



SETOF

Soil Erosion and TOrrential Flood
*Prevention: Curriculum Development at the
Universities of Western Balkan Countries*

Monitoring bujičnih tokova i sistemi rane najave



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Goč, novembar 2021. godine

Co-funded by the
Erasmus+ Programme
of the European Union





Monitoring - Praćenje

- Nadgledanje znači biti svjestan stanja sistema.
- Promjene u sistemu koje se mogu pojaviti tokom vremena posmatraju se pomoću **mjernog uređaja ili monitora**.
- U fizikalnim naukama i inženjerstvu, mjerenje je aktivnost dobivanja i uspoređivanja fizičkih veličina predmeta i događaja iz stvarnog svijeta.
- Obično se zabilježene količine koriste za sicanje iskustva, za razvoj novih opisa ili formula, za testiranje hipoteza, za kontrolu sistema ili za izvođenje pragova.
- Svi mjerni uređaji podložni su različitim stepenima pogreške instrumenta i mjerne nesigurnosti.





Praćenje i percepcija

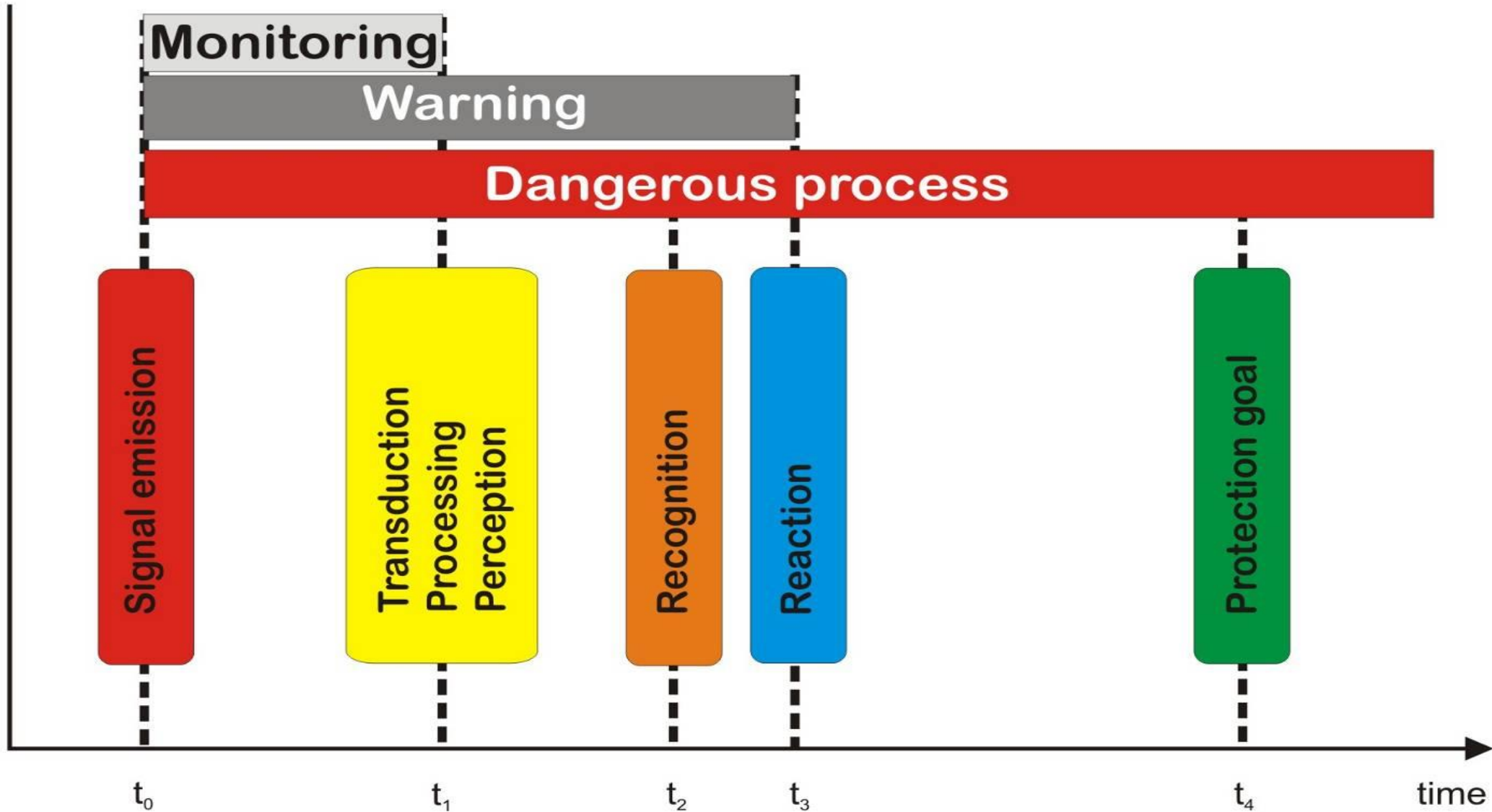
- Uz osnovno praćenje je povezan i proces postizanja svijesti ili razumijevanja senzornih informacija (percepcije).
- Ljudska bića usvajaju informacije iz okoline svojim osjetilima (vid, sluh, okus, miris, dodir, gravitacija) i reaguju.
- Nedostaci percepcije mogu dovesti do dubokih nedostataka u djelovanju.
- Iz tehničkih razloga sistemi praćenja mogu pomoći u prevladavanju nekih “ljudskih” ograničenja, jer rade prema standardiziranim procedurama i ograničavaju subjektivni dojam.





- Ovaj model, razvijen za percepciju ljudskih života, lako se može primijeniti na sisteme praćenja i upozorenja.
- mjerljivi signal emitiran iz objekta (npr. zvučni valovi)
- Prijenos ovog signala u fizičku mjerljivu jedinicu na kojoj se može izvršiti obrada informacija. (Danas uglavnom elektronski.)
- Obrada informacija filtriranjem ili matematičkim transformacijama.
- Transformacija obrađenih informacija radi kontrole izvedbe
- Informacija se uspoređuje s već poznatim uzorkom
- Rezultat procesa percepcije. Reakcija je usmjerena na cilj i podvrgnuta učenju.







Nadzor – sistem upozorenja

- Monitoring označava prikupljanje podataka kako bi se opisao status sistema.
- Prije svega moraju se odabrati bitni signali sistema (varijable) koji su značajni za opis statusa sistema.
- Zavisno o vremenskim promjenama ovih varijabli, potrebno je odabrati vremensku razlučivost prikupljanja podataka.
- Prepoznavanje i reakcija se mogu zanemariti, jer se obrađeni podaci pohranjuju isključivo na medij.
- Sistem upozorenja je svaki sistem tehničke prirode koji koristi pojedinac ili grupa kako bi obavijestio o budućoj opasnosti, na osnovu prepoznavanja kritičnih obrazaca.

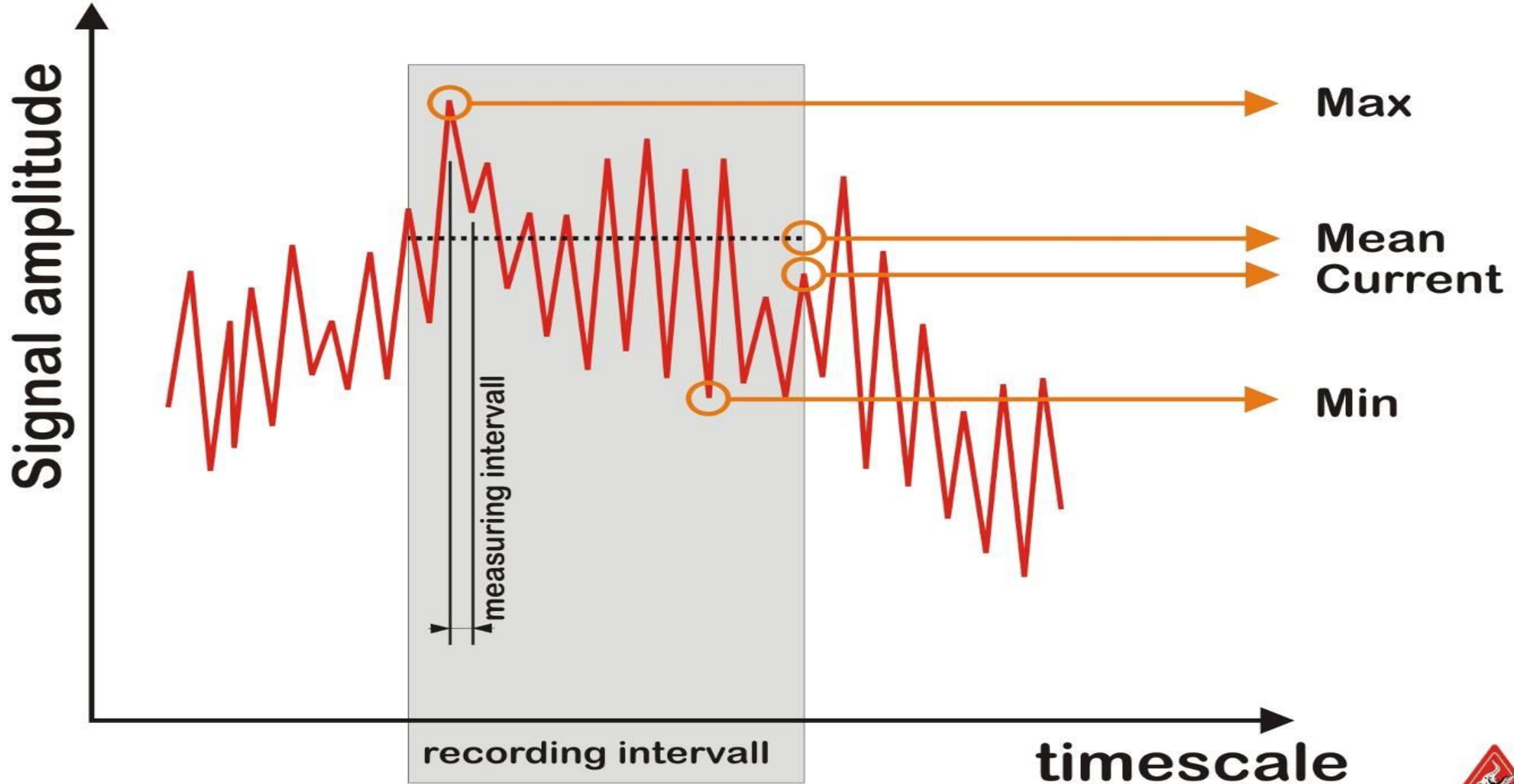




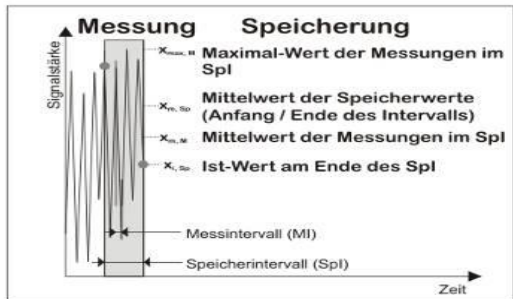
- Njegova svrha je omogućiti osobi zaduženoj za sistem upozorenja da bude spremna za opasnost i da u skladu s tim djeluje kako bi ublažila ili izbjegla opasnost.
- Upozorenje bi trebalo osigurati odgovarajuće vrijeme koje bi omogućilo mogućim pogođenim osobama da reaguju u slučaju upozorenja.
- Alarm, kojeg šalje sistem upozorenja, dovodi do reakcije prema datim uputstvima.



