Unstructured grids

The CF conventions define a standard for storing data on (non-staggered) structured grids. For staggered data on structured grids one can use the structured grid conventions with grid definitions for the various stagger locations (this approach is e.g. used by ROMS): the relationship between the stagger locations is lost. For data on unstructured grids, one can store data along a spatial dimension representing a series of points: all topological information is lost in this case.

For the new D-Flow FM (Unstruc) code, we need to define some standard for storing 1D, 2D and 3D unstructured data. Many other international groups are also looking for such standard data storage model for unstructured grid data. The UGRID Interoperability group was created on Google Groups to discuss this issue (see http://groups.google.com/group/ugrid-interoperability). This wiki space contains some information on data model proposals.

Unstructured grid storage concepts

- Based on various discussions we have drafted a first proposal for storing unstructured grid data. This proposal integrates a geometric view of the grid that allows you to store various kinds of data including all data relevant for finite volume type of layered hydrodynamic models. The current version of our D-Flow FM code writes out files that are alike but do not yet fully comply with this draft standard.
- Although the draft standard mentioned above allows you to store data at points, edges, faces and in volumes, it doesn't allow you to specify the details of a finite element scheme used. The finite element information contains valuable information that may help you to accurately interpolate data from the original grid onto other grids. David Ham, one of the developers working at Imperial College on ICOM, has jumped into the discussion to help to address this issue. We are currently working on a draft proposal that will cover that issue too.
- Bill Howe and others are looking into matching the existing data model used by the gridfields code to these new data models.

Other unstructured models that use netCDF:

- ADCIRC
- FVCOM