Hydrology Hydraulic Module Modeling (HHMM) is used to simulate three-dimensional (3D) hillslope energy-material transport. HHMM comprises a suite of modules, including the surface flow module, infiltration module, subsurface flow module, surface energy balance module, snowpack module, frozen soil module, subsurface heat transport module, and subsurface solute transport module.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Since the model is still being improved and tested, the complete version is not yet ready. This version is a test version of HHMM. It is expected that the surface solute transport module and vegetation module will be added in the complete version. Parameter files and selection options for processes and methods that are easy for users to modify will be given in the complete version. Some parameters of the current version need to be modified within the code.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

For a detailed explanation of the HHMM model input and output files, see *input\_and\_output.docx*. The input file path is *bin\Debug\*. The output file path is *output\*. When parallelism is not enabled, the vtk file is in *output\0\*.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

If you want to use parallelism, please first ensure that your Windows system has MS-MPI installed. The download link is *https://www.microsoft.com/en-us/download/details.aspx?id=100593.*

Then, open a command prompt, enter *bin\Debug\*, and run the command *mpiexec -n 3 HHMM.exe* (3 represents the number of subdomains and can be modified).

Input and output folders for each subdomain are automatically generated. The input folders for each subdomain are *bin\0, bin\1, bin\2...*, and the output folders for each subdomain are *output\0, output \1, output \2*.... The total output file is *output\hydraulicresult.txt*