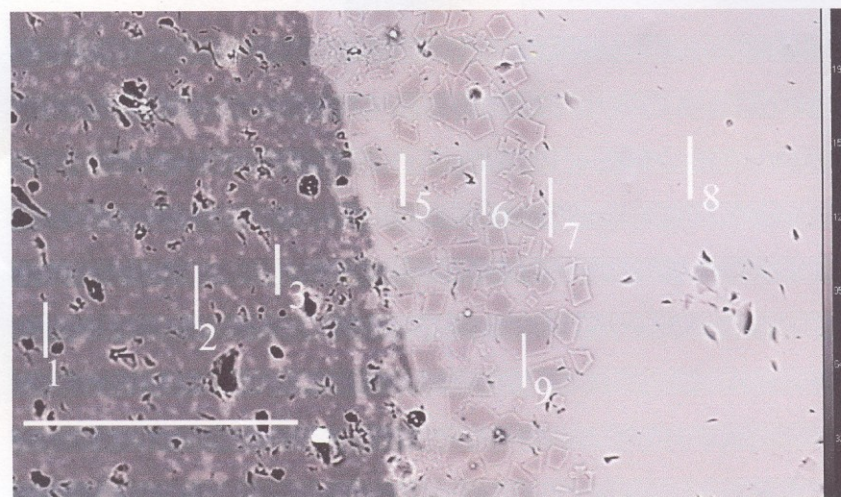
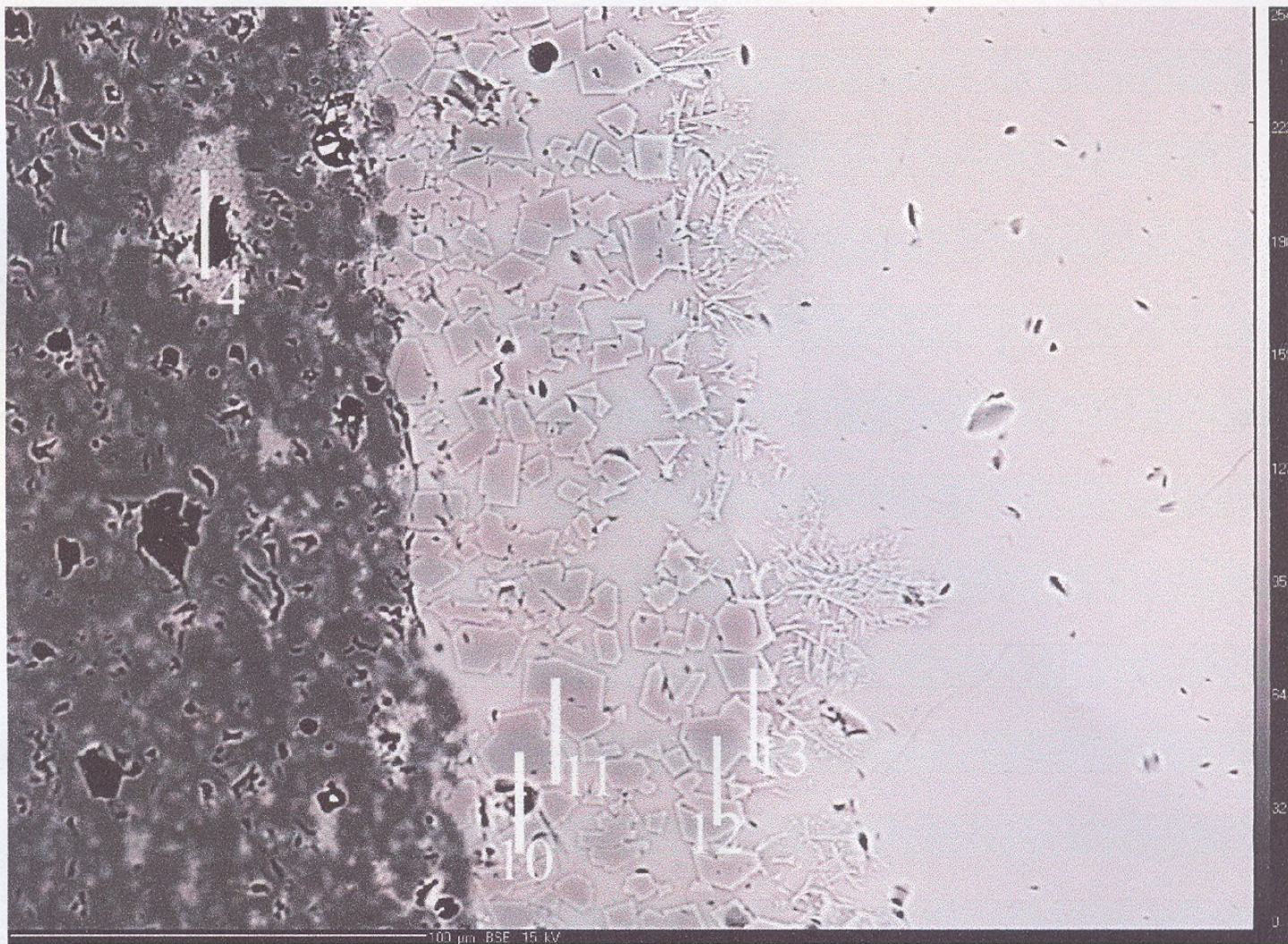


