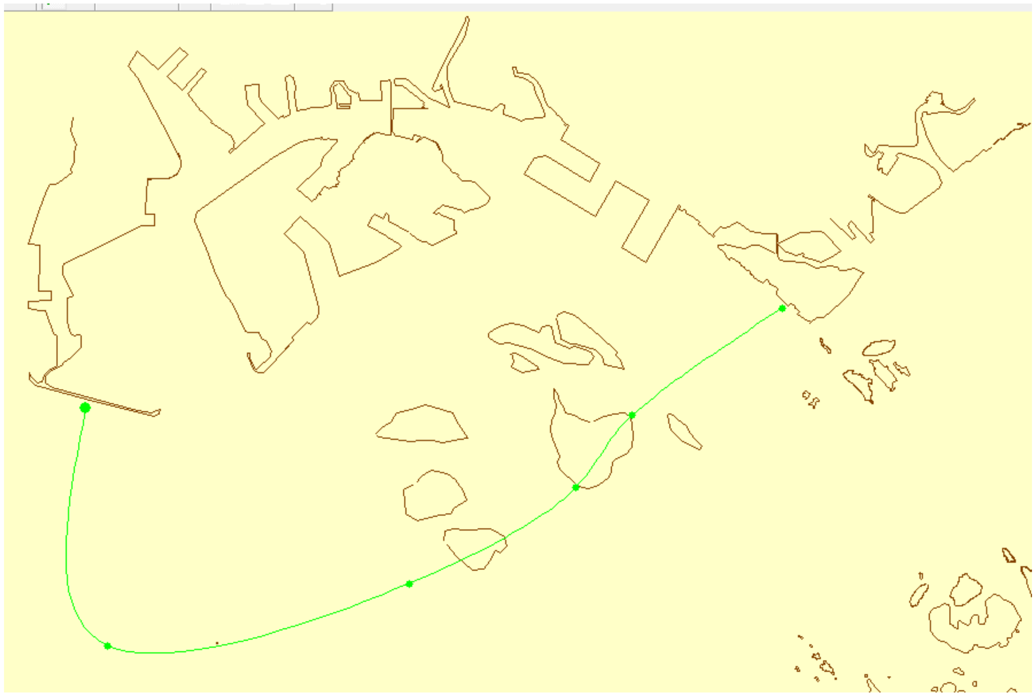
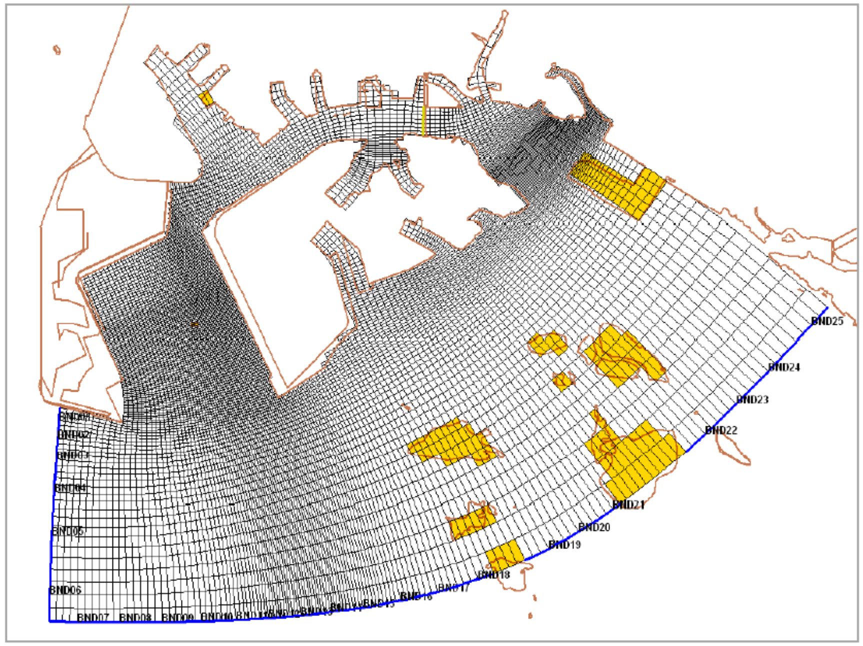




