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Climate-hydrology interactions explored using an integrated groundwater-surface water hydrological model for over a 100 year period in a natural temperate zone regional catchment

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Wetland ecosystems in river valleys are strongly related to hydrological and climatic conditions. Accurate exploration of these relationships is essential to achieving a proper projection of changes in these ecosystems under the climate change. The aim of the research is to identify the effects of climate change on the way the flood and inundation are formed in the natural river valleys of the temperate zone. The research is conducted in the Biebrza catchment, which is located in north-eastern Poland and has an area of about 7000 km². Because of its natural character, this area is considered as a reference area for wetland research. For the study area an integrated hydrological model (HydroGeoSphere) was developed and used to simulate the contribution of various sources of water in inundation and floods in the period 1900-2015. The preliminary conclusions with respect to hydrology-climate linkage as well as the lessons learned from the model development and calibration are presented.