ERDC
Engineer Research and Development Center

CMSWave to GenCade

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What is it?

- Tool to allow use of CMS-Wave output as wave stations within GenCade
  - converts CMS-Wave observation stations to .map file usable within SMS
  - Inserts wave stations into GenCade files

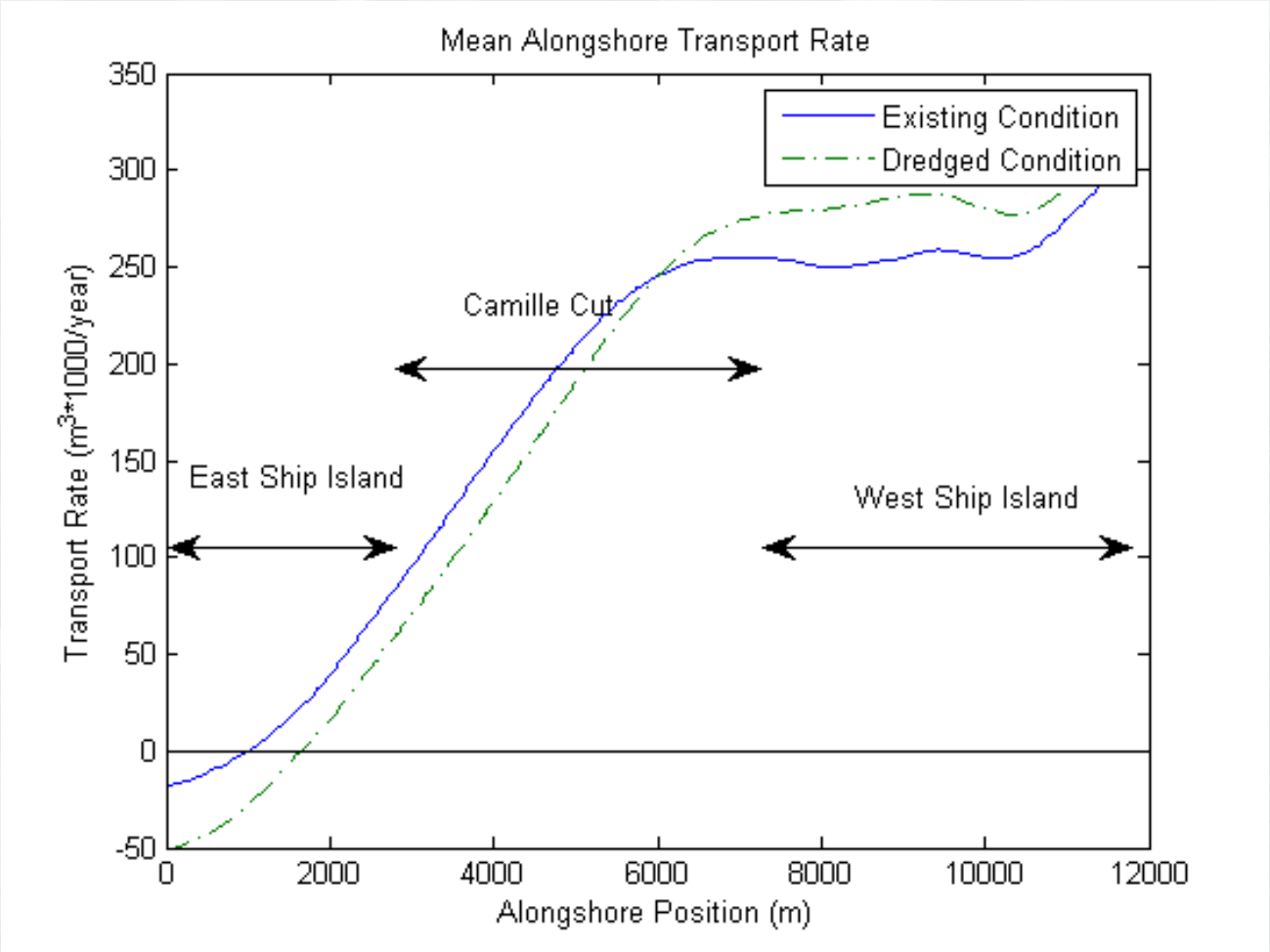
CMS-Wave

- CMS-Wave is a nearshore spectral wave model
- Allows for wave modeling in and around inlets
- Can use save stations in order to monitor certain grid locations.
- Additional features include grid nesting, wave-wave interaction, and wave overtopping

