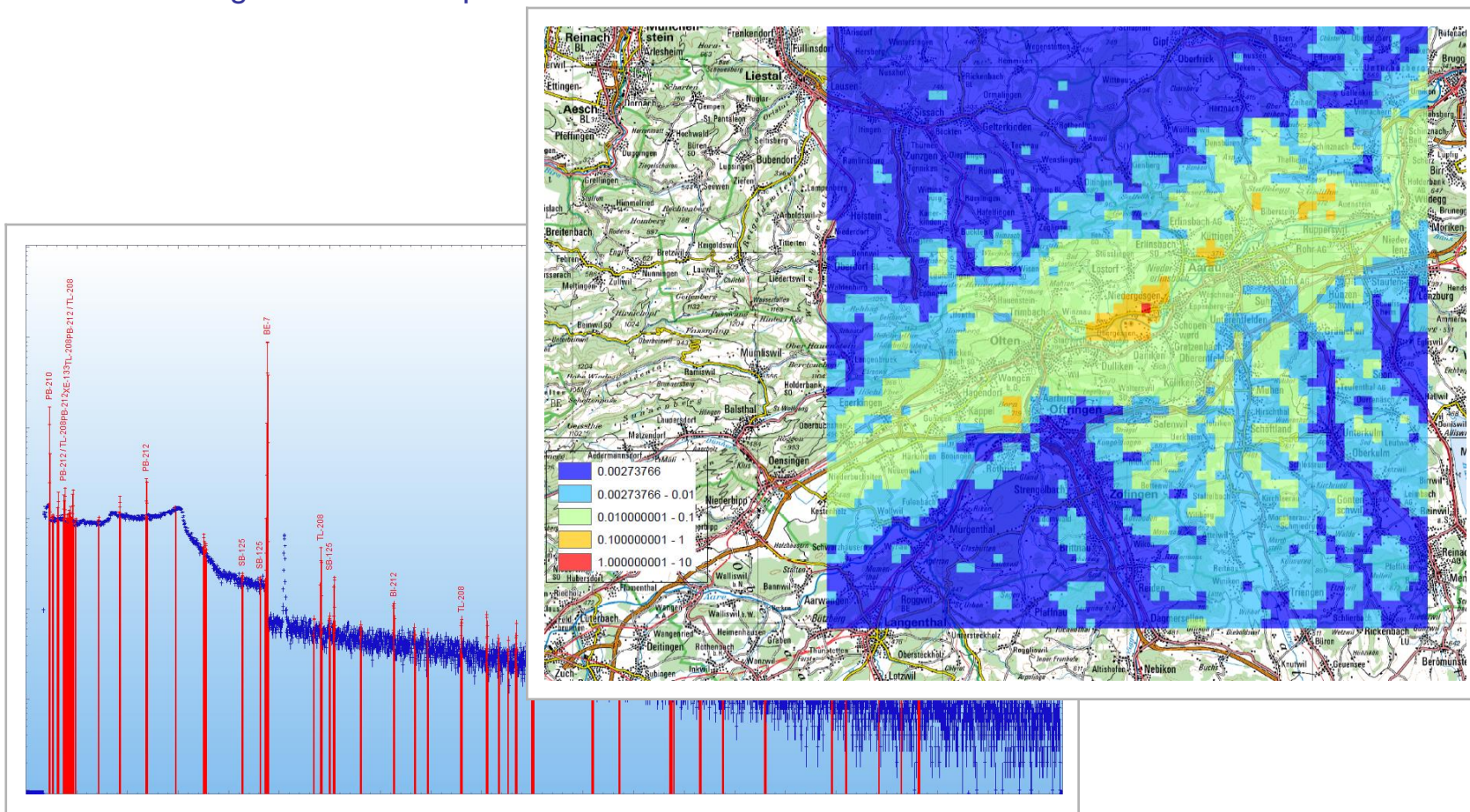




URAnet aero

Automatisches Messnetz zur Überwachung der Radioaktivität in der Luft

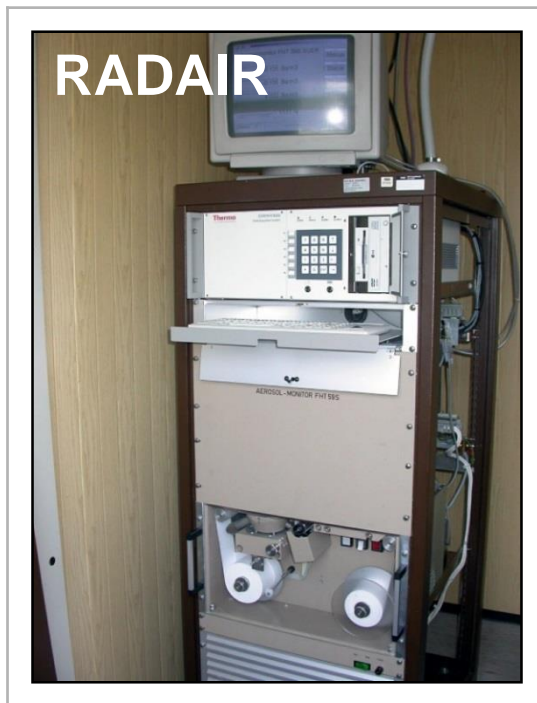
Eine Anwendung der Gamma-Spektrometrie im Feld



Automatische Messnetze zur Überwachung der Luft (Stand 2013)