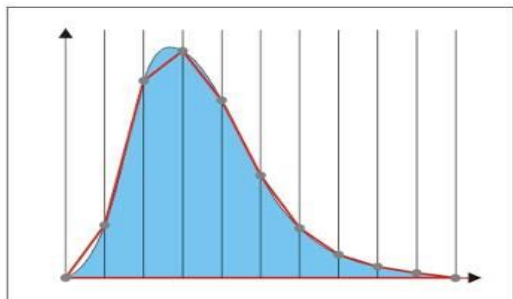
- Prikupljanje podataka



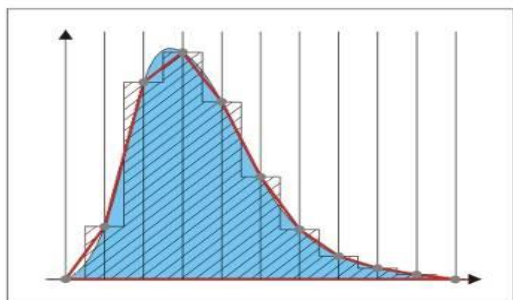
• Prikupljanje podataka



Prinzipische Skizze zur Speicherung von Messdaten

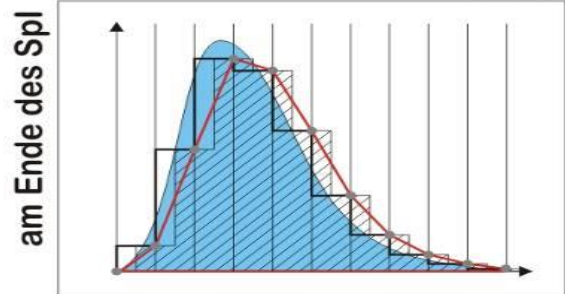


Ist-Werte am Ende des SpI



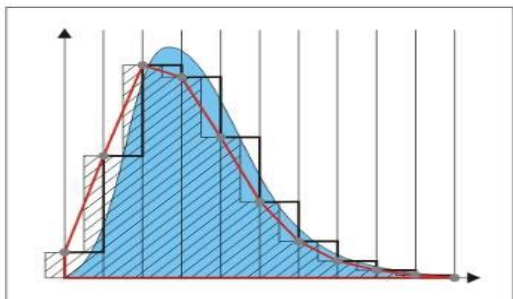
Ist-Werte zum Speicherintervall

Mittel der Istwerte ($x_{m, SpI}$)



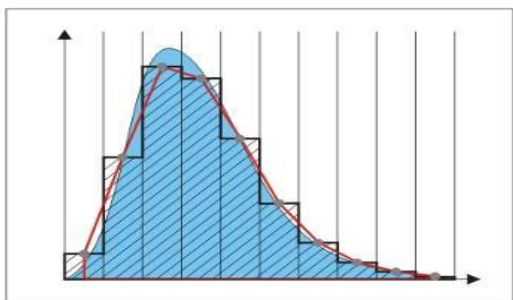
Mittel der Ist-Werte am Ende des Intervalls gespeichert

Datenspeicherung
am Beginn des SpI



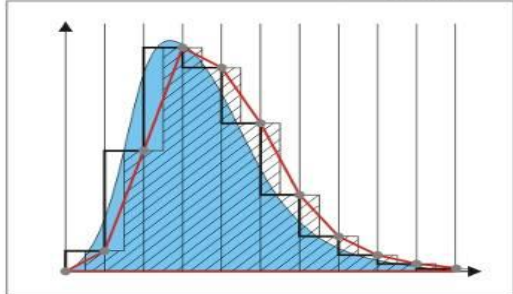
Mittel der Ist-Werte am Beginn des Intervalls gespeichert

in der Mitte des SpI

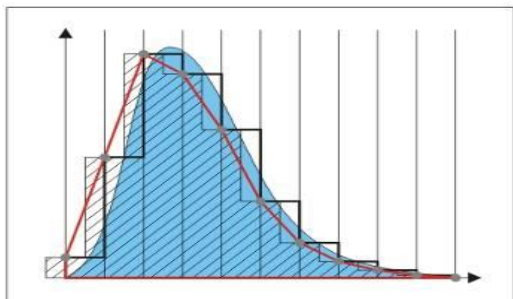


Mittel der Ist-Werte in Intervallmitte gespeichert

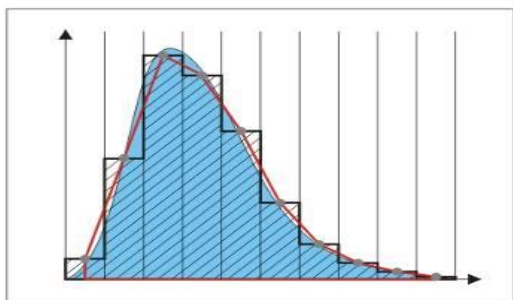
Mittelwert im SpI ($x_{m, M}$)



Mittelwert eines Intervalls am Ende des Intervalls gespeichert

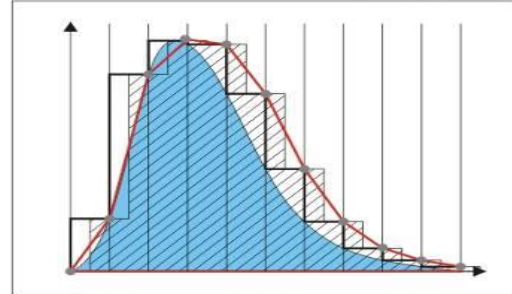


Mittelwert eines Intervalls am Beginn des Intervalls gespeichert

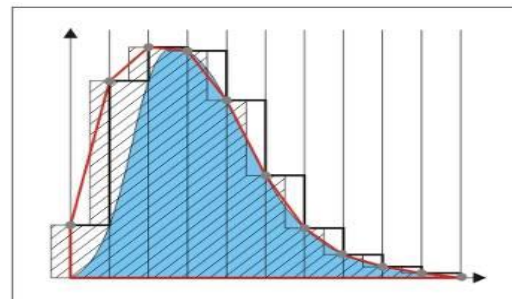


Mittelwert eines Intervalls in Intervallmitte gespeichert

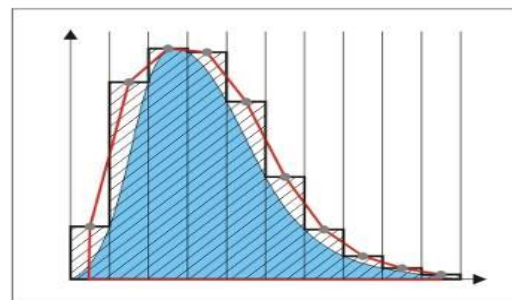
Maximalwert im SpI ($x_{max, M}$)



