Introduction to SwanOne

- **SWAN** is a third generation wave model that computes random, short-crested wind-generated waves in coastal regions and inland waters.
  (for more information see *http://vlm089.citg.tudelft.nl/swan/index.htm*)

- **SwanOne** is an interface to simplify one-dimensional wave modelling problems and is written as a series of MATLAB routines (M-files).

  SwanOne can be run in two modes:

  1. In a MATLAB platform (any version)

  2. As a stand-alone executable file

Introduction to SwanOne

- **In a MATLAB platform**

  1. Open MATLAB (any Version).

  2. Make the folder containing SwanOne MATLAB scripts
     as the current directory of MATLAB.

  3. Run SwanOne.m (M-File) and start working.

- **As a stand-alone executable file:**

  1. Needs MATLAB Runtime Component (MCRinstaller77.exe), already installed on
     your computer. (or the same MCRinstaller.exe of MATLAB version that the
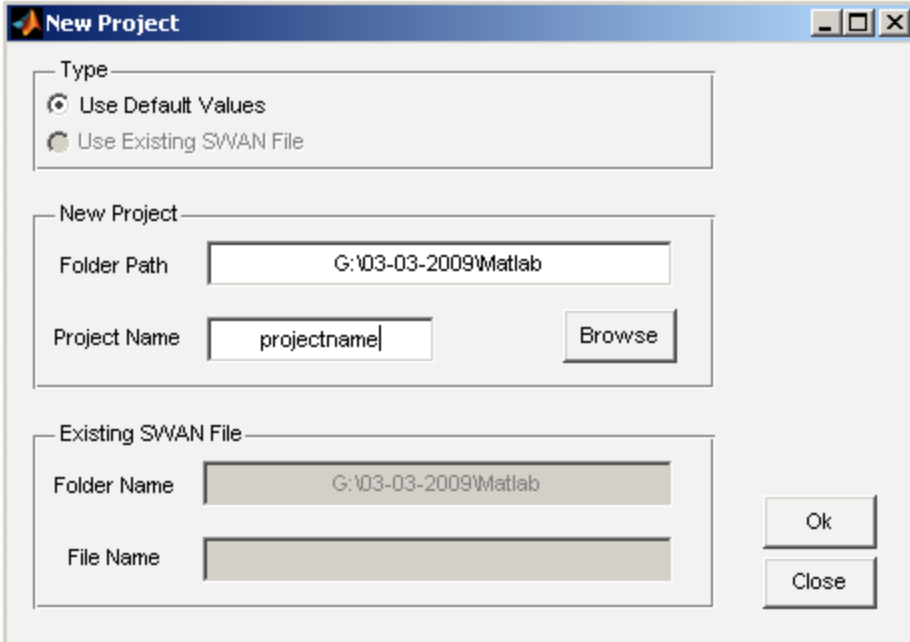   program has been compiled with!)

     (See Manual *http://www.kennisbank-waterbouw.nl/Software/SwanOne%20User%20manual.pdf*)

  2. You may compile it yourself with your own version of MATLAB!

Starting a Project with SwanOne

Folder Path: Defines where you want the SwanOne input files and

output files stored (you may not see any file until you

run the computation)

Projectname: All the input and output files will start with this

projectname

* Using a previously-run project

is not active yet!

Inputs of SwanOne

• **Bottom Profile**

"filename.txt" layout of such a file is

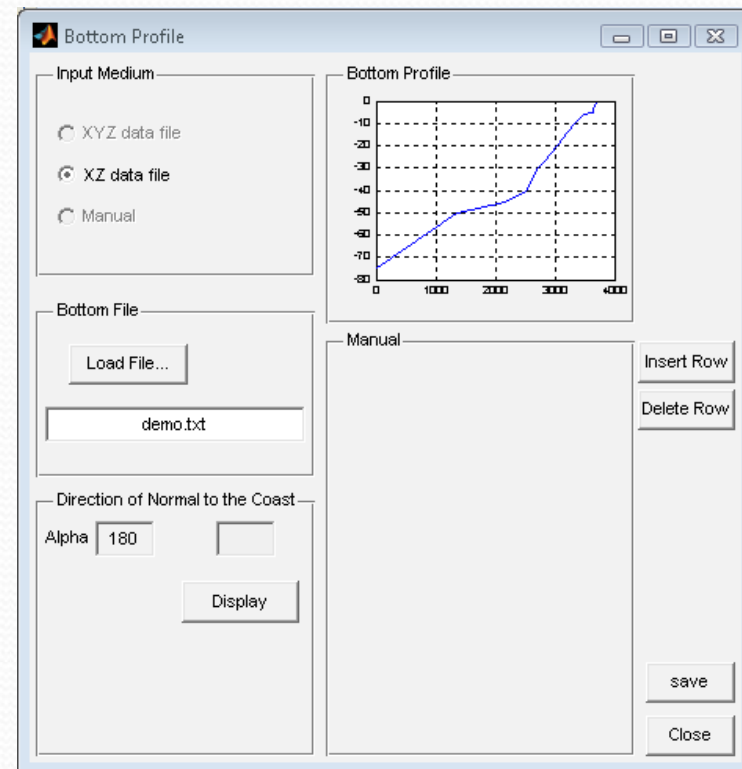as follows:

Column1 : Distance from the Offshore

Boundary

Column2: Depth

"Negative Downward"

Alpha is the direction of the normal to

the coast line (Default 180 $^{\circ}$)

* *Manual option is not active yet!*

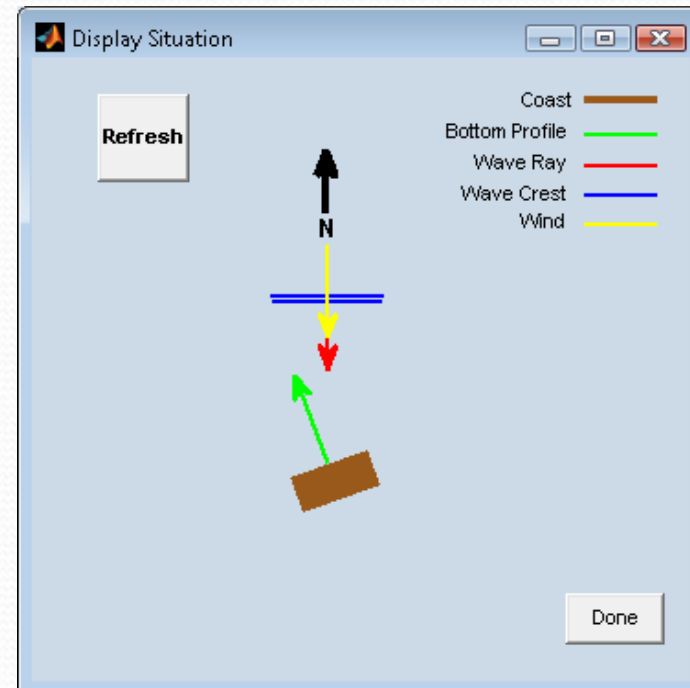| 1	%	Xp (m)	Yp (m)
2		0	−100
3		200	−75
4		344	−56
5		500	0

Inputs of SwanOne

- Nautical Convention of SWAN is used in SwanOne:

"Zero degree is looking from north to south and increases clockwise"

- The Difference between the wave ray and bottom profile cannot be more than 70 degrees.
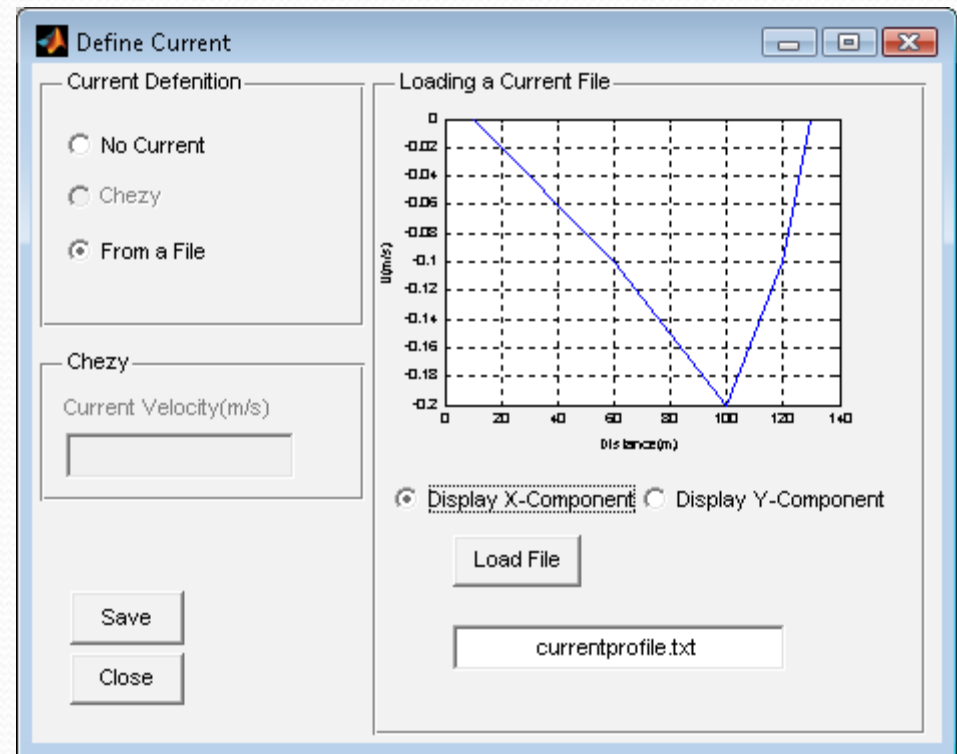
Inputs of SwanOne