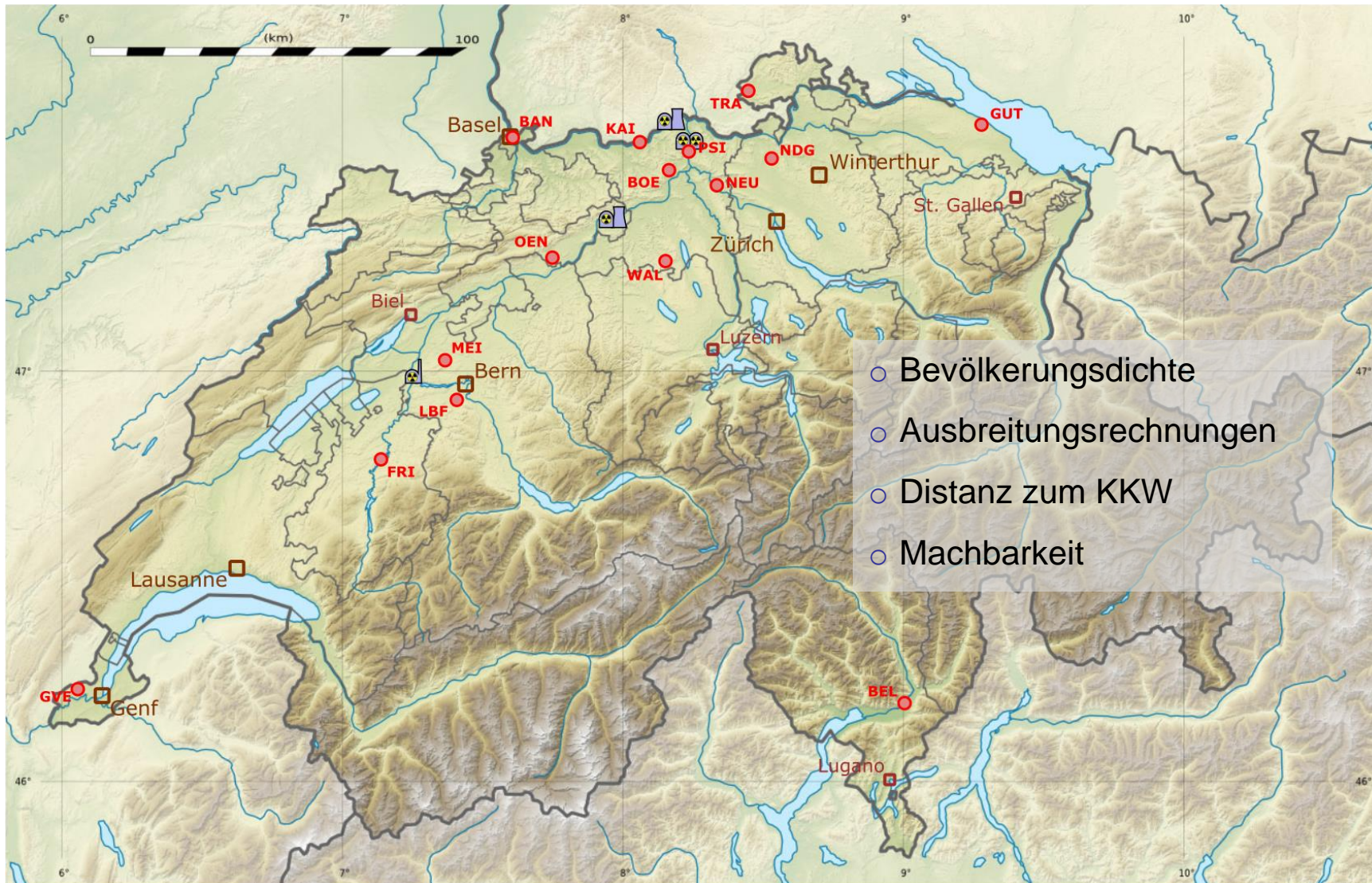
- ENSI: Ortsdosisleistung um KKW (MADUK)
- NAZ: Ortsdosisleistung schweizweit (NADAM)
- BAG: automatisches Aerosol-Messnetz (RADAIR)