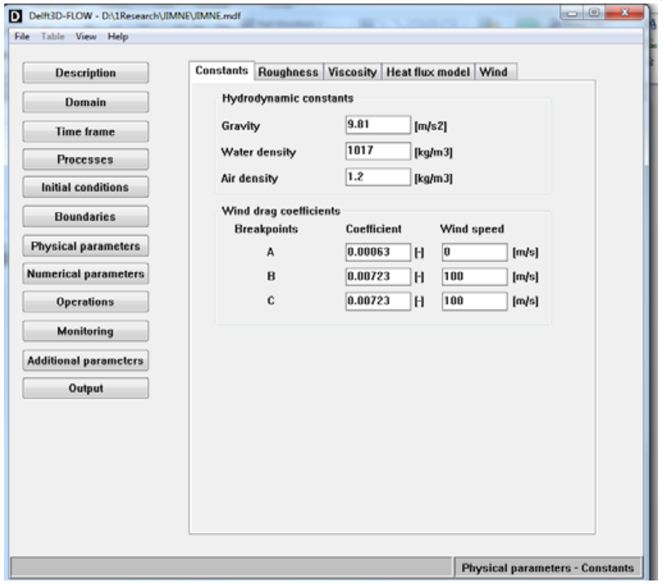
# Term Project

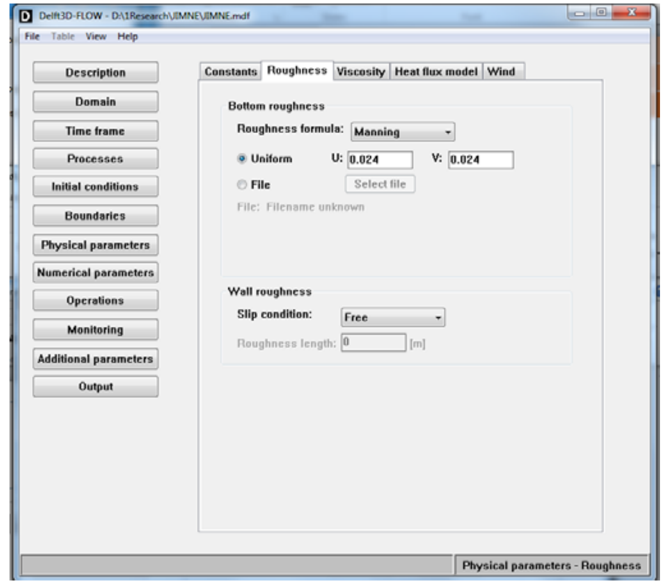
General Setup

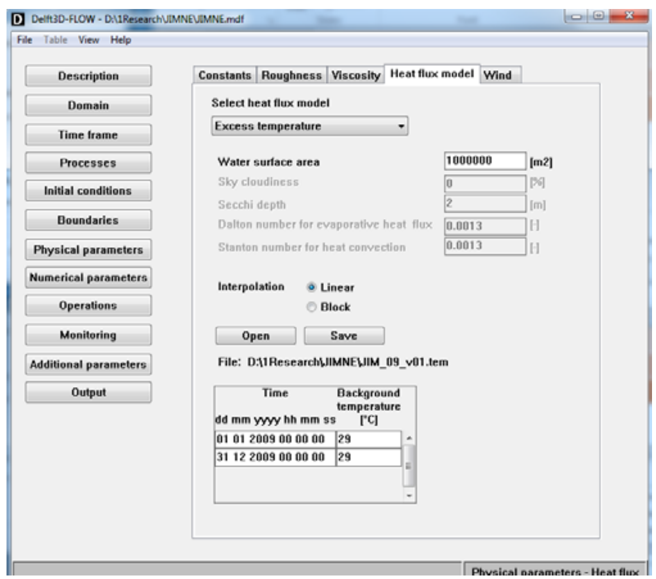
# Key Dates to Assist Your project planning

- Nov 10:
  - 2D Runs without discharges as well as verification completed (should come to see me before this date if you have problems)
  - 2D runs with thermal discharges started → this task should be completed by Nov 13-15 if not there is no time to complete presentation
- Nov 17:
  - Application 2D runs completed
  - Presentation by group
- Nov 20:
  - Report and presentation submitted on IVLE
  - Group analysis submitted on IVLE