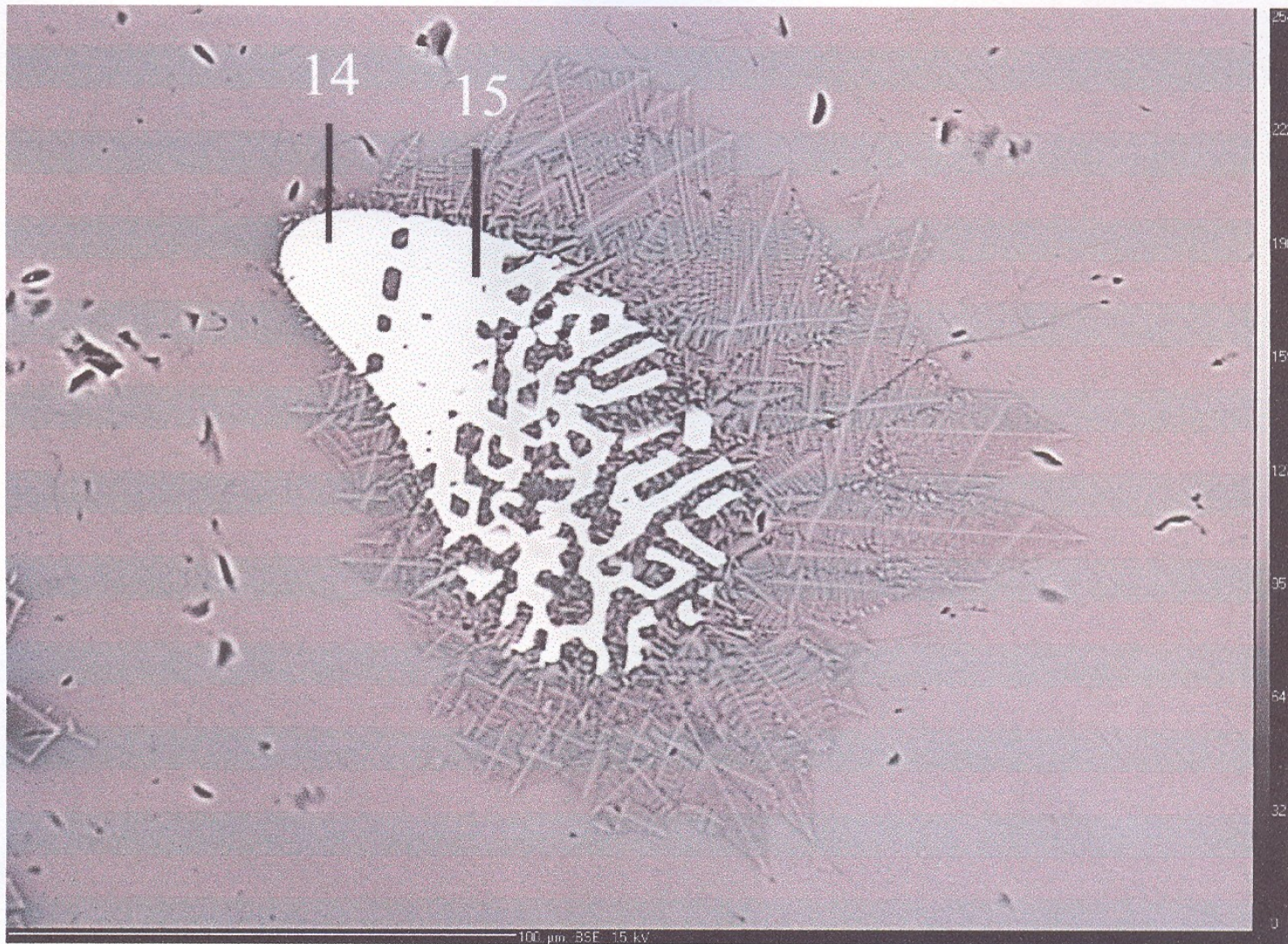
Obr. 34 :Celkový pohled na analyzovanou část výbrusu [A]-oxalový kelímek, [B]-reakční lem taveniny a rozpad kelímku, [C]-korodovaný neroztavený původní minerál (foto BSE, měřítko v dolní části obrazu- 500 μm)



Obr. 35: Detail analyzovaného místa s vyznačenými body, kde byla provedena samotná analýza. (foto BSE, měřítko v dolní části obrazu 100 μm)



Obr. 36: Detail druhé části analyzované oblasti s vyznačenými místy analyzování (foto BSE).



Obr. 37: Detail kostrovitého krystalu s místy analyzování (foto BSE, měřítko v levém dolním rohu obrazu- 100 μm)

the risk of iodine deficiency disorders (IDD)

Table 150 Halite

<i>Mineral</i>	<i>Formula</i>	<i>Color/Luster</i>	<i>SG</i>	<i>H</i>	<i>Crystal system/ habit</i>	<i>Occurrences</i>
Halite Greek <i>hals</i> = the sea	NaCl 34.34% Na 60.66% Cl	colorless, white, yellow, orange, reddish, purple, and blue; vitreous; transparent to translucent	2.2	2	cubic; xls often cavernous or hopper-shaped; massive, compact, or granular	extensive in sedimentary deposits; as an efflorescence in playa deposits; as a sublimation product near volcanism

Source: various including Roberts et al., 1990

Consumption of salt in the United States (tonnes)