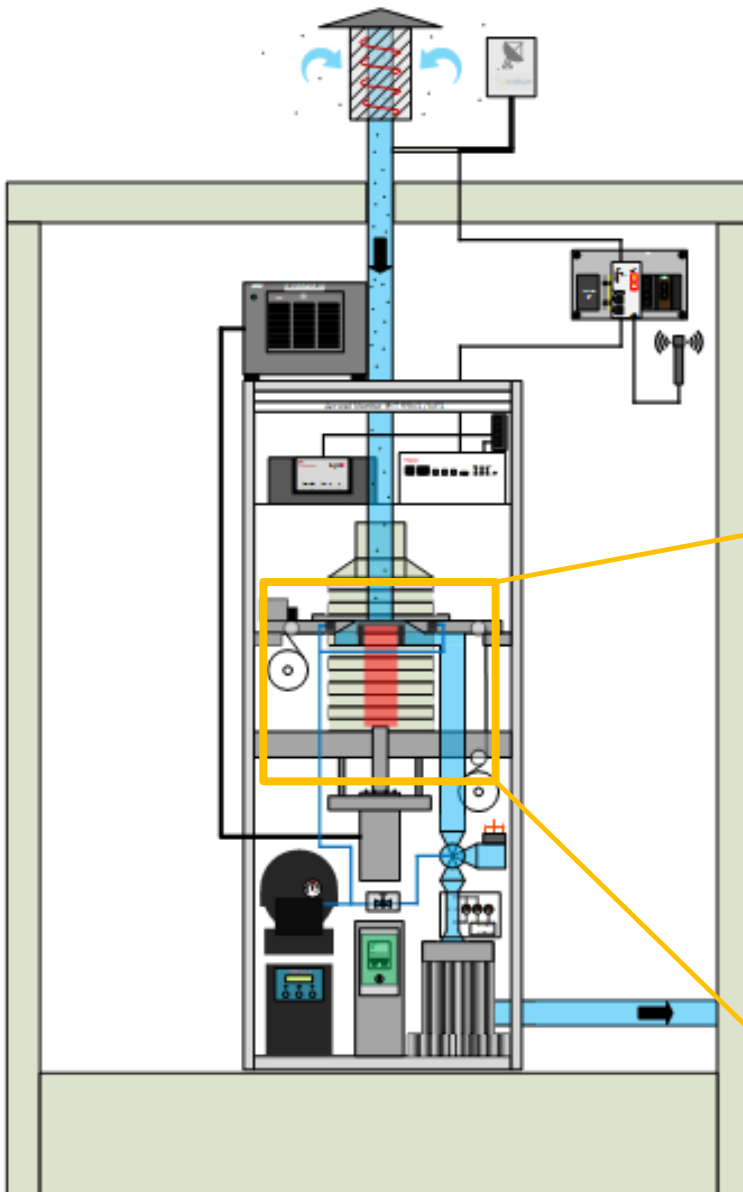
➔ URAnet aero





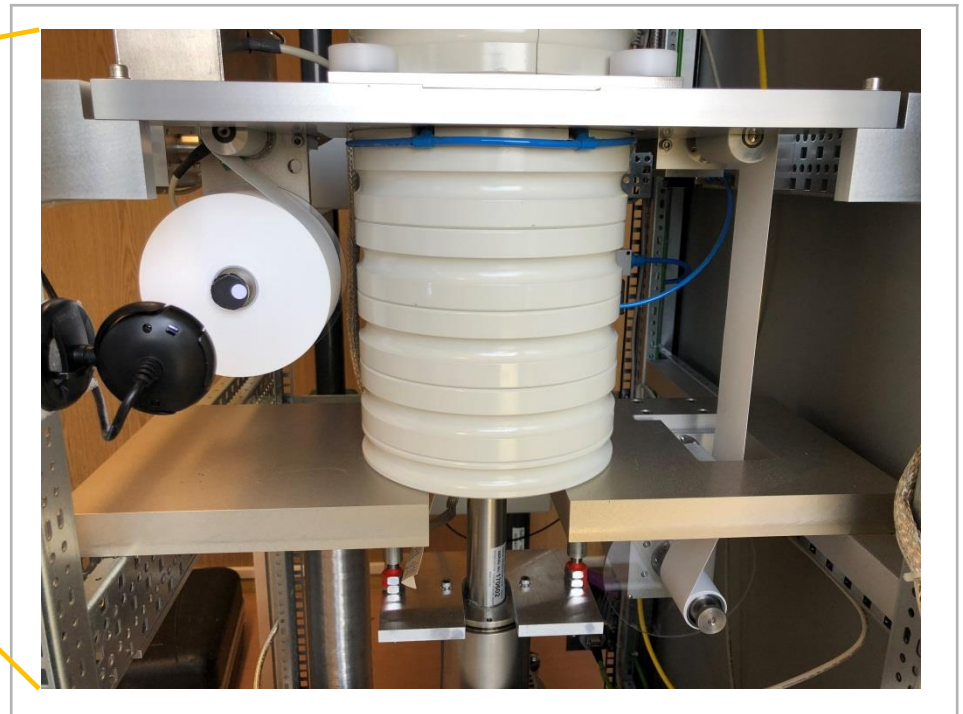
URAnet aero Standorte





Automatische und kontinuierliche Überwachung
nuklidspezifischer Aktivitätskonzentration:

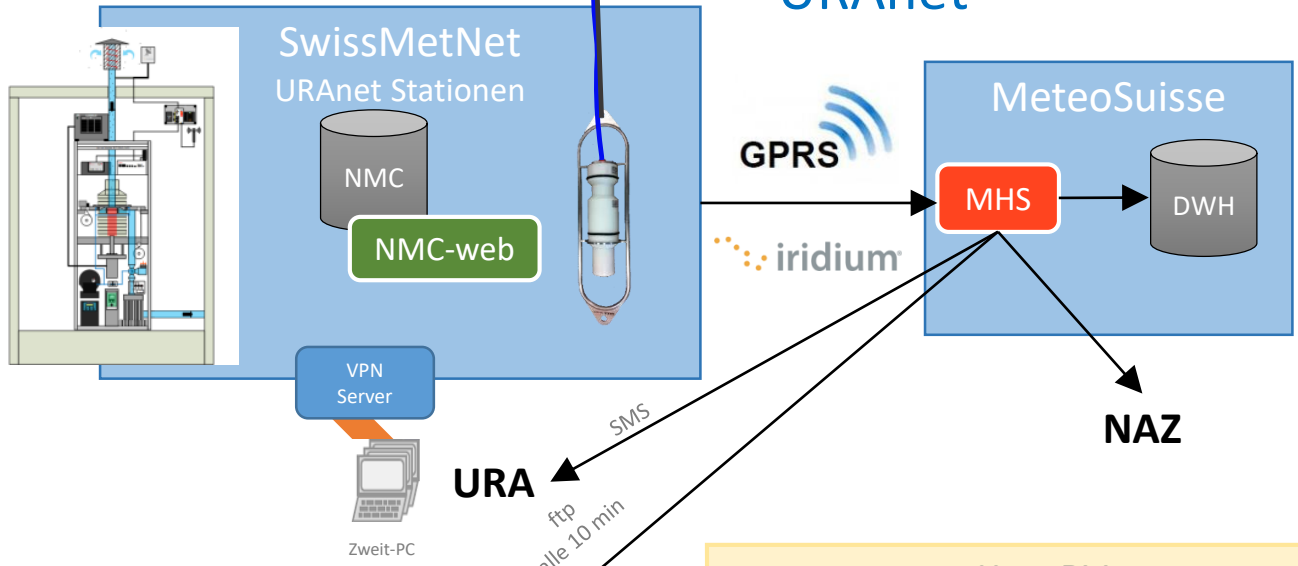
- Partikel akkumulieren auf dem Filterband (Luftdurchsatz von 16 bis 18 m³/h, Bandvorschub alle 12 h)
- Energieabhängige Erfassung der γ -Quanten (HPGe)
- Vergleich mit Nuklidbibliothek zur Identifizierung
- Prüfung auf Überschreitung der Alarmschwellen alle 5 Minuten.







