H2PL: A New Open Source Library for Hydrological Modeling

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Abstract

Due to spatial and temporal variation of hydrologic processes, development of distributed hydrological models remained a difficult task over the last decades. As a consequence application of Geographic Information Systems (GIS) has become a useful and popular tool not only for hydrology but also in many different fields of science. On other hand literature emphasizes that hydrological modelers use GIS blindly but should take the advantage of advances in computing technology. This issue generates a demand for development of hydrological frameworks to conceptualize time and space models which targets hydrological modeling specifically.

This study presents the development of an easy reusable hydrological modeling framework called H2PL which is an acronym standing for Hydrologic and Hydraulic Programming Library. The developed open-source library is a collection of computational hydrological functions and complex spatial calculations for Windows and .NET frameworks. The functionality of the tools allows users to develop their own models using different scripting languages and graphical interfaces. Output models of the library can be compiled as standalone executable files and therefore it would be independent of any GIS. In order to encourage users with minimum programming knowledge, the programming structure of the library is kept simple.

Recently the development team of WetSpass has upgraded an old version of the model using this library and we have also developed another new physically based and distributed model called RASAM. The library thus provides a good framework for dealing with spatial and temporal data.

Keywords: hydrological modeling, model builder, compiler, embedded GIS

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