

Hydrological Measurements

Wim Luxemburg

1. Stage Measurement



Need for measurements

Data requirements related to purpose

Regarding long/short term, large/small time scale, real-time, spatial resolution

Planning

Design

Management

Research



Measurement of stage in rivers:

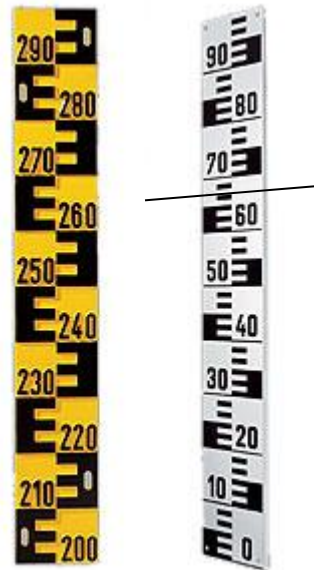
Considerations for site selection:

- Practical issues for accessibility, installation, sustainability
- Stage-discharge
 - Unique relation stage-discharge
 - Discharge measurement possible
 - Confined cross section for accuracy

Measurement of stage

Direct systems:

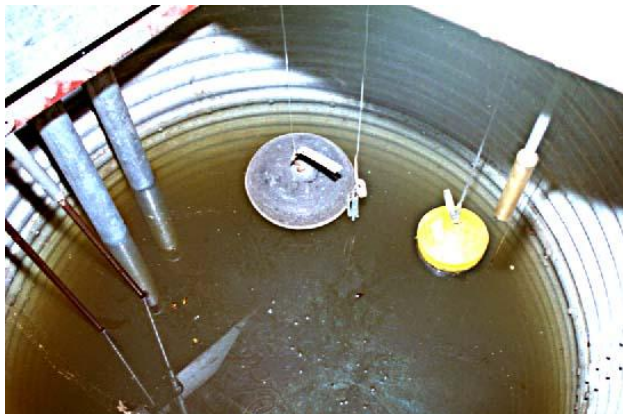
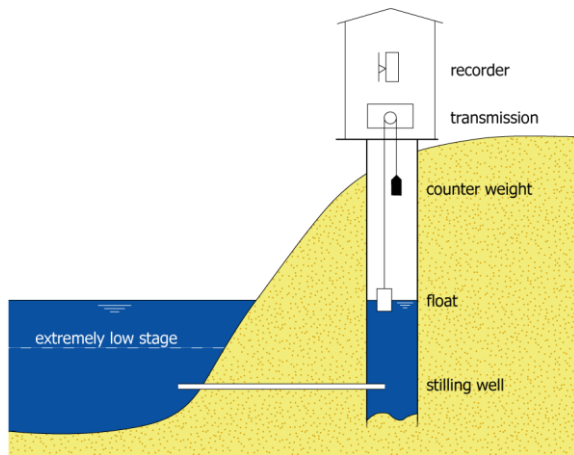
Staff gauge:



Measurement of stage

Direct systems:

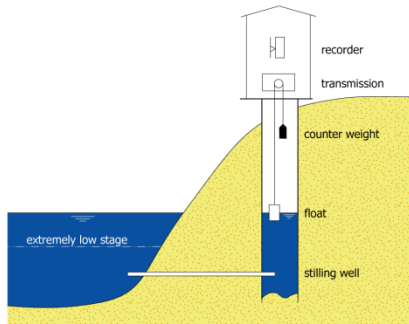
Float gauge:



Measurement of stage

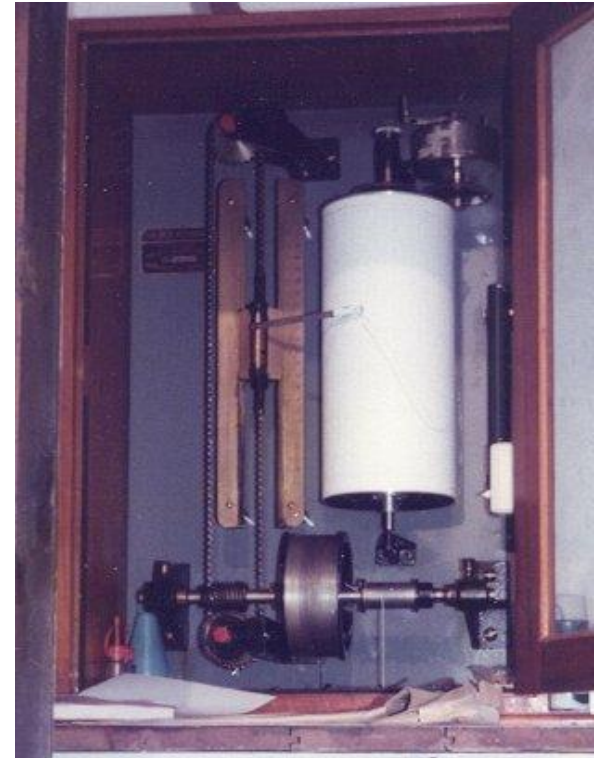
Direct systems:

