



Česká geologická služba
Czech Geological Survey



LEGEND (KEY) TO GEOLOGICAL MAP





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- colours

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Legend definition



Legend is a table explaining the meanings of all colours and symbols used to represent geologic features in the geological map, cross section and lithostratigraphic column.

LEGEND

Platform Cover

CENOZOIC

QUATERNARY

Holocene

¹ Qh		Gravels, sands and silty sands (fluvial sediments of intermittent streams)
² Qh		Fine- to medium-grained sands and silts, locally containing coarser clasts (eolian, colluvio-eolian sediments)
³ Qh		Silty clays and sands, locally with lenses of gravels (lacustrine, lacustro-eolian and lacustro-fluvial sediments)
⁴ Qh		Gravels, sands and silty sands (sediments of alluvial fans)
⁵ Qh		Laminated silty clays (lacustrine sediments)
⁶ Qh		Gravels, rarely sands and silty sands (colluvial sediments)

Pleistocene- Holocene

¹ Qp		Gravels, sands and silty sands (sediments of alluvial fans and colluvial sediments)
² Qp		Gravels and sands (fluvial sediments)

QUATERNARY- TERTIARY

Neogene- Pleistocene

N-Q		Silty sands containing coarser clasts, locally breccias (sediments of alluvial fans)
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CAMBRIAN

Cambrian undifferentiated

Boomyn Khudag Formation

¹ Bo		Red sandstones with layers of conglomerates and locally carbonatic sandstones and siltstones
² Bo		Red conglomerates with layers of sandstones and siltstones
³ Bo		Recrystallized dark grey limestones, locally silicified

Ulaanshand Formation

¹ U		Basalt, andesite and their tuffs, green tuffaceous conglomerates and breccias
² U		Slates, sandstones, lenses of limestones
³ U		Limestones
⁴ U		Jasper, silicite
⁵ U		Tuffaceous sandstones, siltstones and conglomerates

Naran Formation

¹ N		Sandstones and slaty siltstones with tuffaceous admixture
² N		Undifferentiated volcanites of rhyolite composition, subvolcanic basalt

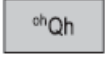
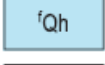
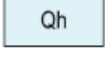
Map Symbols

	Geological boundary, observed
	Boundary of lithological transition
	Geological boundary, approximate, presumed
	Fault, observed
	Fault, inferred
	Fault, concealed
	Normal fault, observed
	Normal fault, inferred
	Strike and dip of axial plane
	Strike and dip of beds
	Fossil flora
	Fossil fauna

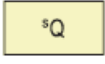
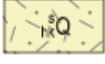
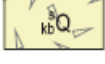
Geological unit – element which is mappable and distinct from one another

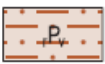
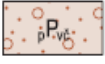
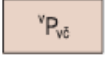
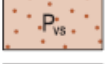
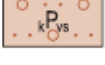
KVARTÉRNÍ POKRYV KENOZOIKUM

kvartér denudačních oblastí KVARTÉR holocén

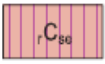
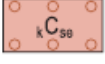
- 1  antropogenní uloženiny nerozlišené
- 2  "Q sedimenty vodních nádrží, vodní plochy
- 3  ^{ch}Qh organické sedimenty: hnílokaly
- 4  ^fQh fluvialní sedimenty: hlíny, jíly, písky a štěrky
- 5  Qh splachové sedimenty: hlíny, jíly, písky, ojediněle se štěrky

pleistocén–holocén

- 6  ^sQ svahové hlinité, písčité a jílovité sedimenty, místy s úlomky hornin
- 7  ^hQ svahové kamenitohlinité až hlinitokamenité sedimenty
- 8  ^kQ svahové kamenité až blokové sedimenty

- 25  ^P vrchlabské souvrství: hnědočervené a šedohnědé prachovce, jílovce, slídnaté jemně zrnité pískovce
- 26  ^{P_{vr}} vrchlabské souvrství, rudnický obzor: prachovce, vápnité jílovce, bitumenní jílovce, vápence
- 27  ^{P_{vr}} vrchlabské souvrství: hrubě zrnité pískovce s valouny, prachovce (čistiské pískovce)
- 28  ^{vP_{vč}} vrchlabské souvrství: fialovohnědé vápnité pískovce, prachovce a jílovce (čistiské pískovce)
- 29  ^{P_{vs}} vrchlabské souvrství: hrubě zrnité arkózovité pískovce s valouny, slepence (staropacké pískovce)
- 30  ^{P_{vs}} vrchlabské souvrství: nevytříděné slepence a arkózovité pískovce s valouny a úlomky silicifikovaných hornin (staropacké pískovce)

KARBON pennsylvan stephan stephan C

- 31  ^{rC_{8d}} semilské souvrství: fialovohnědé a červenohnědé bioturbované prachovce a jílovce, pískovce, arkózy a slepence
- 32  ^{vC_{8d}} semilské souvrství, ploužnický obzor: šedé a šedofialové vápnité prachovce a jílovce, vápence a čočky silicitů
- 33  ^{kC_{8d}} semilské souvrství: nevytříděné petromiktní slepence, brekie a hrubě zrnité pískovce s valouny

Symbols – expressions of line and point geological elements, superposed phenomena

Boundaries

Tectonic lines

Tectonic symbols

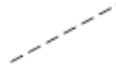
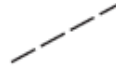
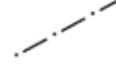
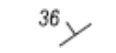
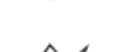
Paleontology

Alteration

Exodynamic phenomena

Mining

....

- | | | |
|----|---|---|
| 39 |  | zjištěná hranice litostratigrafických jednotek a hornin |
| 40 |  | pravděpodobná, přesně nezjištěná hranice litostratigrafických jednotek a hornin |
| 41 |  | petrografický přechod litostratigrafických jednotek a hornin |
| 42 |  | významná diskordance (jen v litostratigrafickém schématu) |
| 43 |  | zlom zjištěný |
| 44 |  | zlom předpokládaný |
| 45 |  | zlom zakrytý |
| 46 |  | směr a sklon vrstev |
| 47 |  | subvertikální vrstevnatost |
| 48 |  | fosilní flóra |
| 49 |  | roztroušené bloky |
| 50 |  | výplavový kužel |
| 51 |  | odlučná hrana sesuvu |
| 52 |  | sesuv, sesuvné území |
| 53 |  | lom v provozu |
| 54 |  | lom opuštěný |



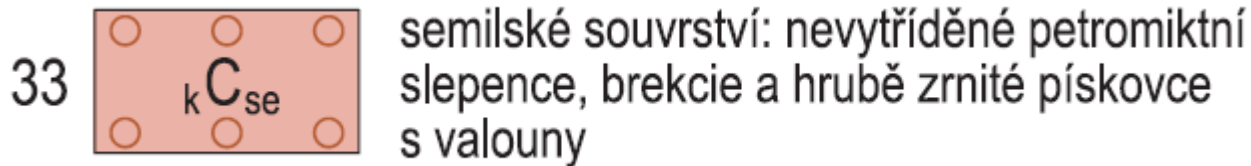


Legend symbology





Basic parts of description of geological unit



Ordinal number (individual for each map sheet)

Colored box with hatch

Index

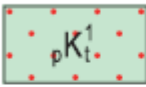
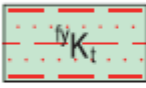
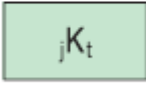
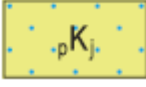
Description

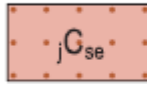
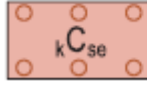


Colours of geological maps

Colours in geological maps should come out from international standards.

