



Gamma-ray survey in the geological research (KRNAP area, Czech Republic)

Měření gamaspektrometrie v rámci geologického
mapování (Krkonoše, Česká republika)

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Research area (Czech Republic)



5 maps of scale 1: 25 000

- Harrachov
- Špindlerův Mlýn
- Horní Maršov
- Horní Úpa
- Horní Mísečky

Aim of project:

Geological maps + text
(geology, tectonic, geophysics,
hydrogeology, geochemistry,
engineering geology, deposits,
interaction with environment)

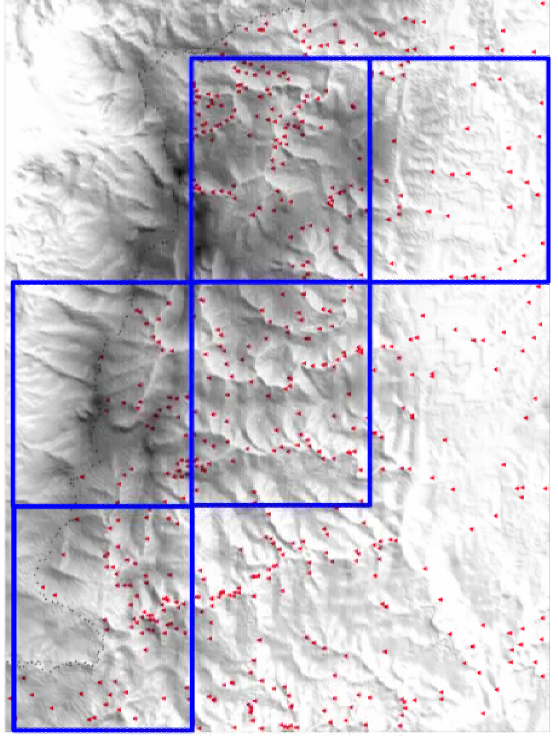


Geophysical equipments

Gamma-ray spectrometers (GS 256 a GRM 2560)

Proton-resonance magnetometer (PM-2)
Magnetic susceptibility meter





This is a detailed geological map of the area around the mouth of the Mississippi River. The map is oriented with North at the top. Key features include the Mississippi River, Lake Pontchartrain, and the Gulf of Mexico. The map is color-coded to represent different geological units, with a legend provided on the right side. The legend includes the following entries:

- Quaternary (light blue)
- Pleistocene (dark blue)
- Pliocene (light green)
- Pleistocene (dark green)
- Pliocene (light yellow)
- Pleistocene (dark yellow)
- Pliocene (light orange)
- Pleistocene (dark orange)
- Pliocene (light red)
- Pleistocene (dark red)
- Pliocene (light pink)
- Pleistocene (dark pink)
- Pliocene (light purple)
- Pleistocene (dark purple)
- Pliocene (light brown)
- Pleistocene (dark brown)
- Pliocene (light grey)
- Pleistocene (dark grey)
- Pliocene (light black)
- Pleistocene (dark black)

The map also shows various cities and towns, including New Orleans, Lake Charles, and Lake St. Charles. It includes a scale bar and a north arrow.

➤ airborne data 1 : 200 000
(natural radioactivity)

► petrophysical data



Gamma-ray surveying in the field



Measurement of the content of naturally occurring radioactive elements (potassium, thorium, uranium) on the rock in the field.