- **Current Profile:**

  "CurrentProfile.txt" layout of such a file must be as follows:

  Column1: distance from the offshore boundary

  Column2: X-component of current velocities perpendicular to the bottom profile)

  Column3: Z-component of current velocities (parallel to the bottom profile)
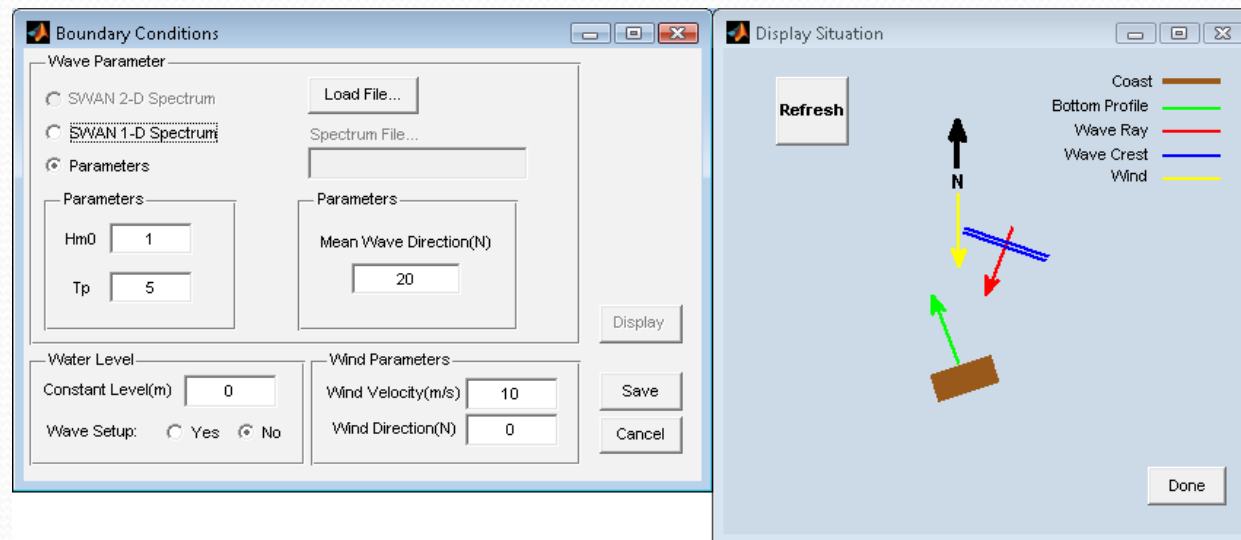
  *Current velocities outside the defined area are assumed to be zero!