Colours commonly expresses age, hatch lithology

<i>turon</i> <i>svrchní turon</i>	
23	 pK_t^1 teplické souvrství: jemně až hrubě zrnité křemenné pískovce (pískovce Boreckých skal)
24	 lyK_t teplické souvrství: vápnité prachovce, vápnité jílovce až slínovce s polohami jemně zrnitých vápnitých pískovců (flyšoidní facie)
25	 jK_t teplické souvrství: vápnité jílovce, slínovce
26	 pK_j jizerské souvrství: jemně zrnité křemenné pískovce, slabě vápnité

KARBON pennsylvan <i>stephan C</i>	
39	 jC_{se} semilské souvrství: červenohnědé jílovce, prachovce, drobovité pískovce, s polohami slepenců
40	 C_{ss} semilské souvrství, štěpanicko-čikvásecký obzor: šedé jílovce, prachovce, pískovce, uhelné sloje
41	 kC_{se} semilské souvrství: nevytříděné petromiktní slepence a brekie

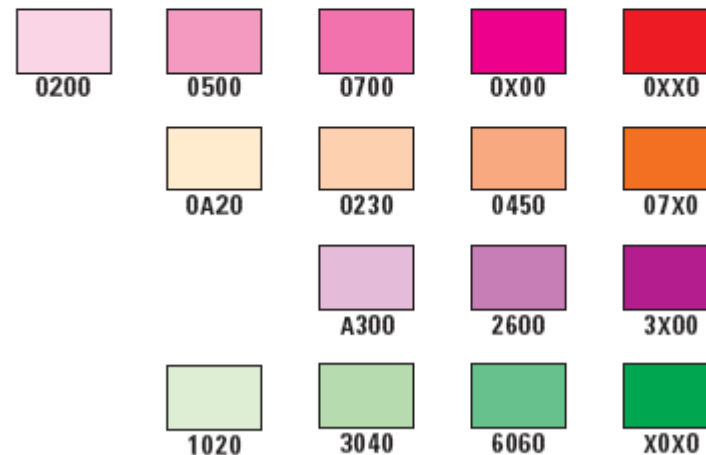
[illegible]

Jan 2012

For igneous and volcanic rocks are used colours to contrast to surroundings units

Related Igneous or Volcanic Units

A tonal sequence of a color should be used when related groups of igneous or volcanic units are shown on a map. The groups may be related by age, chemical composition, or type of igneous activity. Reds, oranges, and reddish-purples are most commonly used. Blues, greens, and purples are used when a map has several groups of igneous or volcanic units, or when these colors are needed to create contrast.





On geologic maps that have many map units, it is sometimes impossible to maintain the standard geologic age colours

Colours should be choose so the map has been well legible

- Showing contrast and clarity of map units and symbols

- Showing ages or age relationships of map units

- Matching or approximating colours and patterns used on nearby or adjacent maps to maintain consistency and continuity of colours and patterns among maps in a region

- Showing structural relationships of map units

- Using colours that are light enough for easy readability of the base map

- Do not forget that map should be nice



Description of geological unit

P ₁ hv		Alternation -grained co
ρP ₁ hv		Massive rh

Alternation of sandstones, tuffitic sandstones with layers of coarse-grained conglomerates and of undifferentiated volcanites

Massive rhyolite and rhyolitic crystalline tuffs

Description of geological unit in legend has a descriptive (petrographic character), completed by genetic information for Quaternary sediments and volcanoclastic rocks





Sedimentary (volcanosedimentary) unit

Litostratigraphic unit: colour, grain-size, composition
characteristic attribute, name of rock(s), supplemental
information





Sedimentary unit

Litostratigraphic unit: colour, grain-size, composition characteristic attribute, name of rock(s), supplemental information

White-creek Fm:



Lithostratigraphic units are bodies of rocks, bedded or unbedded, that are defined and characterized on the basis of their lithologic properties and their stratigraphic relations.

Lithostratigraphic unit is the basic unit of geological mapping.

https://engineering.purdue.edu/Stratigraphy/strat_guide/litho.html

Supergroup
Group

Formation

Member





Sedimentary unit

Litostratigraphic unit: colour, grain-size, composition characteristic attribute, name of rock(s), supplemental information

White-creek Fm:





Sedimentary unit

Litostratigraphic unit: **colour**, grain-size, composition
characteristic attribute, name of rock(s), supplemental
information

No-name Fm: **brown**





Sedimentary unit

Litostratigraphic unit: colour, **grain-size**, composition
characteristic attribute, name of rock(s), supplemental
information

No-name Fm: brown **fine grained**





Sedimentary unit

Litostratigraphic unit: colour, grain-size, **composition**, characteristic attribute, name of rock(s), supplemental information

No-name Fm: brown fine grained **micaceous**





Sedimentary unit

Litostratigraphic unit: colour, grain-size, composition
characteristic attribute, name of rock(s), supplemental
information

No-name Fm: brown fine grained micaceous **limonitic**





Sedimentary unit

Litostratigraphic unit: colour, grain-size, composition
characteristic attribute, **name of rock(s)**, supplemental
information

No-name Fm: brown fine grained micaceous limonitic
sandstones





Sedimentary unit

Litostratigraphic unit: colour, grain-size, composition characteristic attribute, name of rock(s), **supplemental information**

No-name Fm: brown fine grained micaceous limonitic sandstones **with tuffaceous admixture**





Magmatic and metamorphic units

grain-size, texture, mineral composition, name of rock(s),
supplemental information





Magmatic and metamorphic units

grain-size, texture, mineral composition, name of rock(s),
supplemental information

Medium-grained stromatitic biotitic migmatite with
sillimanite





Magmatic and metamorphic units

grain-size, **texture**, mineral composition, name of rock(s),
supplemental information

Medium-grained **stromatitic** biotitic migmatite with
sillimanite





Magmatic and metamorphic units

grain-size, texture, mineral composition (max two minerals), name of rock(s), supplemental information

Medium-grained stromatitic biotitic migmatite with sillimanite





Magmatic and metamorphic units

grain-size, texture, mineral composition, **name of rock(s)**,
supplemental information

Medium-grained stromatitic biotitic **migmatite** with
sillimanite





Magmatic and metamorphic units

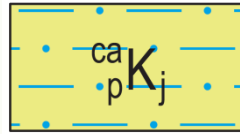
grain-size, texture, mineral composition, name of rock(s),
supplemental information

Medium-grained stromatitic biotitic migmatite with
sillimanite





Index



Index of geological unit is used for unique identification of legend unit in a map

Generally, index is composed from body which expresses main stratigraphic and lithological information and symbols in lower and upper cases, which characterize supplemental signs

The index building slightly differs for sedimentary, volcanic, igneous and metamorphic rocks





Sedimentary rocks

te¹
li So_{ls}

Body of index

S – system

o – series

1 – lower, 2 – middle/upper, 3 – upper

Symbols in upper and lower cases

te – expressive sign (*characteristic texture, mineral, colour, admixture, matrix, texture, genesis, grain size etc.*)

li – dominant lithology

ls – lithostratigraphic or geologic unit



Chronostratigraphic indexes

Sytem	Series	Index
Quaternary		Q
	Holocene	Qh
	Pleistocene	Qp
Neogene		N
	Pliocene	N2
	Miocene	N1
Paleogene		p
	Oligocene	p 3
	Eocene	p 2
	Paleocene	p 1
Cretaceous		K
	Upper C.	K2
	Lower C	K1
Jurassic		J
	Upper J.	J3
	Middle J	J2
	Lower J.	J1
Triassic		T
	Upper T.	T3
	Middle T.	T2
	Lower T.	T1
Permian		P
	Lopingian	P3
	Guadalupian	P2
	Cisuralian	P1

System	Series	Index
Carboniferous		C
	pennsylvanian	C2
	mississippian	C1
Devonian		D
	Upper D.	D1
	Middle D.	D2
	Lower D.	D3
Silurian		S
	Pridoli	S4
	Ludlow	S3
	Wenlock	S2
	Llandovery	S1
Ordovician		O
	Upper O.	O1
	Middle O.	O2
	Lower O.	O3
Cambrian		Є
	Furongian	Є4
	Series 3	Є3
	Series 2	Є2
	Terrenuvian	Є1
Erathem		
Neoproterozoic		NP
Mezoproterozoic		MP
Paleoproterozoic		PP

Important sedimentary textures and genic feature (te)

bd	biodetritic
if	ichnofossil
bi	existence of bitumene
ca	carbonaceous rocks, admixture
cb	cross bedding
dt	detritic
e	eolian sediment, admixture
f	fluvial sediment
fy	flysh sediment
fw	fossil weathering
g	glacial sediments
ch	chaotic texture
co	coral sediments
l	limnic sediments
la	lamination
mv	massive texture
my	mylonitization
bo	biogenic rock
vc	variocoloured
ry	rhytmite
s	spotted
si	silicification
t	tuffaceous admixture

Sedimentary lithology (li)

a	arcose
b	breccia
d	dolomite
di	diatomite
e	evaporite
cy	clay, claystone
sh	shale
c	conglomerate
l	loes
ld	lydite
s	sandstone
q	quartzite
r	siltstone
ra	radiolarite
ch	chert
m	marl
sg	spongilite
g	gravel
co	coal
li	limestone
w	grauwacke

