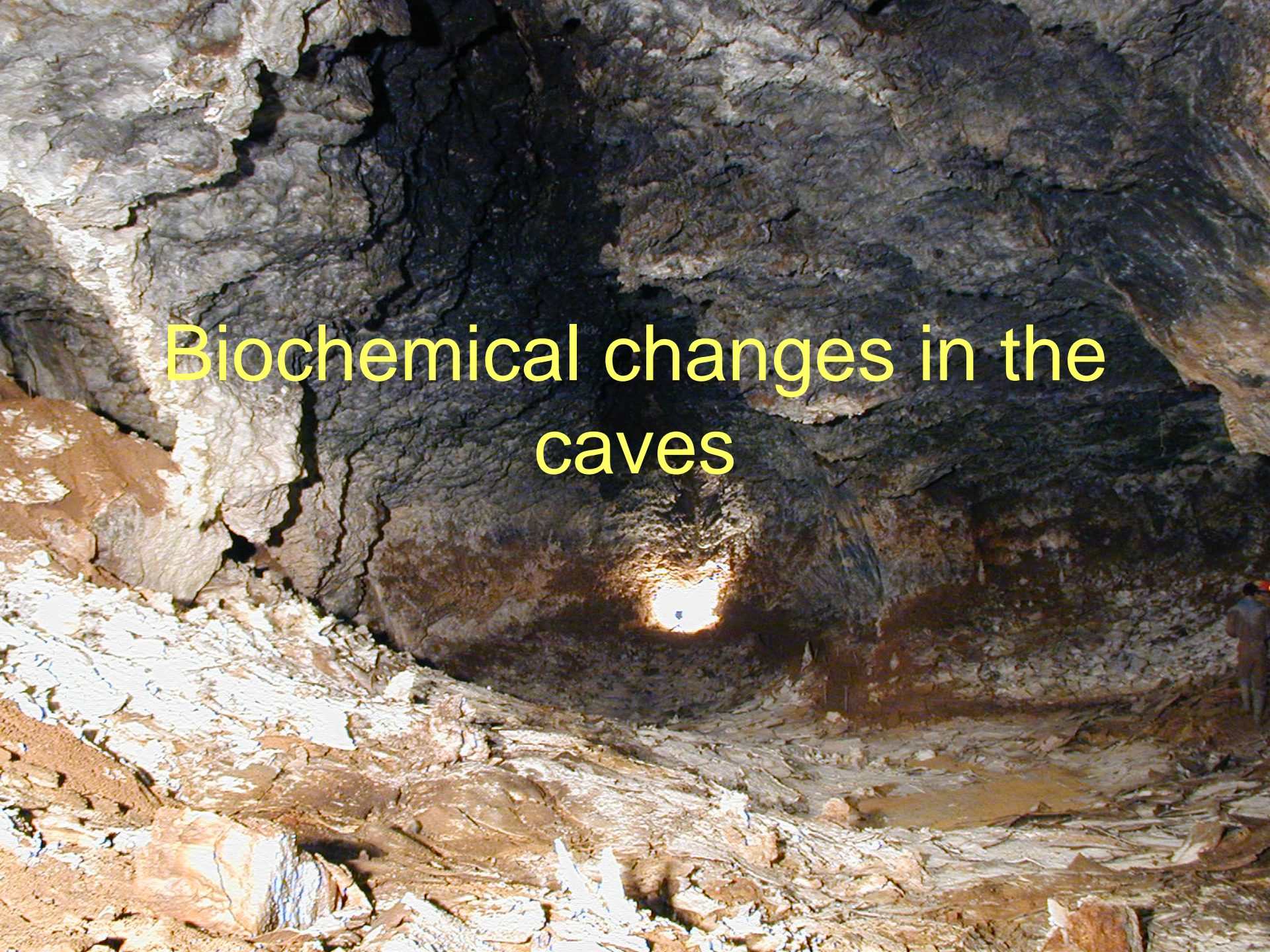


Biochemical changes in the caves



Circumstances

- » Low temperature,
- » High level of vapour,
- » Higher level of CO₂,
- » Higher level of Rn,
- » Injuries,
- » Difficult work.