# Possible Settings?

- 

# Verification?

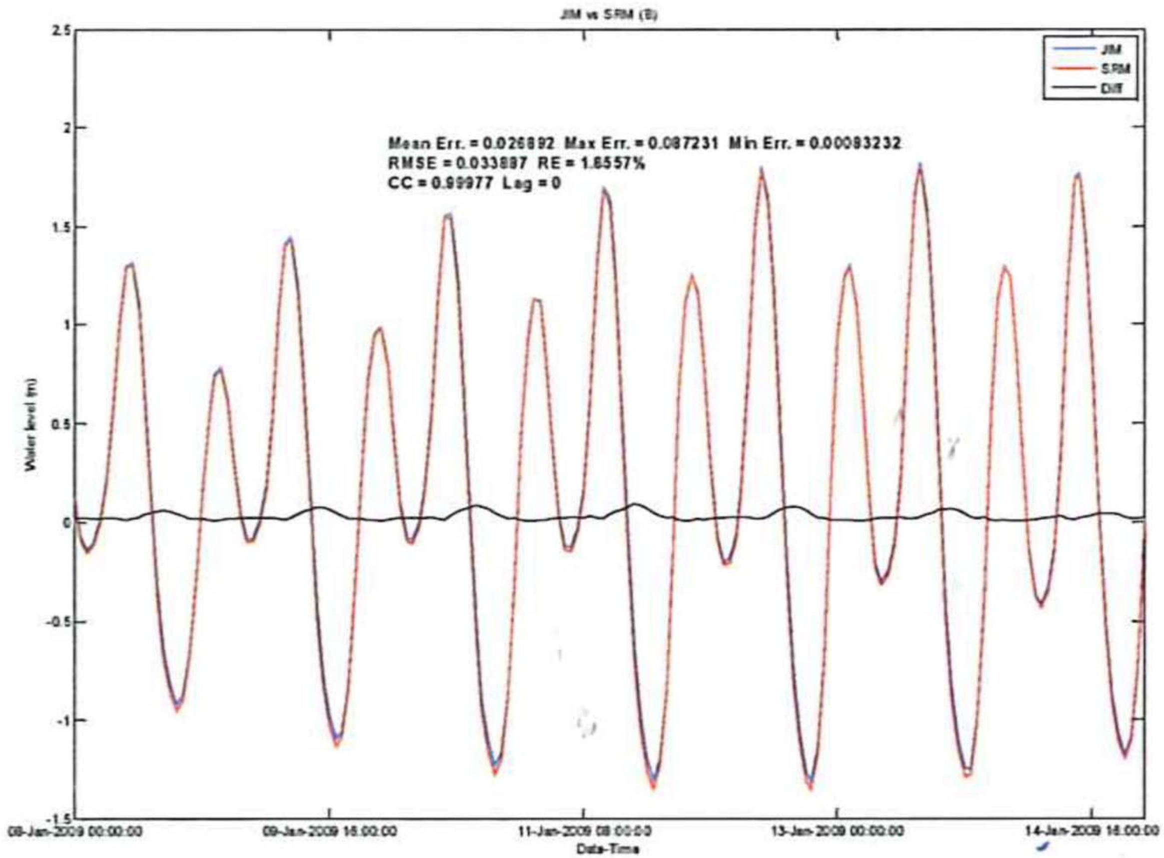



*Figure 3.7* *Comparison of the modelled water level elevation at station B between the SRM (red line) and the Jurong Island Model (blue line).*

# Modeling Tasks

General Pointers applicable to your term project and future models

# Typical steps/tasks you should do

- What are the objectives of the study
    - (guide lines for the numerical approach)
- General orientation
- (field) data collection and analysis
- If just hydrodynamics then
    - Set-up FLOW model
    - Set-up FLOW postprocessing;
- Calibration and verification
- Production and Reporting

# What are the study objectives?

- What is your interest?
  - hydrodynamic, water quality, waves, morphology
- If hydraulic, what are the problems?
  - e.g. storm surge, flooding, construction, recirculation, stratification, flow regime
- Are different scenarios involved?
  - e.g. seasonal discharges, wind, tidal ranges
- Are (accuracy) criteria set?
  - e.g. maximum water levels, velocities, temperature
- What will be the main output, result?