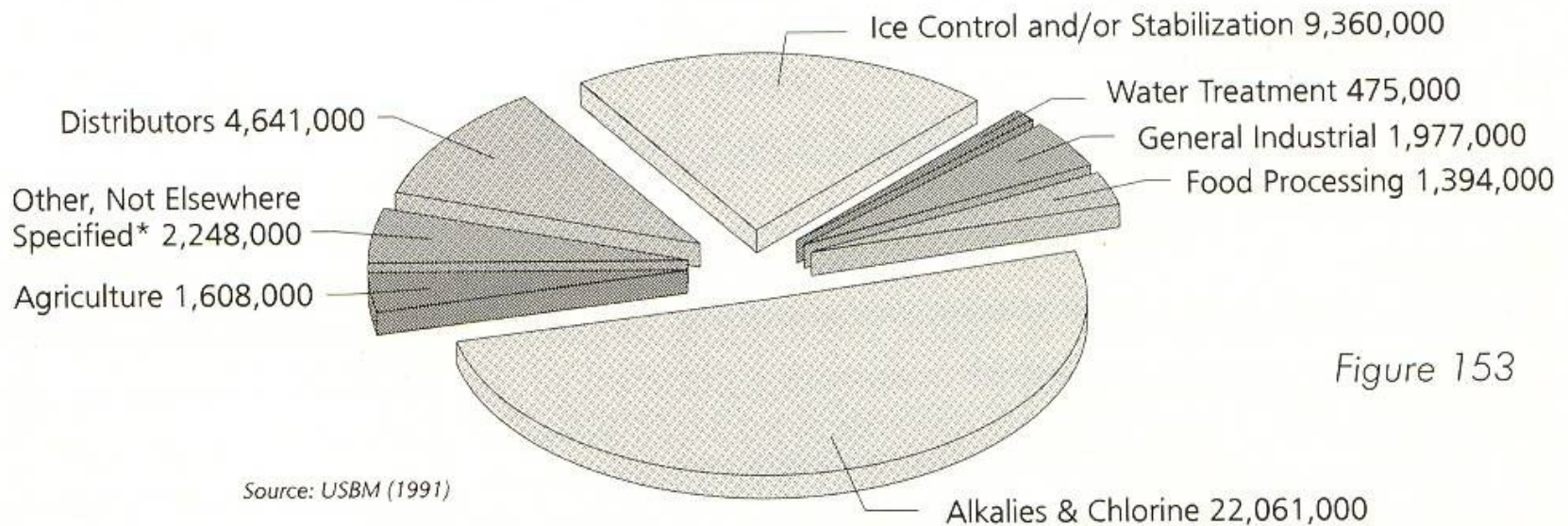


Figure 153

Source: USBM (1991)

GENETIC TYPES

Sodium chloride, NaCl, or rock salt occurs in solid form as the mineral halite (Table 150) which, when pure, consists of 39.34% Na and 60.66% Cl₂. Sodium chloride deposits are found in solution in the first four types or in the solid state in the last two:

- Seawater
examples: the oceans and seas of the world
- Lacustrine
examples: Lake Baskunchak, Elton Lake, Gulf of Karabogaz-Gol, Russia; Great Salt Lake, Utah, and Searles Lake, California, in the United States
- Groundwaters (brines)
examples: Smackover Formation, Arkansas, United States; Solivar near Presov, Slovakia
- Lake basins of the playa type
examples: various lakes in California including Searles Lake; numerous salars in Peru, Bolivia, Chile, and Argentina, for example Salar de Atacama in Chile, Laguna Salinas, Peru, Salar de Hombre Muerto, Argentina, Salar de Uyuni, Bolivia
- Bedded salt deposits
examples: *Precambrian* - Australia, Iran; *Cambrian* - Australia, Northwest Territories, Canada, Iran; *Ordovician* - Williston Basin, Wyoming, United States; *Silurian* - Salina Basin, United States, Canada; *Devonian* - Williston Basin, Wyoming, United States; *Mississippian* - New Brunswick & Nova Scotia, Canada; *Pennsylvanian* - Paradox Basin, Colorado, United States; *Permian* - Permian, Supai, and Williston basins, United States; Mexico, Brazil, Germany; *Triassic* - Isthmus of Tehuantepec, Mexico, Ethiopia, France, Germany, Greece, UK; *Jurassic* - Gulf Coast, United States, Cuba, Chile, Germany, Tanzania; *Cretaceous* - Florida, United States, Mexico, Bolivia, Brazil, Colombia, Russia, Libya, Morocco; *Eocene* - Green River Basin, Wyoming, United States; Iran, Morocco; *Oligocene* - France, Germany, Spain, Iran, Iraq, Spain, Turkey; *Miocene* - Algeria, Cyprus, former Czechoslovakia, Poland, Spain, Trucial Coast; *Pliocene* - Nevada & Utah, United States, Italy, Jordan; *Pleistocene* - California & Nevada, United States; Mexico, former USSR, Israel
- Salt domes
examples: Gulf Coast of the United States and Mexico; Zechstein Basin in Germany