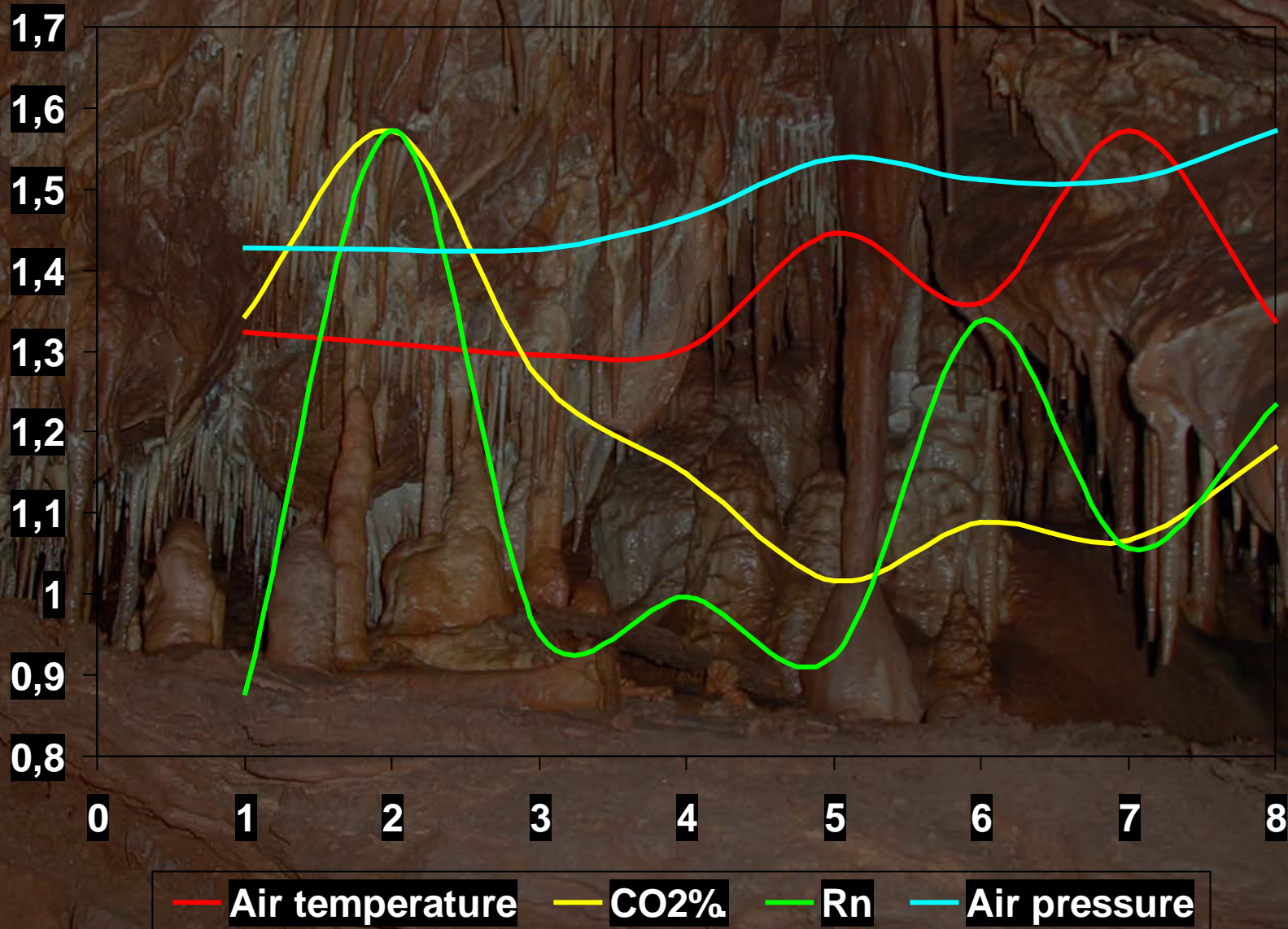
Investigations:

- 1996-97 Cseszegtomaj cave
- 1998-2001 Aggtelek, Baradla-cave

Biological parameters:

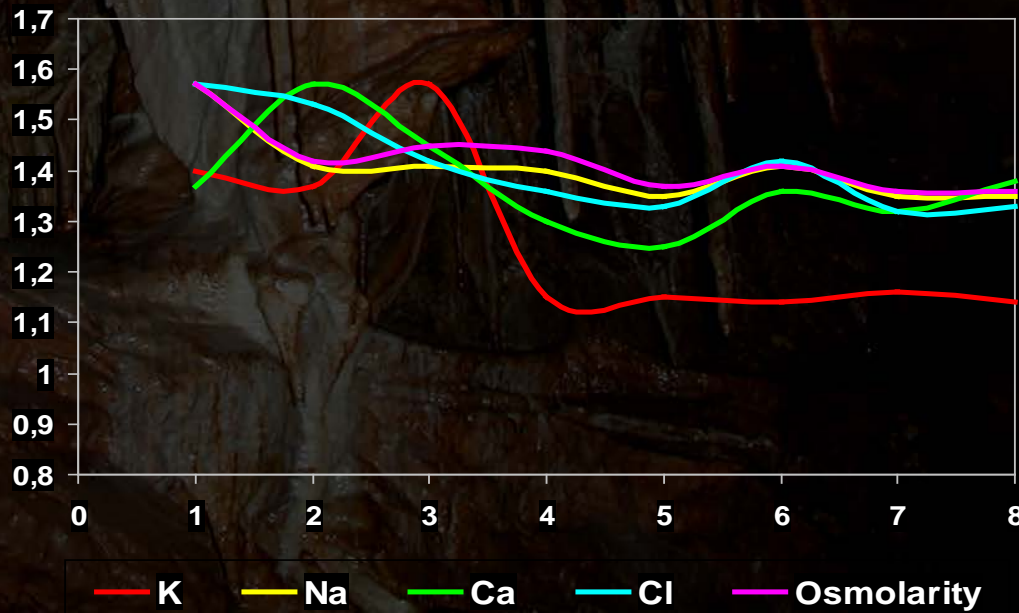
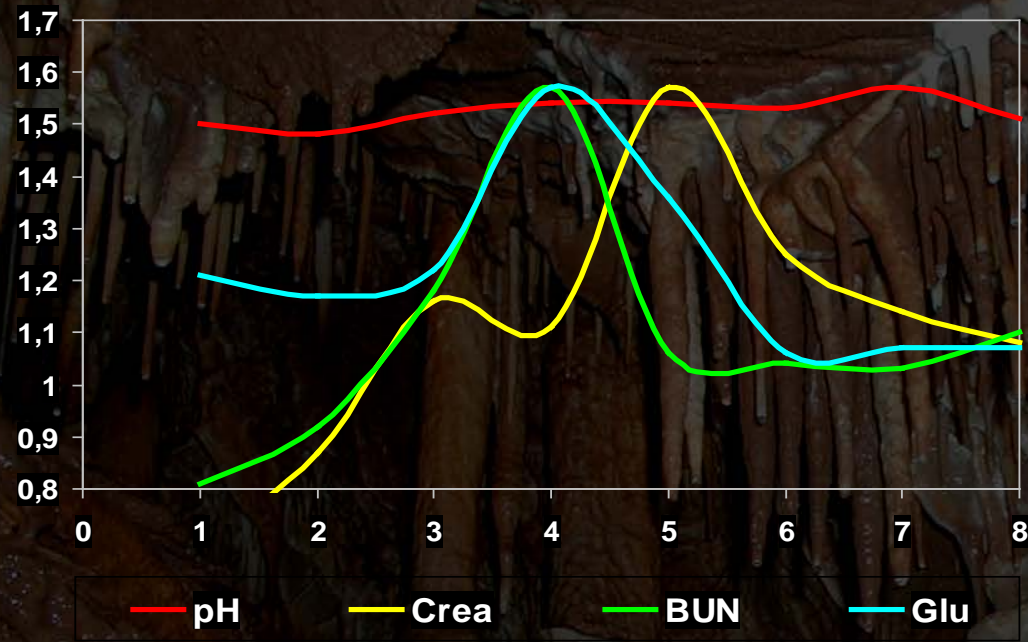
- BP, body temperature; blood cell counts, Hgb, Hct, SGOT, SGPT, gGT, AP, creatinin, BUN, CK.
- Blood gas parameters: pH, cH+, pCO₂, pO₂, ctHgb, satO₂, O₂Hgb, COHgb, MetHgb, RHgb, K+, Na+, Ca²⁺, Cl⁻, glukose, lactate.
- Urine parameters (stix): pH, haemoglobin, UBG, bilirubin, protein, glucose, acetone, density, volume.
- ICG (Z0, VET, SVR, CO)