# General orientation

- How do you want to tackle the problem.
- What is known from past studies?
- And from the questions above you should be able to set out the following:
  - Characteristics of the study area
    - Dominant currents, seasonal effects, morphologically active?
    - What physical phenomena to include, 2D or 3D
  - Model boundaries
    - Availability and accuracy of data
    - Tidal excursion, main flow patterns, orientation boundary
  - Grid specifications, bathymetry required?
    - Area of interest, channels, reclamations, outfalls

# (Field) data collection and analysis

- Ensure you have consistent data on:
  - coast line, bathymetry
  - water levels, currents, salinity, temperature
  - river flows, wind and pressure
- Ensure you are processing consistently:
  - Check units, reference systems, format, conversion
  - Erroneous data
- Check your analysis for
  - tidal constants
  - consistency, quality assessment

# Set-up of the FLOW model-1

- model area and grid; Delft3D-RGFGRID
  - specifications from previous steps
  - boundary fitted, orthogonal
- bathymetry; Delft3D-QUICKIN
  - digitising?, different reference levels?
  - best data (recent, high resolution) first
- dry points, thin dams; VISUALISATION AREA
  - jetties, small islands, reclamations

# Set-up of the FLOW model-2

- open boundaries
  - water level, velocity, discharge?
  - number of boundary sections (variability parameter)
  - forcing; time-series, Harmonic, tidal constants
- physical and numerical parameters
  - roughness, wind, heat, drying & flooding parameters
- monitoring stations, cross-sections
  - calibration data at inside locations
- sensitivity time-step
  - accurate results?

# Set-up FLOW postprocessing

- QUICKPLOT  or GPP?
- What kind of plots, graphs
  - computed versus measured, predicted
  - time-series, 2DH, 2DV, profiles, vector, iso-lines
- Establish a working routine for data set names/files
  - very efficient for postprocessing similar simulations
- layout and text
  - well-documented
  - self explaining

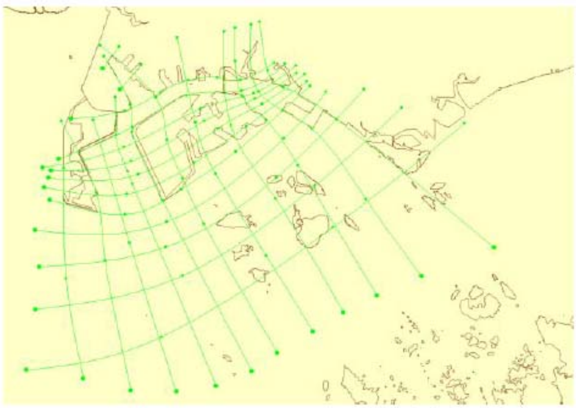
# Calibration and verification

- strategy, which data and periods
  - accuracy criteria, wet-dry, neap-spring, wind
- frequency and time domain
  - tidal constants, first 2DH, always time domain
- calibration parameters
  - bathymetry, boundary conditions, roughness
- working routine for file names
- log simulations and analysis results

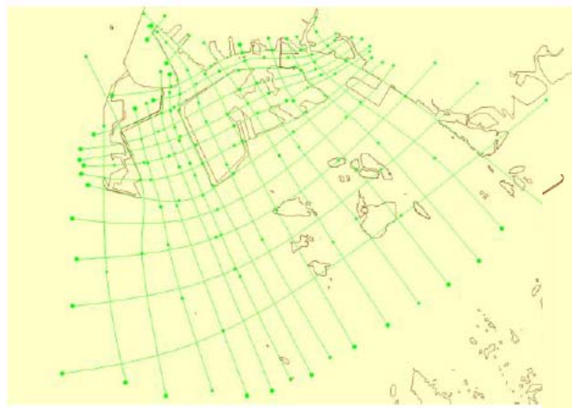
# Production and reporting

- Final calibration, verification
- report on
    - data used, quantity and quality
    - model set-up
    - process of calibration, verification
- QA label model
- Do you need to keep hydrodynamic databases for WAQ, WAVE, etc.?
- Finally archive your data; model; reports.