Maximalwert eines Intervalls am Ende des Intervalls gespeichert

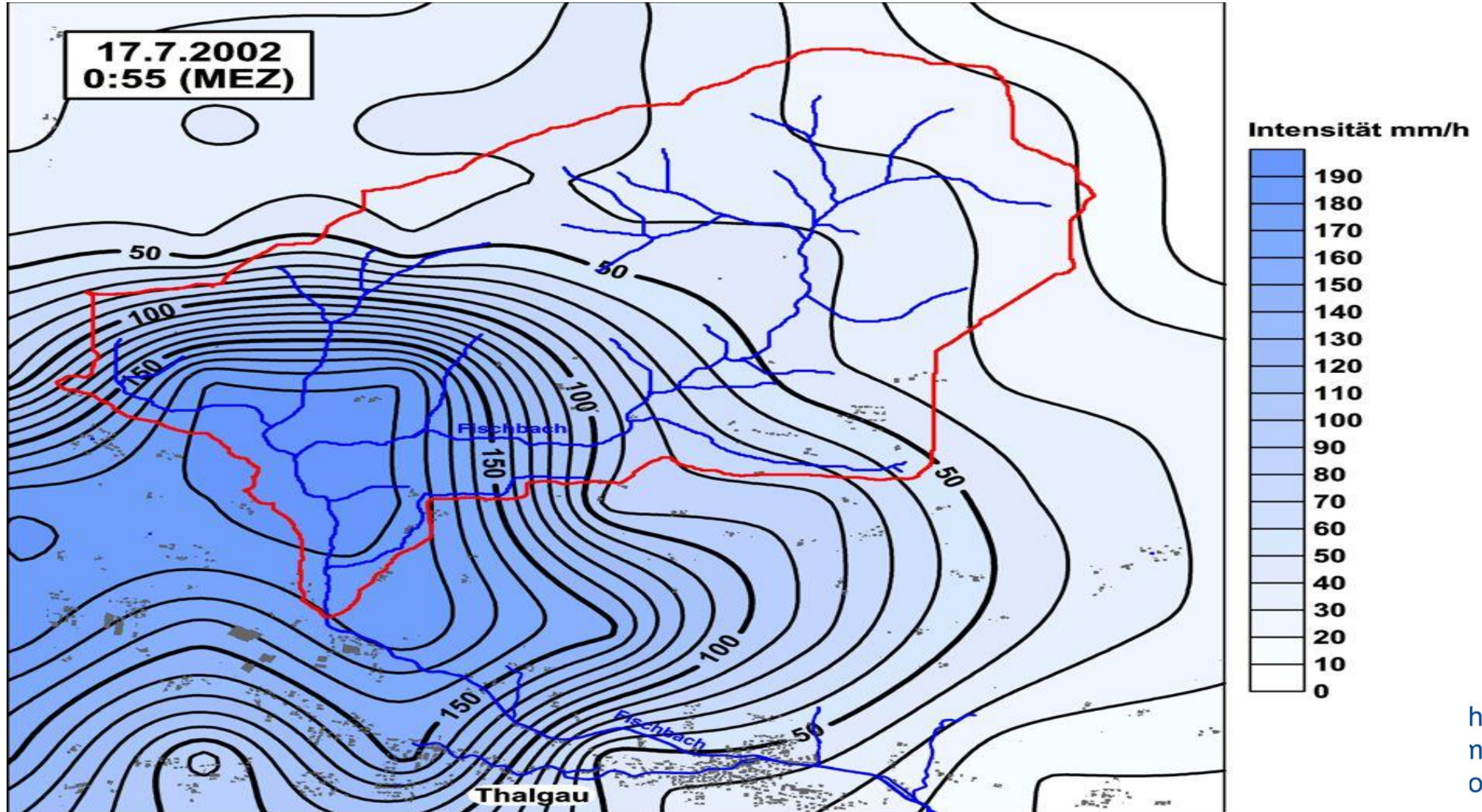


Maximalwert eines Intervalls am Beginn des Intervalls gespeichert

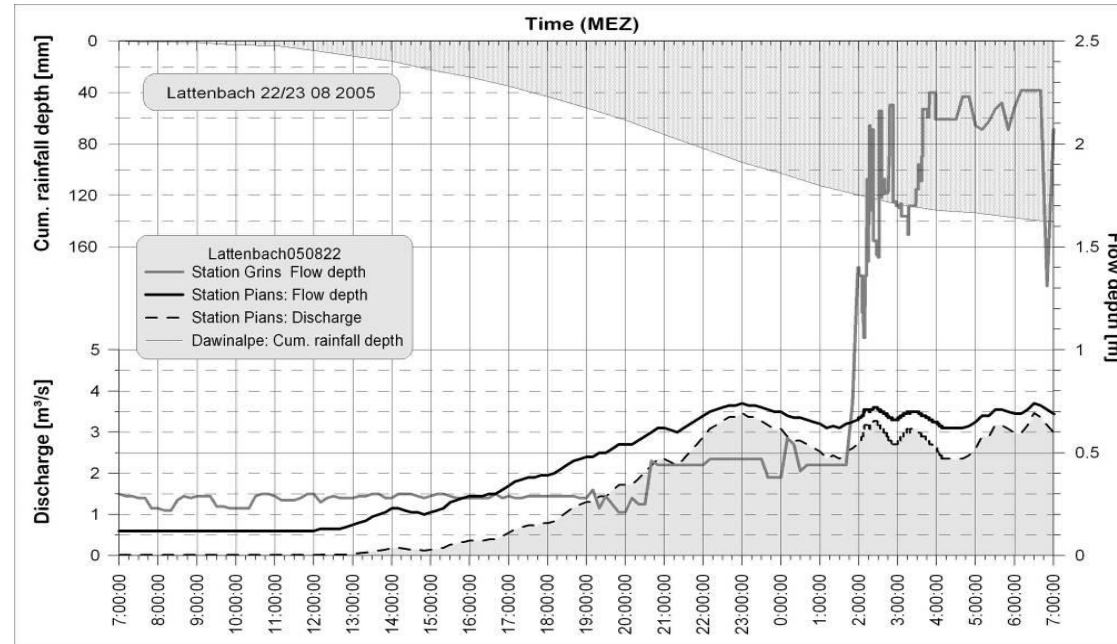
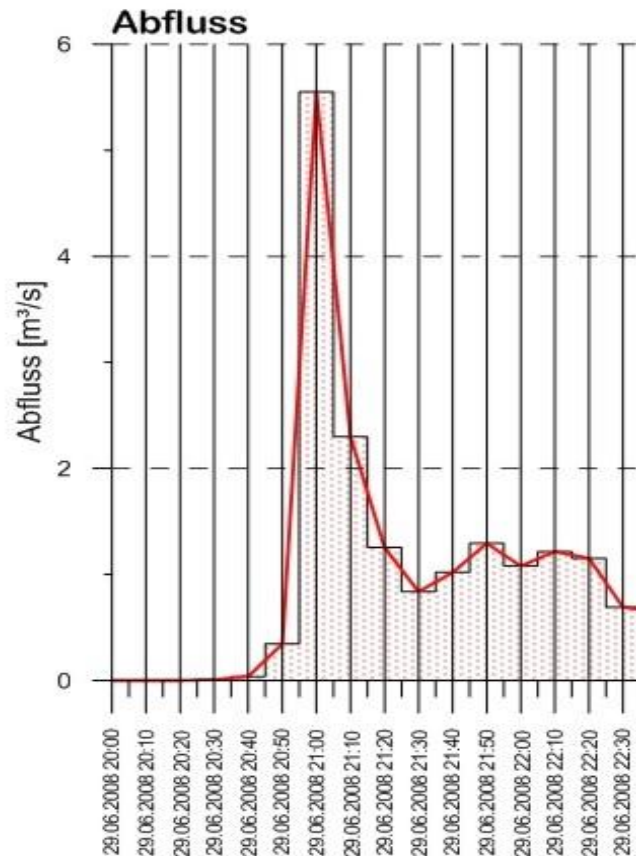
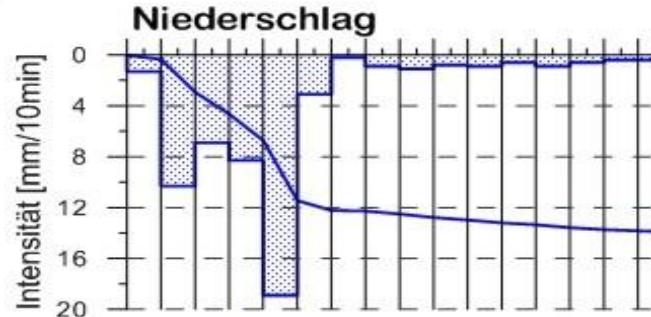


Maximalwert eines Intervalls in Intervallmitte gespeichert

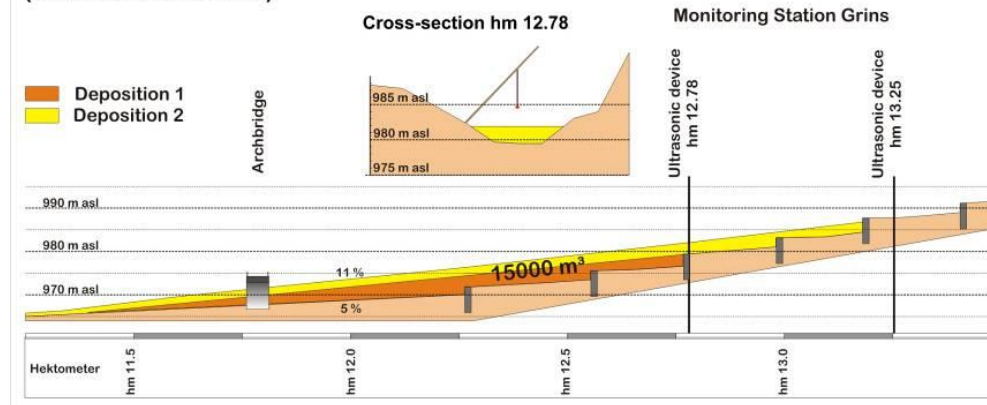
- Prikupljanje podataka



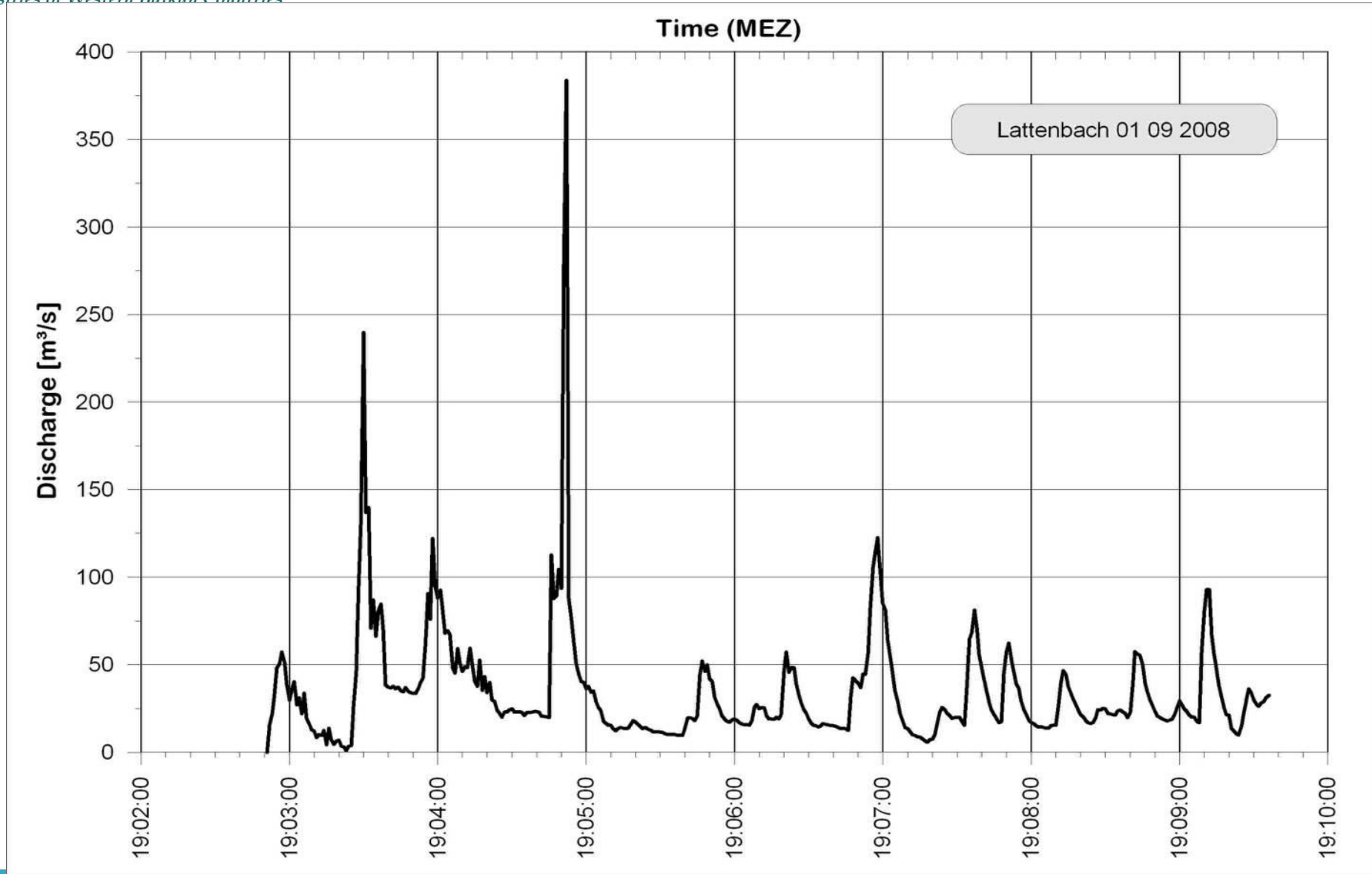
• Prikupljanje podataka



(Situation 25.08.2005)



