



Mohid GIS - A geographical information system for water modeling software

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Traditional Geographical Information System (GIS) usually handle only spatial variable data in 2D which turn them unsuitable to explore results from water modeling systems which generate 3D data which is temporally variable. In order to overcome this problem, MOHID Water Modeling System includes his own GIS, which has the ability to represent 4D data (x, y, z, t) MOHID Water Modeling System comprises two major groups of software: (i) numerical tools and (ii) graphical user interfaces. All numerical tools are written in FORTRAN 95, following an object oriented modular design. The two core numerical tools of WMS - MOHID are: (i) MOHID Water for surface water bodies (oceans, estuaries and lakes), (ii) MOHID Land for integrated basins simulations (overland flow, saturated/non-saturated zones, aquifer and drainage network). The graphical user interfaces are all developed on the .NET platform, either in Visual Basic or in C#. The two core graphical user interfaces are: (i) MOHID GUI for setup and management of data files and (ii) MOHID GIS which acts as a GIS and serves for pre and post processing model data. Information exchange between the numerical tools and the graphical user interface is achieved by two file formats: (i) the format implemented by the class EnterData and (ii) the Hierarchical Data Format (HDF). MOHID's class EnterData allows writing and reading ASCII data files structured in a similar way as XML files. In order to exchange information between the numerical tools written in FORTRAN 95 and the graphical user interface written in .NET class EnterData has been developed in both languages. Another way to change information between the graphical user interface and the numerical tools is the class HDF. Like the class EnterData this class is implemented in both languages. All data loaded into MOHID GIS is geo-referenced. Data loaded by the class EnterData (e.g. points, lines, polygons, grids, gridded data) have a proper formatting. All HDF files

have a special group (or folder) inside the file which references the data spatial and temporal. Graphical representation is done using the OpenGL library. Visualization can be done in XY, YZ, XZ or 3D. If the data is temporally variable, an animator permits the user to step through individual frames. MOHID GIS also incorporates a set of tools necessary for water modeling software. Major tools are: (i) a tool to create structured grids (regular or curvilinear), (ii) a tool to create digital terrain model from XYZ data sets, (iii) a tool to delineate basins / generate drainage network, (iv) interpolation routines for river cross sections and (v) tools to create time series locations. MOHID GIS is attached with some small tools which allows the user to import data from different models and data sources. By the moment data can be imported from: (i) meteorological models ARPS and MM5, (ii) large scale hydrodynamic models HYCOM and MERCATOR and (iii) wave model WAVE WATCH. The major data sources which can be imported into MOHID GIS are: (i) the world elevation map from NASA, (ii) bathymetric data from ETOPO 2, ETOPO 5 and GEBCO, (iii) satellite images from MODIS and SeaWifs (iv) any data stored in ESRI Shapefiles and (v) climatological ocean data from LEVITUS. An interface to a PostGIS database is currently under implementation through an adaptation of the Npgsql driver. In this communication the different abilities of MOHID GIS will be presented, highlighting its interface with the numerical tools.