Coherent volcanic rocks

te¹
mi¹ rSo¹_{ls}

Body of index

r – rock, small letter of Greek alphabet

S – system

o – series

1 – lower, 2 – middle/upper,

3 – upper, (used according to stage of knowledge)

Pyroclastic rocks

ge¹
rSo¹_{ls}

Symbols in upper and lower cases

te – texture

mi – characteristic mineral

ge – genetic type

ls – lithostratigraphic (regional) unit





Coherent volcanic rock (r)

α	andezite
β	bazalt
βα	basaltic andezite
η	bazanite
ζ	dacite
φ	foidite
υ	phonolite
ω	pikrite, polzenite
ρ	rhyolite
ψ	tefrite
τα	trachyandezite
τβ	trachybazalt
τ	trachyte

Textural and genetic specification of volcanic rocks (te)

f	fluidal
gt	granulate
la	lamination
an	amygdaloidal
mv	massive
my	mylonitic
p	porphyric
pl	pillow lavas
gs	glassy
v	vitritophyric
vl	variolitic
s	stratification
at	altered
e	effusive
ep	epiclastic
fr	freatomagmatic

Pyroclastic rocks - genetic types (ge)

b	breccia
ig	ignimbrite
l	lappili-stone
la	lahar
p	pumice
s	scoria
t	tuff



Igneous (plutonic) rocks

Metamorphic rocks

te
gs **rSmi**_{ls}

te
gs ***Rmi***_{ls}

Body of index

r – rock, small letter of Greek alphabet
S – system
mi – significant minerals

Body of index

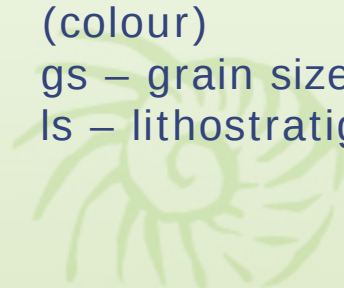
R – rock, large (orthometamorphites) or small (metasediments) letter in italic
mi – significant minerals

Symbols in upper and lower cases

te – texture or other expressive sign (colour)
gs – grain size
ls – lithostratigraphic or geologic unit

Symbols in upper and lower cases

te – texture or other expressive sign (colour)
gs – grain size
ls – lithostratigraphic or geologic unit



Igneous (plutonic) rocks (r)

l	aplite
δ	diorite
δq	quartz diorite
v	gabbro
vδ	gabbrodiorite
γ	granite
γδ	granodiorite
hσ	hornblendite
av	hyperite
si	quartz vein
χ	lamprophyre
pv	norite
κ	pegmatite
σ	peridotite
γπ	porphyric microgranite
vπ	porphyric microgabbro
γδπ	porphyric microgranodiorite
ξπ	porphyric microsyenite
δπ	porphyric mikrodiorite
pσ	pyroxenite
ξ	syenite, monzonite
ξδ	syenodiorite
ξv	syenogabbro
δ'	diorite dyke
γ'	granite dyke
γδ'	granodiorite dyke
ξ'	syenite dyke

Textures and expressive signs of igneous rocks (te)

al	alkalic
at	altered
s	schistosed
b	brecciated
en	enclave
l	leukocratic
la	lamination
ml	melanocratic
mv	massive
my	mylonitic
p	porphyric

Grain size (gs)

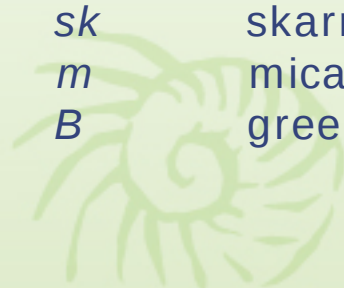
m	massive
f	fine-grained
m	medium-grained
c	coarse-grained

Metamorphic rocs (*R*)

<i>A</i>	amphibolite
<i>s</i>	schist
<i>E</i>	eklogite
<i>e</i>	erlan, calc-silicate rock
<i>ph</i>	phyllite
<i>vA</i>	gabbroamfibolite
<i>Gr</i>	granulite
<i>h</i>	hornfels
<i>v</i>	crystallic limestone (marble)
<i>q</i>	quartzite
<i>^mβ</i>	metabazalt
<i>M</i>	migmatite
<i>G</i>	orthogneiss
<i>g</i>	gneiss, paragneiss
<i>S</i>	serpentinite
<i>sk</i>	skarn
<i>m</i>	mica schist
<i>B</i>	greenschist

Textures and expressive signs of metamorphic rocks (*te*)

<i>a</i>	agmatitic
<i>ca</i>	carbonatic
<i>f</i>	phlebitic
<i>i</i>	injected
<i>c</i>	cataclastic
<i>l</i>	leucocratic
<i>M</i>	migmatitized
<i>ml</i>	melanocratic
<i>mv</i>	massive
<i>my</i>	mylonitic
<i>n</i>	nebulitic
<i>o</i>	ophtalmitic, augen
<i>la</i>	laminated
<i>po</i>	porhyroblastic
<i>q</i>	quartzitic
<i>s</i>	stromatitic



Minerals (mi)

mineral	index	abb.*
actionolite	ak	Act
albite	ab	Ab
almandine	al	Alm
hornblende	h	Amp
analcime	ac	Anl
andalusite	ad	And
andesine	as	
anhydrite	ah	Anh
ankerite	ai	Ank
anorthite	an	An
anortoklase	ao	Ano
antophyllite	ay	Ath
apatite	ap	Ap
arfvedsonite	af	Arf
augite	ag	Aug
axinite	ax	Ax
baryte	ba	Brt
beryl	be	Brl
biotite	b	Bt
bronzite	bz	
brucite	bc	Brc
bytownite	by	
zinnwaldite	zw	Znw
cordierite	co	Crd
datolite	da	Dat
dialage	dl	
diopside	dp	Di
dolomite	do	Dol
aegirine	ae	Aeg
enstatite	en	En

epidote	e	Ep
phlogopite	pl	Phl
fluorite	fl	Fl
fuchsite	fu	
gedrite	gd	Ged
glaucophane	gl	Gln
glaukonite	gk	Glt
graphite	gf	Gr
garnet	g	Grt
grosular	gr	Grs
halloysite	hl	
hauyn	ha	Hyn
hedenbergite	he	Hd
haematite	hm	Hem
humite	hu	Hu
hypersthene	hy	Hyp
chalcedona	cl	
chamosite	cm	Chm
chiastolite	ch	
chlorite	c	Chl
chloritoide	cd	Cld
chromite	cr	Chr
ilmenite	i	Ilm
jadeite	j	Jd
calcite	ca	Cal
cancrinite	cc	Ccn
kaolinite	k	Kln
cassiterite	cs	Cst
corundum	co	Crn
quartz	q	Qz
cyanite	ky	Ky
labradore	la	

lepidolite	le	Lpd
leptochlorite	lc	
leucite	l	Lct
limonite	lm	Lm
litionite	li	
magnetite	mt	Mag
magnezite	mg	Mgs
marcasite	ma	Mrc
talk	tk	Tlc
melilite	me	Mll
microcilen	mi	Mc
monazite	mz	Mnz
monticellite	mc	Mtc
montmorillonite	mo	Mnt
muscovite	m	Ms
nepheline	n	Nph
nosean	no	Nsn
oligoklase	ol	
olivine	o	Ol
omfacite	om	Omp
opal	op	Opl
orthite	or	
orthoclase	ok	Or
otrelite	ot	
ozokerite	oz	
paragonite	pa	Pg
periklase	pe	Per
phillipsite	ph	Php
plagioclase	pg	Pl
prehnite	pr	Prh
pumpellyite	pu	Pmp
pyrrhotine	pn	Po

pyrite	py	Py
pyrope	po	Prp
pyroxene	p	Pyx
rutile	r	Rt
gypsum	gi	Gp
sanidine	sa	Sa
sericite	s	Ser
serpentine	se	Srp
siderit	sr	Sd
sillimanite	si	Sil
scapolite	sk	Scp
sodalite	so	Sdl
spessartine	sn	Sps
spinel	sp	Spl
staurolite	st	St
stilpnomelane	sm	Stp
halite	sl	Hal
thuringite	th	
titanaugite	ta	
titanite	ti	Ttn
titanomagnetite	tm	
topaz	to	Top
tremolite	tr	Tr
tourmaline	t	Tur
wollastonite	wo	Wo
wolframite	w	
zeolite	z	Zeo
zircon	zr	Zrn
zoisite	zt	Zo
feldpars	f	Fsp



Exercise – creation of legend index

[Link to legend](#)

[Link to index](#)





Map symbols - expresses aerial, line and point geological phenomena superposed on geological units.

