natural scientist Theophrastos of Eresos described the production of gypsum in a paper. In Greece gypsum was used because of its easy workability also for building ornamentations at the houses.



The photos were taken in the Koprokefala Mountains between the villages Dafni and Hrisopigi, at a side road of the route Sitia - Ierapetra. Picture left shows a mountain-slope “from gypsum”, which looks even in the high summer (from a distance) “snow-covered”. The fig. right shows „gypsum rocks“ signed by weathering at the roadside of the route specified before. The erosion “forms” here an impressive, white rock landscape



**Sea salt** “eyes” (see fig.) predominantly result in littoral caves from inserted sea water, which remains located in small hollows (soil recesses). While the water evaporates by sun and wind, the sea salt set down at the ground of the hollows and “continues to grow” periodically, until the salt deposit fills out the hollow (even with the floor space)

The shown “salt eye” originated from the “bear’s den” (Souda peninsular / Northwest Crete); see also our leaflet No.: 038-04/E

**Fotos:** (5438, 5440, 5349, 5350, 5540/28.-30.07.2005) *H. Eikamp*