- **Prikupljanje podataka**





Padavine

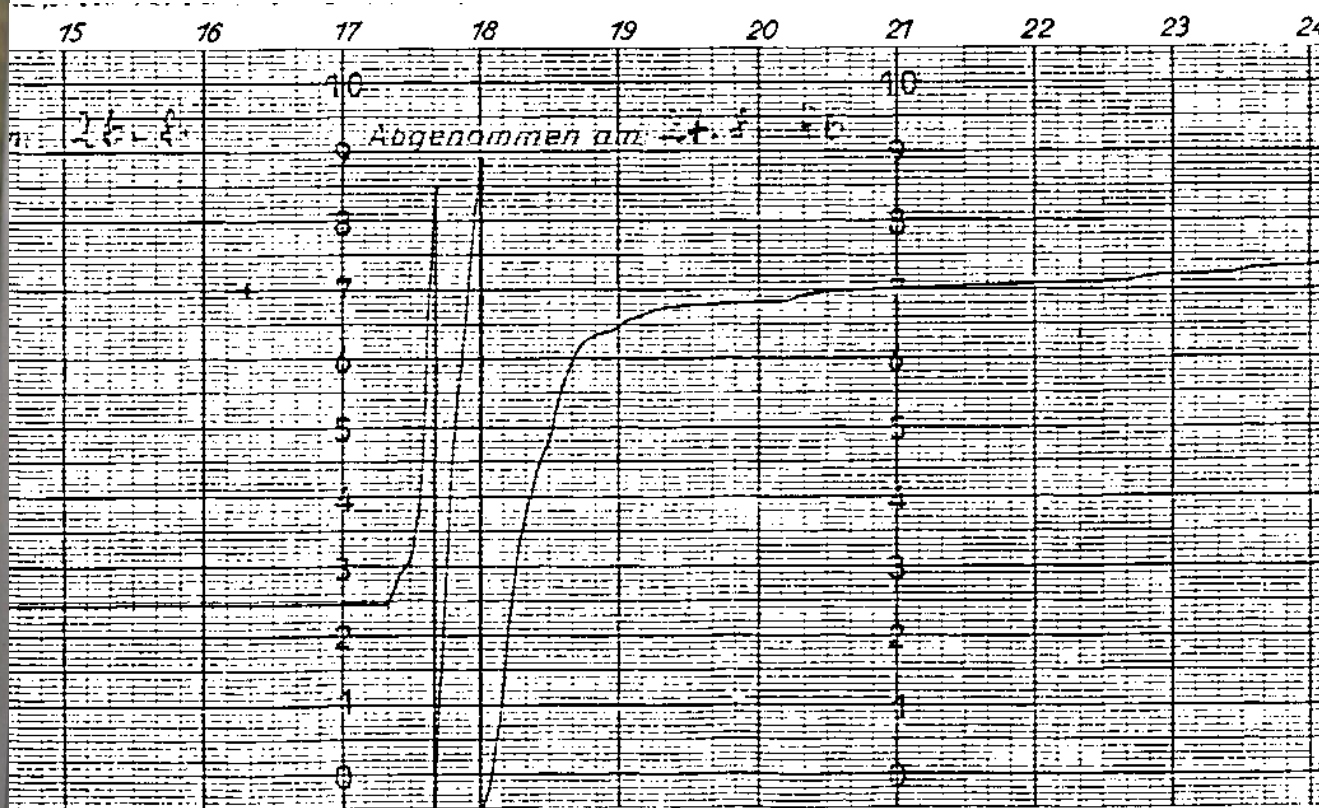
Ombrometer





Padavine

Ombrograf (princip plutača i sifona)





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Padavine

Sistem ponderisanja



by the
European
Union





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Padavine

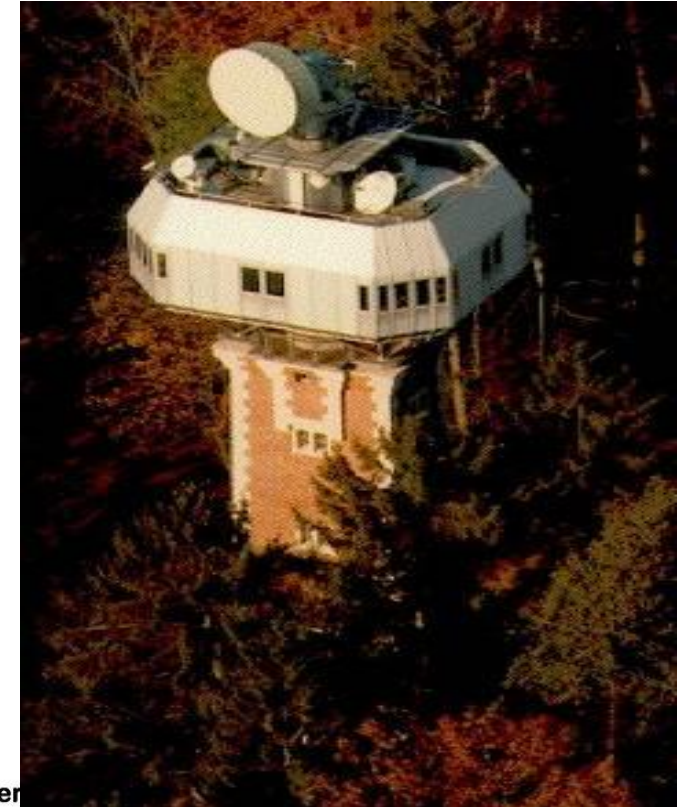
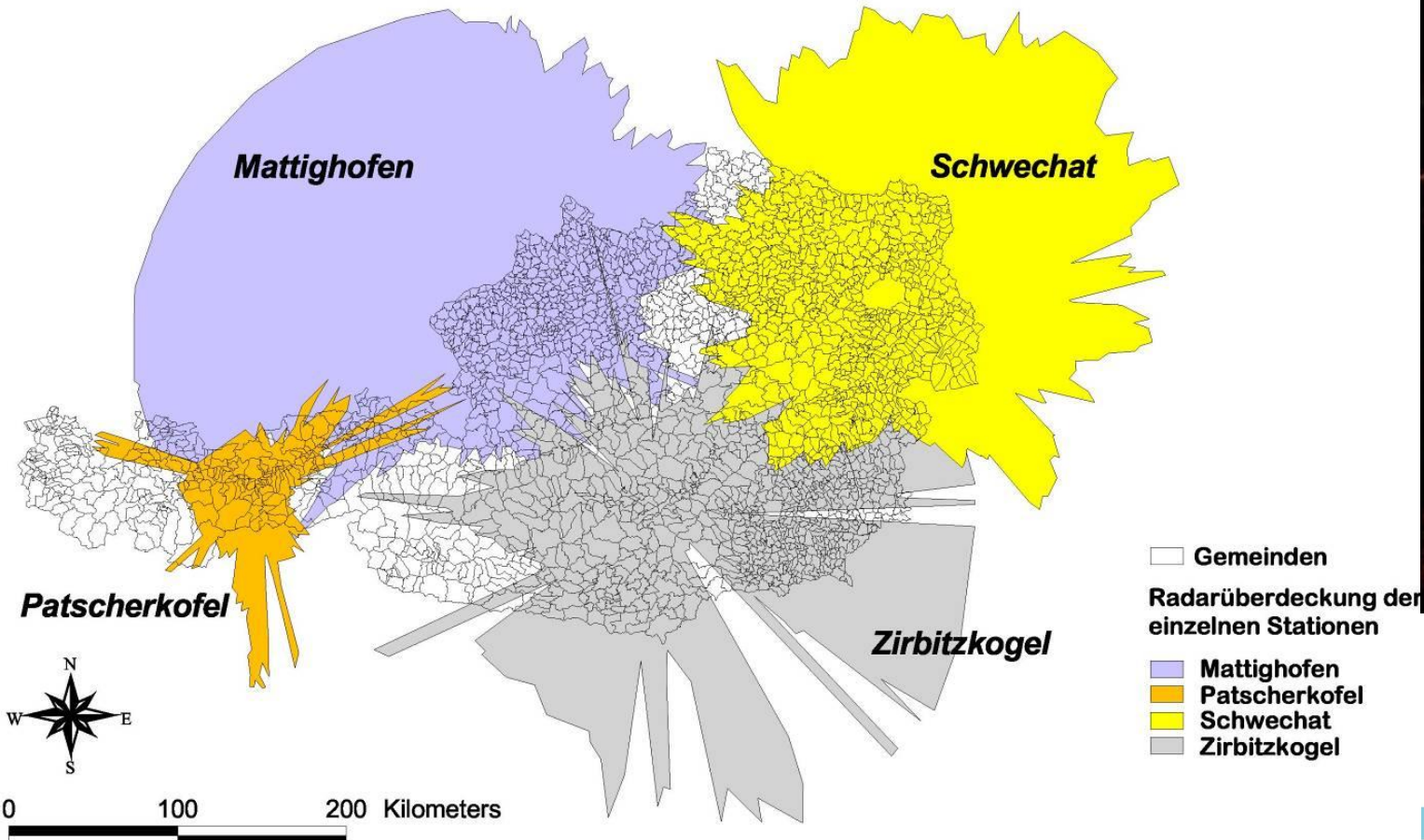
Laserski monitor padavina (Distrometar)



Padavine

Vremenski radar

Reichweite der vier Wetterradars der AUSTRO CONTROL GmbH
Regenhöhe: 1500 m über Grund