300 localities



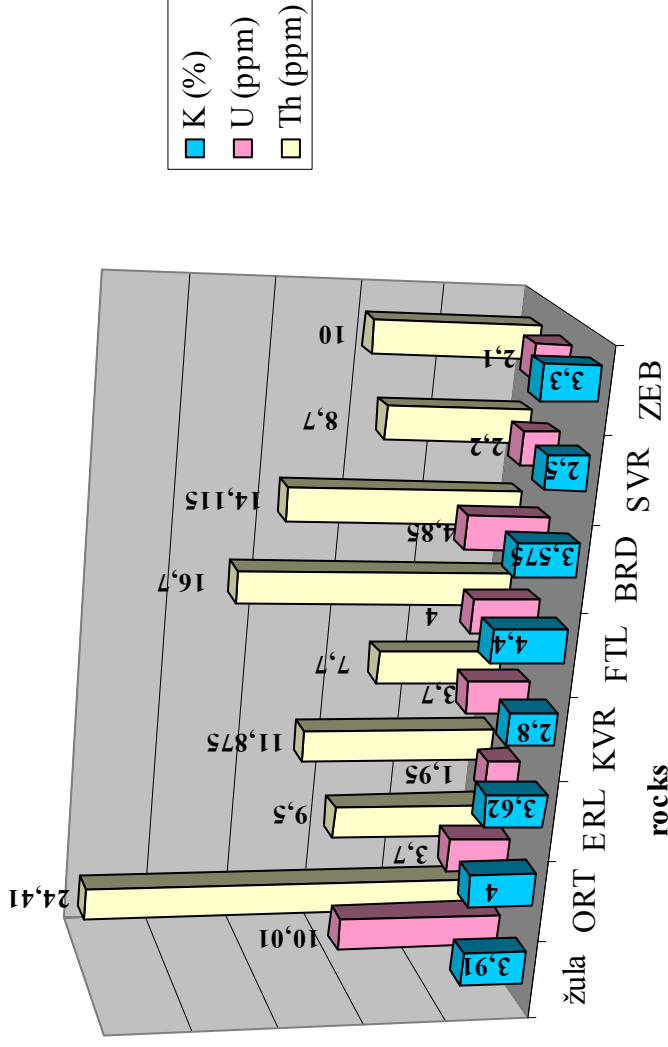


Statistics (relation with laboratory measurements)

Rock	Contents of radioactive elements (median)		
	K %	Th ppm	U ppm
quarzite	2,8 (1,2)	7,7 (14,5)	3,7 (2,3)
erlan	3,1 (1,2)	11,9 (3,9)	2,0 (2,5)
crystalline schist	3,4	13,5	4,6
orthogneiss	4,0 (4,01)	9,5 (9,8)	3,7 (3,7)
granite	3,9 ± 0,5 (3,63)	24,2 ± 6 (26,15)	9,6 ± 5 (9,7)
granite (porphyritic)	3,82	24,08	8,78
granite (no porphyritic)	4,06	26,34	11,54
granite (aplite)	3,99	26,3	14,06

