

# Outroduction



# SCHISM model ...

- ❖ Is an implicit model without mode splitting
- ❖ Uses Galerkin FEM
- ❖ uses Eulerian-Lagrangian Method for advection
- ❖ Numerical diffusion and dispersion are balanced and can be adjusted in different regimes

## Therefore....

- ❖ Large  $\Delta t$  is required for accuracy and convergence (CFL>0.4)
- ❖ No grid orthogonality is necessary – skew elements and sharp transition of resolution are tolerated, at least in non-eddy regime

# When generating a grid for SCHISM...

- ❖ Make sure the channels are resolved with at least 1 row of 'always wet' elements – no blockage of channel flow
- ❖ Always keep the map file and DEM sources to edit the grid, as often the model results (and sometimes performance) depend on the grid
- ❖ First estimate the smallest  $\Delta t$  you'd use, and then estimate the coarsest  $\Delta x$  at sample depths to make sure  $CFL > 0.4$
- ❖ Resolving features is much easier with SCHISM – be game! Bathymetry smoothing is not necessary
- ❖ Implicit TVD<sup>2</sup> transport is very efficient, but horizontal transport is still explicit (and is the main bottleneck). Therefore be ware of grid quality in critical regions to avoid excessive sub-cycling; use upwind in areas of no stratification

# When setting up a model...

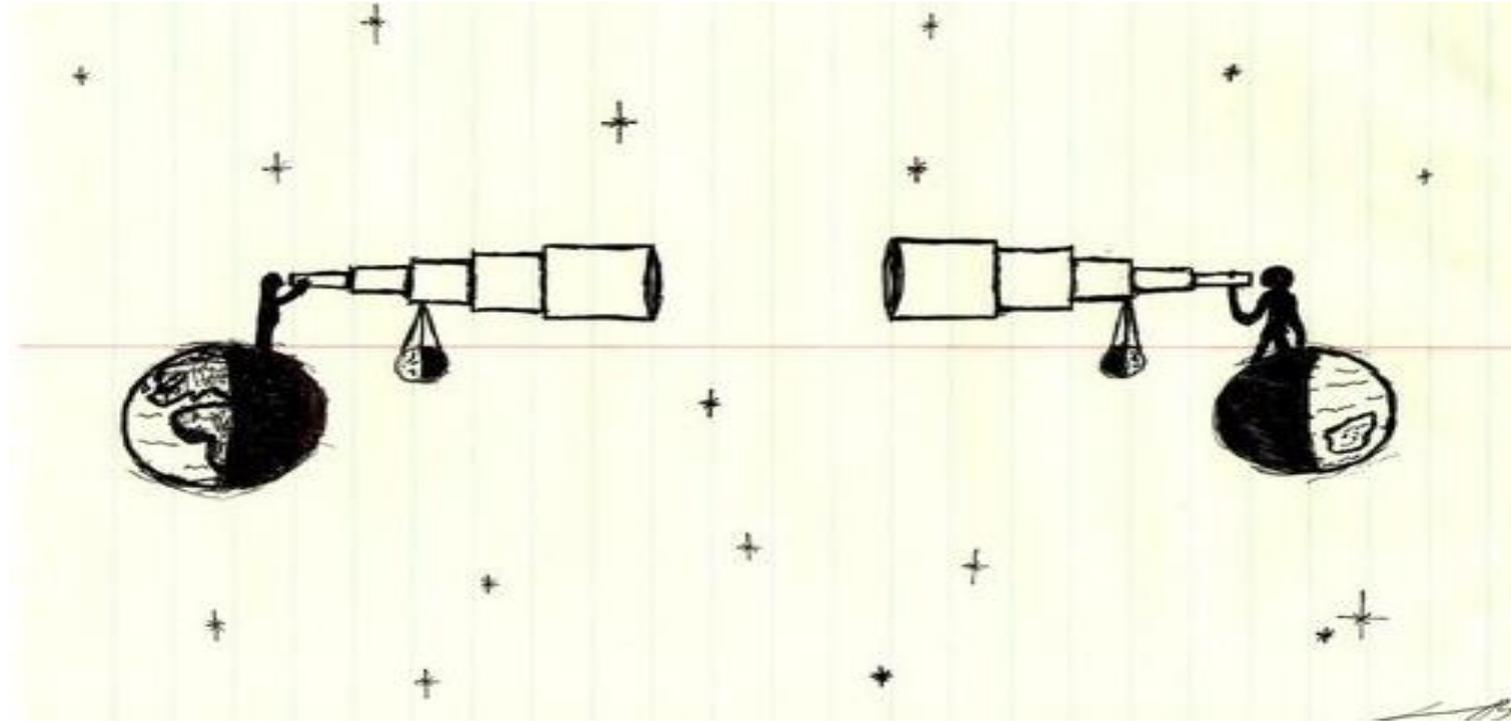
- ❖ Always check the grid first with a 2D model with `ipre=1`
- ❖ Start from simple and then build up complexity
- ❖ Examine surface velocity in animation mode to find potential issues
- ❖ Beware large  $C_D$  in shallow areas in 3D model
- ❖ Make sure all open boundaries stay wet during simulation
- ❖ Negative river flow for inflow
- ❖ Use 1-way nesting capability to generate velocity b.c.
  - ❖ 2D model is very fast even for large-domain

# When calibrating SCHISM...

- ❖ Remember the grid is the single most important factor for accuracy – here lies the greatest strength and challenge of unstructured grids
- ❖ Tweak the balance between numerical diffusion and dispersion (indvel, ihorcon...)
- ❖ Transport solver performance may require some experience
- ❖ LSC<sup>2</sup> grid requires some learning, but is a very powerful tool (resembling unstructured grid in the vertical)

# And...

## Remember you are not alone...



Help (and truth) is out there...

**Thank you for your attention and patience**