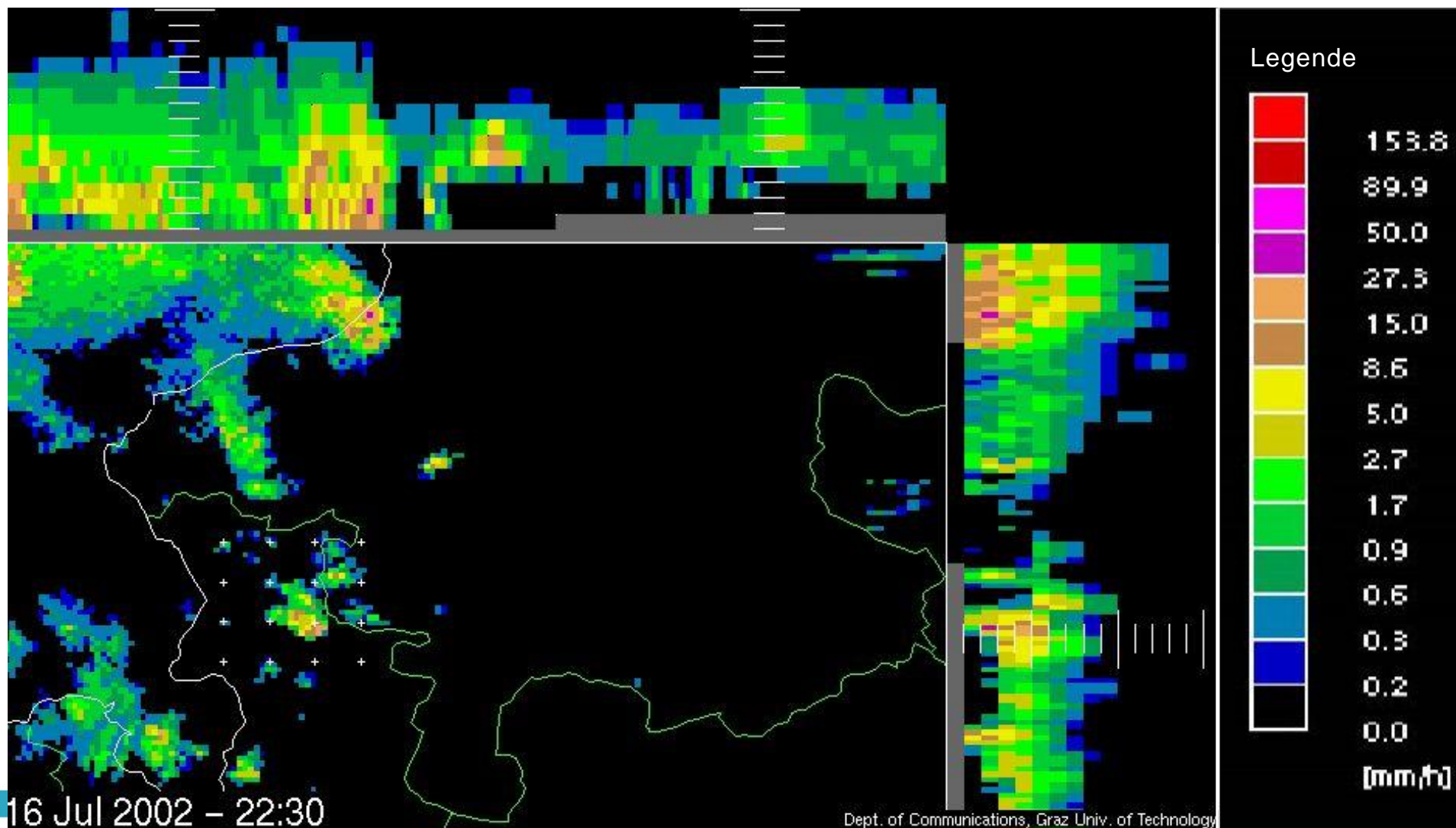
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Padavine

Vremenski radar





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Mikrofon - senzor



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Dubina protoka - Manometar





Dubina protoka - Ultrazvučni senzor





Dubina protoka - Radarski senzor





Dubina protoka - Radarski senzor



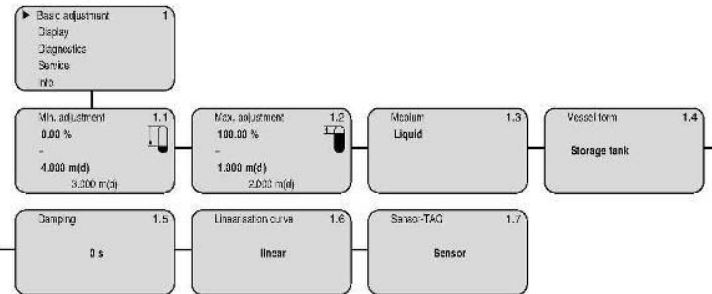
6 Set up with the indicating and adjustment module PLICSCOM

6.5 Menu plan ultrasonic sensor



Information:
Depending on the version and application, the highlighted menu windows are not always available.

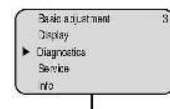
Basic adjustment



Display



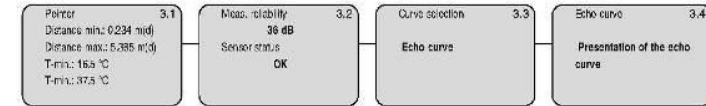
Diagnostics



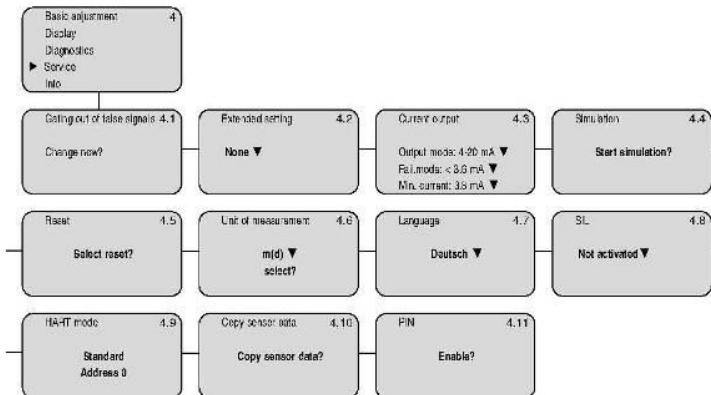
28775-EN-090306



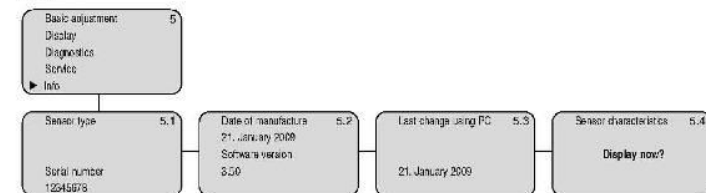
6 Set up with the indicating and adjustment module PLICSCOM



Service



Info



28775-EN-090306



Brzina strujanja - Radarski senzori





Vibracije tla Seizmički geofon



Električna vodljivost
Senzor vodljivosti





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Otklon/pomak Prekidač za preklop