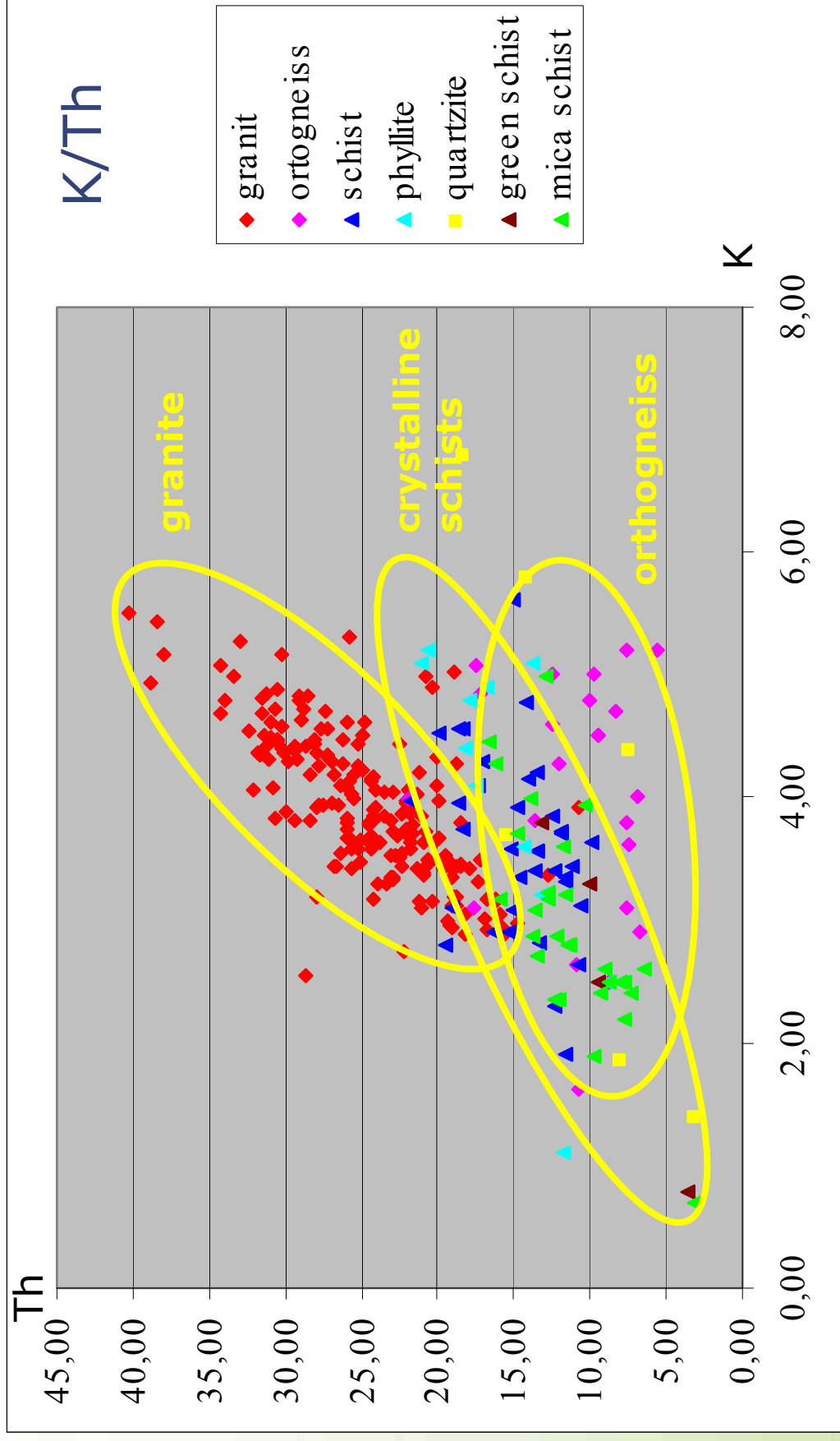


Crystalline schists – petrology problem?



Laboratory measurements (1981) versus field gamma-ray surveying (2006):

- **FLT K = 2,82 % (4,4)** **U = 2,2 ppm (4,0)** **Th = 11,5 ppm (16,7)**
- **SVR 2,98 (2,5) 3,0 (2,2) 12,3 (8,7)**

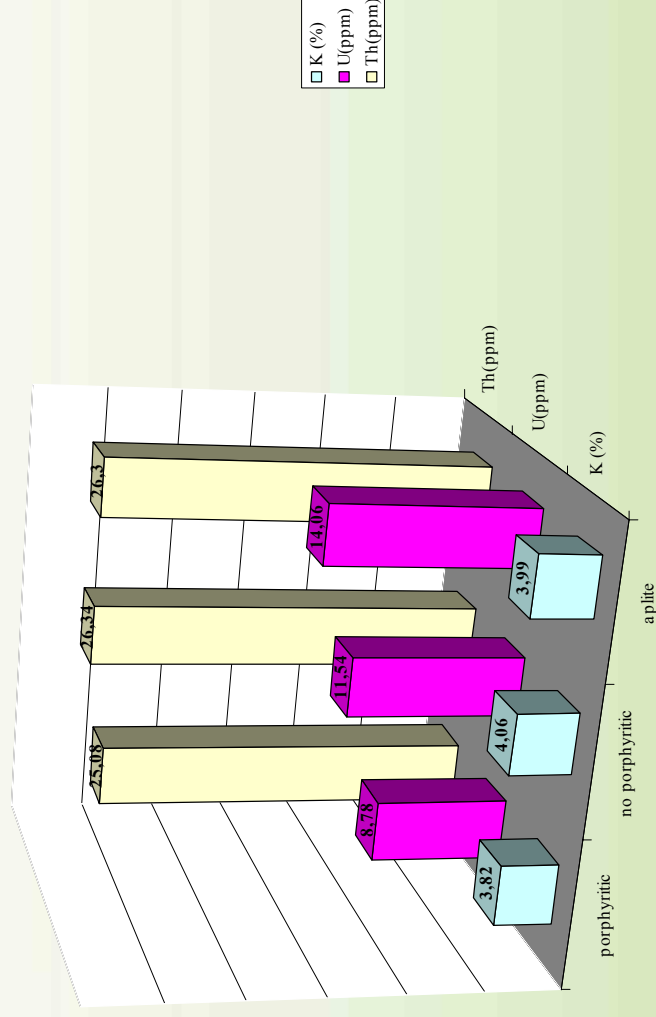




Granite

Statistics – minimum contrast between types ?

