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Hydrological observation network for determination of water budget in open cast mines

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Monitoring and measurement programs are generally oriented towards answering a certain question. Every measurement approach has to consider the specific peculiarities of the investigated object, i.e. monitoring and measurement setups are based on Hypotheses and modelling aspects. The interaction between the measurement and the modelling concept bears the key to identify the governing factors of predominant processes.

In the Lusatian mining district the landscape and water budget are heavily affected by pen cast lignite mining operations since many decades. For instance, the groundwater depression cone due sumping amounted to 2100 m^2/d in the early 90s. The impacts of mining operations upon the natural water budget in form of sump drainage and water transfer from adjacent catchments are serious and pose severe consequences to the water resources management.

The hydrological observation network included meteorological measurements (precipitation, global radiation, humidity, wind speed and direction), lake level by pressure probes, TDR probes, tensiometers and a seepage gravity lysimeter. The field observation resulted in a modelling concept where modules for actual evapotranspiration, soil water movement and surface runoff were specified and coupled with each other.