Inputs of SwanOne

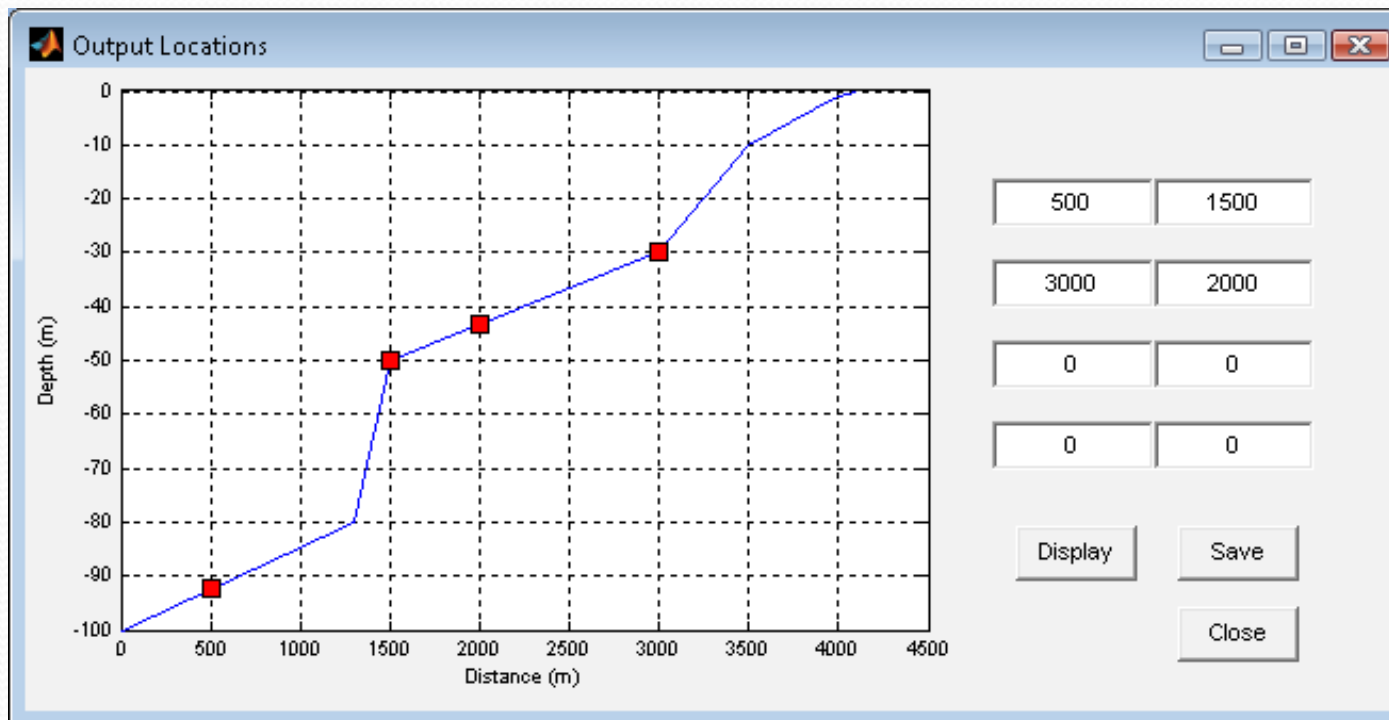**Boundary Conditions:**

- *SP1 file:* one-dimensional spectrum file already computed by SWAN.
- *Wave Parameters:*
  - Significant Wave Height,
  - Peak Period,
  - Wind Direction and Velocity
  - Wave Direction
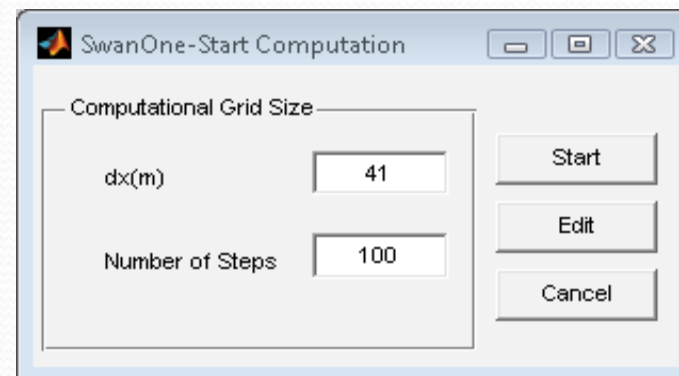
Inputs of SwanOne

Output Locations:

- for SP1 and SP2 output files of SWAN, at least one location is needed.

Inputs of SwanOne

Starting Computation:

- You may change the Computation Resolution in the *SwanOne- Start Computation* window.

- SWAN reads the "Projectname.SWN", and runs the model.