Results:



Given in ARCSIN(x/max) because of comparability

Physiological parameters:



Results:

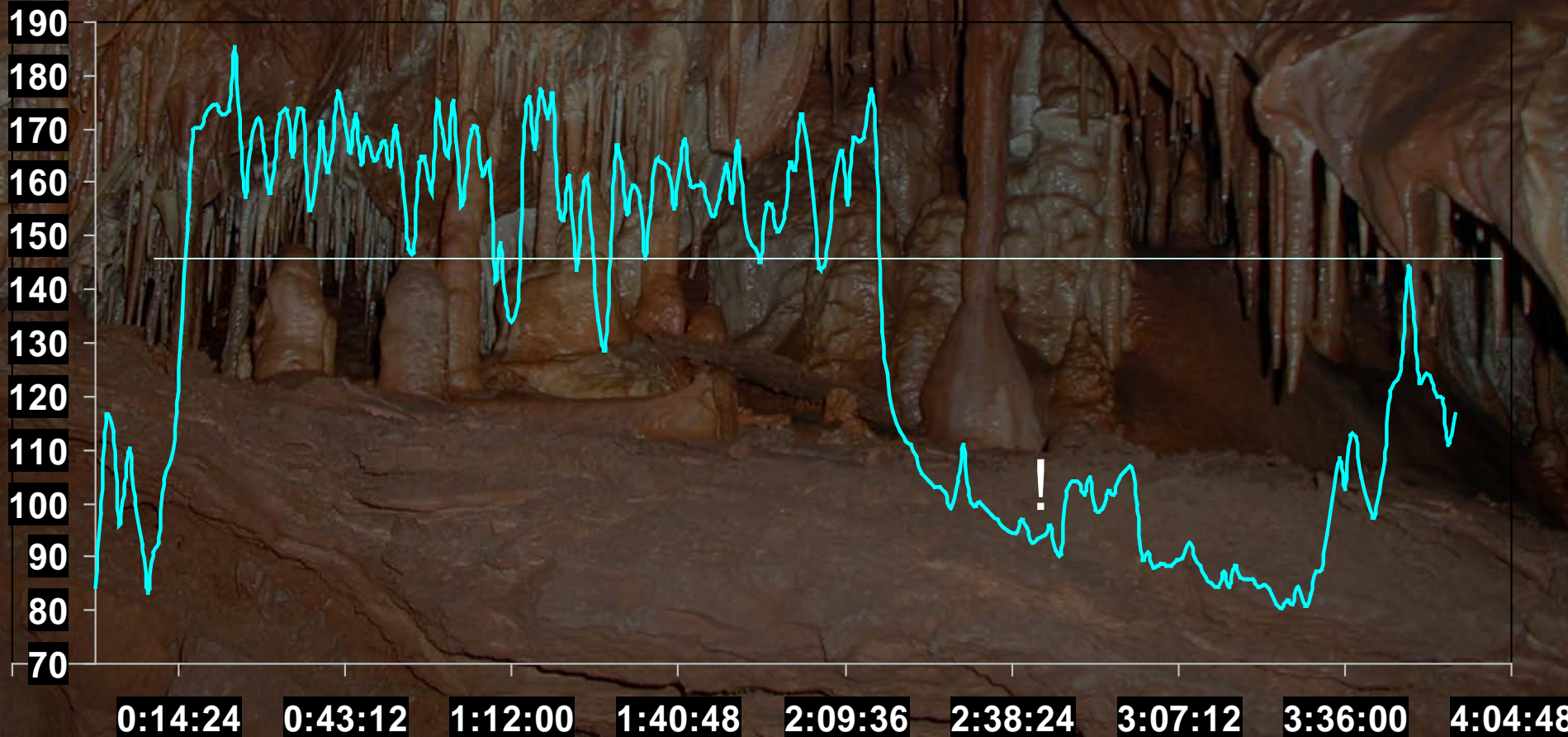
- In cave group: Changes (worsening) in peripheral blood circulation.
- Reorganisation of blood volume between central and peripheral circulation.
- Because of environmental factors we founded worsening of microcirculation and faster aging and death of erythrocytes (Higher LDH, UBG and bilirubin levels)
- We founded adversary changes in pH levels.

