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Assessment of hydrological flows in the Po river basin in connection with the underground aquifer

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We present preliminary results in fulfilment of a *Gruppo CAP* funded project aiming to evaluate the contribution of the Ticino-Adda TA catchment surface runoff to aquifer recharge of the Lombardia region of Italy. The area of interest is nested within the Po river valley, largely snow/ice fed, and rich in both surface and underground waters, and management of groundwater resources requires thereby assessment of water exchanges between surface and subsurface bodies. Final purpose of this 3-year effort is the production of weather based (IPCC AR5/6) hydrological scenarios in the TA catchment, as boundary conditions for aquifer modeling during 21st century. Here, we report results from Project's Phase 1, i.e. data based set up of a weather driven, semi distributed hydrological model *Poli-Hydro*, usable to mimic hydrology of high-altitude catchments watering the Po Valley. The adopted model simulates water budget, including dynamics of glaciers, snow melt, evapotranspiration, and subsequently provides routing time of overland and underground flow at any river section of the river network. In regulated catchments proper operation rules are developed to account for modified flows downstream. We demonstrate model accuracy against historical hydrological information. Modeled daily flows, underground flows, and the contribution of the irrigation systems within the TA can be used as inputs for aquifer dynamics models, to assess control of surface water budget upon aquifer dynamics. Projected hydrological scenarios will be also usable to mimic future hydrogeological dynamics of the area.