Float gauge:



Recording

- 1) on chart
- 2) tape
- 3) solid state









Thalimedes in combination with a mechanical Water-Level Recorder Type X



Thalimedes / R 20 Strip-chart Recorder



Thalimedes / R 16 Vertical Recorder



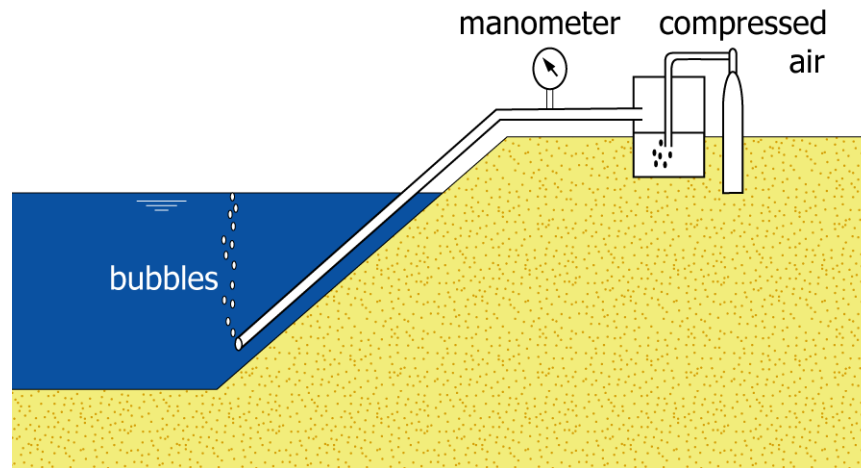




Measurement of stage

indirect system

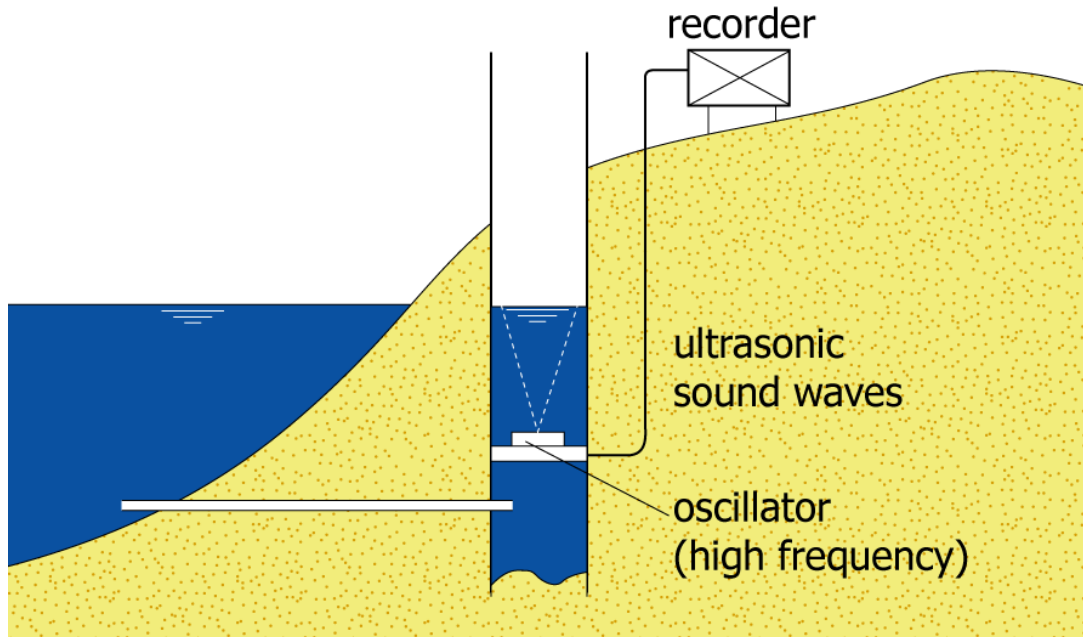
Bubble type pneumatic gauge



Measurement of stage

indirect system

Ultrasonic water level gauge



Measurement of stage

indirect system

Optic water level gauge



Measurement of stage indirect system

Capacitance Rod

The AquaRod is a high precision, low maintenance instrument based on capacitance-measuring technology. It is comprised of a pod, which contains the electronics for data acquisition, and a rod, which is the capacitance gauge. A simple snap-on design