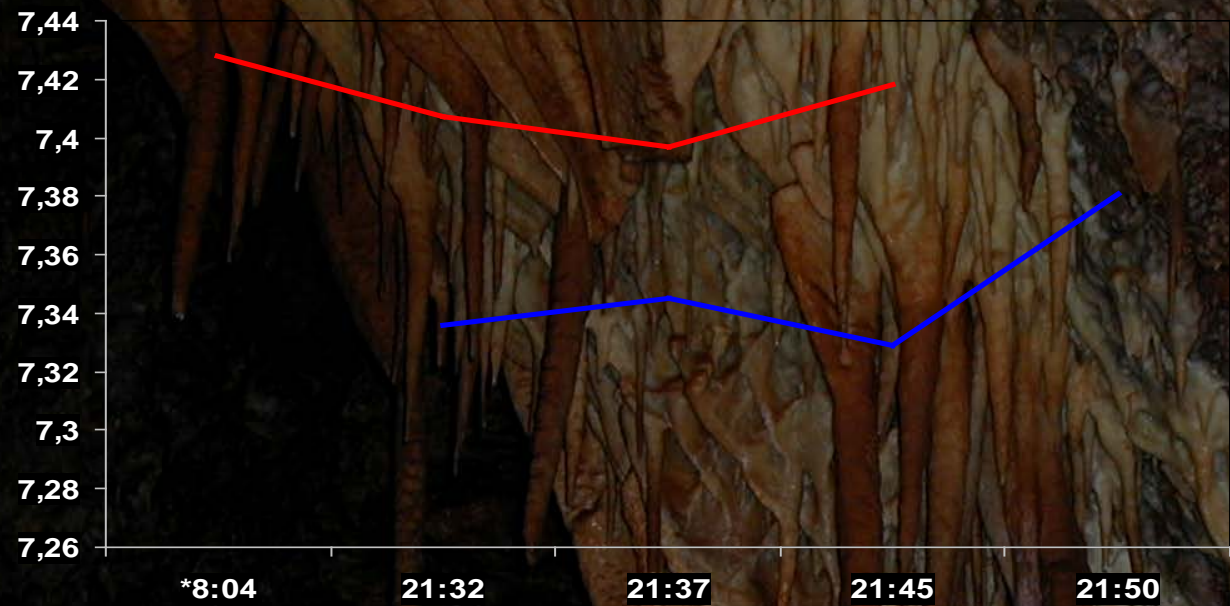
In 1998 special investigation:

Exhausting in cool environment.

Theory: Hard work in cool environment causes Ion changes and it can cause a death.

Plan: 1 (max. 2) person runs over the cave Baradla and back.
On becoming whole blood gas analysis, ions (K,Na) ICG.