- Lithological (unit) boundaries
- Tectonic lines
- Structural elements
- Paleontological symbols
- Superposed geological and geodynamic phenomena
- Occurrence and exploitation of raw materials
- Hydrogeological elements
- Documentation symbols

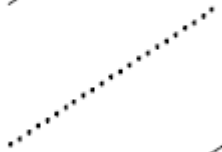




Lithological boundaries



Geological boundary, observed



Boundary of lithological transition



Geological boundary, approximate, presumed



Tectonic lines

	Fault, observed
	Fault, inferred
	Fault, concealed
	Normal fault, observed
	Normal fault, inferred
	Normal fault, concealed
	Thrust fault, observed
	Thrust fault, inferred
	Thrust fault, concealed
	Reverse fault, observed
	Reverse fault, inferred



Structural elements



37

Strike and dip of beds



Strike of subvertical beds



Subhorizontal bedding



29

Strike and dip of cleavage



Strike of subvertical cleavage



23

Strike and dip of foliation



36

Bearing and plunge of lineation



28

Bearing and plunge of fold axis



32

Ripple marks



Paleontological symbols

	Fossil microflora
	Ichnofossil
	Fossil macrofauna
	Fossil macroflora
	Fossil vertebrata
	Microfossil





Superposed geological and geodynamic phenomena

	flute cast
	imbrication
	landslide
	active landslide
	blocky landslide
	single rocky block
li	limonitization



Occurrence and exploitation of raw materials

	Active mine
	Abandoned mine
	Active quarry
	Abandoned sand-pit
	Active clay-pit
	Abandoned placer



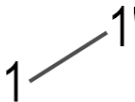


Hydrogeological elements

	Underground water spring
	Spring area
	Mineral water spring
	Thermal water spring



Documentation symbols

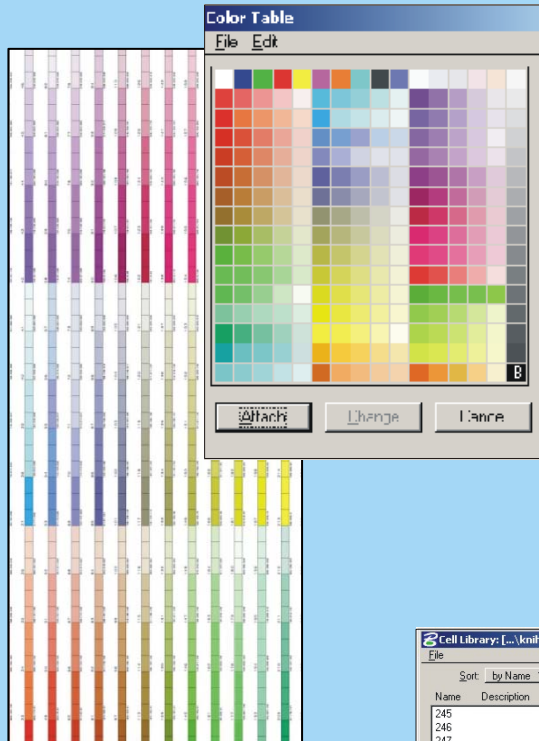

Geological cross section

●	Economic borehole
⊙	Other borehole
⊙	Mapping borehole
◦	Important geological site

