Barometric Compensation

Barometric compensation has traditionally been performed using a vent tube leading from the surface down to the transducer. This vent tube terminates behind the transducer diaphragm, providing a cancellation effect for barometric pressure. However, there is no possibility to review the associated barometric data.

Solinst decided the Levelogger Edge would use an absolute pressure transducer, requiring a barometric data recorder for compensation.

The Levelogger series of water level dataloggers measure absolute pressure, so when in water, they measure the total head of water plus the barometric pressure. One Barologger at a site is used to measure barometric pressure.

The algorithms programmed into the Barologger are strictly for use in air, making this instrument extremely accurate. The barometric data is then used, along with a software Data Wizard, to compensate the Levelogger data, and provide true water level readings. To increase the accuracy of barometric compensation data, it is recommended the Barologger and Leveloggers be programmed with the same recording times.

Once the Levelogger and Barologger data is downloaded to Solinst Levelogger Software, the Data Wizard can be used to barometrically compensate the data, and adjust it to depth measurements.

Multiple Levelogger files can be barometrically compensated at once using one Barologger file.

You can view your data directly, or it can be exported in a standard .csv or .xml format for use in any hydrologic software for further analysis and interpretation.

Barometric Data

Levelogger Software provides a record of the raw barometric and total pressure recordings as well as the compensated data.

When analyzing barometric data it is important to keep in mind that storm events commonly reduce total atmospheric pressure by about 1.7% from pre-existing high pressure conditions. 1.7% converts to approximately 0.6 ft or 0.2 m of water level equivalent barometric fluctuation.

Raw data can be very useful information for calculating barometric efficiency, which can be very significant in tight, deep, confined aquifers, when the investigator has a choice not to compensate the readings.

The use of vented cable technology to provide barometric compensation can be suitable for shallow applications, however, vented pressure sensors assume 100% barometric efficiency, which is a fair assumption in shallow conditions, but the lack of barometric data can make it difficult to confirm if the vented transducer is recording correctly.

It was found that recorded barometric data provides the necessary barometric compensation data our clients require. The absolute pressure method also provides the separate barometric data of local air pressure and ambient air temperature, which can be analyzed to ensure the Levelogger transducer is recording properly.