Table 79 Calcium Sulfate

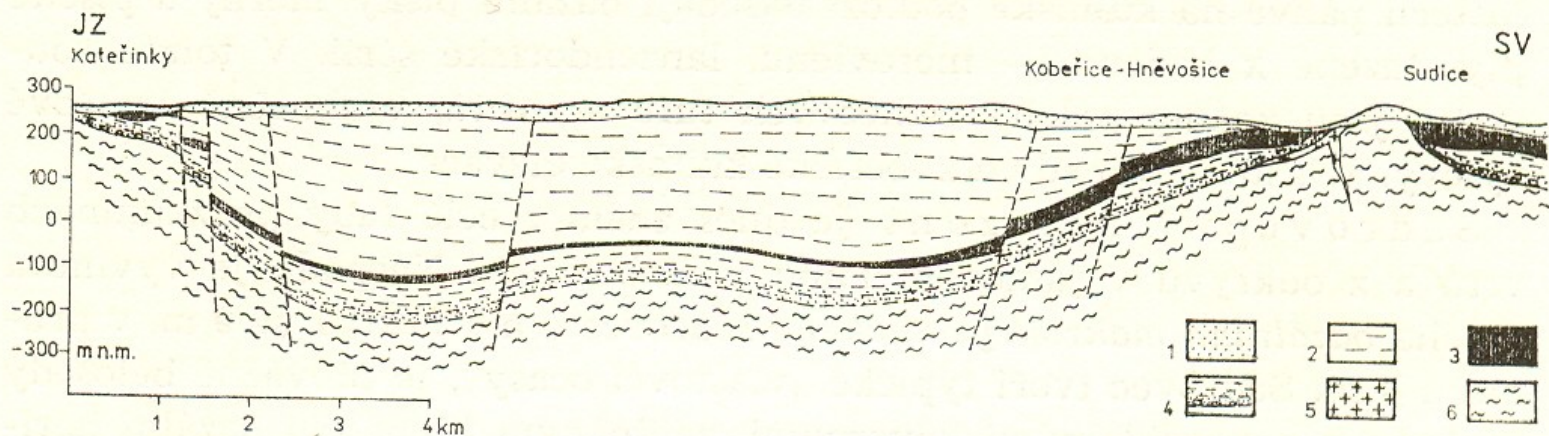
Minerals	Formula	Color/Luster	SG	H	Crystal system/ habit	Occurrences
Anhydrite Greek anhydros = dry or without water	CaSO ₄ 41.2% CaO 58.8% SO ₃	colorless, white, gray, bluish, pinkish, reddish, brownish; transparent - translucent; vitreous - greasy to pearly	2.96- 2.98	3½	orthorhombic; equant xls, thick tabular; usually massive, coarse to fine granular, fibrous	assoc. with gypsum, salt beds, dolomite, or limestone; hypogene mineral in hydrothermal vein deposits; cavities in igneous trap rock; rarely as a sublimation product
Gypsum the Greek gypsos = plaster, an ancient name	CaSO ₄ ·2H ₂ O 32.6% CaO 46.5% SO ₃	colorless and transparent (selenite), white, gray, yellowish, greenish, reddish, or brownish when massive; subvitreous, xls pearly on cleavages	2.32	2	monoclinic; thin to thick tabular xls, short to long prismatic, acicular; lenticular, rosettes; fine to coarse granular (alabaster); fibrous (satin- spar); distorted formations on cavern walls (helectites) concretionary	widespread in sedimentary deposits, especially Permian and Triassic formations; saline lakes and playas; as an efflorescence on certain soils; oxidized portions of ore deposits; deposits assoc. with volcanic activity

Source: various including Roberts et al., 1990

GENETIC TYPES

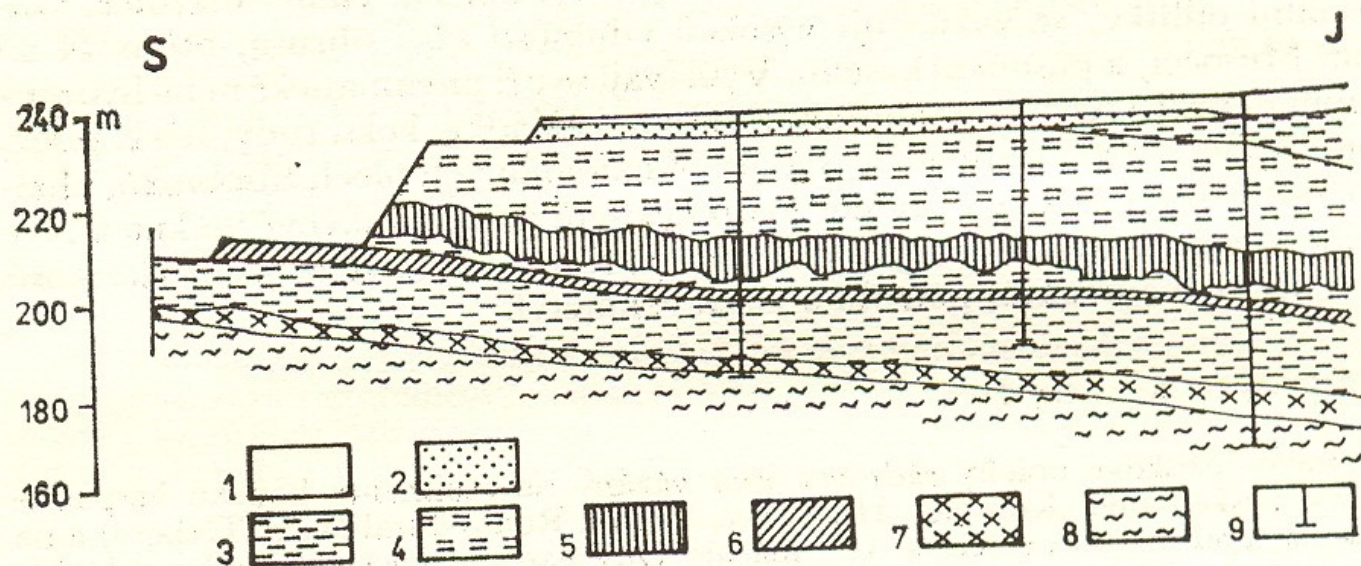
Calcium sulfate is somewhat soluble, and under certain conditions precipitate anhydrite and gypsum. In addition, gypsum may form through the hydration of the more common anhydrite down to a depth of about 700 m. Genesis of anhydrite and gypsum is quite simple, although the details are less so. Deposit types are as follows:

- Bedded primary deposits
 - ◆ in deep, large-scale basins
 - ◆ in sabkhas or salt flats
examples: Trucial Coast of the Persian Gulf (present day); southeastern Indiana (Mississippian), Ohio and New York in the United States, and Ontario, Canada (Silurian); Jamaica
- Secondary deposits
 - ◆ infiltration deposits
 - ◆ surface concretions
examples: Wadi Hoff, Wadi Gibbu, and Wadi Garrawi, Eastern Desert of Egypt
 - ◆ gypsite
examples: Kern County, California, United States
 - ◆ gypsum Sands
examples: White Sands, New Mexico, United States; Cuatrocieneegas, Coahuilla, Mexico
- Gypsum Cap Rock
examples: Gulf Coast of the United States and Mexico



