SURF-SHYFEM Development

Current State

- **Pre-processing :** 99.9%
- **Simulation :** 100% , using version :

```
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SHYFEM - Finite Element Model for coastal seas
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version: 7.5.0
routine: 3D FEM model

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[...]

program stop at time =    604800 seconds
iterations =      12103
NUMBER OF MPI THREADS USED  =            1
NUMBER OF OMP THREADS USED  =            1
TIME TO SOLUTION (WALL)     =    2011.6726238419999                0
TIME TO SOLUTION (CPU)      =    2011.9556470000000                0
TIMESTEPS TIME (WALL)     =    2010.2527838630001                0
MPI_TIME =   2011.5478877119999                0
Parallel_TIME =   2011.5478874109999                0
```

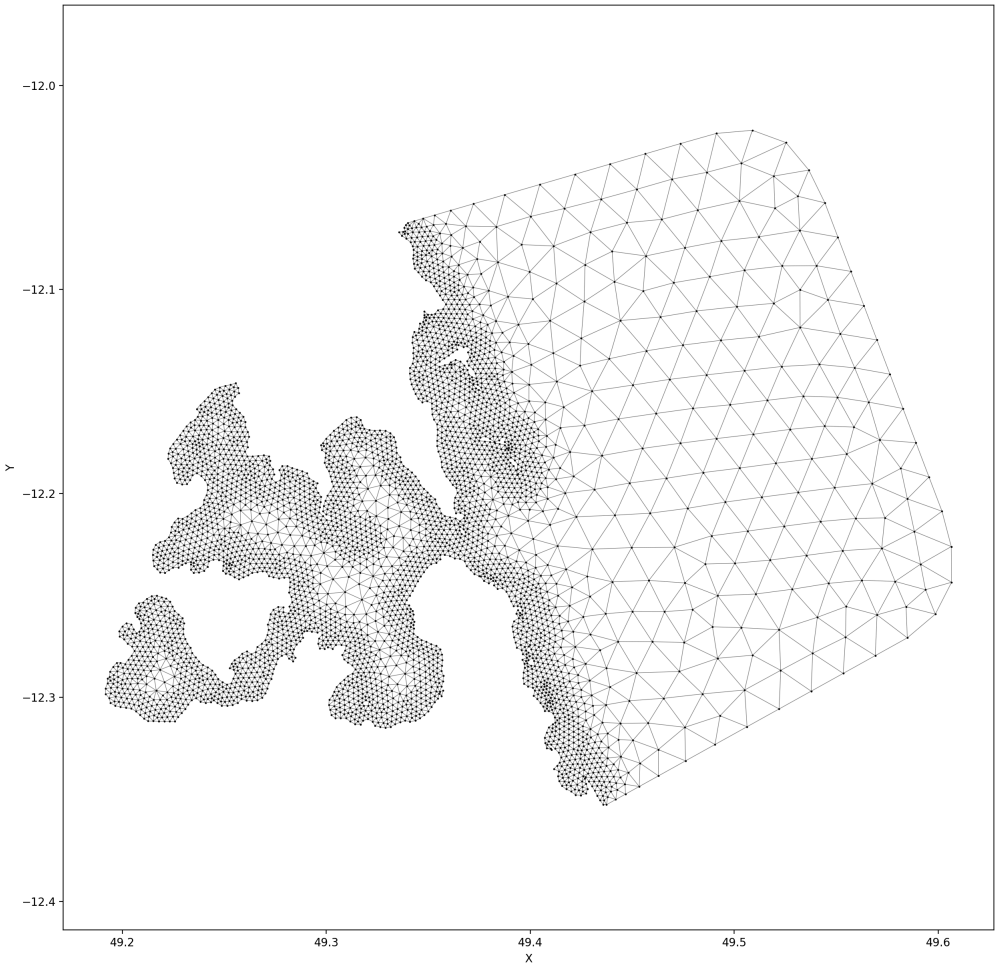
- **Post-processing :** ~70%
  - Visualization of results on both **structured** and **unstructured** grid

- **Structured :** uses same module already implemented for `surf_nemo`
- **Unstructured :** based on `matplotlib.tri.Triangulation`