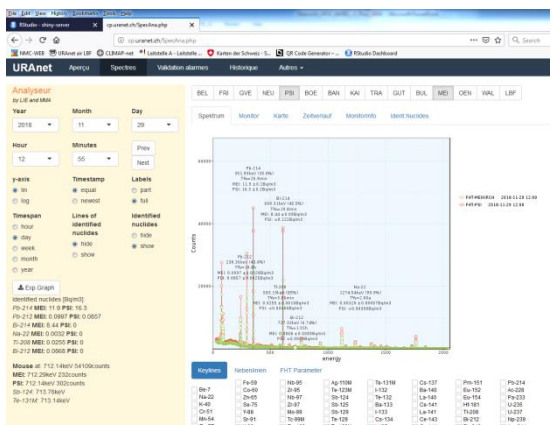
URAnet



uranet.ch
n42 files
cockpit
R/Shiny

KomBV
ORACLE
LIMS

MySQL
www.radenviro.ch



Analyseur
 by LIE and MMA

Year: 2018 Month: 11 Day: 29

Hour: 12 Minutes: 55
 Prev Next

y-axis: lin log
 Timestamp: equal newest
 Labels: part full

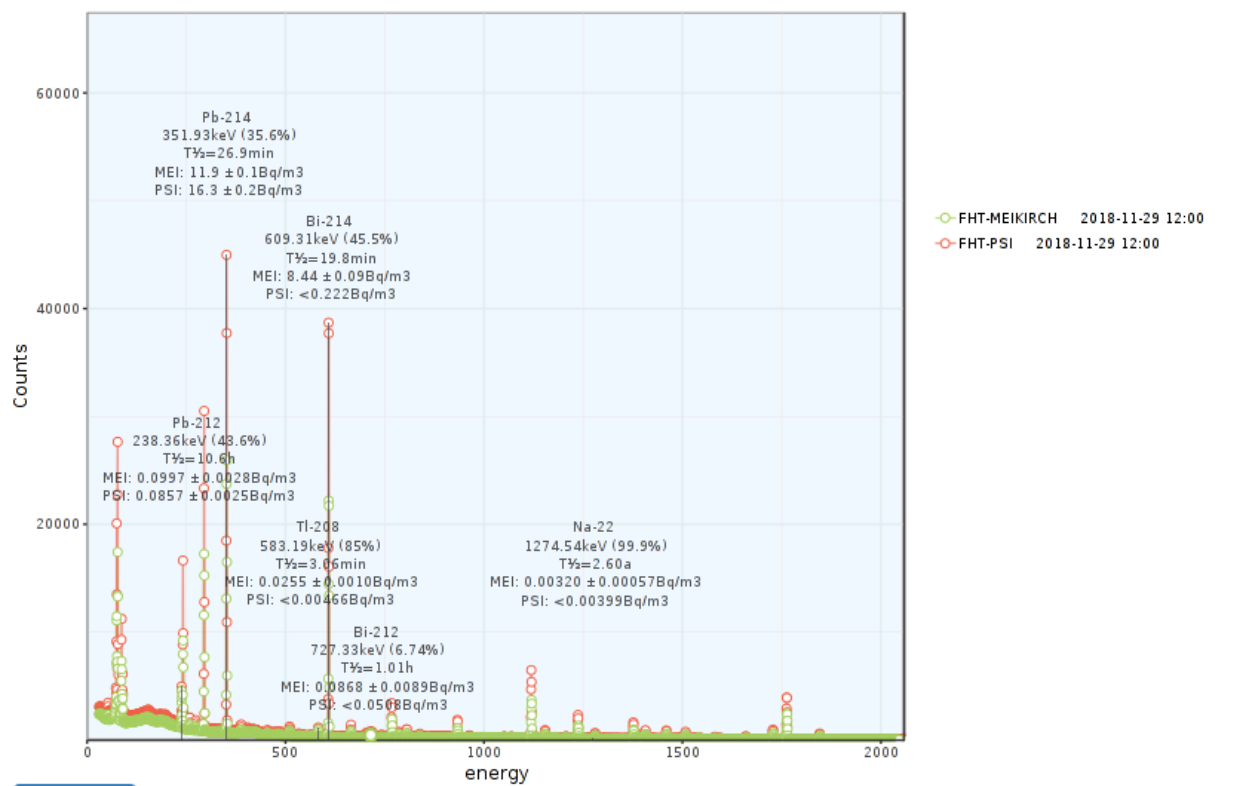
Timespan: hour day week month year
 Lines of identified nuclides: hide show
 Identified nuclides: hide show

Exp. Graph
 Identified nuclides [Bq/m³]:
 Pb-214 MEI: 11.9 PSI: 16.3
 Pb-212 MEI: 0.0997 PSI: 0.0857
 Bi-214 MEI: 8.44 PSI: 0
 Na-22 MEI: 0.0032 PSI: 0
 Tl-208 MEI: 0.0255 PSI: 0
 Bi-212 MEI: 0.0868 PSI: 0