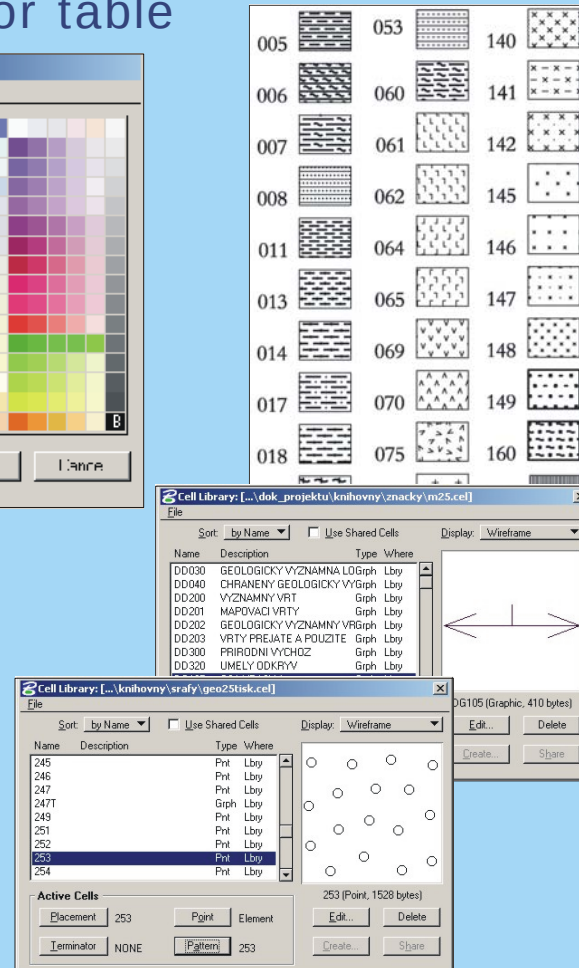


CGS has prepared own symbols library

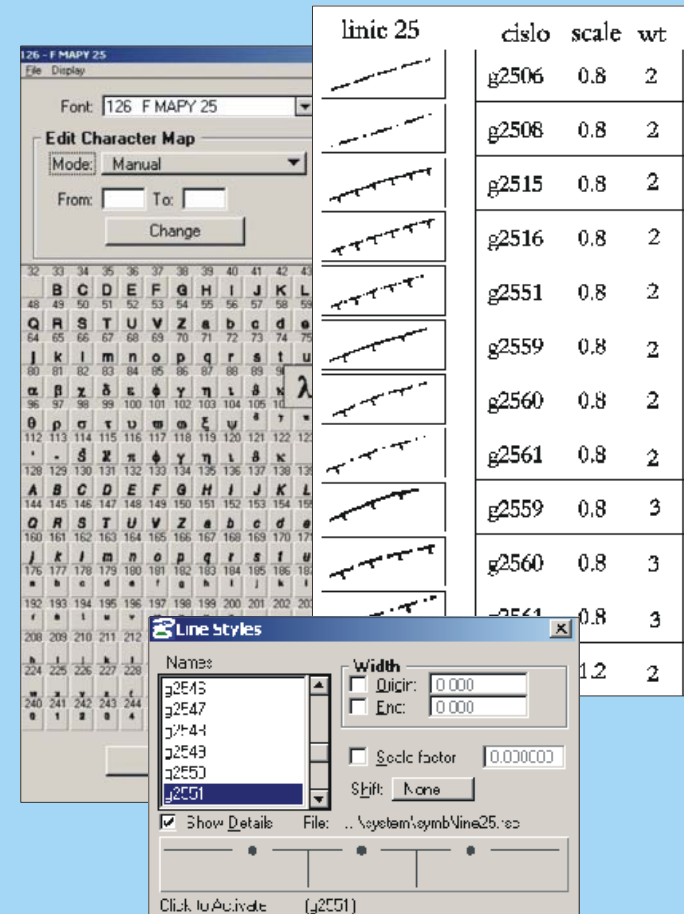
Microstation color table



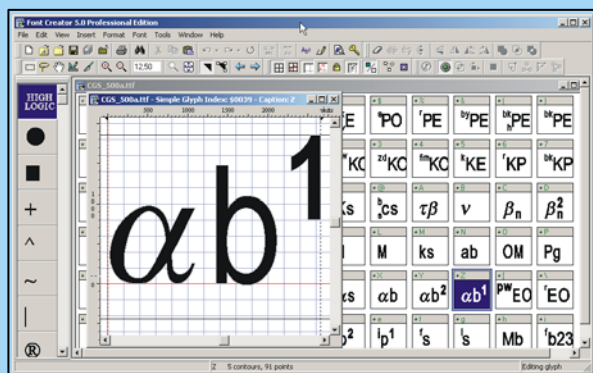
Microstation cell library



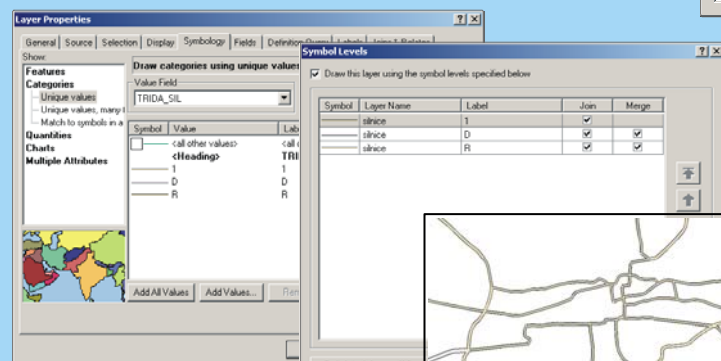
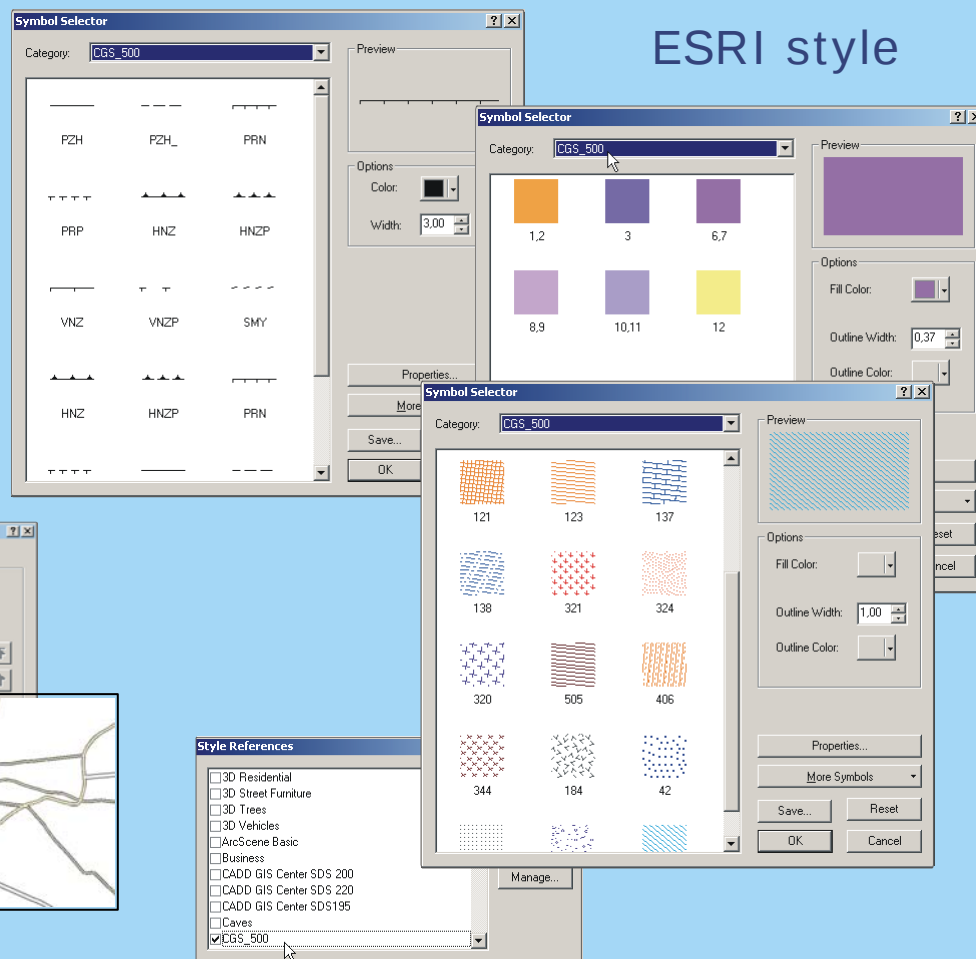
Microstation rsc library



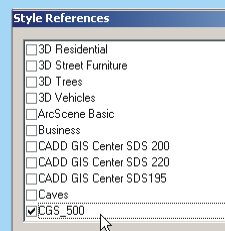
True Type Fonts



ESRI style



ArcMap Symbol Levels





Sources of geological symbols

Symbols library

Corel Draw

<http://www.geologynet.com/corel.htm>

<http://pangaeasci.com/index.php?page=rfill>

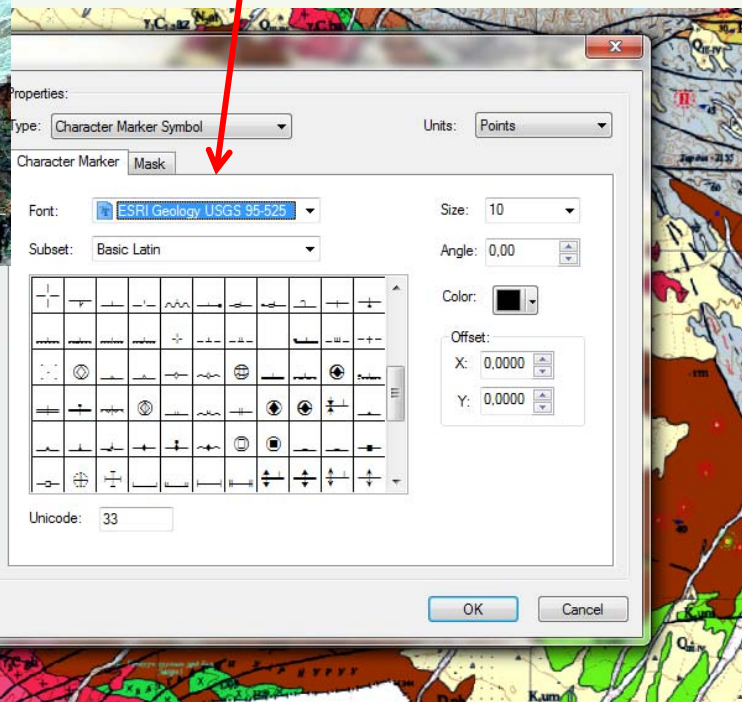
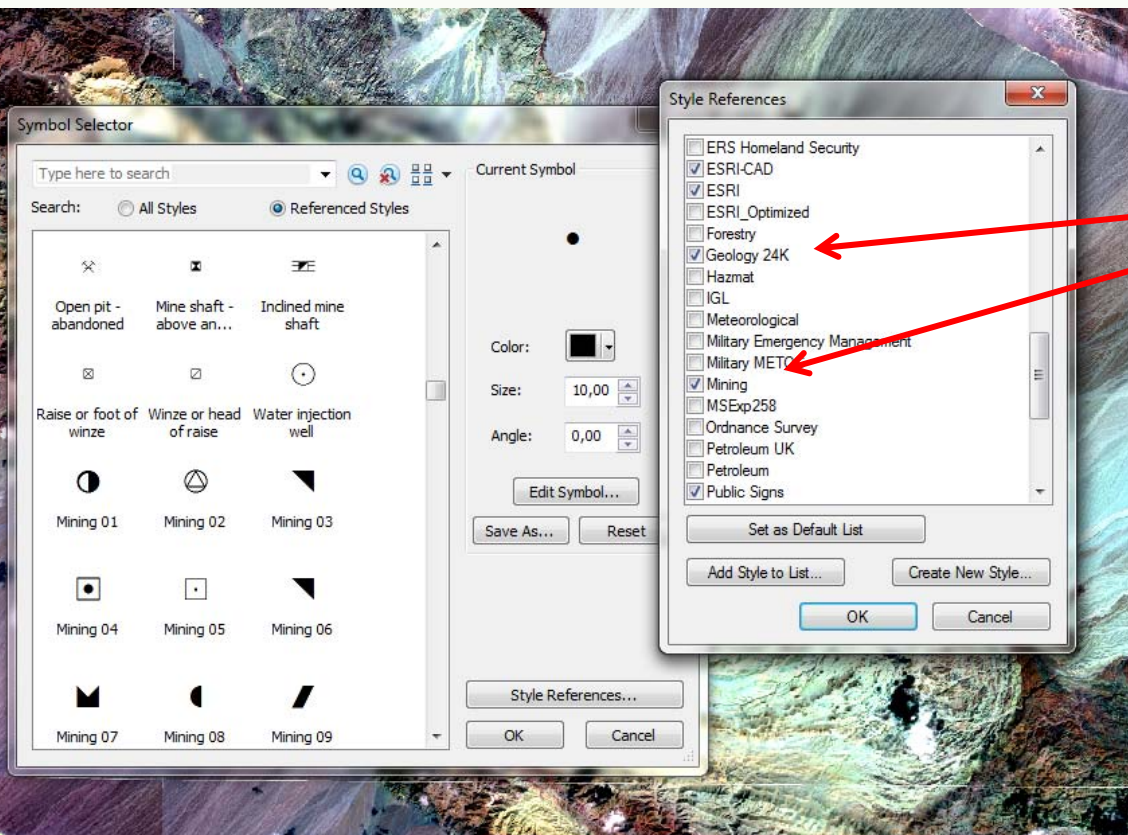
<http://pubs.usgs.gov/of/1995/ofr-95-0526/downloads/>

