

Integrated real-time data access and monitoring systems for hydrological investigations and water resources management

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Abstract Global changes in ecosystems, the growth of population as well as the modifications to legal frameworks, in recent years have caused an increasing requirement for groundwater and spring water quality monitoring with the target of supplying present and future consumers with high-quality uncontaminated drinking water. There is also the demand for sustainable protection of drinking water resources which causes the deployment and use of early warning systems and quality assurance networks in water supplies. Hydrological research has to seize these challenges by groundbreaking, multidisciplinary approaches. Data transmission using Low Earth Orbit Satellites (LEOS) provides world-wide “nomadic” on-line data-communication. This is particularly important for regions which are inaccessible by land-based wireless (GSM/UMTS) or geostationary (GEO) satellite systems. For several years our working-group has successfully applied LEO satellite data transmission to hydro-meteorological research, e.g. for online data transmission, event-triggered water quality monitoring and sampling networks and also for remote quality monitoring of online measurements. This paper shows the possibilities of bringing these different systems together. This is achieved by a bi-directional satellite link, near-real-time data transmission, event monitoring and event sampling as well as remote quality monitoring of on-line field measurements.

Key words LEO-satellite communication; on-line data access; automated event sampling; early warning systems; drinking water protection