FLOREO – a system for flash flood monitoring and forecasting in the Czech Republic

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Currently flood monitoring and forecasting systems are mostly based on weather station and stream water flow point data measurements. These systems exhibit some level of uncertainty. Some portion of uncertainty is in the rainfall prediction and other comes from imperfect data use in the models. A new FLOREO system (www.floreo.cz) has been designed to support existing hydrological monitoring activities by implementation of relevant Earth observation services in the Czech Republic. FLOREO concept is based on detailed hydrological water balance. Snow monitoring is implemented as hybrid model based on Terra MODIS, Envisat ASAR and in-situ data (Brodský et al., 2010). Snow melt is calculated by degree day factor snow melt model according to WMO (1986). Water interception on vegetation is assessed from a land cover and a leaf area index (LAI), which is estimated by Terra MODIS data (Brodský et al., 2010). Potential evapotranspiration is calculated using climatic and vegetation data. Runoff (e.g. potential flooding) is calculated using the CN-curve. Since the CN value depends not only on land use types, hydrologic soil groups, management practice and slope, but also on the actual soil water content, the average CN values (values for average soil water content conditions) are modified similarly to Krysarova et al. (2000). However, different numerical model, the one-dimensional model HYDRUS-1D (Šimůnek et al., 2008a,b), is used to simulate daily soil water regimes within the soil profiles. The HYDRUS-1D code was simplified for this purpose.

Thus FLOREO system provides not only information about the actually monitored data, but also data simulated using actual data, and data predicted for the next day like critical precipitation potentially causing surface runoff, potential runoff simulated for several precipitation scenarios etc.

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