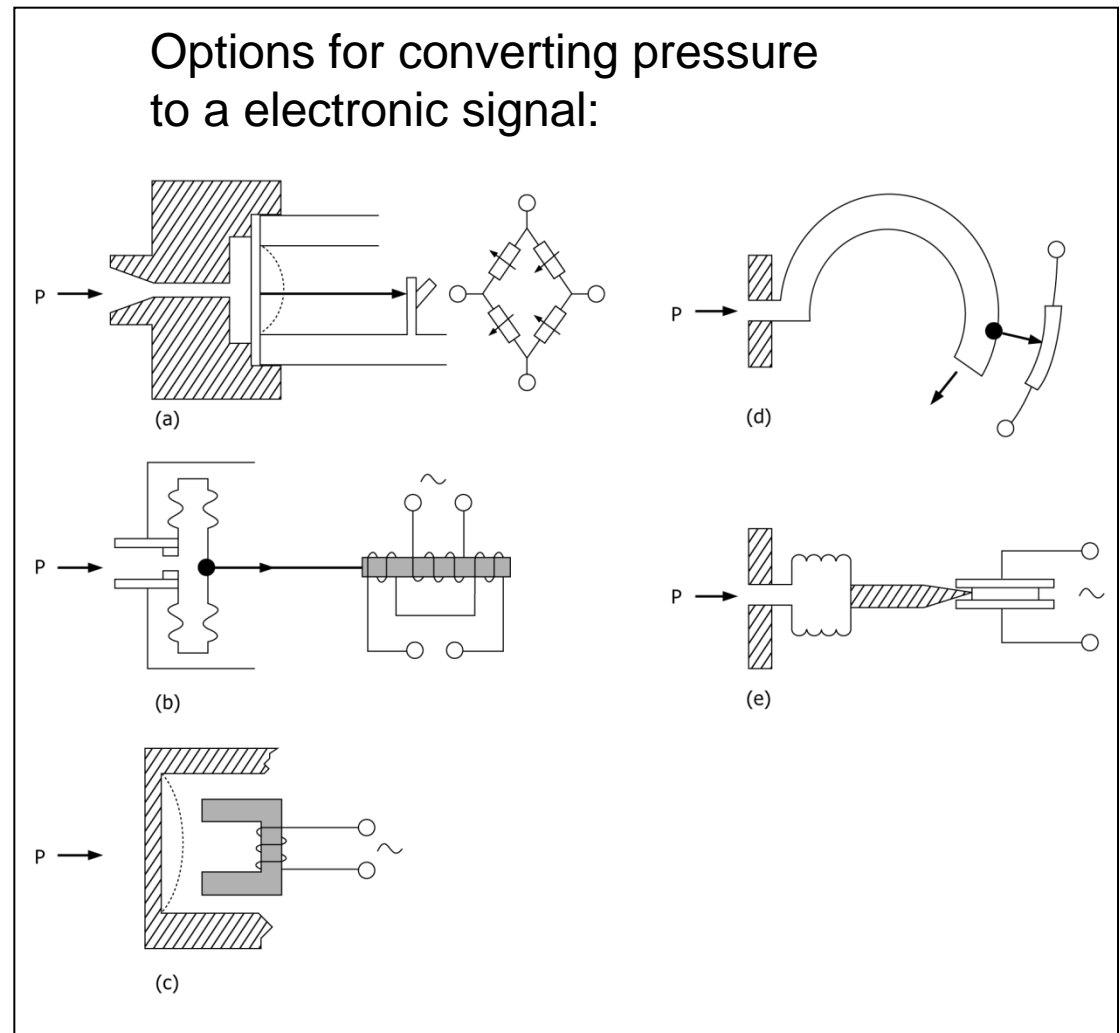
permits easy deployment in cold, damp conditions... More details at [AquaRod Recorder](#)

Measurement of stage indirect system

Pressure transducers

Air pressure compensated

- 1) Vented
- 2) Not vented



InSitu Minitrol
Vented



Van Essen Diver
Not vented

Can we notice a pressure difference between 0 and 20 meters altitude with a pressure transducer.

Can we notice a pressure difference between 0 and 20 meters altitude with a pressure transducer.

$$\log^{10}(P) \approx 5 - \frac{h}{15500}$$

Where,

(P) = pressure in Pascal

h = altitude from surface in [m]

How much pressure difference in cm water would an altitude of 20 meters from surface give

Assume 1 atm = 10 meterwater = 100000 Pa