Granites





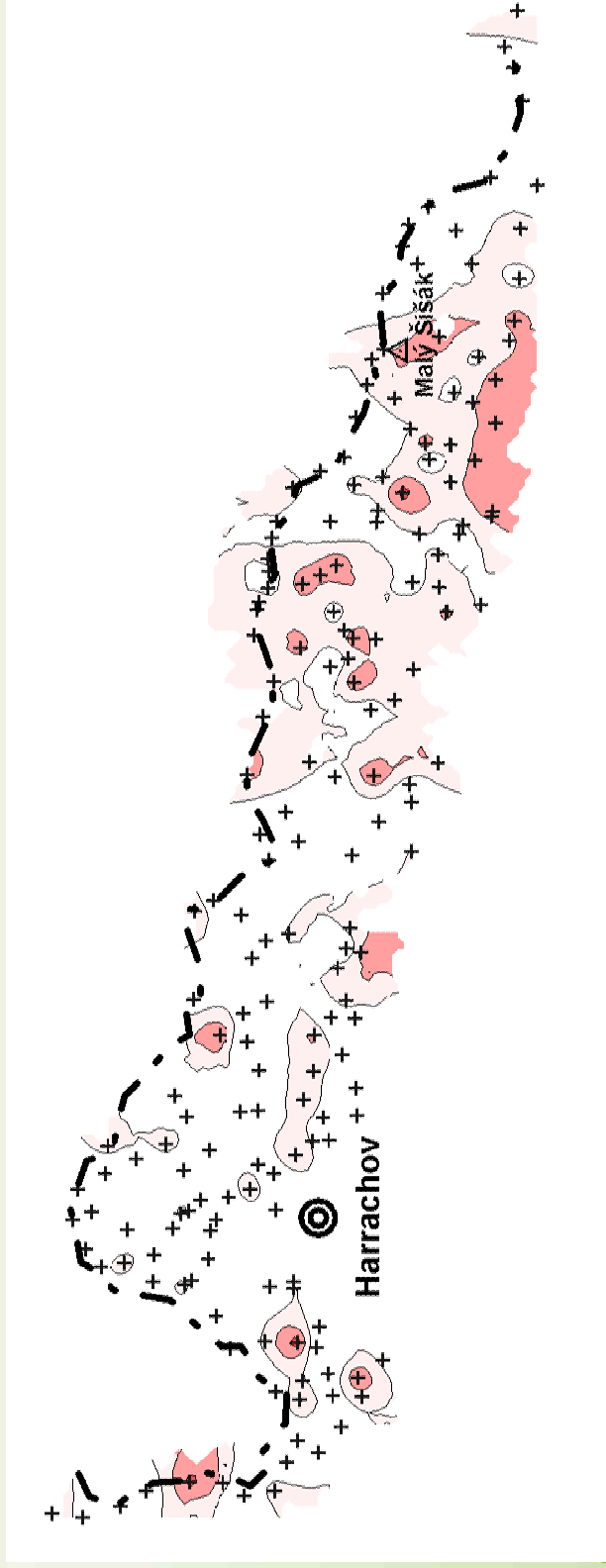
Reality in the field ?





Potassium (K %)