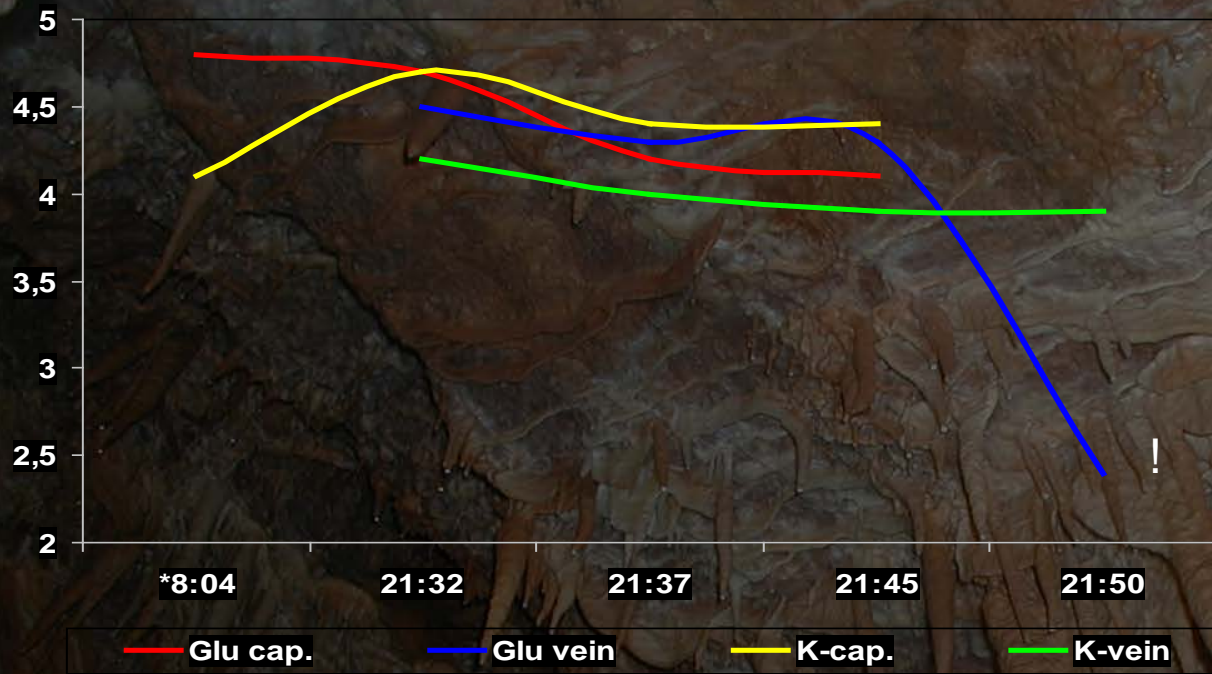
pH

— Capillary — Vein

Z0

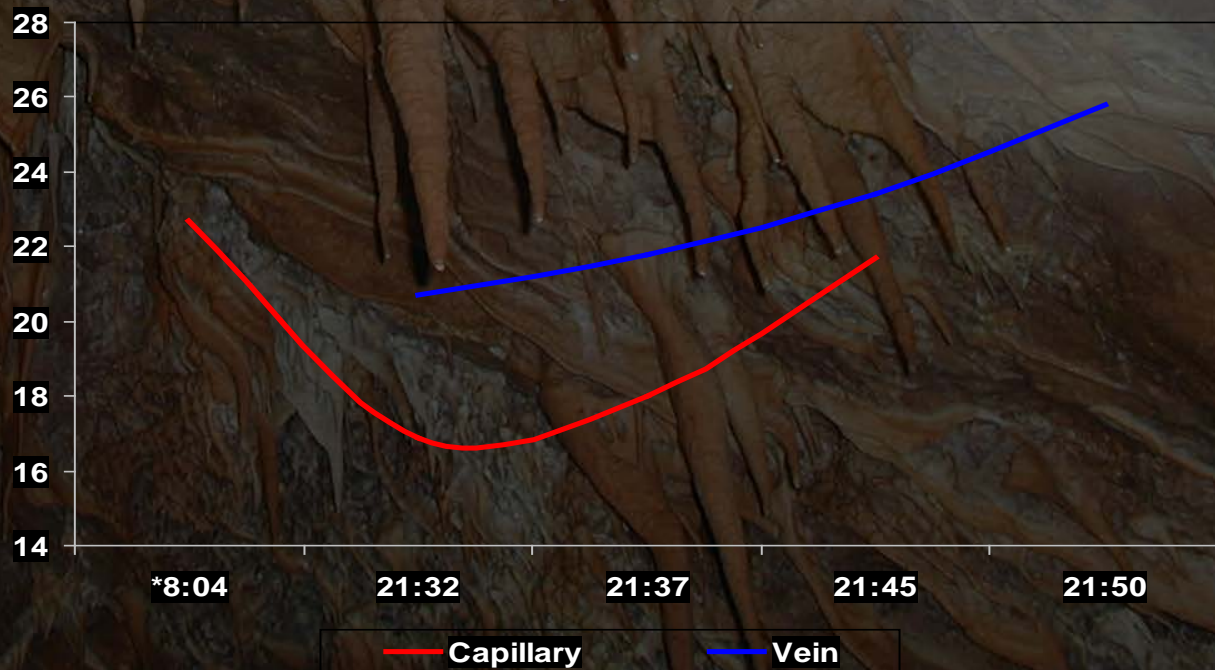


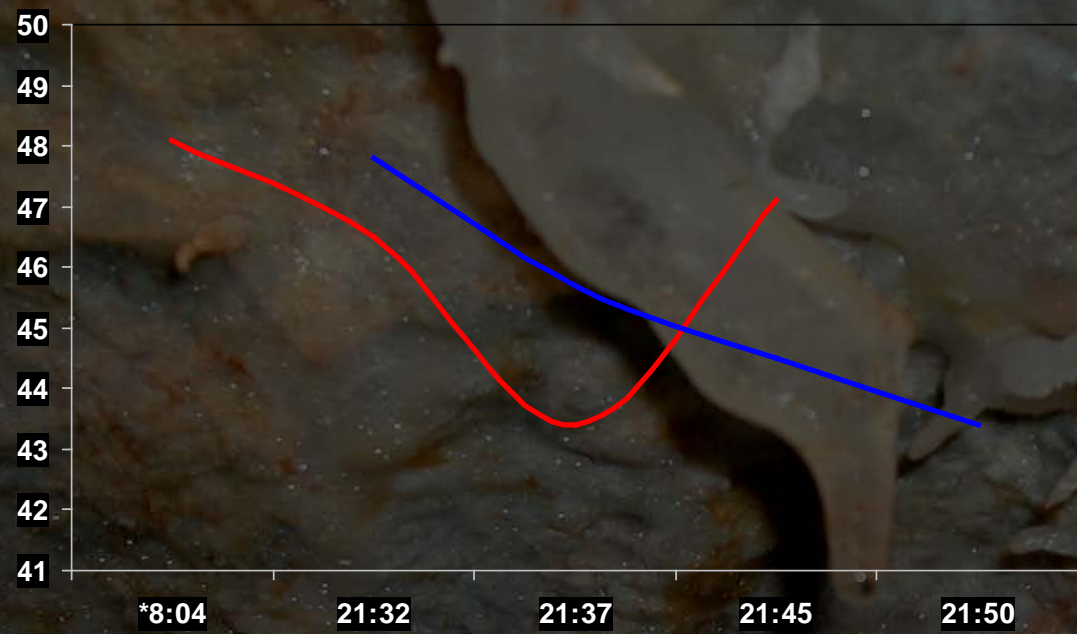
— Z0



Se glucose
K+

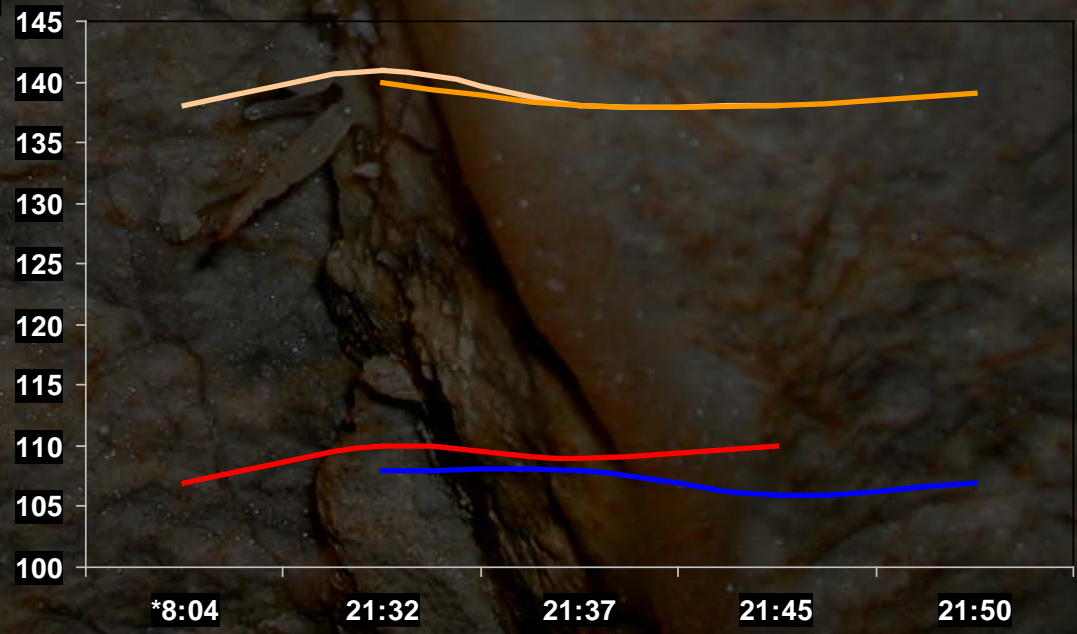
HCO_3^-



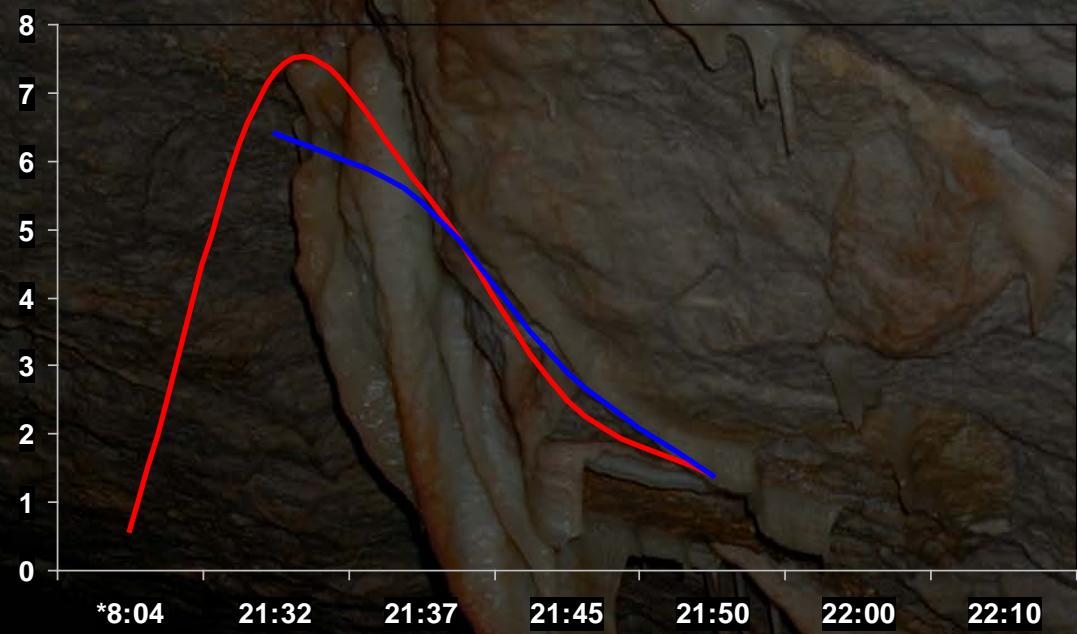


— Capillary — Vein

Na, Cl



— Cl-cap — Cl-vein — Na-cap — Na-vein



Tejsav

— Capillary — Vein

SVR



*8:04 21:32 21:37 21:45 21:50 22:00 22:10

Results of exhaust assessment :

- We founded nearly the same changes, we waited after the extra load. But the Z0 change was too high.
- After the 5 minutes rest, a bit movement caused big changes in K+, pH and glucose levels, which can cause the dead of person.
- Neural alarm signs switched off by stress reaction (higher cathecholamines and endorphine levels).



Thanks!

Photos are made by Csaba Bognár.