

# Linking models

There are many ways in which the OpenMI can be used. However, in order to keep this guide short and simple an example of the typical usage of the OpenMI is given below.

In order to demonstrate the capabilities of the OpenMI, a complex system of integrated catchment modelling is shown in Figure 1. Meteorological data from a number of measurement stations are handled by a database system. This system will provide precipitation and evaporation data to rainfall-runoff models. The rivers are modelled by a simple conceptual river model that will obtain inflow data from the rainfall-runoff models. For a particular river reach, a more detailed representation of the river flow is required. This river reach is modelled by a physically-based hydrodynamic river model. The river model will obtain inflow data for its upper boundary from the conceptual river model and will provide inflow data for the conceptual river models that connect to the downstream boundary of the hydrodynamic river model. Interaction between groundwater and surface water is considered important at the location of the hydrodynamic model. The underlying aquifer is modelled by a 2D distributed groundwater model. The groundwater model will receive leakage from the river model. The river model will calculate this leakage based on information about the groundwater level, which is obtained from the groundwater model.

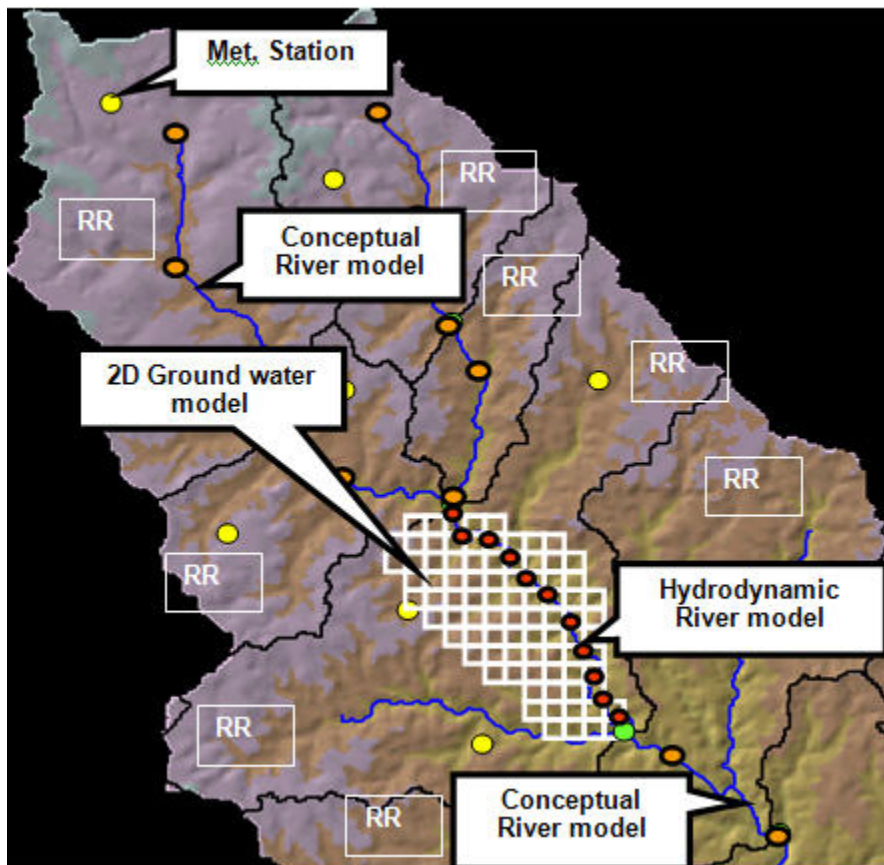


Figure 1 Example of integrated catchment modelling that can be realized by combining OpenMI-compliant models

This system can be built using appropriate OpenMI-compliant models. The procedure for building such a system is as follows:

1. Populate each of the models with the required data through the preparatory user interfaces of each individual model. The prepared input data for these models is saved to disk. Most OpenMI models will, when input files are saved, also create a small OpenMI standardized XML file (the OMI file), which contains information about the filename for the OpenMI-compliant model component (the LinkableComponent) and the filenames for input files.
2. Use an OpenMI editor to add the models to a configuration. Figure 2 illustrates the open source OpenMI Configuration Editor. With this editor, the user selects **Add model** in the Configuration Editor and browses the file system to find the OMI files. Each time an OMI file has been selected, the OpenMI-compliant model component is loaded and the component reads its input files.
3. Connections between the models are created simply by dragging arrows from one model to another. Clicking a connection brings up a link editor dialog (see Figure 3). This dialog has information, obtained from the model components, about which quantities can be provided and which quantities can be accepted. The required combination can then be selected.
4. When all the links have been established, the linked system can be run.
5. When the model run has completed, the results from the calculations can be investigated through the proprietary user interfaces of each individual model.