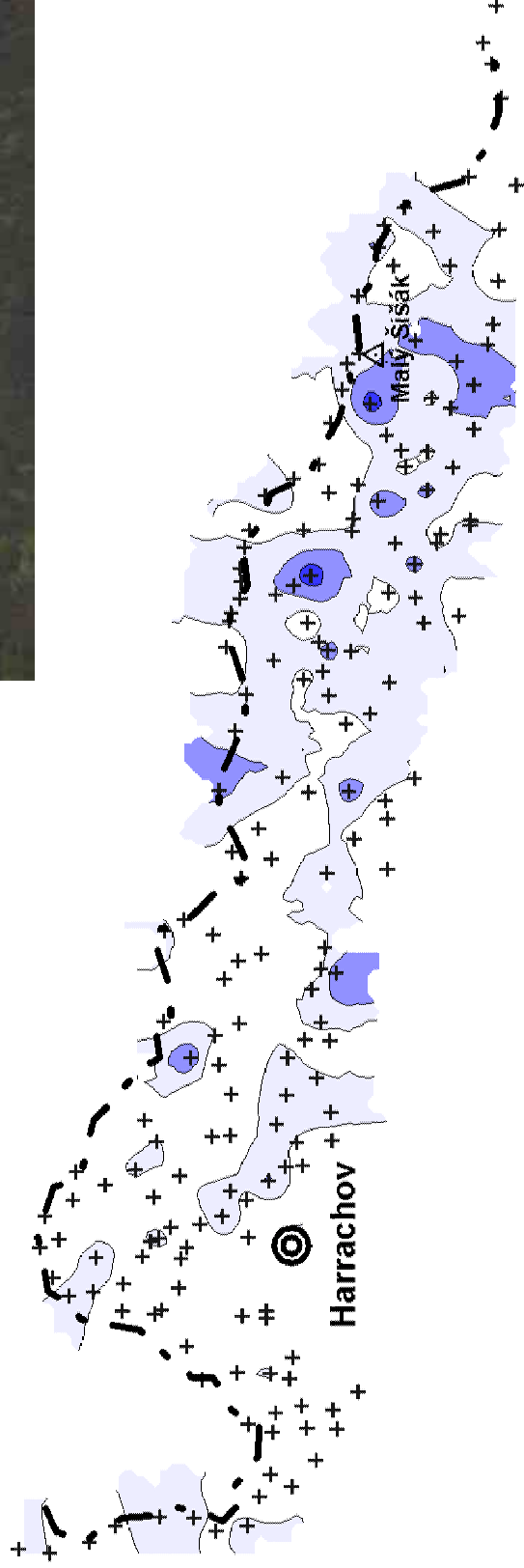
Anomalies over 4 % – monzogranite,
aplite





Thorium (Th ppm)

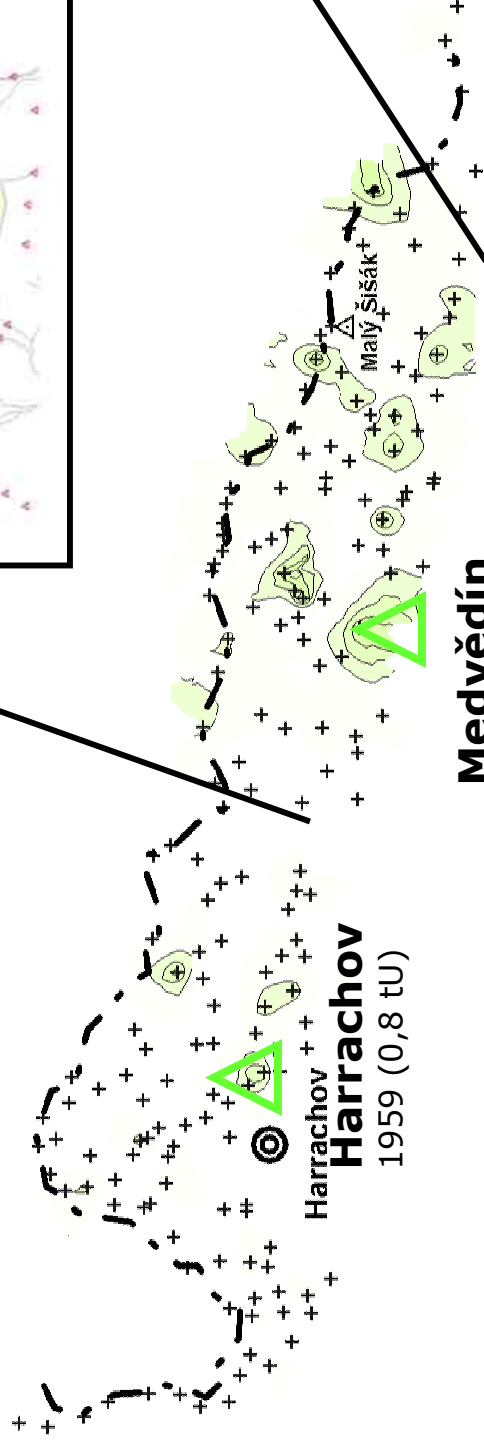
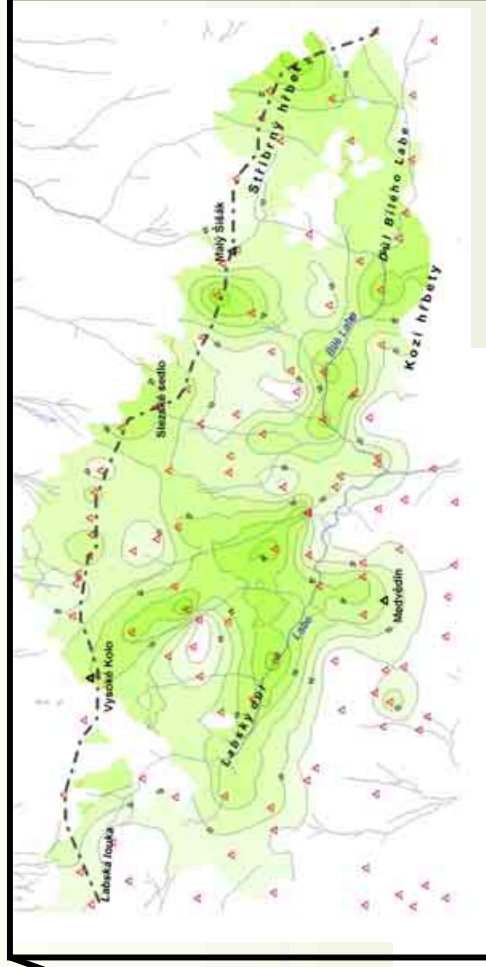
Anomalies over 25 ppm – monzogranite,
aplite