Mouse at: 712.14keV 54109counts
 MEI: 712.29keV 232counts
 PSI: 712.14keV 302counts
 Sb-124: 713.78keV
 Te-131M: 713.14keV

BEL FRI GVE NEU **PSI** BOE BAN KAI TRA GUT BUL MEI OEN WAL LBF

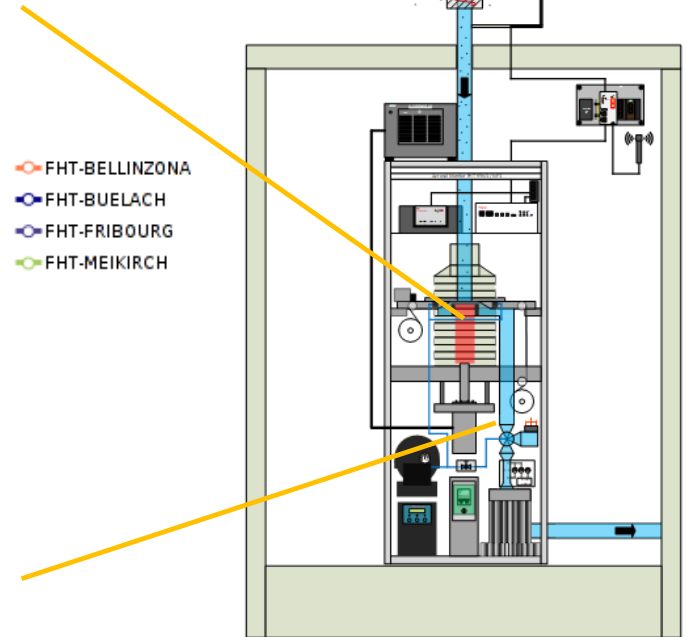
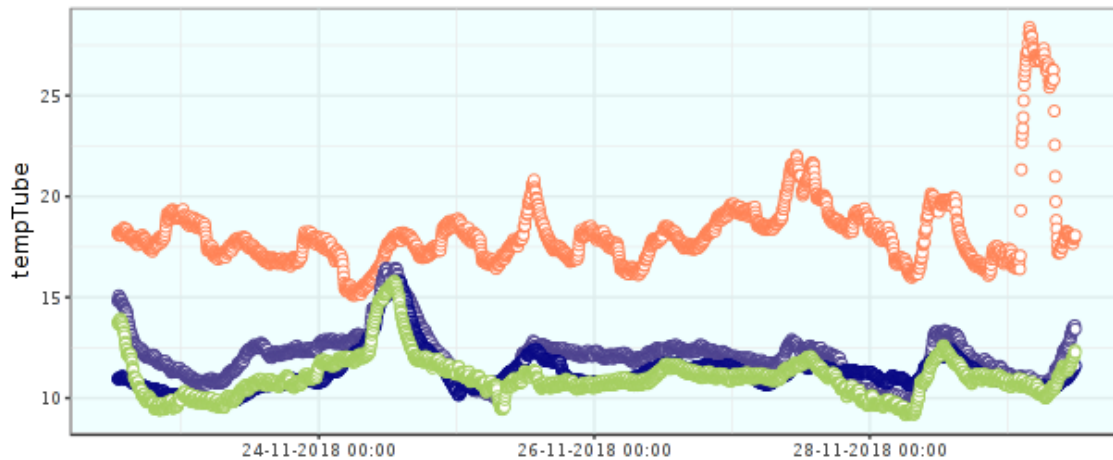
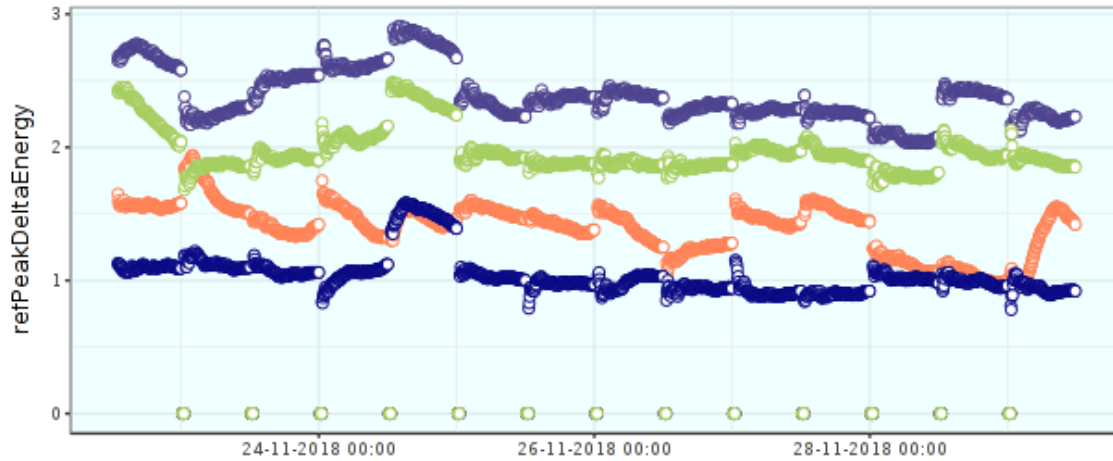
Spektrum Monitor Karte Zeitverlauf MonitorInfo Ident.Nuclides