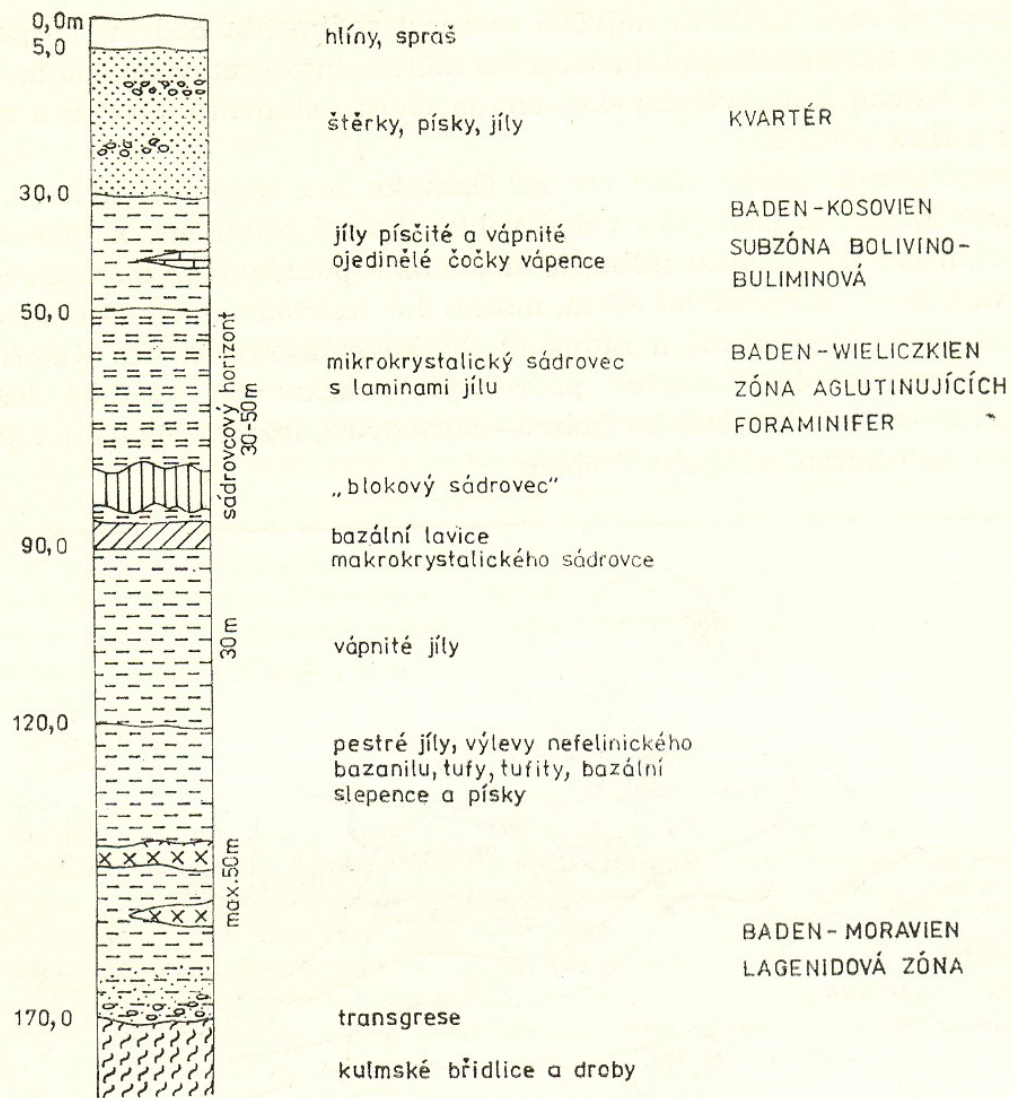
64. Geologický řez opavskou pávní (V. Mátl)

1 — kvartérní štěrky, písky a hlíny; 2—5 — miocén (baden, dř. torton): 2 — jíly písčité a vápnité (kosovien, subzóna bolivino-buliminová); 3 sádrovcový horizont (wieliczkien, zóna aglutinujících foraminifer); 4 — bazální štěrky a písčité jíly (moravien); 5 — výlevy nefelinického bazanitu, tufy, tufity (moravien); 6 — kulmské břidlice a droby (visé-kyjovické vrstvy).