Uranium (U ppm)

Anomalies over 15 ppm
– aplite, deposits of uranium
and fault zones



Medvědíň

1955-59 (20,8 tU)

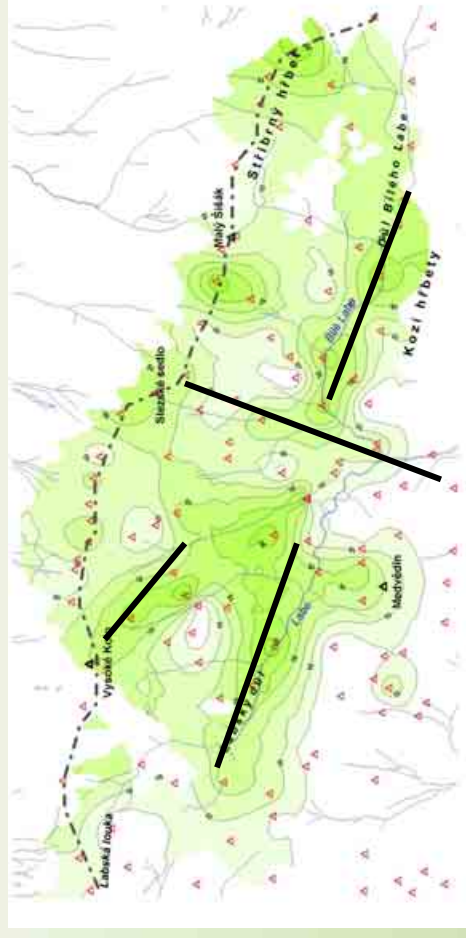
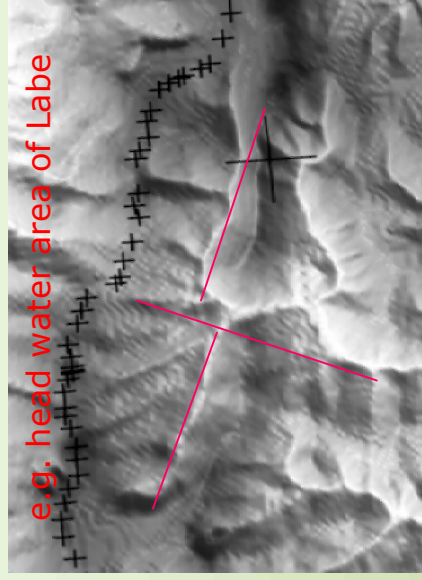
Harrachov

1959 (0,8 tU)



Relationship between U-anomalies and morphotectonical analysis (Lysenko 2006) – preliminary results

- ✓ **Morphotectonic analysis from Radarsat, ERS-2 SAR, Landsat
7ETM+satellite images**
- ✓ **Frequent coincidence in relation with U-anomalies:**
 - a) Linear structures of NW-SE trends (faults and borders of lithological units)
 - b) Structures of NE-SW trends – delimitation of the morphostructural blocks and faults





Thank you for attention

