



THE SMART DATA SOLUTION

The Geolux SmartObserverPlus is a versatile, next-generation datalogger designed for reliable hydrological and meteorological monitoring, featuring expanded connectivity options, enhanced storage capabilities, and customizable operation through MicroPython.

In the rapidly evolving field of hydrometeorological monitoring, dataloggers serve as the backbone of hydrological and meteorological automatic monitoring stations. The role of the modern datalogger includes a range of tasks, such as data retrieval from on-site instruments, instrument configuration and calibration, power management, data management and recording and real-time data transfer. Positioned in remote and often harsh environments, these devices must operate reliably under extreme atmospheric conditions, requiring them to be robust and durable. Since they are placed far from human settlements, minimal maintenance is crucial to ensure uninterrupted data collection over extended periods.



Versatile dataloggers

In the context of global climate change and the increasing frequency of extreme weather events, the expansion of the global hydrometeorological monitoring network is inevitable. This growth highlights the critical need for dependable dataloggers that can provide accurate, real-time data. The challenge of limited cellular coverage in remote locations makes it essential for dataloggers to have versatile communication options, such as satellite or radio-based systems, to ensure continuous data transmission regardless of connectivity constraints. Another limiting factor in remote monitoring locations is the power supply availability. Since there is typically no grid access, solar panels and batteries are commonly used to provide the power to the instruments. However, large solar panels can also attract vandalism. Therefore, the datalogger must be designed for extremely low power operation to ensure the entire monitoring site can function efficiently with minimal power resources. With all of this in mind, Geolux developed its first datalogger more than five years ago. The product, called SmartObserver, features tight IoT integration with the Geolux Hydroview data portal, an integrated MPPT battery charger, and support for Modbus and SDI-12 data interfaces. It also provides cellular connectivity with additional support for LoRaWAN and satellite links. The SmartObserver has been installed and is actively used in various hydrological and meteorological stations across every continent in the world, except Antarctica.



The next generation

Geolux has actively sought and reviewed feedback from its customers regarding the SmartObserver datalogger. The next generation of the datalogger, the SmartObserverPlus, has been developed based on their insights. The SmartObserverPlus is the direct result of the feedback that has been received from many Geolux customers and represents the next step in providing a reliable and versatile datalogger. One of the major improvements in the SmartObserverPlus was driven by customer feedback regarding the internal memory storage of the SmartObserver, which was neither expandable nor replaceable.

the SmartObserverPlus was driven by customer feedback regarding the internal memory storage of the SmartObserver, which was neither expandable nor replaceable. In response, the new SmartObserverPlus includes a slot for a microSD memory card and a USB host connector for connecting an external USB flash drive. Both the SD card and the USB flash drive can be used to store measurement data as it is recorded or to copy data from the internal storage. Additionally, firmware upgrades for the datalogger can be performed from the SD card. Another significant enhancement is the addition of a USB device interface, allowing users to connect the datalogger to a PC for configuration. This USB interface is much more convenient than the serial RS-232 interface used in the older SmartObserver. Another improvement over the old SmartObserver is an increase in the number of interfaces for connecting instruments to the datalogger. The new SmartObserverPlus features three Modbus inputs and two SDI-12 data inputs; the old model had two Modbus inputs and one SDI-12. The number of analog inputs has also been increased from three to four, with all four analog inputs configurable for either voltage or current measurement mode. These analog inputs are 24bit, ensuring high precision. Additionally, there are four digital input-output connectors that can be used to interface with devices such as mechanical tipping buckets or anemometers. When reconfigured to output mode, these connectors can be used to activate external devices such as a siren alarm. Another major improvement in the SmartObserverPlus is the addition of a wired ethernet interface. This ethernet interface can be used in two ways. Firstly, if there is wired internet available at the monitoring site, the datalogger can use its ethernet interface to connect to a remote server and deliver real-time measurement data over the wired connection. Secondly, the ethernet port can be used to connect an instrument or device – such as a camera – locally to the datalogger. In this setup, the datalogger retrieves data from the locally connected instrument via ethernet (for example, a picture from the camera) and then securely delivers it to the remote server over another data channel, such as cellular. For wireless connectivity, the SmartObserverPlus features two internal slots for wireless modules, allowing for various configurations based on the modules installed. The slots are miniPCle, accommodating any compatible miniPCle card such as a cellular modem (4G, 5G or NB-IoT), an Iridium SBD module or a LoRaWAN module. This flexibility enables the SmartObserverPlus to be configured with a single cellular modem, or into a dual-SIM configuration, a cellular modem with an Iridium SBD backup link, a cellular modem with a LoRaWAN backup link, only a LoRaWAN module, or solely an Iridium SBD module. The greatest enhancement in the SmartObserverPlus is the availability of the MicroPython programming language. This feature enables advanced users to completely customize the datalogger's operation using the familiar Python programming language. While the datalogger can be fully configured without Python, this feature offers additional flexibility and power for those who need it. Advanced users can choose to run a full Python program on the datalogger or write small scripts to, for example, format data before it is sent over the network or to perform calculations based on measured values retrieved from the instruments. Geolux will introduce the SmartObserverPlus at Meteorological Technology World Expo in Vienna, Austria, in September 2024. Attendees are invited to visit the Geolux booth (6060) for more information about this innovative datalogger and its advanced features.