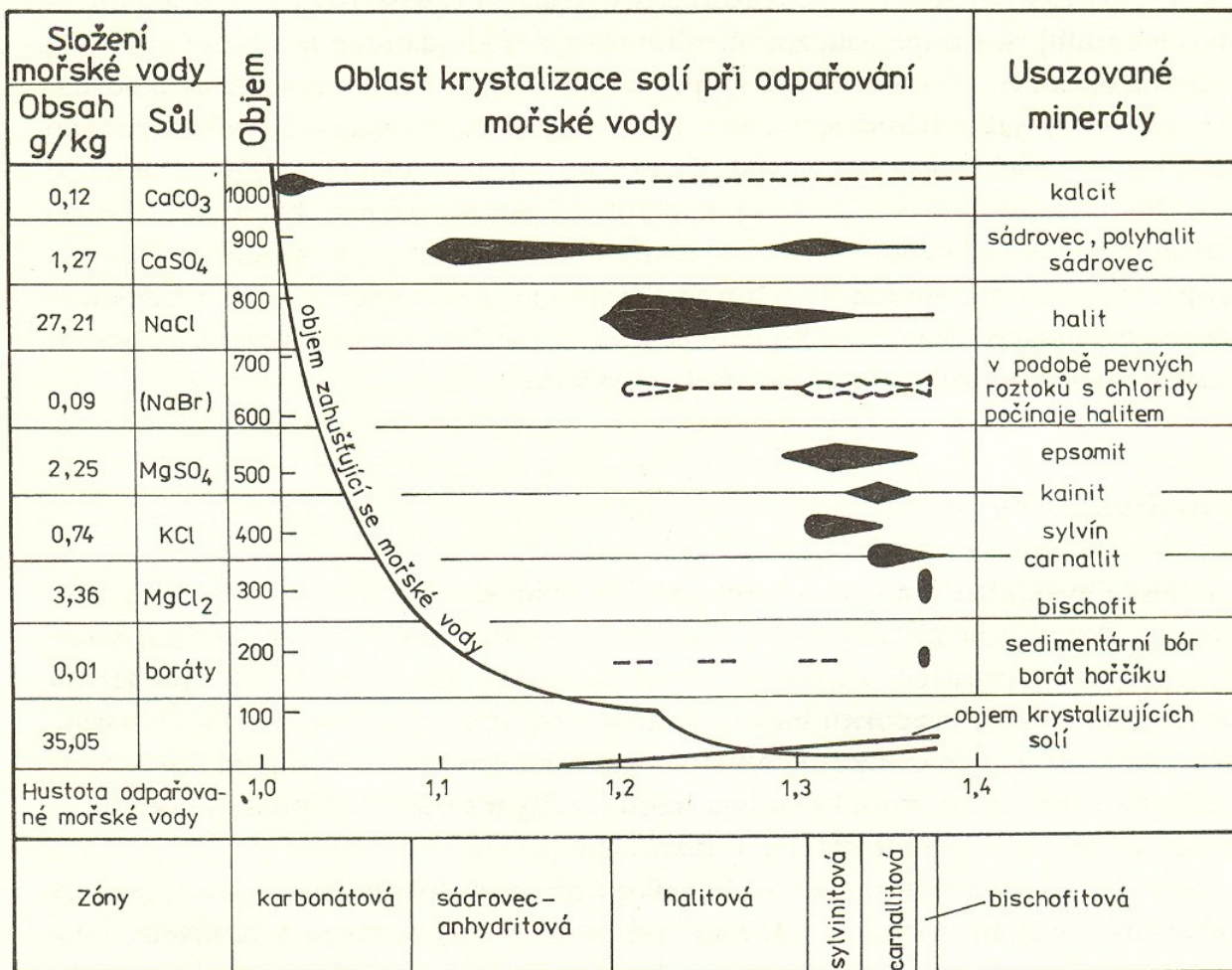
Obr. 73. Geologický řez předpolím jižní těžební stěny ložiska sádrovce v Koberčicích (podle Mátla in *Kužvart* ed. 1977)

1 až 2 — kvartér: 1 — hlíny a sprašové hlíny, 2 — písky a štěrky, 3 — písčité a vápnité jíly (baden děvínské série, subzóna bolivino-buliminová), 4 až 6 — baden děvínské série, zóna aglutinujících foraminifer: 4 — mikrokrytalický sádrovec s jílem, 5 — „blokový“ sádrovec, 6 — bazální sádrovec, 7 — čedič a čedičová vulkanoklastika (baden-moravien, lanzendorfská série), 8 — droby a břidlice (kulm), 9 — vrty



63. Ideální profil miocénu opavské pánve se sádrovcovým horizontem v okolí Ko-beřic (stratigrafie podle I. Cíchy 1959 b).

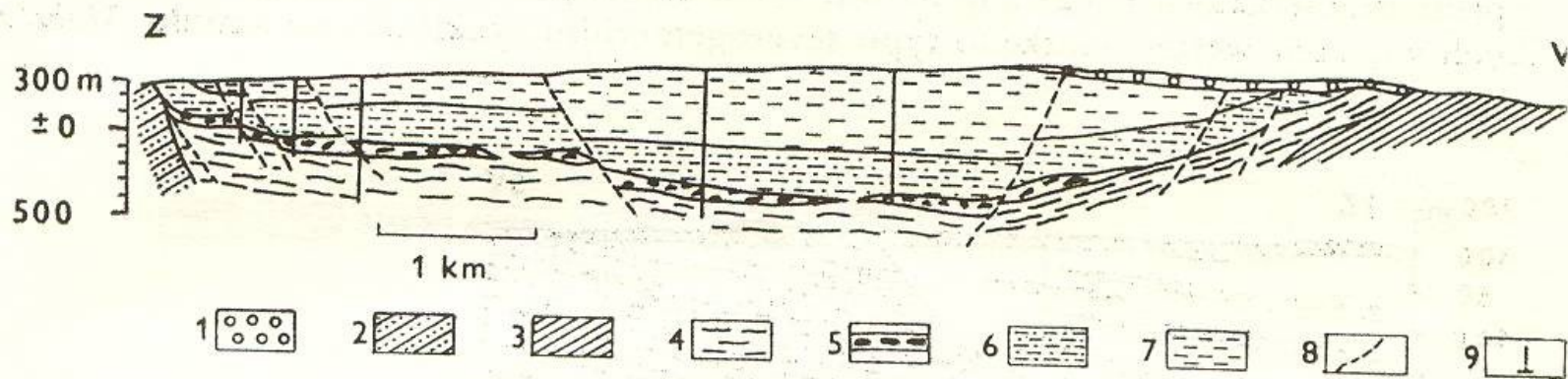
Nepřítomnost zkamenělin v ložiskách evaporitů vysvětloval Walther (1903)



20. Sled vylučování solí z mořské vody při zmenšování jejího objemu se současným zahušťováním při odpařování (podle Valjaško in Strachov, 1962).