Complete library

[USGS Digital Cartographic Standard for Geologic Map
Symbolization](#)

http://ngmdb.usgs.gov/fgdc_gds/geolsymstd.php





Arc GIS default
library



Legend structure



Regional approach

Legend

Cenozoic deposit

Cs sebkha (clay with gypsum) **Cr** sand dune and reg **Ca** hammada

dyke (post-Birimians)

LVb basic rock **LVi** intermediate rock **LVa** acidic rock

Anajim Guebli unit

AGgt tonalite and granodiorite (locally including melanocratic-leucocratic bands, and xenoliths of amphibolite & leptynite)

Sfariat igneous complex

SFgd granodiorite, tonalite, quartz diorite (locally porphyroid)
SFmg granodiorite, tonalite, quartz diorite (locally porphyroid & mylonitic foliation)
SFgy foliated megacrystalline rose granite

Adam Esseder igneous complex

AEn rose monzogranite
AEgr xenolith-rich rose monzogranite, granodiorite, and diorite (locally gneissose)
AEgb gabbro, leucogabbro, diorite, ultrabasicite

Rich Anajim unit

RAgn garnet-bearing migmatitic gneiss (with garnet-bearing calcic gneiss & aplite lenses)
RAmg shist, gneiss, (proto-)mylonitic granite and aplite
RAgv amphibole-bearing migmatitic gneiss (with lenses of meta-sediments & meta-volcanics)
RAqz BIF
RAqc BIF, crystalline limestone
RAqz Guelb Zednes formation (BIF, amphibolite, kyanite-mica schist, meta-conglomerate)

Gleibat Tenebdar unit

GTog biotite/amphibole granodiorite, amphibole tonalite
GTor heterogeneous gneissose granodiorite

Tmeimichat unit

TMgr amphibolite, norite, quartz diorite, coarsed leptynite (locally foliated)
TMab gneissose amphibolite chert, marble, pyroxenite, serpentinite
TMma schistose/gneissose rocks (diorite, mylonitic granite, amphibolite)

Adam Anajim unit

AAgn biotite band-bearing migmatitic gneiss

lineation of mineral
foliation

gneissosity
schistosity

fault
concealed/inferred fault
thrust

strike-slip fault
axis of synform

⊕ mineral deposit
• locality of dating sample
• locality of observation

Chronostratigraphical approach

CENOZOIC	Quaternary		 Alluvium (Qal)
			 Quaternary undivided (Qu)
	Tertiary	2 m.y.	 Beaumont Formation (Qb)
		Pliocene 5 m.y.	 Lissie Formation (Ql)
		Miocene 24 m.y.	 Blackwater Draw Formation (Qbd)
		Oligocene 38 m.y.	 Willis Formation (Pow)
		Eocene 58 m.y.	 Ogallala Formation (PoMo)
			 Goliad Formation (Mog)
			 Fleming and Oakville Formations (Mof)
			 Catahoula Formation (Oc)
MESOZOIC	Paleocene	 Oligocene and Eocene undivided (OE) (volcanic rocks and conglomerates in Trans-Pecos Texas)	
		 Jackson Group (Whitsett, Manning, Wellborn, Caddell, Yazoo, and Moodys Branch Fms.) (Ej)	
	Cretaceous	 Claiborne Group (Yegua Formation) (Ec2)	
		 Claiborne Group (Cook Mountain, Sparta, Weches, Queen City, and Reklaw) (Ec1)	
		 Wilcox and Midway Groups (EPA)	
		 Navarro and Taylor Groups (Ku2)	
		 Austin, Eagle Ford, Woodbine, and U. Washita Groups	
		 Fredericksburg and L. Washita Groups (KI2)	
		 Trinity Group (KI1)	
		 Cretaceous undivided (Ku)	
Jurassic Triassic 245 m.y.	 Jurassic Triassic undivided (JT)		





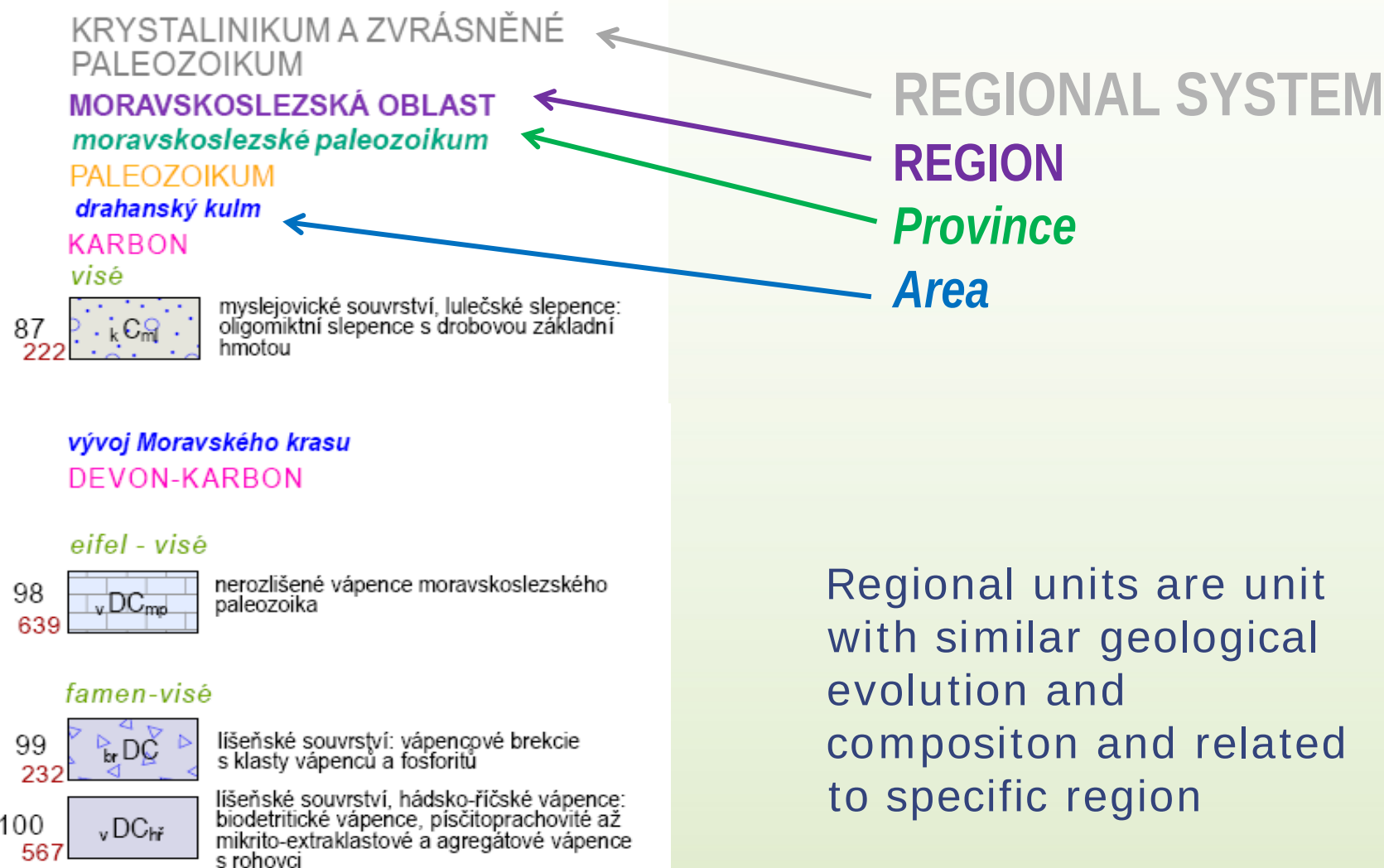


Legend is compiled in logical structure according to regional-geologic and chronostratigraphic units

Logical blocks are introduced by heading and subheadings expressing regional (lithostratigraphic) and chronostratigraphic classification



