IMPACT OF MASS MOVEMENTS ON HYDROGEOLOGICAL SYSTEMS: AN EXAMPLE FROM CARINTHIA, AUSTRIA

THALHEIM, Felix; WINKLER, Gerfried*

University of Graz, Austria

gerfried.winkler@uni-graz.at

hydrogeology, mass movements, Sattnitz, conglomerates, dewatering dynamics

The Turiawald plateau in the Western Sattnitz is built up by massive conglomerates underlain by Miocene fine clastic sediments that act as an aquiclude. Nearly no overland flow occurs and most of the infiltrating water flows towards three captured springs whose catchments differ highly with regard to the occurrence of mass movements. Roach spring is located about 750 meters NW of the conglomerate plateau at the foot of a large-scale mass movement. Pleier spring, in the north of the plateau, is mainly influenced by rockfalls and small scale mass movements, and Hojoutz spring is supposedly unaffected by such features. At these springs, water level, water temperature (WT) and electrical conductivity (EC) were measured over several years.

To determine the dewatering dynamics and the mass movement's influence, hydrograph analysis was conducted and natural tracers and specific recharge events were evaluated.

Hojoutz spring, representing the flow dynamics of the conglomerate plateau, shows the lowest discharge variability and the slowest recession, but also fast responses to recharge events. The WT varies seasonally only between 7.7-7.8 °C with a varying time shift, the EC ranges between 309-355 µS/cm, clearly responding to precipitation events. In contrast, Roach spring shows high discharge variability and the highest recession coefficients, but a delayed response to recharge events (2 to 4 days). The WT seasonally varies by 0.3 °C with a time shift of 4 to 6 months to the AT, and the EC is the lowest (290-325 µS/cm). Pleier spring shows a fast response to recharge events, the recession coefficients range between the other two springs. The WT seasonally varies by 1 °C and shows a time shift of about 2 months, while the EC ranges between 300-330 µS/cm.

It can therefore be concluded that the mass movements cause additional aquifer components impacting massively the flow dynamics of Roach spring and, in some respect, of Pleier spring. They cause a longer retention of the water and a delayed response of the discharge to recharge pulses. Both influenced springs show a shallower water circulation and thus a higher vulnerability to pollution from the surface.