Tabulka 6. Zastoupení solí v mořské vodě a v evaporitech
(podle Schmalze, 1969, in Hsü, 1972)

Sůl	V jednom litru mořské vody je obsaženo (v cm ³)	V průměrném evaporitu (v cm ³)	Mocnost solí usazených z vrstvy mořské vody 1500 m mocné (v m)
MgCl ₂	1,48	0,02	2,20
KCl	0,43	0,23	0,65
MgSO ₄	0,94	0,30	1,41
CaSO ₄	0,59	4,29	0,89
NaCl	12,87	10,89	19,31
CaCO ₃ + CaMg(CO ₃) ₂	0,06	1,04	0,18



Obr. 76. Geologický řez ložiskem kamenné soli Solivar-Solná Baňa (podle Slávika 1967)

1 — aluvium, 2 — břidlice a pískovce vnitrokarpatského flyše (eocén), 3 — břidlice s vločkami pískovce (eggenburg), 4 až 7 — karpát: 4 — vápnitý jílovec, 5 — solná brekcie, 6 — vápnitý jílovec s anhydritem, 7 — vápnitý jílovec, 8 — poruchy, 9 — vrty

It underlies about 2,500 km² of eastern and northeastern Ohio, dipping southeastwards so that the top is 425-450 m deep in Efffield, Lorain County, 920 m at Barberton, and 2,240 m in Marshall County, West Virginia. There are four salt beds, each with a maximum thickness of 100 m, within a thick sequence of limestone and dolomite. Solution mining is used at operations near Akron and Rittman (Akzo Salt and Morton International); underground mining takes place at hiskey Island near Cleveland (Akzo Salt) and at Fairport (Morton International).

In West Virginia the Salina salt is more than 2,000 m below the surface. Solution mining is employed at Mersville, near Moundsville (lanlin Chemicals), and at New Martinsville (PPG Industries). Despite the fact that salt underlies half of Pennsylvania, the state is not a commercial salt producer.

S GULF COAST

The 298,000 km² area extending from Alabama westward through southern Arkansas and Texas, and southward into the Gulf of Mexico, constitutes the Gulf Coast Basin. The stratigraphic section is some 1,000 m thick along the northern border in southern Arkansas, increasing dramatically to

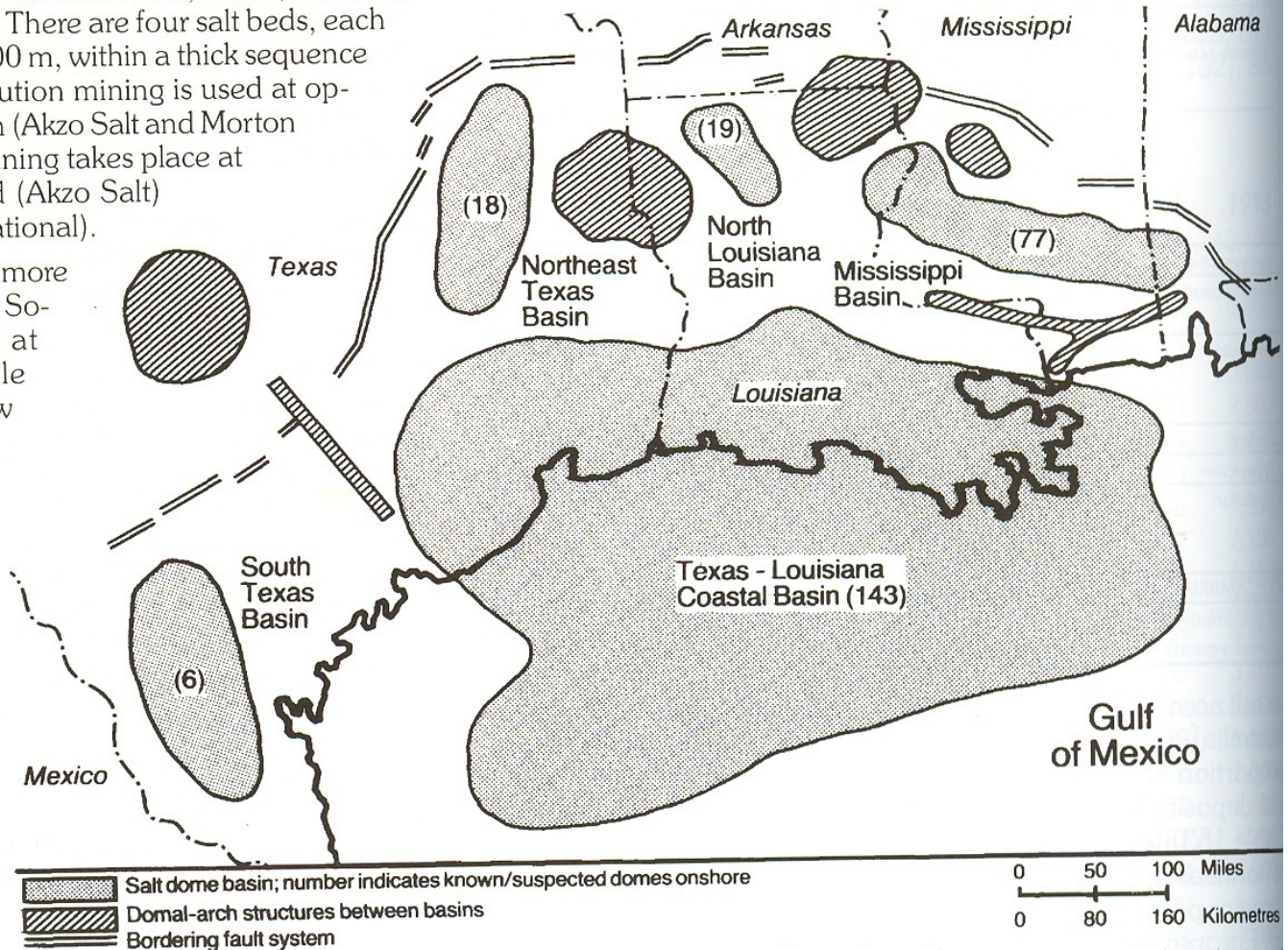


Figure 155 Salt dome basins of the US Gulf Coast. Numbers refer to known or suspected onshore salt domes. Source: Anderson, et al., 1973

