**Specifications**

**SediMeter sensor**
- Light emitted: 945 nm (NIR)
- Number of OBS detectors: 36
- Detector spacing: 10 mm
- Diameter: 15 mm / 20 mm
- Data output: Turbidity in 36+35 levels, bed level
- Turbidity resolution; range: 1 FBU: 0 - 10,000+ FBU
- Bed level resolution; precision: 0.01 mm: 0.1 mm

**International nephelometric turbidimeter (ISO 7027 type)**
- Light emitted: 850 nm (NIR)
- Measurement angle: 90°, NIR filter
- Turbidity resolution; linear range: 1 FNU: 0 - 400 FNU

**U.S. nephelometric turbidimeter (EPA type)**
- Light emitted: White (LED)
- Measurement angle: 90°, visible light filter
- Turbidity resolution; linear range: 1 NTU: 0 - 400 NTU

**Fluorescence meter**
- Wavelength emitted: 367 nm (UVA)
- Measurement angles: 90°, 180°, visible light
- Fluorescence resolution: 1 FTU

**Light meter**
- Resolution; range (ca): 1 lux; 0 - 50,000 lux

**Accelerometer**
- Range: ±2 g
- Resolution: 0.001 g, or 0.016 g
- Samples per measurement: 20, or 30
- Rate: 10 Hz
- Conditions-Based Monitoring: Dynamic threshold

**Logger**
- Memory size: 32,768 measurements
- Logging interval: 1 second to 24 hours
- Communication, charging: USB to RS485 cable
- Intended deployment time: Weeks to months

**Cleaning**
- Vibrator; UV-A light with automatic optimization

**Battery**
- Type: AA rechargeable
- Capacity, ca: 900 mAh

Specifications subject to change without prior notice. Precision refers to repeatability.

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**SediMeter™ SM4**
- Bottom Level
- Vertical Turbidity Profile
- ISO-style Turbidimeter
- EPA-style Turbidimeter
- Fluorescence Meter
- Lightmeter
- Thermometer
- Accelerometer
- Conditions-Based Monitoring
- UV and Vibrator Cleaning

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**Turbidity Array**
The SediMeter sensor consists of an array of 36 optical backscatter detectors (OBS) mounted inside a vertical transparent tube at 1 cm interval. They measure both straight and oblique backscatter. By presenting the data as a 5 mm-resolution false color plot, the bottom comes out beige and the air becomes blue. The turbidity profile also shows the darkness of the sediment below the bottom, such as the black color resulting from anoxia.

**Bed Level**
The bed level of the sea floor is interpolated from the backscatter profile. In an experiment it was possible to detect the sedimentation of 0.1 mm, or 100 g/m². In the real world there are many factors to consider, including that the bottom often is gradual. The turbidity profile reflects this better than a single value of level.

**Software**
The PC software is used to set up the instrument for stand-alone logging, for real time monitoring, for downloading, and for data analysis. It also allows the scientist-in-charge to interactively interpret the data for level determination. Plus, it can sound the alarm if a threshold is exceeded.

**Nephelometric Turbidimeters**
The standard method of deployment uses a holder tube that is screwed down. The holder tube protects the sensor but precludes good turbidity readings. The SM4 has therefore got a thicker section above the holder tube, with nephelometric turbidimeters—both ISO and EPA—that are ideally suited for measuring turbidity from 10 to 400 FTU, the range of most interest for studying suspended sediment transport.

**Fluorescence Meters**
The fluorescence meters emits UV-A light and measures visible light at 90° and 180° angle. The nephelometric fluorescence meter is coaxial with the nephelometric turbidimeters. Since chlorophyll is fluorescent and most sediment is not, the difference between the measured fluorescence and turbidity may be used as an indicator to distinguish between sediment in suspension, and algal blooms. The presence of two fluorescence meters measuring in different geometries may be used to distinguish between fouling on the sensor itself, and algal blooms in the water.

**Light Meter, Thermometer**
The SM4 also measures visible and NIR light (horizontally), and water temperature.

**Anti-Fouling**
Two UV-A LEDs irradiate the windows of the nephelometric turbidimeters with ultra-violet light to discourage microbial growth. A vibrator shakes off bubbles and particles. The kits also include copper tape, which—when applied to the rear side—discourages barnacles from settling also on the front side of the sensor.

**Accelerometer**
The 3D accelerometer continuously gathers data at 10 Hz in a FIFO memory. When a SediMeter measurement is due, the SM4 saves the last 20 or 30 values, depending on if the resolution is 12 or 8 bits, respectively. The software then calculates instrument tilt (to make sure it has not fallen over), and vibration. Strong currents may cause the instrument to vibrate due to vortex formation, so the accelerometer data is a proxy to the energy level available for sediment transport. The measurement rate, filtering parameters, range etc can be customized through the calibration settings.

**Conditions-Based Monitoring**
If the accelerometer measures a value above the set threshold, it will signal the CPU that an extra measurement should be taken. This allows the SM4 to collect accelerometer and other data during peak events that might otherwise have fallen between regular measurements. To prevent the memory from overfilling, the threshold is raised a little after each CBM event. Also, the minimal delay to the next CBM event is 2 s. As default CBM is on, and the start threshold is at about double the noise level. Many of the accelerometer settings are customizable in calibration.

**Networking**
SediMeters can be connected through an RS485 network, and by the SediLink radio modem. They can also be interfaced to third party equipment, such as loggers and telemetry.