

## HISTORIC TOWN OF GOSLAR AND MINE RAMMELSBERG

World Cultural Heritage since 1992

### Engineering geological conditions and problems:

After the old town of Goslar had been completely destroyed during a large fire in the middle ages the new buildings were founded on 6 m of rubble. As it covers old still existent cellars the rubble layer has a low bearing capacity causing damages to many old buildings. Natural building stones were also affected by weathering thereby weakening the foundations of many houses of the old town.

### Protection measures:

Monitoring of damages, underpinning of foundations, protection of building stones within the foundations against aggressive water or substitution by stable stone material.

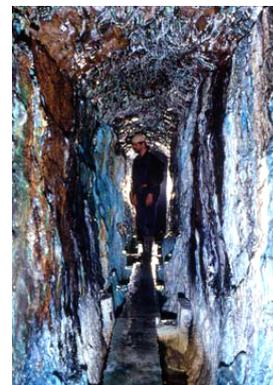
### The Rammelsberg ore deposit:

During the last 100 years the genesis of the Rammelsberg ore deposits has been the subject of numerous publications often holding widely differing views. Today agreement has been reached that the mineralisation was the result of a syngenetic accumulation within a Middle Devonian (380 Ma) marine environment.

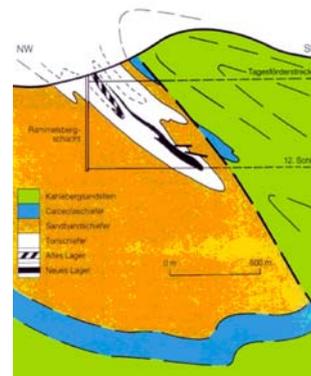
Heavy metals were carried by hydrothermal solutions which ascended via fractures within the earth crust and reached up to the sea bed. The rapid cooling of the solutions at the sea floor caused the precipitation of massive and disseminated polymetallic sulfide ores and baryte embedded within the clays of the marine background sedimentation.



Historic town of Goslar with half-timbered houses



Mine Rammelsberg "Blue Gallery" (Middle ages working)



NW-SE cross section of the ore deposit

### Other information:

The historic town of Goslar, famous for its many half-timbered buildings, is more than 1000 years old. Its wealth is founded on rich ore deposits in the nearby mountains. As the only of its kind in the world, the Rammelsberg mine can testify to 1000 years of continued working, with new historical evidence revealing that mining had started as early as the 3rd and 4th century A. D. The silver-rich ores attracted the attention of medieval German emperors and made Goslar an imperial city. For ten centuries it had been a centre of major importance for the economic and social development of this region. With nearly 30 million tons of ore it was one of the most productive and richest ore deposits in the world and it can claim more mining technology "firsts" from the 10th to the 20th century than any other base metal mine in Central Europe.

### References on studies already performed:

FRANK, H. W.: Ingenieurgeologische Aspekte bei der Verwendung von Natursteinen in der Altstadt von Goslar. - Ber. 4. Nat. Tag. Ing.-Geol., 63-73, 9 Bilder, 5 Tab., Goslar 1983, Fachsektion der DGEG e. V. Dtsch. Geol. Ges. e. V.  
<http://www.rammelsberg.de>.