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Infraczvuk

Audio / Zračni pritisak

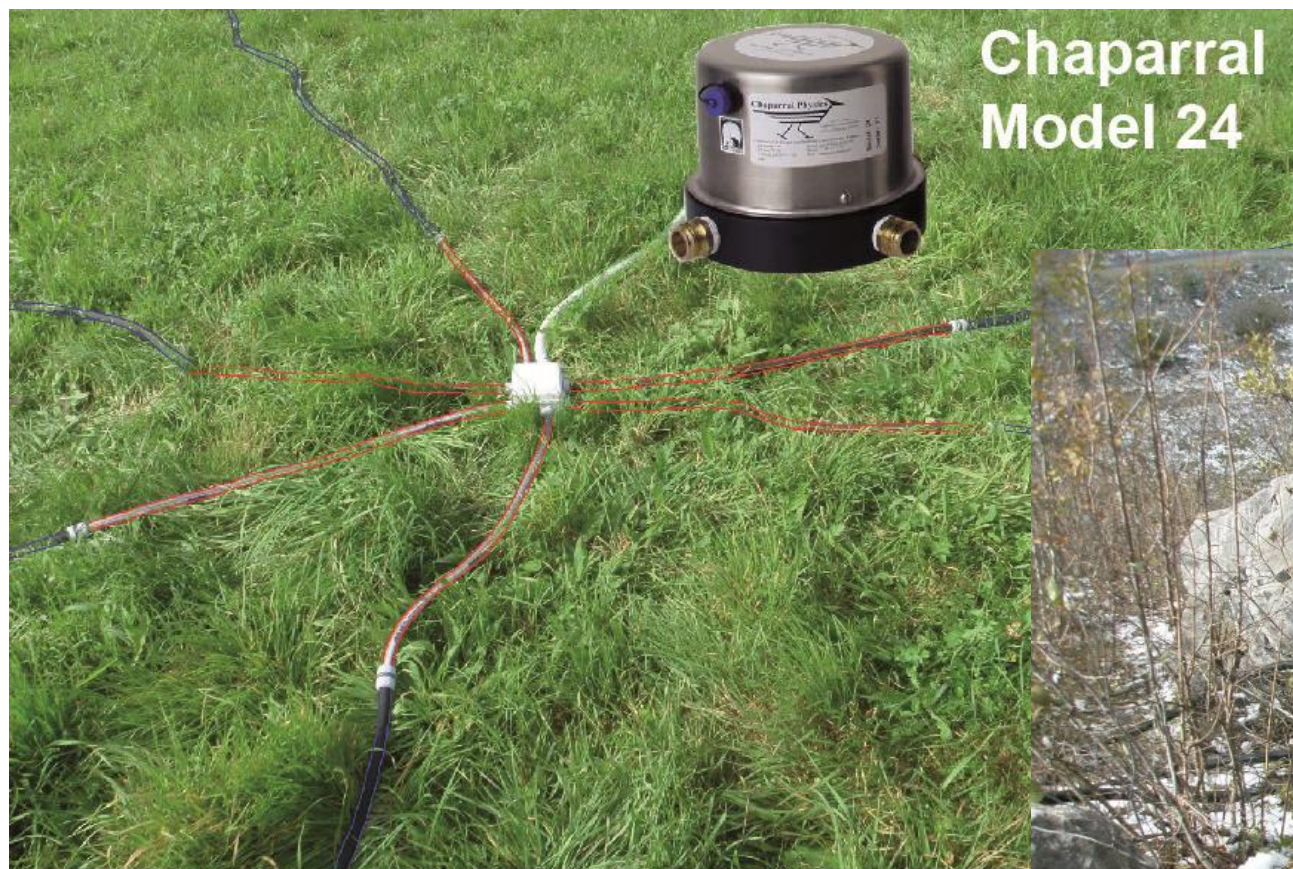




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Infrazvuk

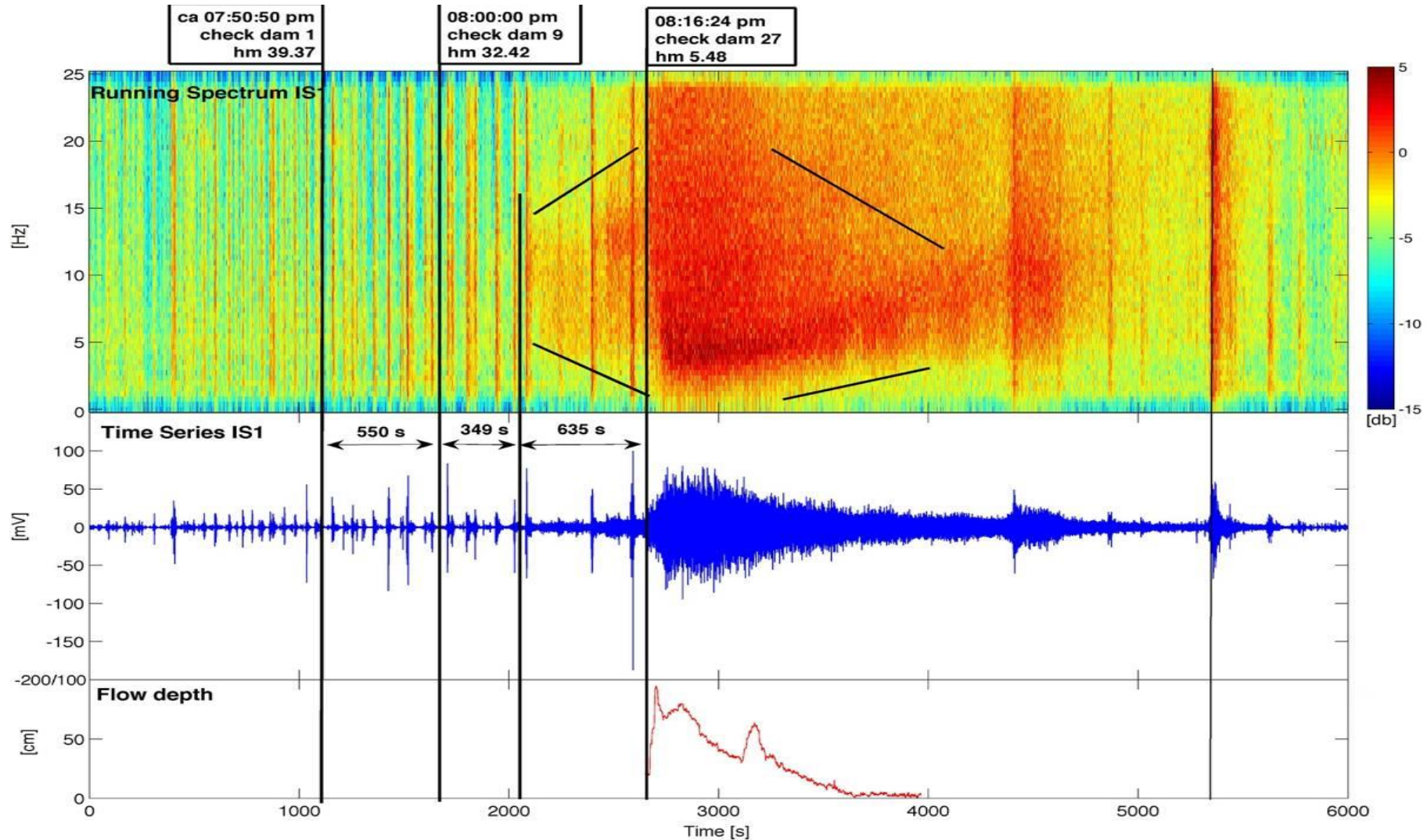
Audio / Zračni pritisak





Infrazvuk

Audio / Zračni pritisak





Temperatura zraka / vlaga / pritisak





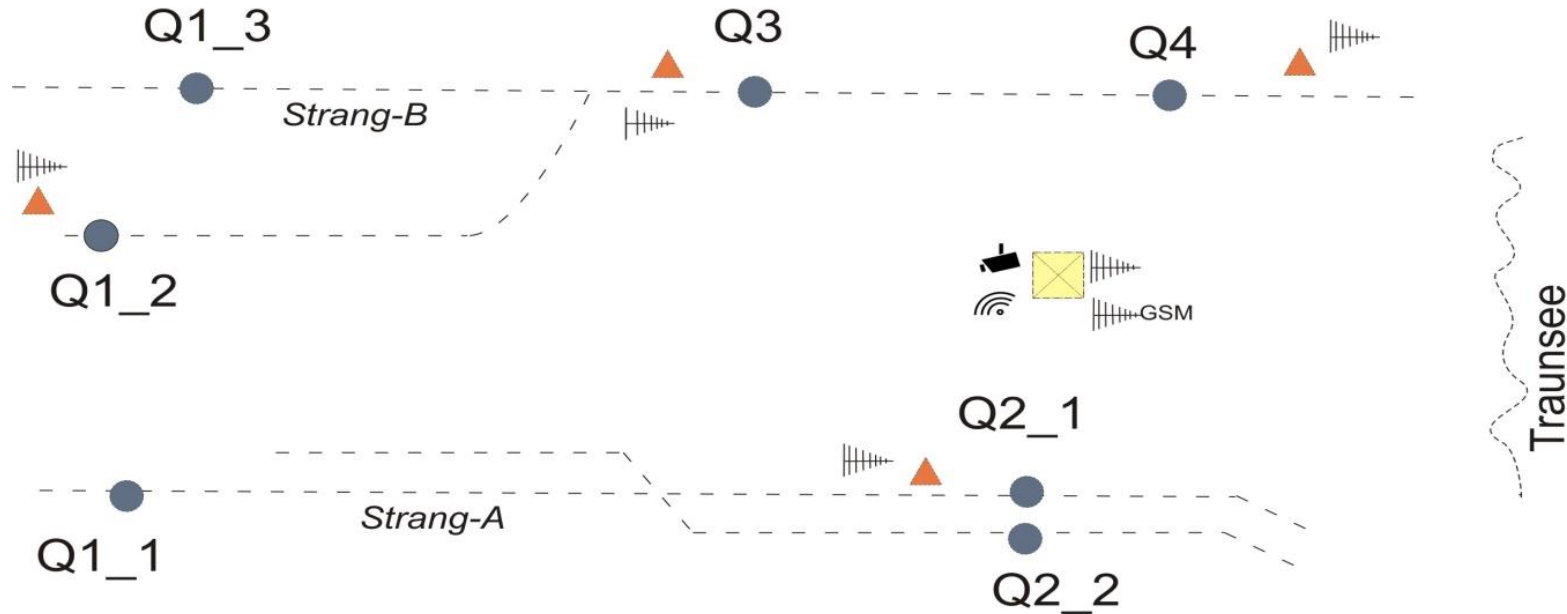
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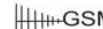
Video oprema



Eksperimenti

Messschema Monitoring Abflüsse Gschlifgraben



-  Datalogger-slave
-  Masterstation
-  Sensor
-  VPN->Boku
-  Webcam
-  Funk
-  Alarm *

*ALARM-KRITERIEN

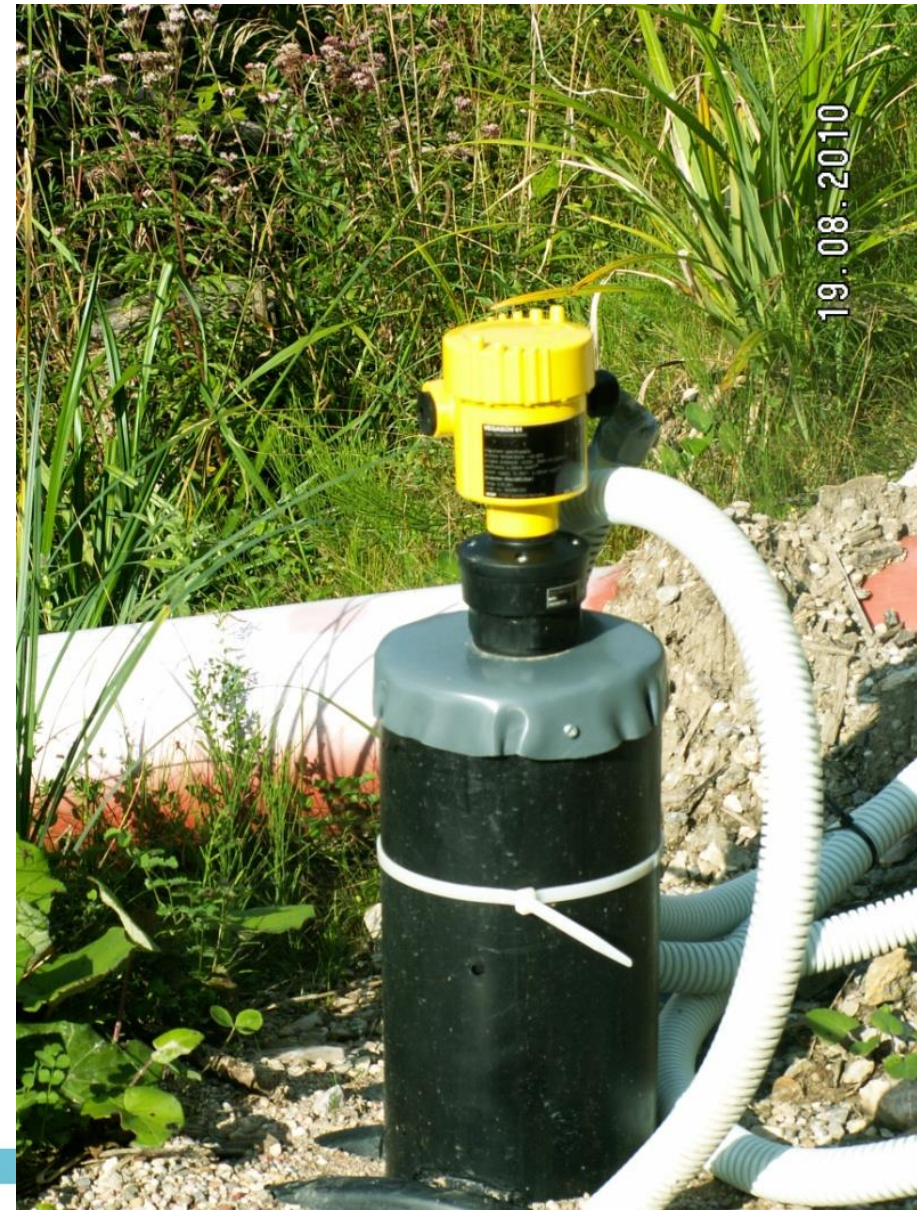
- Alarm1: Gschlifgraben Q1_1 > 600 l/s
- Alarm2: Gschlifgraben Q1_2 > 600 l/s
- Alarm3: Gschlifgraben Q1_3 > 600 l/s
- Alarm4: Gschlifgraben Q4 > 600 l/s
- Alarm5: Gschlifgraben Strang-A Differenz > 100 l/s
- Alarm6: Gschlifgraben Strang-B-C Differenz > 100 l/s



Eksperiment



Gschlifgraben, Oberösterreich
(2010)