# Gridding – Splines to create grid

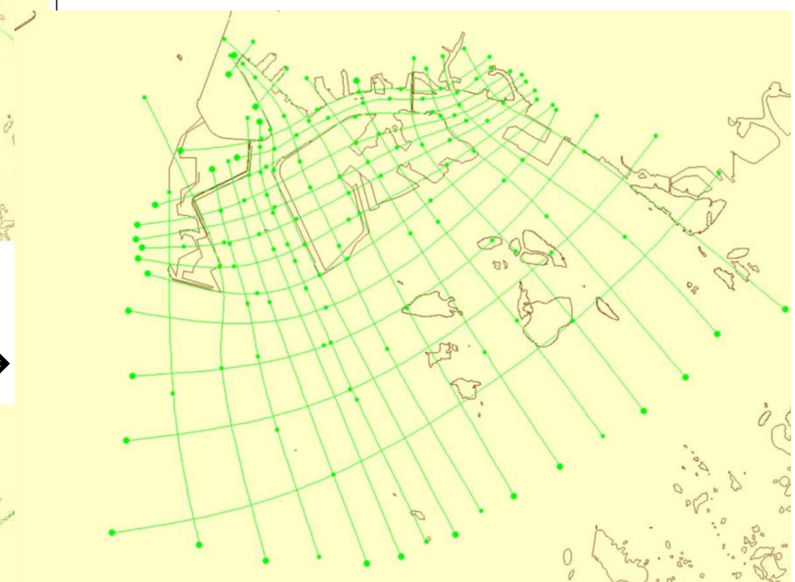


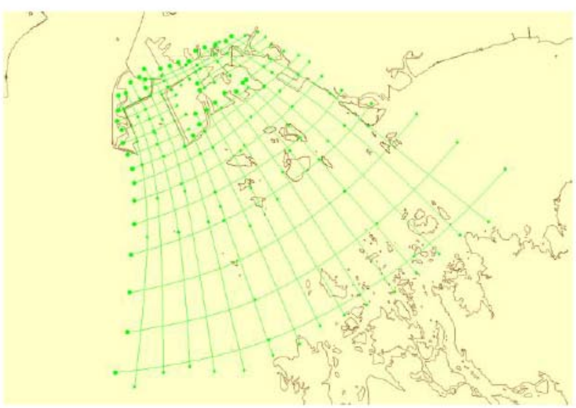
Splines 1



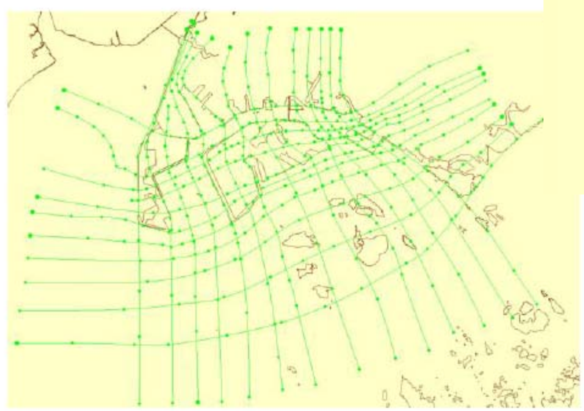
Splines 2

Spline Generation →



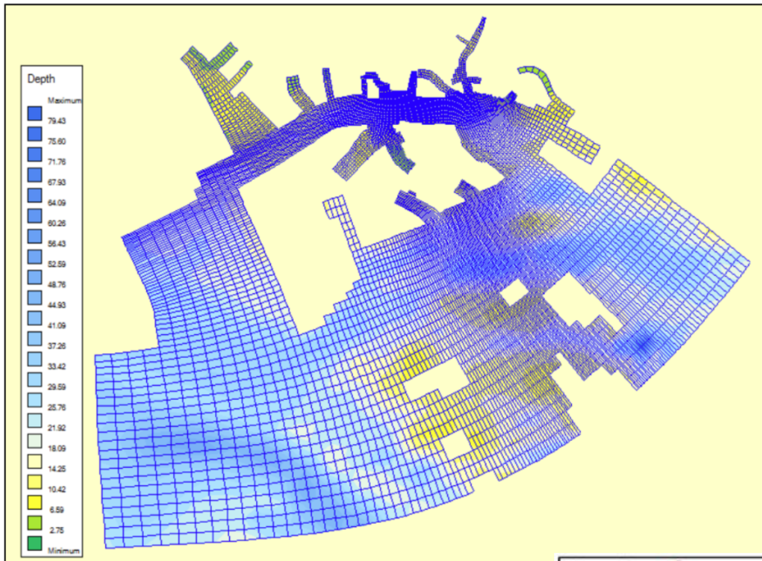


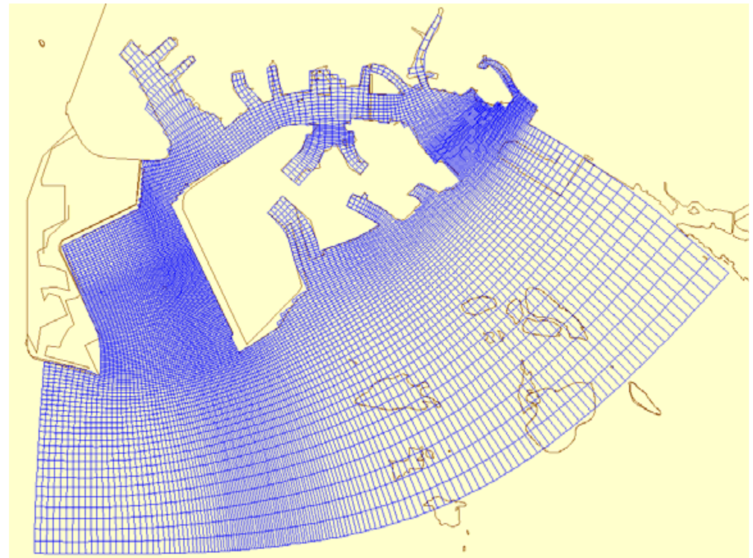
Splines 3

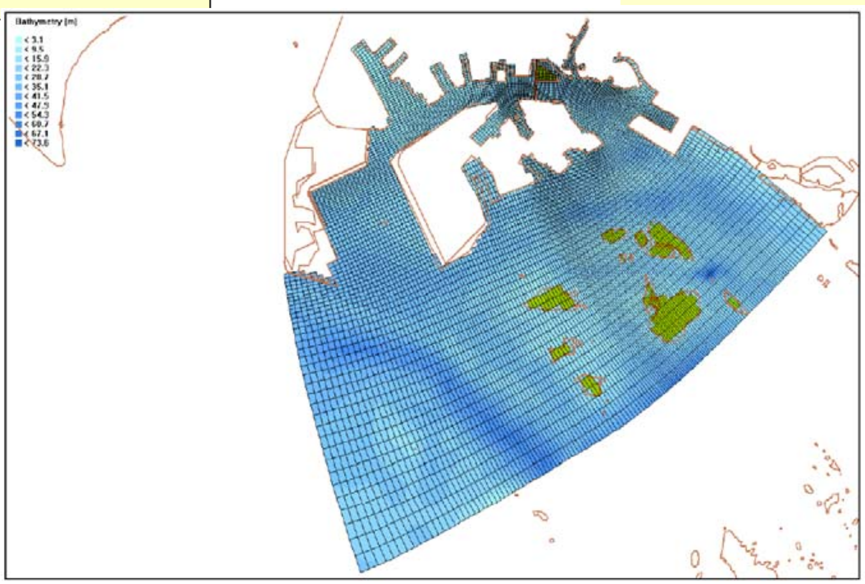


Splines 4

# Bathymetry - Interpolation

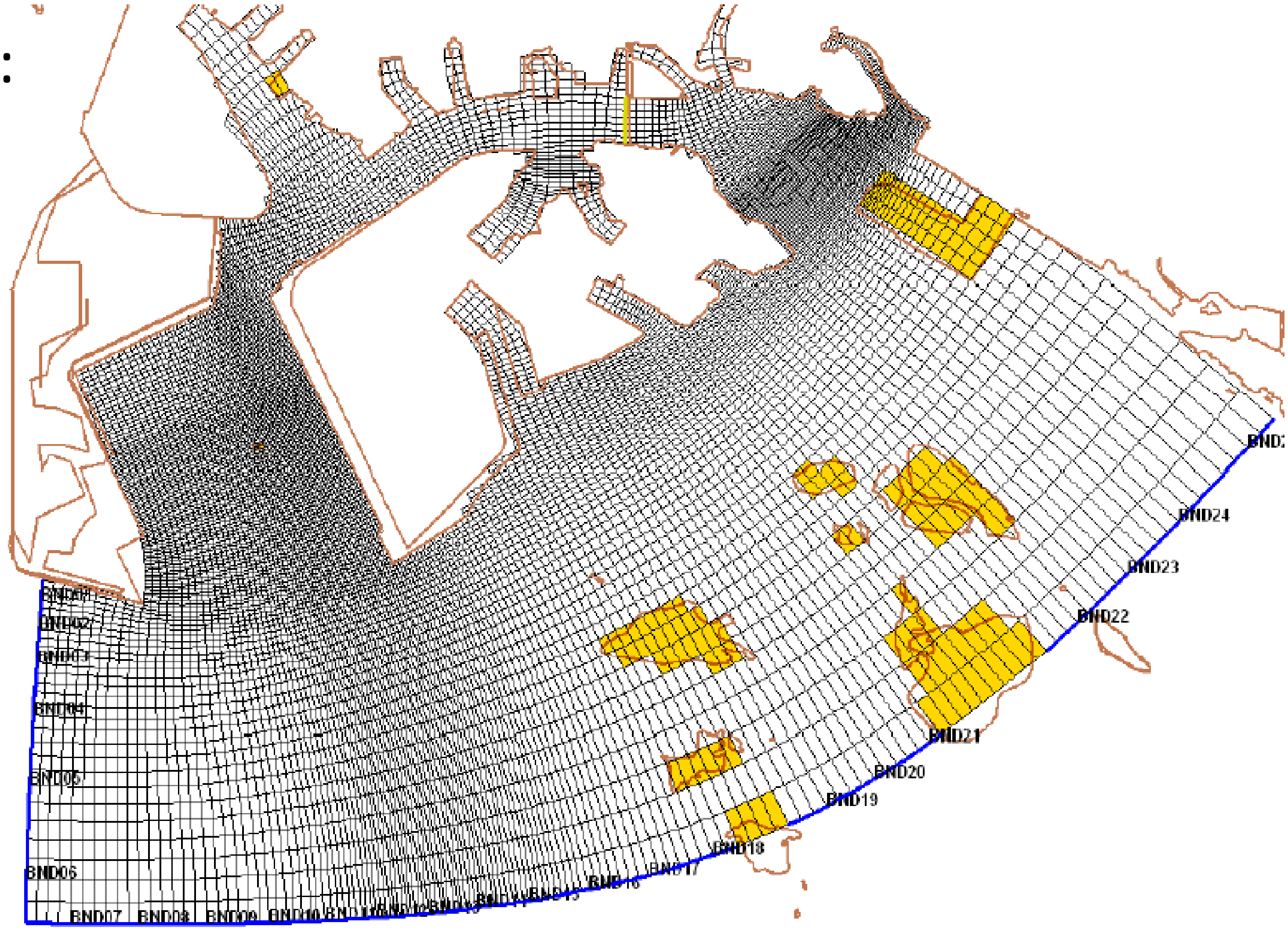


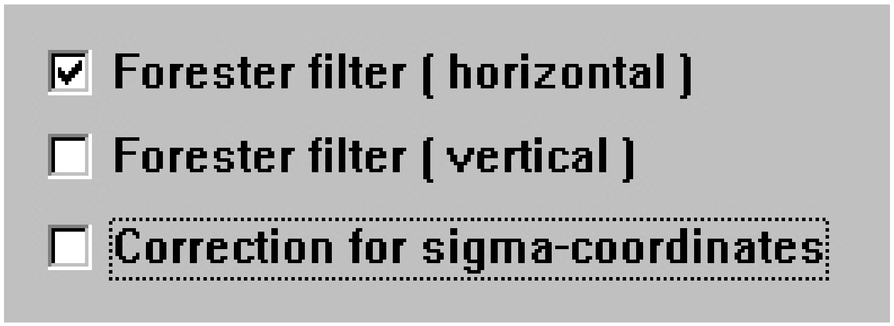


# Boundaries (note size)

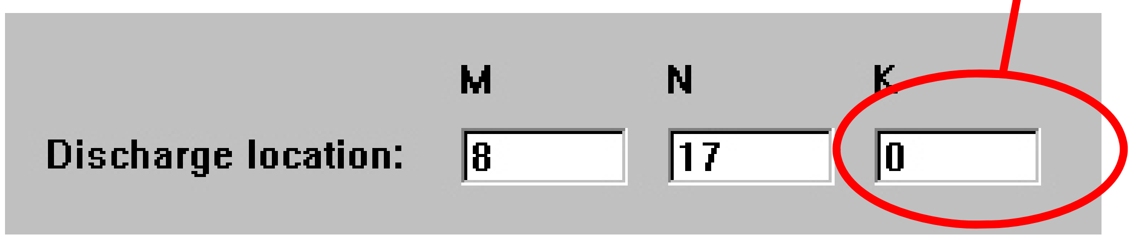
- Use Water Level Time Series: June 1 – Sept 30,
- Example:



# Numerical Parameters and Discharge layer




K = 0: uniform over vertical, proportional with layer thickness



