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Water Scarcity – Development of an Early Warning system in Carinthia

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The aim of this paper is to introduce an operational forecasting system for droughts and water scarcity situations in the southern part of Austria. The introduced early warning system is based on a catalog concept. The local forecasters choose from predefined drought scenarios, combined with appropriate initial catchment conditions, to get predictive information on future drought development in time and space. The predefined drought scenarios in the catalog system are generated by combining information from different sources. Therefore extensive data analyses are carried out over the entire study area. The definition of possible meteorological drought scenarios, with a time horizon of up to three month, is based on the statistical analysis of daily observations from up to 160 precipitation and air temperature gauging stations. These scenarios are used as input data for a continuous hydrological model. The conceptual model is spatially distributed and consists of a snow routine, a soil moisture accounting scheme and a hill slope flow routing component. The model parameters are calibrated and tested against runoff data from stream gauges and gauged springs. Fifty gauged springs are selected and grouped according to their temporal discharge dynamics. Based on continuous model simulations and observed runoff data at selected spring gauges, typical initial conditions (very dry, dry and normal) are defined. This moisture conditions are used to initialise the hydrologic model for the runs with different meteorological scenarios (very dry, dry and normal) on input. The early warning system should help the local authorities to improve their drought and water scarcity preparedness and mitigation measures.