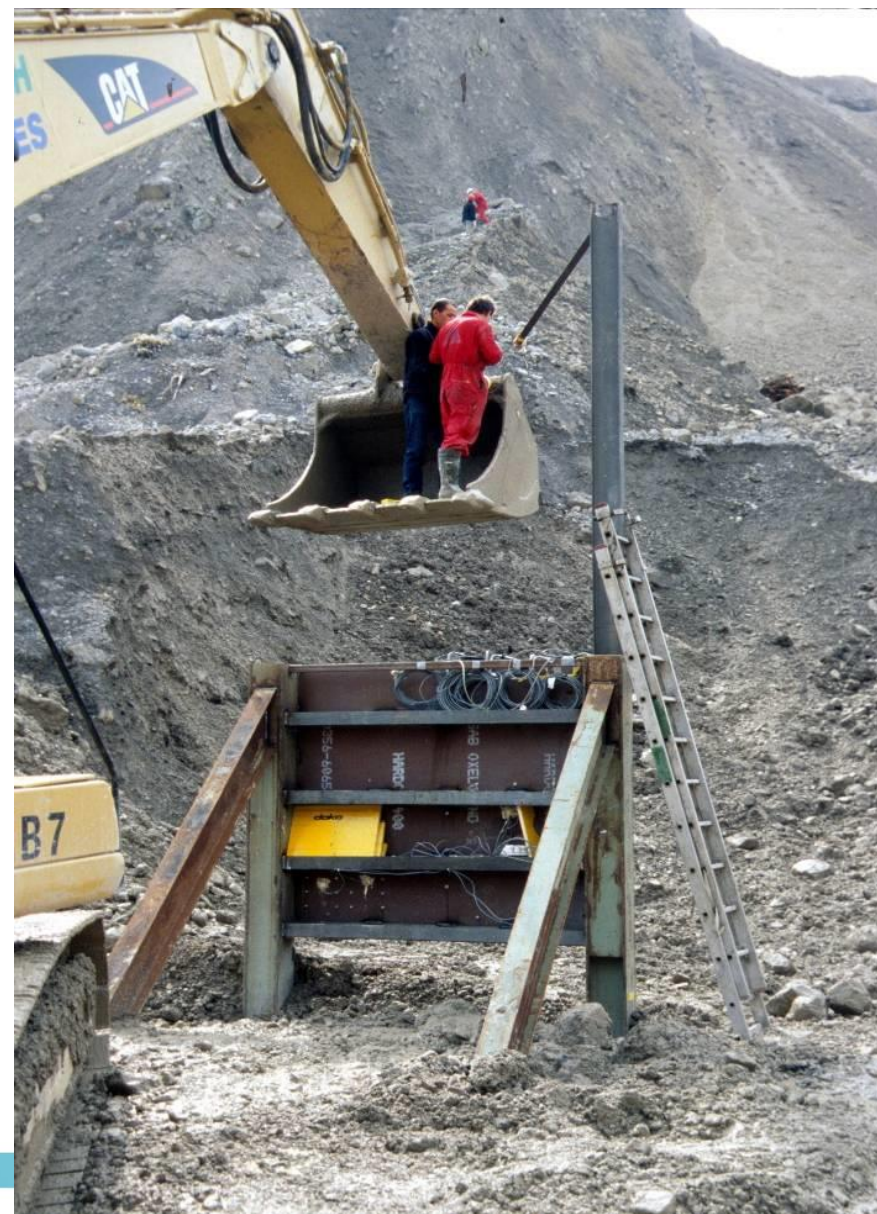




Eksperiment



Schesatobel, Vorarlberg
(2004)





Eksperiment



Schesatobel, Vorarlberg
(2004)





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gramme
an Union





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Primjeri postavljanja stanica za snimanje



Lattenbach, Tirol
(2008)

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Primjeri postavljanja stanica za snimanje





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Primjeri postavljanja stanica za snimanje



Schmittenbach, Salzburg
(2003)

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ogramme
an Union





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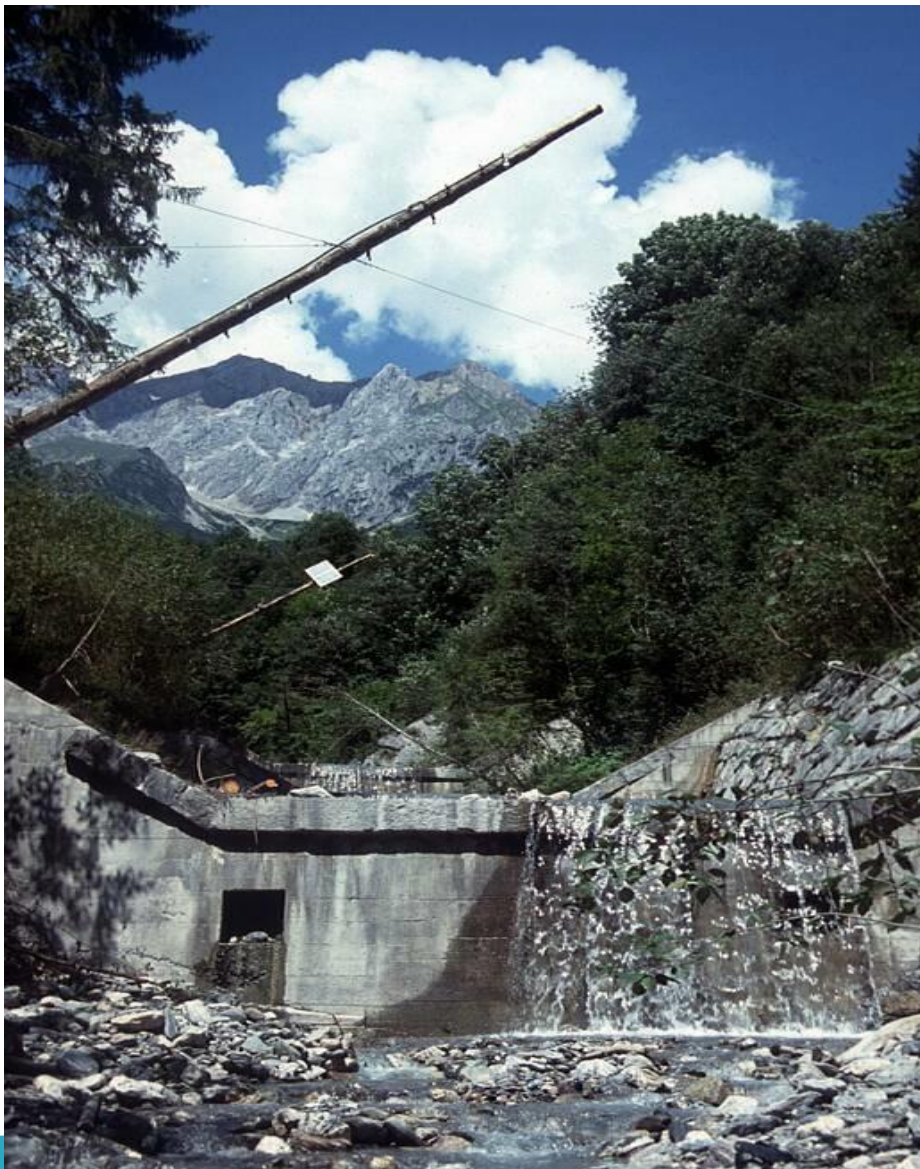


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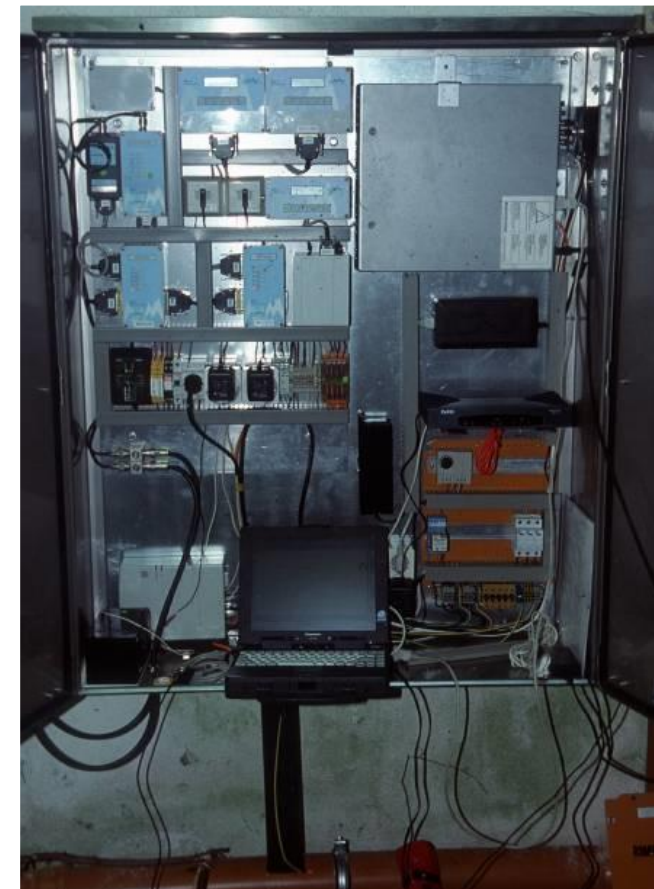
Primjeri postavljanja stanica za snimanje





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Primjeri postavljanja stanica za snimanje



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Primjeri postavljanja stanica za snimanje