- The results will be stored in the directory that was already defined.
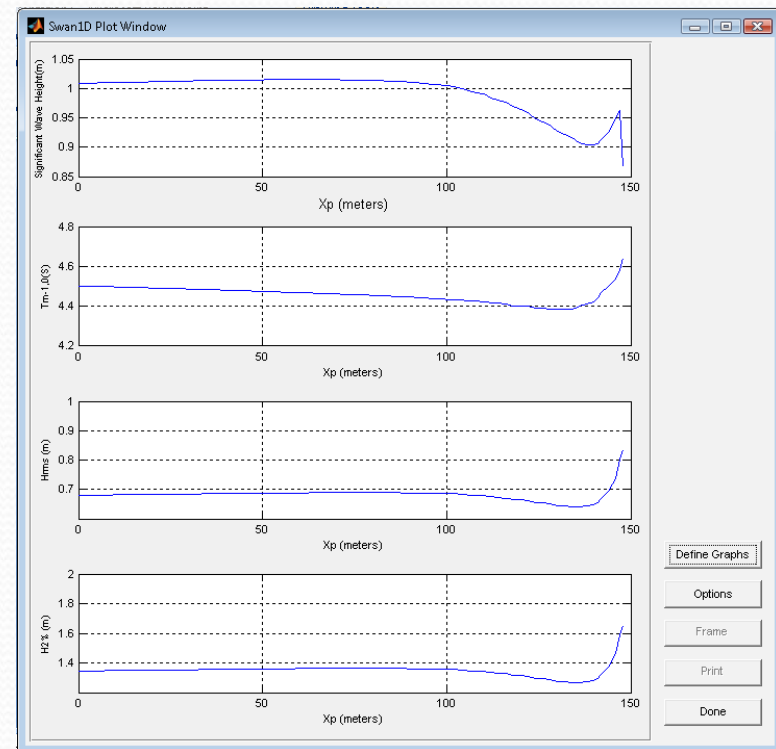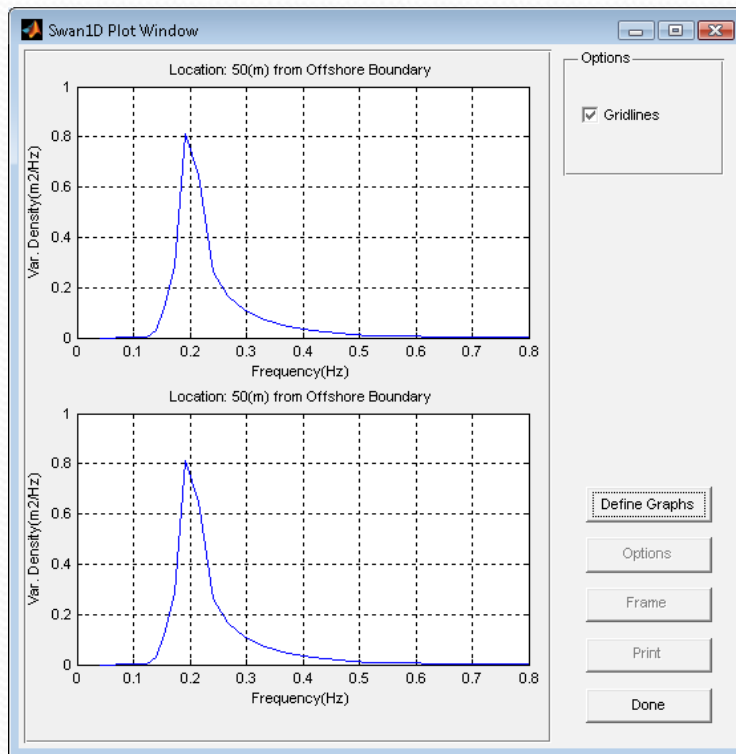
Computation

What SwanOne Creates:

- ProjectName.MAT

  "Data for the Interface"

- ProjectName_bot.DAT

  "SWAN readable bottom profile"

- ProjectName_U.DAT

  "SWAN readable Current Profile"

- ProjectName.SWN

  "List of Commands for SWAN"

- ProjectName_Table.TAB

  "Output Table (Optional)"

What SWAN Creates:

- ProjectName.PRT

  "A report on SWAN computation Process"

- ProjectName.TAB

  "SWAN output results"

- ProjectName.SP1

  "1-D Spectrum for output locations"

- ProjectName.SP2

  "2-D Spectrum for output locations"

Output

- Different Wave Variables along bottom profile, and wave spectrum at pre-defined output locations can be plotted and compared.

Output

- The results can be printed in a table as a text file (ProjectName_Table.TAB), and can be further loaded in MATLAB or Excel.