

**Praha 2010: Workshop on Geological Aspects of Radon Risk Mapping**  
**Tuesday September 24<sup>th</sup> Earthquakes – Radon studies**

## Radon in air

**Indoor** cellar, underground location, basement of house (radon 'collector')  
*Mentioned were these possibilities. Radon measurements in a cellar/basement are too strongly affected by the building itself what makes this method not convenient.*

### Cave

*These measurements need a lot of correction as strong influencing factors that have to be studied previously over long time spans. Only periods of stability can give a signal.*

### Borehole:

- **what criteria to fulfil for a 'good' location?**
- **close to a fault? active fault? fault intersection?**

*Preference for active fault (if choice possible)*

- **what depth?**

*Depth > 1m to limit atmospheric influences.*

*If possible install a grid of boreholes*

- **in soil or brittle rock?**

*Not rock*

- **what about other gases? CO<sub>2</sub>, methane, He, .....**

*add H<sub>2</sub>S, also <sup>14</sup>C, today possibility of continuous monitoring of isotopic signature*

- **what instruments? Grab sampling or continuous measurements?**

*Avoid grab sampling, only continuous measurements*

- **what sampling interval?**

*Compromise of the time interval and the counting rates: normal between 10 minutes and 30 minutes*

## Radon in water

- **what criteria to fulfil for a 'good' location?**

- **springs?** *make sure that no natural underground degassing before sampling*
- **artesian outflows:**
  - how deep? As deep as possible  
*it was pointed out that it is getting more and more difficult to get the permission.*
  - on/near active faults  
*active faults if only possible*
  - earth tides are in the signal – advantage as sensible place for tiny crust deformations  
*one participant pointed out that this may not be an advantage because closed system, here there was no consensus among the participants*
  - besides radon, what other parameters to monitor? High resolution temperature, el. conductivity, other gases (what gases?),  
*Radon alone is not enough as parameter, other parameters have to be monitored continuously with the same or even better time resolution.*
- **bore holes, no artesian:**
  - continuous pumping?  
*One needs flowing water*
  - if no pumping, observation of water level

## Radon air/soil

Is there a difference in the reliability of the radon in air/water approaches?

*Radon in water is more promising than in air. In water better possibility to measure other parameters, also ionic content.*

*In air or in water measuring depends on location and the geology and hydrogeology (one needs good flow conditions, better artesian – see above)*

What is a 'good' signal?  $2\sigma$  or more over (lower?) the mean?

*General opinion last few days*

what distinguishes an outlier from a signal?

*Neural network technology to simulate measured database - optimization for the location of possible events*

Influence of ambient parameters:

- low than ok, no correction
- strictly very low influence
- corrected signal taking into account external known influences

What processes can trigger the radon signal?

*In water, based on changing mixing ratios*

*Should the radon signal be a member of an overall survey system based on data from all possible studies*

Long or short signal) short is better for 'prediction'