- | Keylines | Nebenlinien | FHT Parameter |
|--------------------------------|--------------------------------|----------------------------------|
| <input type="checkbox"/> Be-7 | <input type="checkbox"/> Fe-59 | <input type="checkbox"/> Nb-95 |
| <input type="checkbox"/> Na-22 | <input type="checkbox"/> Co-60 | <input type="checkbox"/> Zr-95 |
| <input type="checkbox"/> K-40 | <input type="checkbox"/> Zn-65 | <input type="checkbox"/> Nb-97 |
| <input type="checkbox"/> Cr-51 | <input type="checkbox"/> Se-75 | <input type="checkbox"/> Zr-97 |
| <input type="checkbox"/> Mn-54 | <input type="checkbox"/> Y-88 | <input type="checkbox"/> Mo-99 |
| <input type="checkbox"/> Fe-57 | <input type="checkbox"/> Sr-91 | <input type="checkbox"/> Tc-99M |
| | | <input type="checkbox"/> Ag-110M |
| | | <input type="checkbox"/> Te-123M |
| | | <input type="checkbox"/> Sb-124 |
| | | <input type="checkbox"/> Sb-125 |
| | | <input type="checkbox"/> Sb-129 |
| | | <input type="checkbox"/> Te-129 |
| | | <input type="checkbox"/> Te-131 |
| | | <input type="checkbox"/> Te-132 |
| | | <input type="checkbox"/> Te-133 |
| | | <input type="checkbox"/> Te-134 |
| | | <input type="checkbox"/> Cs-137 |
| | | <input type="checkbox"/> Ba-140 |
| | | <input type="checkbox"/> La-140 |
| | | <input type="checkbox"/> Ce-141 |
| | | <input type="checkbox"/> La-141 |
| | | <input type="checkbox"/> Ce-143 |
| | | <input type="checkbox"/> Pm-151 |
| | | <input type="checkbox"/> Eu-152 |
| | | <input type="checkbox"/> Eu-154 |
| | | <input type="checkbox"/> Hf-181 |
| | | <input type="checkbox"/> Tl-208 |
| | | <input type="checkbox"/> Bi-212 |
| | | <input type="checkbox"/> Pb-214 |
| | | <input type="checkbox"/> Ac-228 |
| | | <input type="checkbox"/> Pa-233 |
| | | <input type="checkbox"/> U-235 |
| | | <input type="checkbox"/> U-237 |
| | | <input type="checkbox"/> Np-239 |

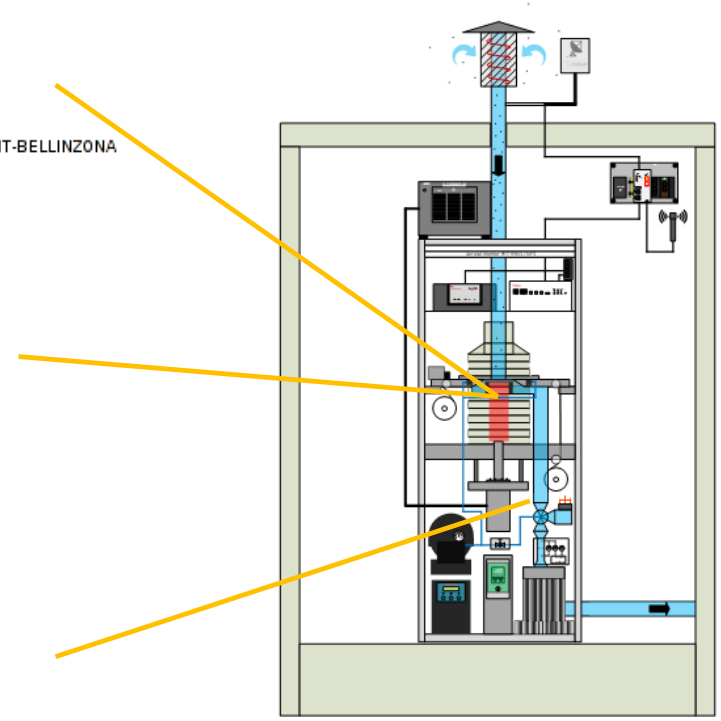
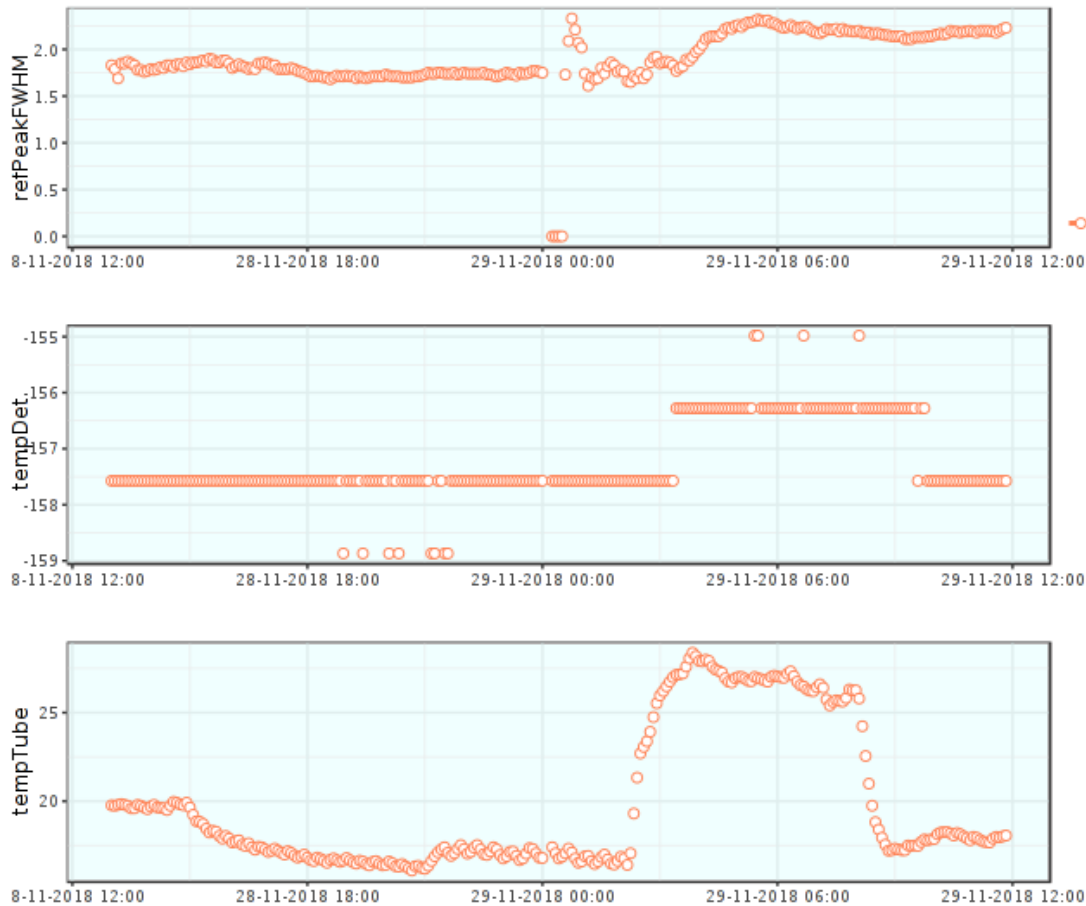


