A unique cave microclimate monitoring system was at first established in 5 show caves managed by Slovak Caves Administration in 2007. The basic aim was to set up a system able to monitor selected characteristic parameters in caves continuously, with automatic data transfer to central database, remote access to data loggers in caves. Cave monitoring system is an integrated system consisting of sensors, permanent and mobile data loggers, communication network, data collection and central database and management system. Cave environment is known for high relative humidity very close to saturation. This causes difficulties for proper humidity measurement and challenges developers to test the measurement equipment behaviour in these difficult and specific microclimate conditions. The research and development is running in parallel in field of sensors, data loggers and other equipment used in caves e.g. with difficult access and without possibility of remote control or maintenance. Building of thorough over-voltage protection and grounding in caves as basic protection of monitoring stations against the burn-out due to over-voltage or lightning. Measurement of some parameters like air humidity, water conductivity and water level and difficulties with choosing the right sensor for the chosen parameter measurement and monitoring of sensors behaviour in cave environment is still in development as a part of our research.