# Nesting and V&V

- Details can be found in appendix F of the flow Manual
- The quick summary is provided here:
  - You need  to already have your grid ready, your mdf and support files setup. Send the necessary files in Appendix F for NestHD1 to me.
  - From your provided files I will create the time series files (bct) that will be based on your files sent to me. The bct files will be a result of a simulation I will run that will be nested in the SRM.
  - You will then need to do NestHD2 and then start your simulation
  - Check at the locations I will provide to you if your model shows good correlation for water level and velocities over the period of interest.
  - If not you will probably need to add more boundary support points, resend to me your boundary files again and I will nest again and resend you the bct files and then you can try again.
  - For this stage you can use 2D only to make sure that everything is OK before proceeding to 3D unless you are absolutely sure you have everything set correctly

1. Select *Nesting (1)*.

You are asked to supply the following information, see also Figure F-3:

1. The filename of the grid file of the overall model.
2. The filename of the enclosure file of the overall model.
3. The filename of the grid file of the nested model.
4. The filename of the enclosure file of the nested model.
5. The filename of the boundary definition file of the nested model. This file must fulfil the conventions as specified in the Delft3D-FLOW manual.
6. The name of the file containing the nest administration. An example of this file as used for nesting of the Stonecutters Island model in the Pearl Estuary model is given in Section F.4.
7. The name of the file containing the position of the monitoring stations in the overall model. This file can be used directly in a Delft3D-FLOW simulation with the overall model.

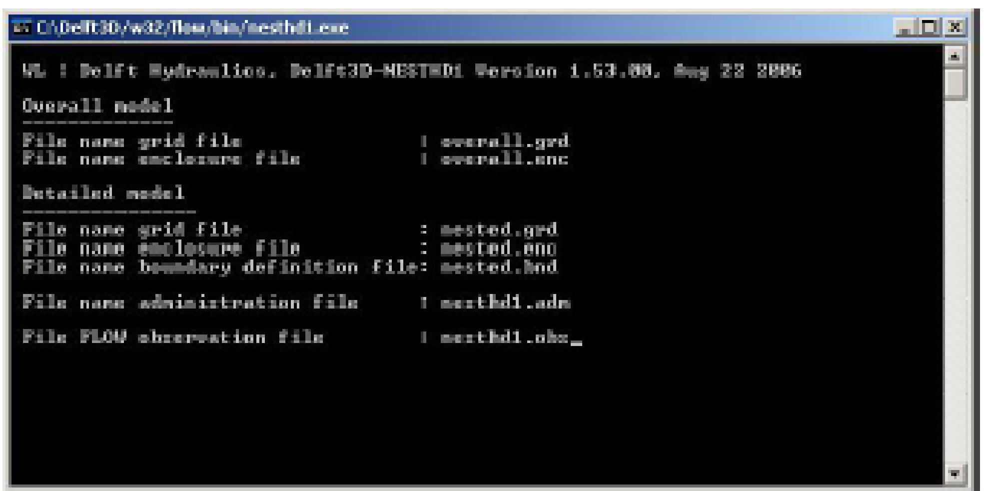



Figure F-3 Specification of input and output files for NESTHD1

After running NESTHD1 a simulation with the overall model should be executed using the monitoring stations as generated by NESTHD1.