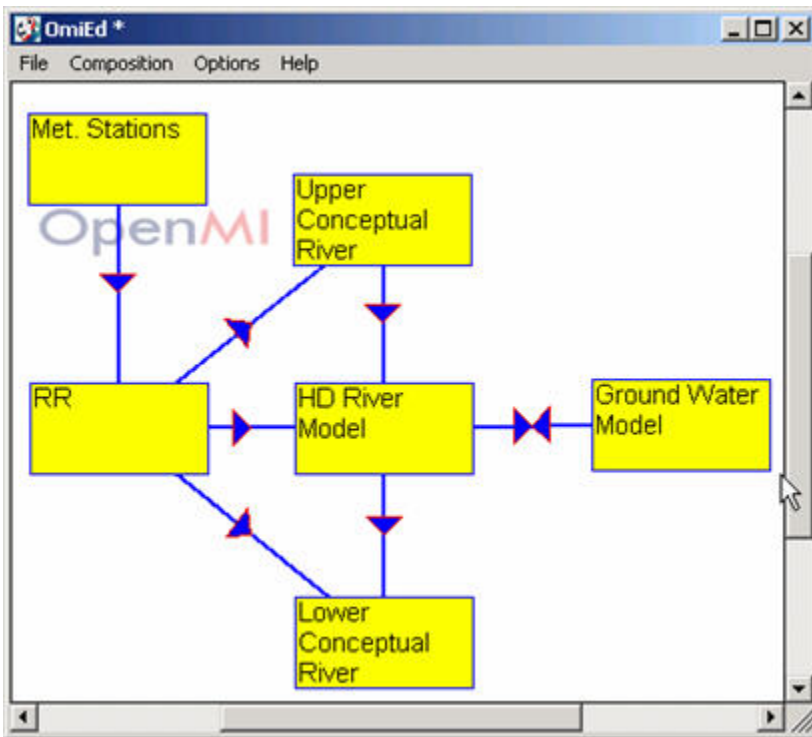


Figure 2 Open source OpenMI configuration editor used to configure links between the models shown in Figure 1

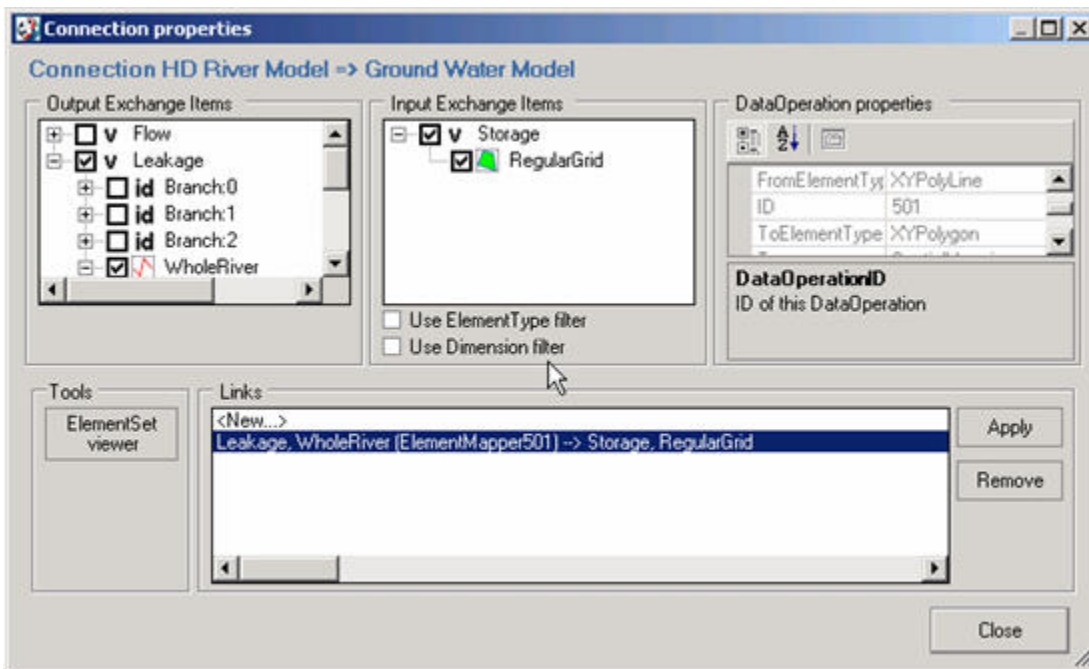


Figure 3 Open source OpenMI Configuration Editor's link property dialog for the link from the hydrodynamic river model to the groundwater model

The steps described above are valid for the open source user interface. The OpenMI standard does not prescribe that this particular user interface should be used, and we foresee that in the future there will be many different user interfaces available.