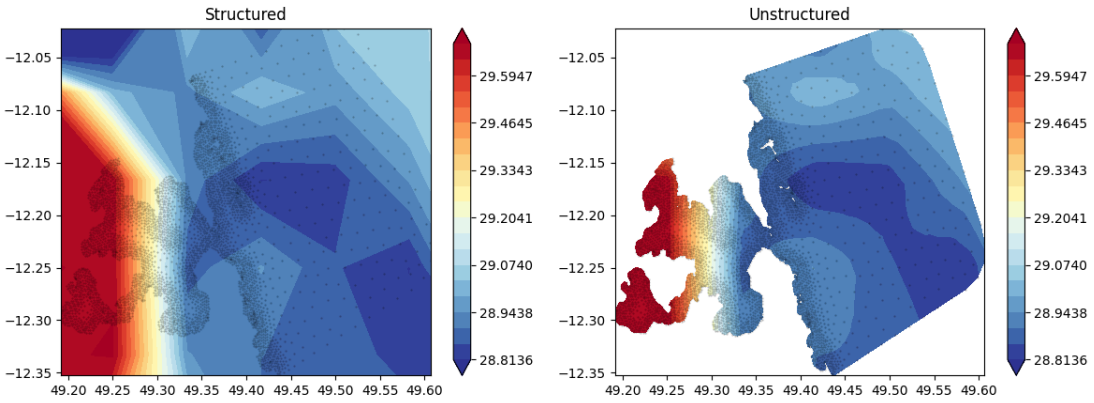
Main developments

Mesh generation

- Automatized generation and boundary extraction
- Rounded open sea corners with Bezier curves



Structured to unstructured data interpolation



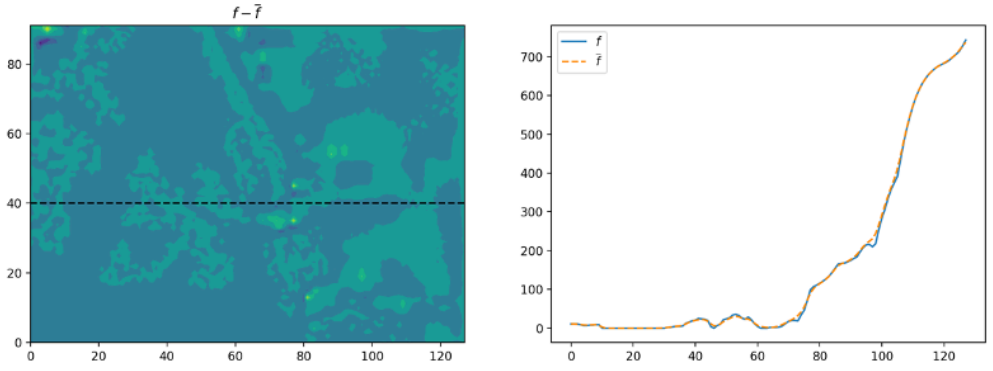
- # Write input files in shyfem readable format (`.dat`)

`boundn_1.dat` :

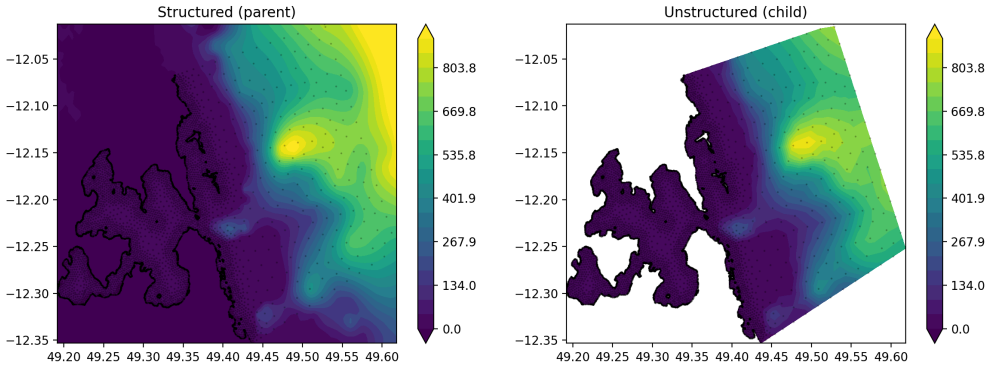
```
0 2 957839 41 1 1 1
20210330 000000
water level [m]
1.3378153056773958
1.3378885358461328
1.3390002590041732
1.339215317250322
[...]
```

- # Bathymetry manipulation

  - Filtering (with Gaussian filter)



  - Interpolation (on element centroid locations)



- Generation of 3d `.bas` file, as required by SHYFEM.

Next steps

- Post-processing module
- Code freeze
- Documentation