Δ Energie vs. T(Luft)



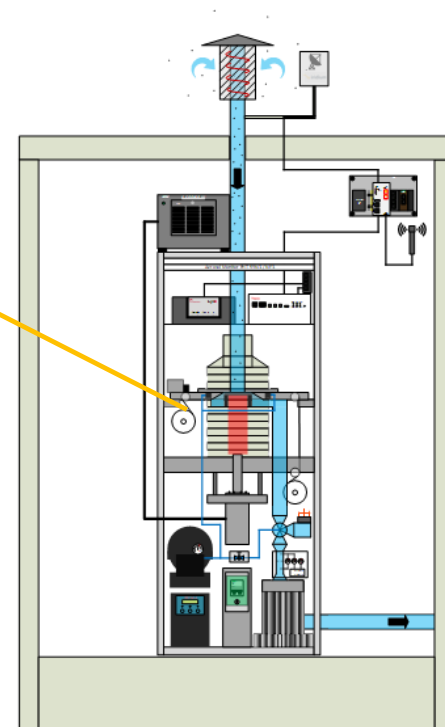
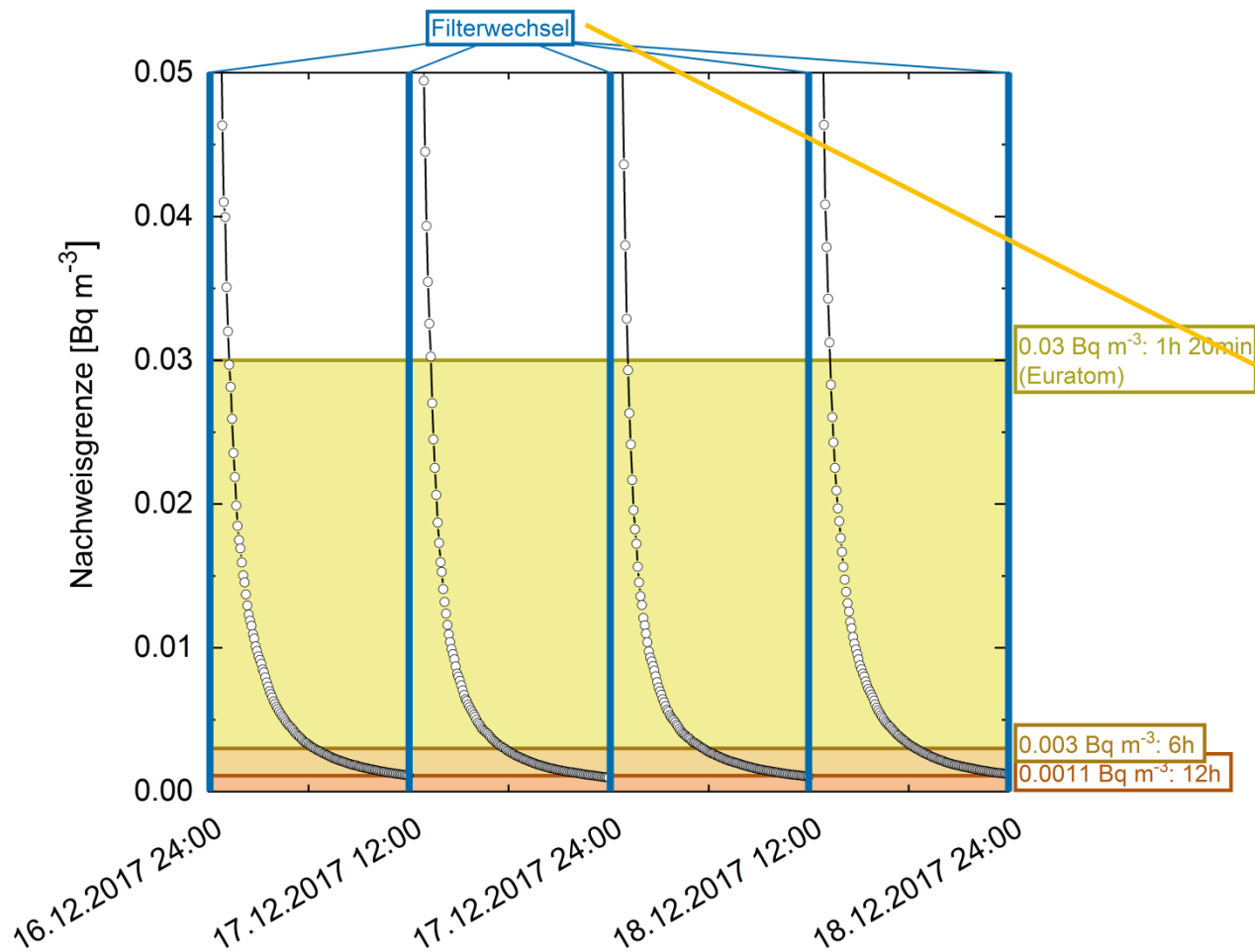