Basin, (Morton and Higgins, 1975).

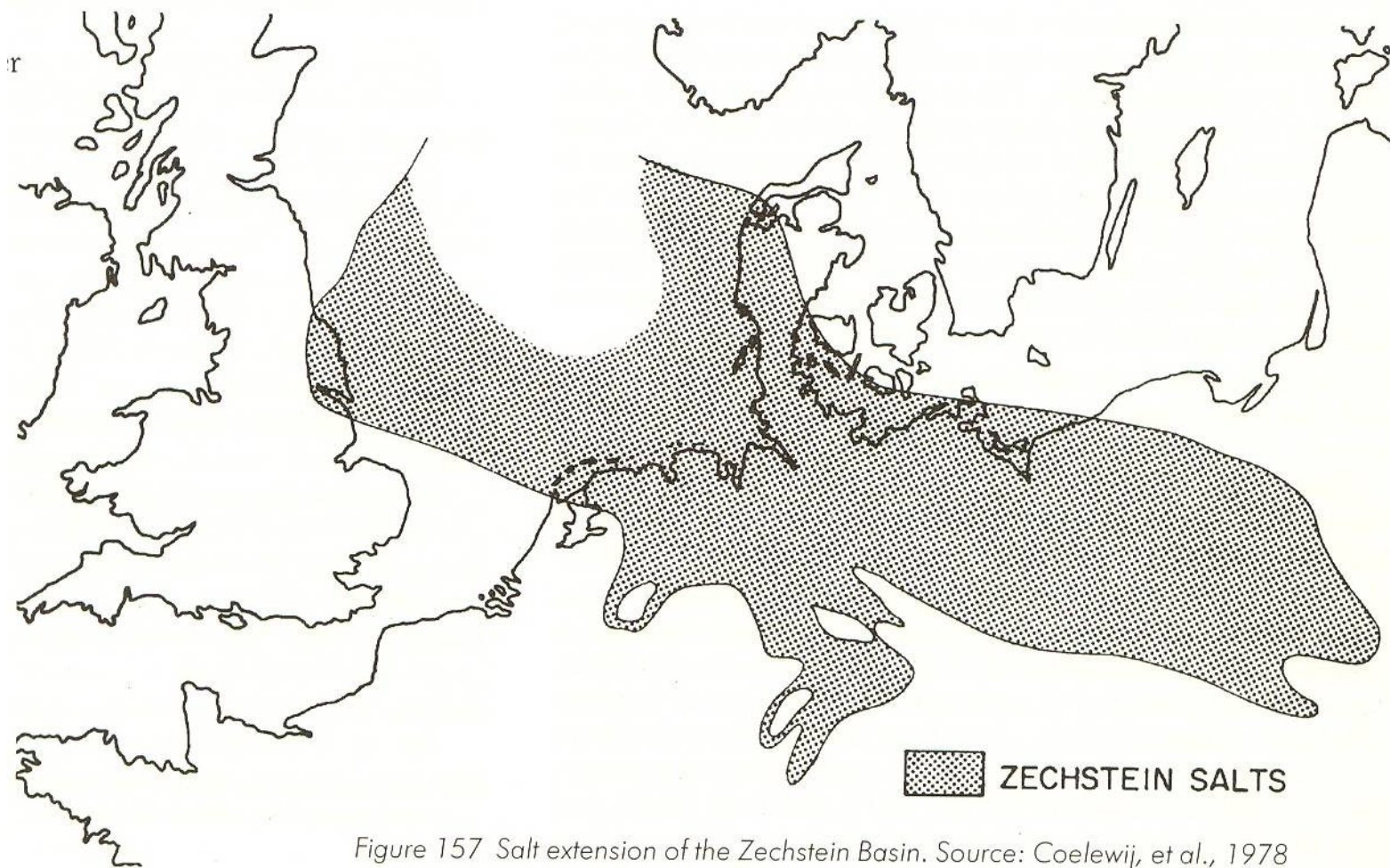


Figure 157 Salt extension of the Zechstein Basin. Source: Coelewijn, et al., 1978

Table 154 German Salt Formations

CENOZOIC

Quaternary

Alluvium

Pleistocene

Tertiary

Pliocene

Oligocene

salt and potassium salts in the Upper Rhine River area

Eocene

Paleocene

MESOZOIC

Cretaceous

Jura

Malm salt in Munder marl in northwest Germany

Dogger

Lias

Trias

Keuper

salt in gypsum in Keuper of western Germany

Muschelkalk

salt in Middle Muschelkalk of western Germany

Buntsandstein

salt in Röt, north Germany

salt in Werfener Beds of Triassic Alps

PALEOZOIC

Permian

Zechstein

salt and potassium salts in the Upper

Zechstein of central Germany

Rotliegendes

salt in northwest Germany

Carboniferous

Devonian

salt-water springs — East Prussia

Silurian

Source: Lefond, 1969