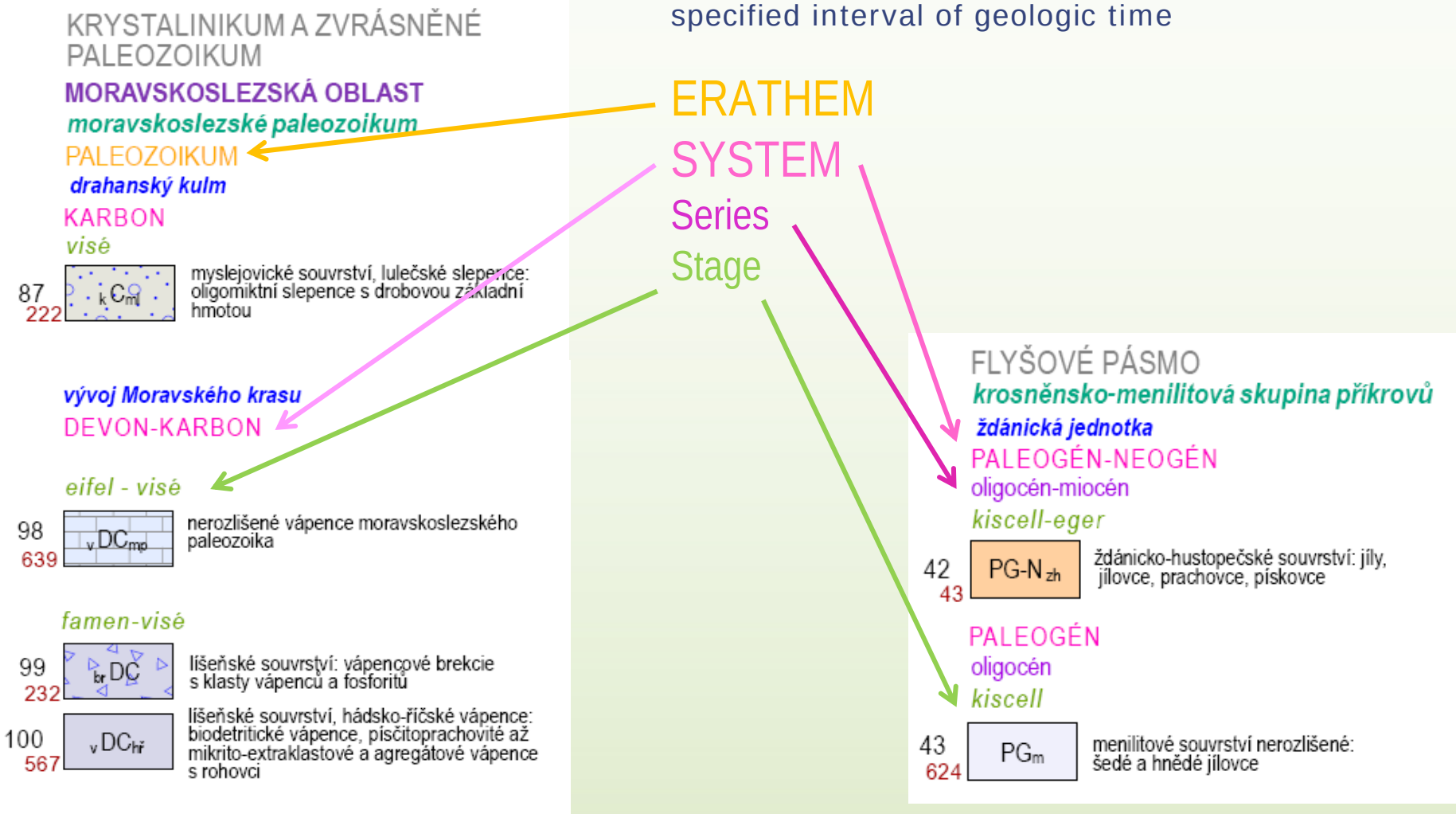
Regional Hierarchy



Regional units are unit with similar geological evolution and composition and related to specific region

Chronostratigraphic Hierarchy

Chronostratigraphic units are bodies of rocks, layered or unlayered, that were formed during a specified interval of geologic time





How to compile a geological legend?

Graphic version

Excel

Word

Corel Draw

...

combined with hand writing



12		j C al	P 58	slánské souvrství (svrchní šedé), nerozlišené: jílovce, prachovce, pískovce
13		p C ot	P 45	slánské souvrství, otrubské vrstvy: pískovce, červenozelené prachovce
14		j C ml	P 56	slánské souvrství, malesické vrstvy: šedé jílovce a prachovce, jemnozrnné pískovce
15		p C jl	P 42	slánské souvrství, jelenické vrstvy: pískovce a slepence, zelenošedé prachovce
16		p C t	P 37	týnecké souvrství (spodní červené): pískovce a slepence, červenohnědé prachovce

KRYSTALINIKUM A ZVRŠNĚNÉ PALEOZOIKUM
BOHEMIKUM (středočeská oblast)
barrandienské proterozoikum
intruzivní horniny v barr

PALEOZOIKUM
devon
čistěcko-jesenicko-louns

17*	
18*	
19*	

kambrium
čistěcko-jesenicko-louns

20*				
21*		l jyl	T 5 s.	jemnozrnný, leukokráttní granitový aplit
22*		jylπs	T 6	jemnozrnný, biotitický granit/granodioritový porfyr, místy s granátem a amfibolem
23*		m jδπs	T 8 s	jemnozrnný, melanokráttní amfibolický křemendioritový metaporfyr
24*		sylb	T 5	středně zrnitý, biotitický granit, místy porfyrický, s granátem, cordieritem a turmalinem "jesenický typ"
25*		p sylb	T 5	středně zrnitý, porfyrický biotitický granit, místy mylonitizovaný "typ Blatno"
26*		hylb	T 5	hrubozrnný, biotitický granit, místy slabě porfyrický a usměrněný "tiský typ"
27*		sylδ b	T 6	středně zrnitý, biotitický granodiorit, místy slabě porfyrický a usměrněný „petrohradský typ"
28*		mv sylδb	T 6	středně zrnitý, mylonitizovaný biotitický granodiorit „lubenecký typ"

Legenda k základní geologické mapě list Zbytiny č. 32-122

sestavili: V. Štědrá a J. Šebesta (2012)

Kvartérní pokryv

Kenozoikum

Kvartér

Kvartér denudačních oblastí Českého masivu

holocén

- | | | | |
|---|--|-----------------|---|
| 1 | | ^{ah} Q | antropogenní uloženiny: haldy |
| 2 | | ^{av} Q | antropogenní uloženiny: navážky |
| 3 | | ^{ak} Q | antropogenní uloženiny: komunální odpad |
| 4 | | ^h Qh | sedimenty vodních nádrží, vodní plochy |

For manuscript OK, but for GIS processing insufficient

Svrchní paleozoikum

Žilné horniny v moldanubiku

- | | | | |
|----|--|-------------------|---|
| 12 | | sl _{mo} | žilný křemen |
| 13 | | zl _{mo} | pegmatit |
| 14 | | lgt _{mo} | leukokráttní turmalin-muskovitický granit |
| 15 | | gp _{mo} | granitový porfyr |
| 16 | | dp _{mo} | dioritový porfyr |

Intruzivní horniny v moldanubiku

- | | | | |
|----|--|------------------|---|
| 17 | | gb _{mo} | drobně zrnitý biotitický granit až granodiorit |
| 18 | | dg _{mo} | drobně zrnitý biotit-muskovitický granit s granátem |
| 19 | | Px _{mo} | flogopitický pyroxenit (přibližný durbachitům) |

Geological Unified Legend

G_LEGEND - ArcMap - ArcInfo

File Edit View Insert Selection Tools Window Help

1:50 000

LEGEND

Platform Cover
CENOZOIC

QUATERNARY
Holocene

Qh Gravelly silty sands (fluvial sediments of intermittent streams)

*Qh Fine- to medium-grained sands and silts, locally containing coarser clasts (eolian, colluvio-eolian sediments)

**Qh Silty clays and sands, locally with lenses of gravels (lacustrine, lacustro-eolian and lacustro-fluvial sediments)

***Qh Gravelly silty sands (sediments of alluvial fans)

Qh Laminated silty clays (lacustrine sediments)

Qh Gravelly, rarely sands and silty sands (colluvial sediments)

Pleistocene-Holocene

*Qp Gravelly silty sands (sediments of alluvial fans and colluvial sediments)

Qp Gravelly silty sands (fluvial sediments)

QUATERNARY-TERTIARY
Neogene-Pleistocene

N-Q Silty sands containing coarser clasts, locally breccias (sediments of alluvial fans)