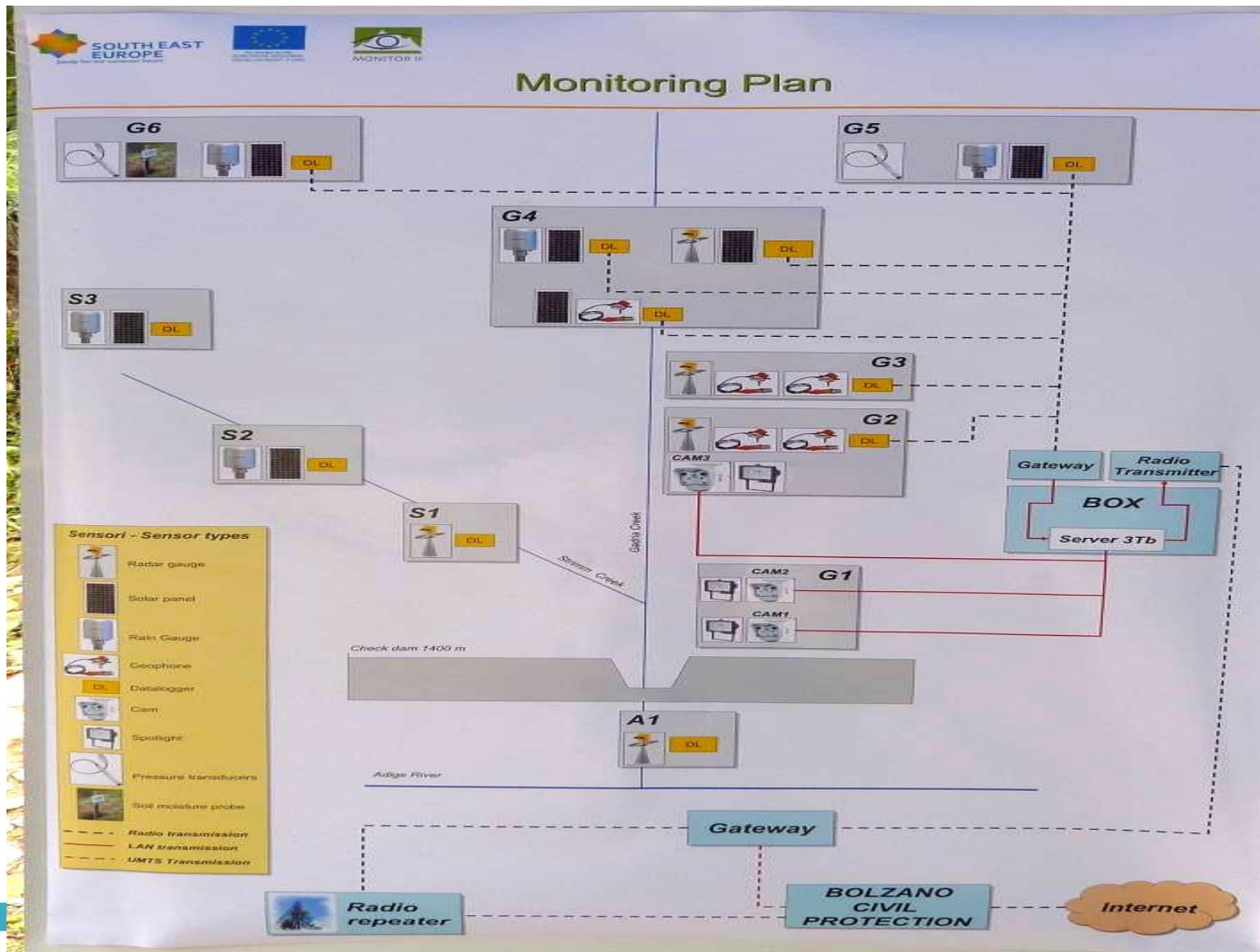


Primjeri postavljanja stanica za snimanje

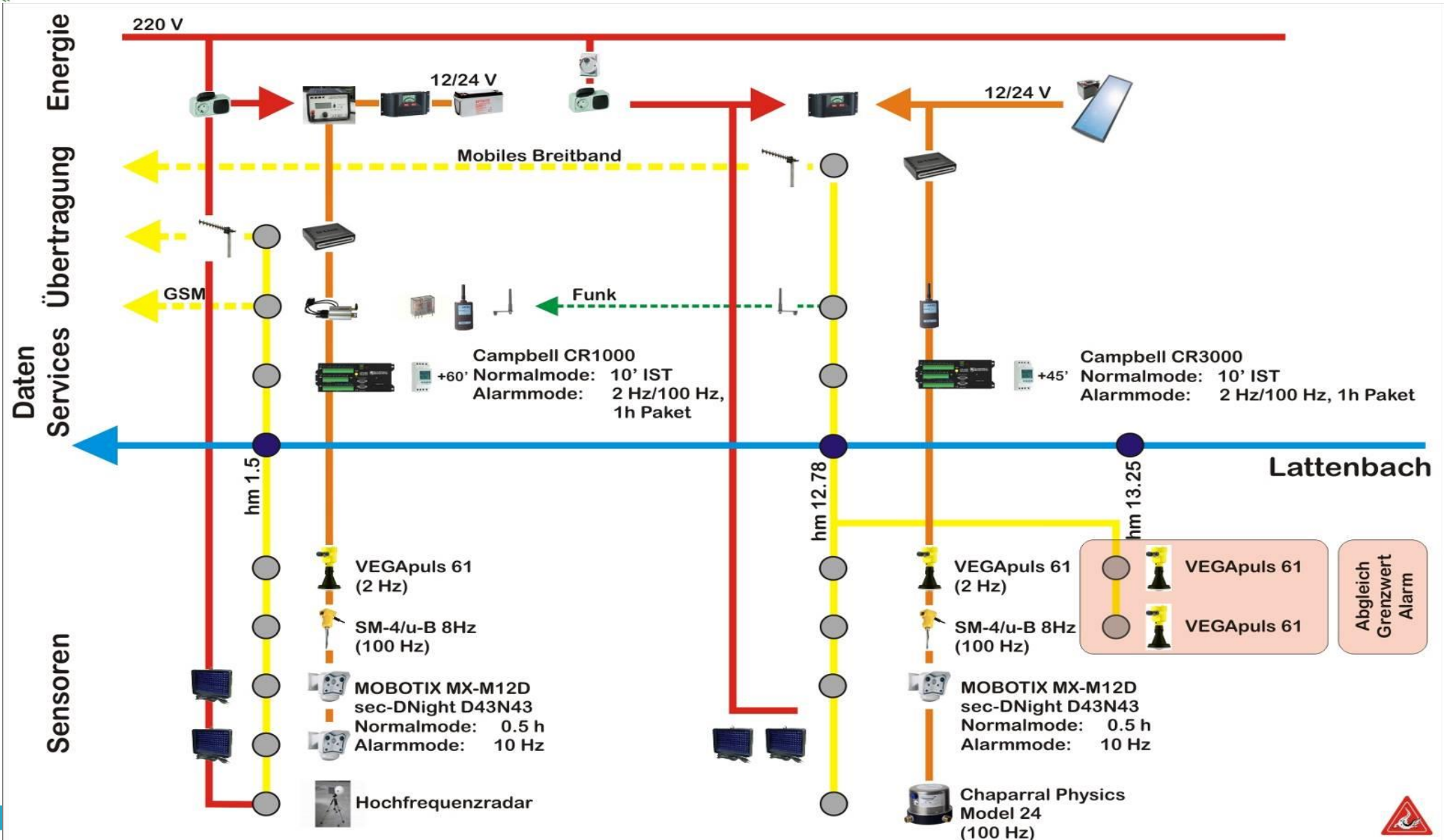




Primjeri postavljanja stanica za snimanje



Primjeri postavljanja stanice

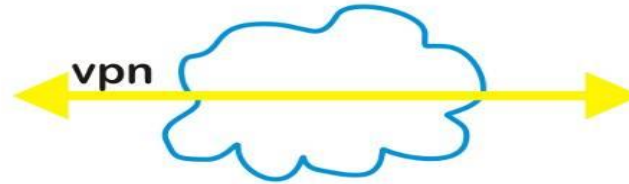


Primjeri postavljanja stanica za snimanje

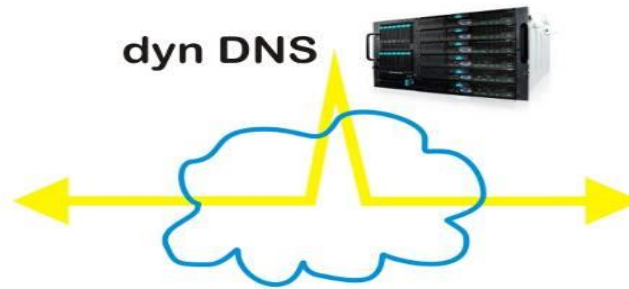
Communication

Home station

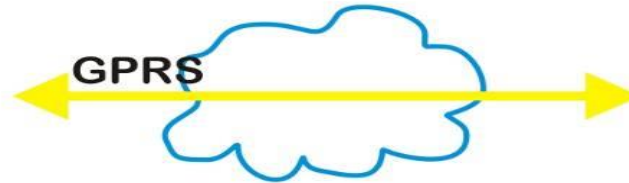
Monitoring station



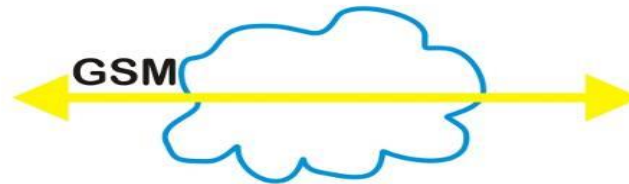
GSM
text message



GSM
text message



GSM
text message

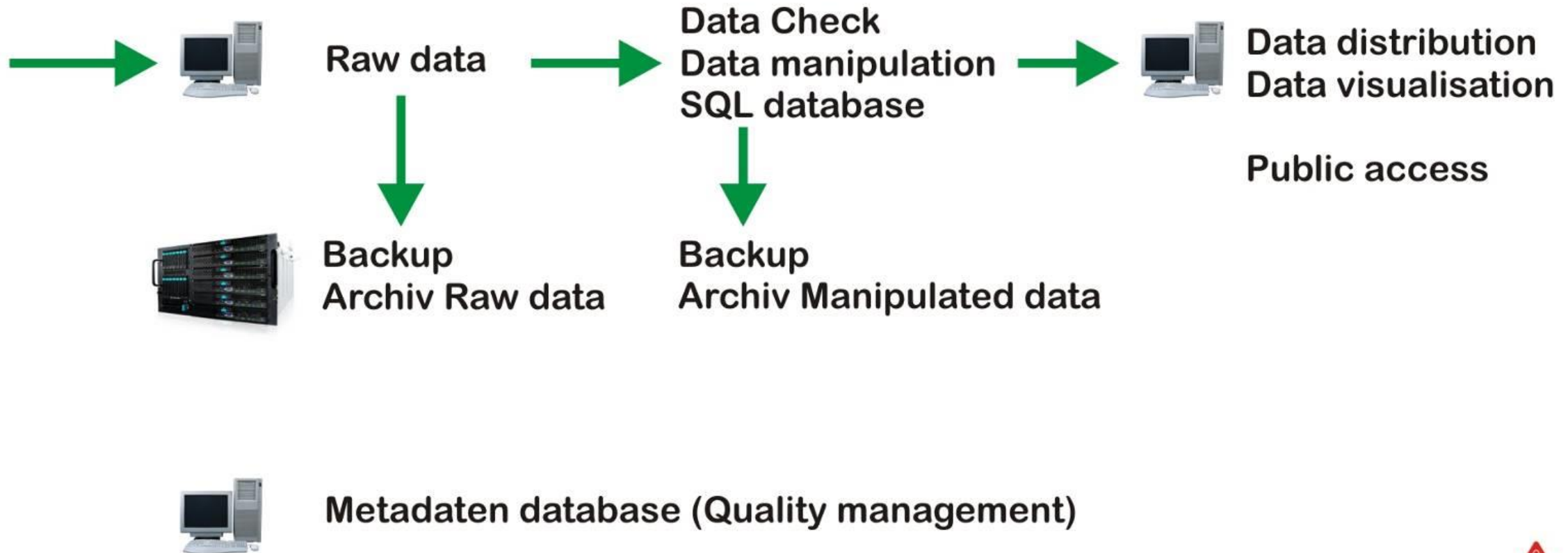


GSM
text message



Primjeri postavljanja stanica za snimanje

Data management





Neka pitanja na koja treba odgovoriti

- Koji se opasni procesi mogu očekivati?
- Koje će se emisije signala pojaviti?
- Koji se signali mogu prepoznati?
- Koji senzori najbolje odgovaraju?
- Gdje je najbolji položaj senzora?
- Koji interval mjerenja treba osigurati?
- Kolika je brzina snimanja?
- Koliko je vremena preostalo za otkrivanje i prepoznavanje?





Neka pitanja na koja treba odgovoriti

- Koja je oprema dostupna za prijenos podataka (upozorenja)?
- Koja oprema se može koristiti za pohranu podataka?
- Koliko snadbijevanja energijom je potrebno?
- Kome treba slati podatke?
- Koje komunikacijske mogućnosti postoje?
- Ko je odgovoran za sistem (kod kuće i na terenu)?
- Ko održava i kontroliše sistem?
- Ko je odgovoran u slučaju kvara sistema?
- Postoji li osiguranje koje će snositi troškove u slučaju kvara?



