



Measuring electric conductivity with modified light sensors

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To obtain spatially distributed time series of electric conductivity (EC) of stream water we needed robust, reliable and low cost EC sensors with data logging and storage capacity.

We modified the Onset temperature + light sensors and replaced their light detector with a simple setup to measure EC. Each sensor was calibrated individually. The raw data has to be adjusted for temperature effects and can then be recalculated into EC of the water with a calibration function. The final measurement accuracy varied little at lower ECs ($\pm 5 \mu\text{S}/\text{cm}$ at $0 - 200 \mu\text{S}/\text{cm}$) and increased for higher ECs ($\pm 50 \mu\text{S}/\text{cm}$ at $1000 \mu\text{S}/\text{cm}$). Measurements were possible until $3000 \mu\text{S}/\text{cm}$ with the 'best' data quality between 0 and $600 \mu\text{S}/\text{cm}$.

95 thus modified sensors are currently employed in streams of the Attert catchment (Luxembourg). In addition to stream EC data, dry periods of streams could also be easily detected with the modified sensors, as extremely low EC values indicate periods of no flow.