



Application of interpolated and high-resolution reanalysis data in SWAT modeling of a critical river basin in the Philippines: The case of the Apayao-Abulug River Basin (AARB)

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ABSTRACT

The Philippines is rich in natural resources across all domains. Surface and groundwater are particularly important resources, and are used in all aspects of living, for domestic, agricultural, and industrial purposes. Surface water bodies in the Philippines, composed of 421 principal rivers and 221 lakes, contribute to about 86.2% of the annual potential water supply (SEPO, 2023). However, over the years only a handful of studies have been conducted in understanding the hydrology of mesoscale river basins (RBs) in the country, much so on conserved mountainous RBs. Data poverty poses challenges in conducting hydrologic studies and modelling. Many Philippine RBs lack long-term, high-quality, and reliable meteorological and hydrological data despite the multi-sectoral cooperation of national departments, regional, local government units, and civil organizations. The Apayao-Abulug River Basin (AARB) in Northern Luzon has an estimated 83.63% vegetation cover according to the 2015 NAMRIA Land Cover Map of Luzon and is inhabited mostly by indigenous people of Apayao that implement the *Lapat* system: a forest conservation method. While streamflow data is available for the AARB, pertinent long-term meteorological data is lacking. With this we aim to interpolate climatological and precipitation data for the AARB using ordinary kriging interpolation (Basconcillo et al., 2017) and evaluate its performance in driving the SWAT model against different high-resolution gridded reanalysis datasets. Furthermore, the study also aims to evaluate the applicability of different global and national land use and land cover maps in modelling streamflow, water balance components, parameter sensitivities, and associated uncertainties to the SWAT model of AARB.

Keywords: *hydrologic modeling, SWAT, interpolation, kriging, reanalysis datasets, LULC maps*