FWHM vs. T(Det) vs. T(Luft)



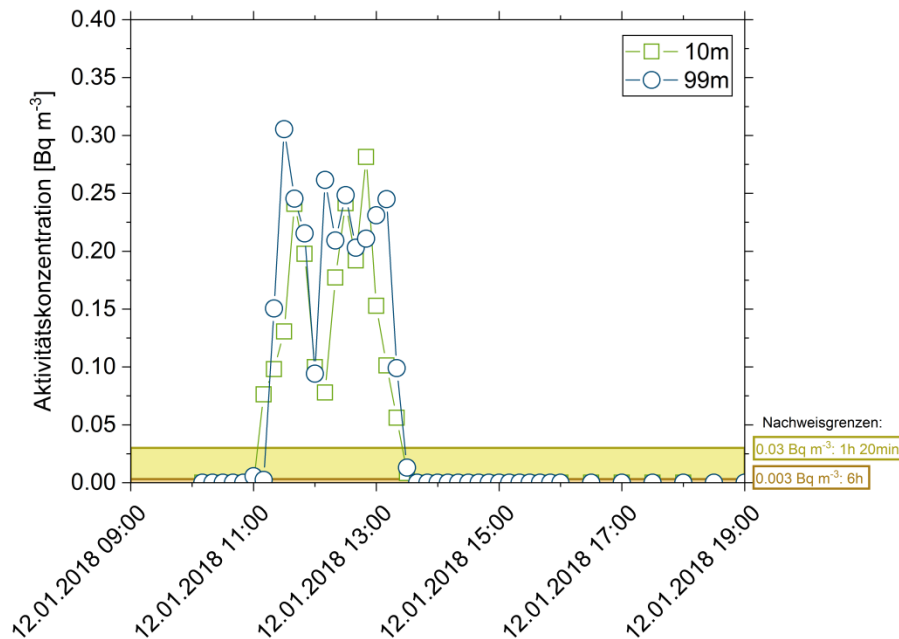
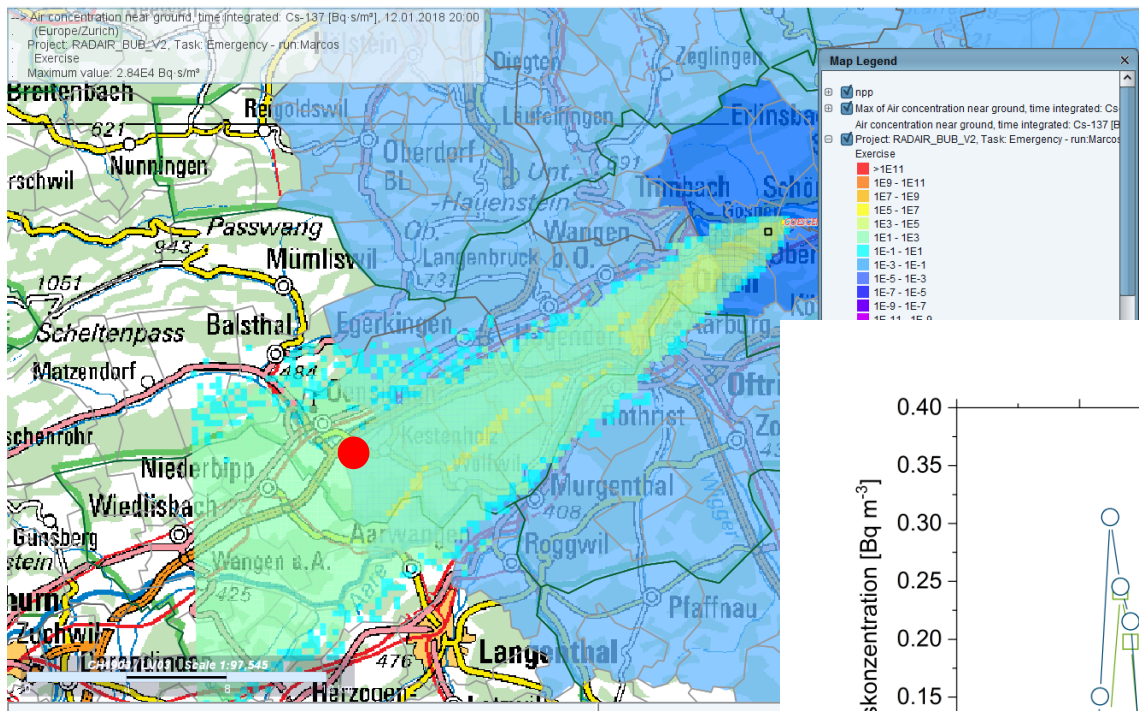


Nachweisgrenze Cs-137





Dispersions-Modellierung KKG 12. Januar 2018





Take-home messages:

- 15 Messstationen mit HPGe-Detektoren sammeln **kontinuierlich** Aerosolpartikel
- **Kontinuierliche** γ -Spektrometrie: Identifizierung und Quantifizierung der Radionuklide
- Nachweisgrenze Cs-137 nach 1h 20min bei 0.03 Bq m⁻³
- Alarmprüfung alle 5 Minuten
- Temperatur von Detektor/Aussenluft/Messraum beeinflusst Energie-Kalibrierung:
 - Herausforderung einer Messung im Feld



Vielen Dank für Eure Aufmerksamkeit