TERTIARY
Mesozoic

iD gc
βD gc
*βD gc
ζD gc
Takhitt
D th
sD th
iD th
βD th
SILURIA
Middle S
Wenlock
Khutag
Sht
sSht
iSht

Identify

Identify from: <Top-most layer>

TITLE_
IS2ht

Location: 429 898,545 5 051 709,596 Meters

Field	Value
NO_	38
ORDER_	40
ROCK_	Limestones
INDEX_	IS2ht
UNIT_	Khutag Nuur Formation
EPOCH_	Middle Silurian
PERIOD_	SILURIAN
AREA_	Mongolian Altay Zone
HYDRO_	4
SHEET_89A	no data
SHEET_89B	no data
SHEET_89V	no data
SHEET_89G	no data
SHEET_90A	no data
SHEET_90B	no data
SHEET_90V	no data
SHEET_90G	no data
SHEET_101A	no data
SHEET_101B	M
SHEET_101G	M
ERA_	PALAEOZOIC
AGE	Wenlock-Ludlow
Code of the geological unit	SHT
Structural level	Lower Middle Palaeozoic MAZ
leg_no	<null>

Identified 1 feature

430030,82 5051722,82 Meter

Parameters of legend's feature table

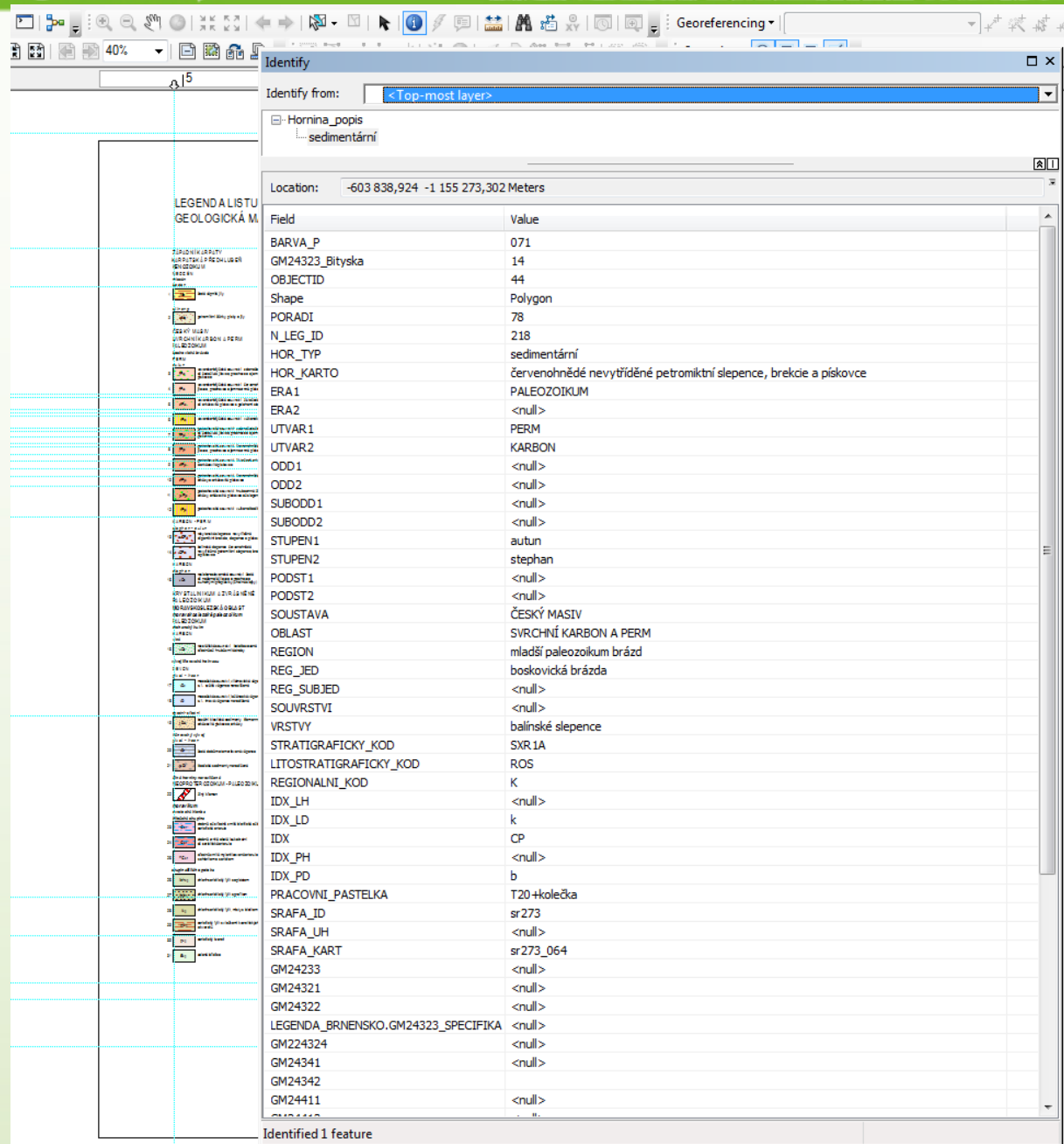
Technical parameters

Units description

Chronostratigraphic data

Regional data

Existence on map sheet



The screenshot shows a software interface with a map on the left and a detailed feature table on the right. The map displays a geological unit with a legend on the left side. The feature table is titled 'Identify' and shows the following data:

Field	Value
BARVA_P	071
GM24323_Bityska	14
OBJECTID	44
Shape	Polygon
PORADI	78
N_LEG_ID	218
HOR_TYP	sedimentární
HOR_KARTO	červenohnědé nevytříbené petromiktní slepence, brekie a piskovce
ERA1	PALEOZOIKUM
ERA2	<null>
UTVAR1	PERM
UTVAR2	KARBON
ODD1	<null>
ODD2	<null>
SUBODD1	<null>
SUBODD2	<null>
STUPEN1	autun
STUPEN2	stephan
PODST1	<null>
PODST2	<null>
SOUSTAVA	ČESKÝ MASIV
OBLAST	SVRCHNÍ KARBON A PERM
REGION	mladší paleozoikum brázd
REG_JED	boskovická brázda
REG_SUBJECT	<null>
SOUVRSTVI	<null>
VRSTVY	balinské slepence
STRATIGRAFICKY_KOD	SXR1A
LITOSTRATIGRAFICKY_KOD	ROS
REGIONALNI_KOD	K
IDX_LH	<null>
IDX_ID	k
IDX	CP
IDX_PH	<null>
IDX_PD	b
PRACOVNI_PASTELKA	T20 +kolečka
SRAFA_ID	sr273
SRAFA_UH	<null>
SRAFA_KART	sr273_064
GM24233	<null>
GM24321	<null>
GM24322	<null>
LEGENDA_BRNENSKO_GM24323_SPECIFIKA	<null>
GM224324	<null>
GM24341	<null>
GM24342	<null>
GM24411	<null>





Technical parameters

Leg_ID – unique identification of legend unit, integer No, labelling of polygon in the geological map

Order No – sequence No in accordance with geology, integer No

Index – syntax of geological index in technical record

<CLR black='97'>_k</CLR>CP<CLR black='95'>_b</CLR>

Colour, hatch – number (code) from library

[link to colour](#)

[link to hatch](#)





Description of geological unit

Unit_DCSR - petrographic description of rock(s) in unified legend

(colour, grain-size, composition characteristic attribute, name of rock(s), supplemental information)

Map_Order - order (and existence) on the given map sheet

Map_spec - difference from description in unified legend





Chronostratigraphic units – the bodies of rocks that includes all rocks formed during a specific interval of geologic time, and only those rocks formed during that time span.

Eratem

Sytem

Series

Stage

Two columns - FROM and TO - should be in legend table

<http://www.stratigraphy.org/upload/bak/chron.htm>



Regional Units – geological unit of similar evolution related to some geographic region. The size and the borders of each region are defined by geologically significant boundaries and by the occurrence of similar geologic processes.

Region

Province

Area





Lithostratigraphical Units

Group - a grouping of adjacent formations, sharing some shared lithological characteristics or genesis.

Formation - a mappable unit with relatively homogeneous lithological characteristics which allow it to be distinguished from adjacent formations.

Member - a subdivision of a formation; these may be laterally discontinuous.

Bed - a lithologically distinct horizon or layer





Exercise – preparation of legend's table

[Link to table](#)

[Link to colours](#)

[Link to hatch](#)

[Link to legend](#)





Questions?