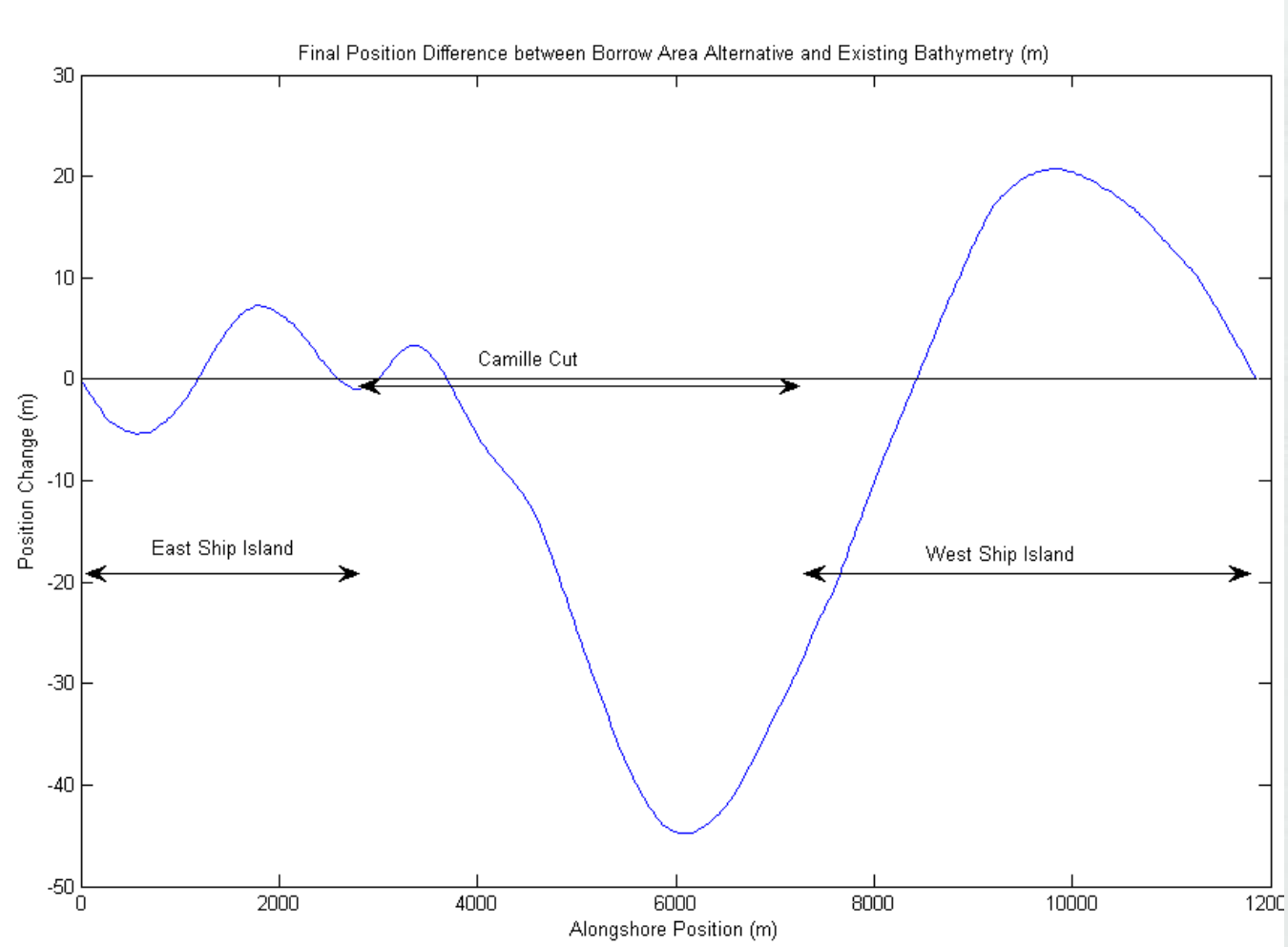
Purpose

- Accounts for presence of nearshore bathymetry in model
- Allows for sensitivity analysis of various projected bathymetries
  - ► Used to determine optimal location of borrow areas

Ship Island Mean Transport



Ship Island Mean Transport



Developing Wave Spectra

- Waves may be inputted into CMS-Wave as either an historical time series or as a set of representative wave conditions
- Waves must be binned prior to use within CMS-Wave for a set of wave conditions

Developing Wave Spectra

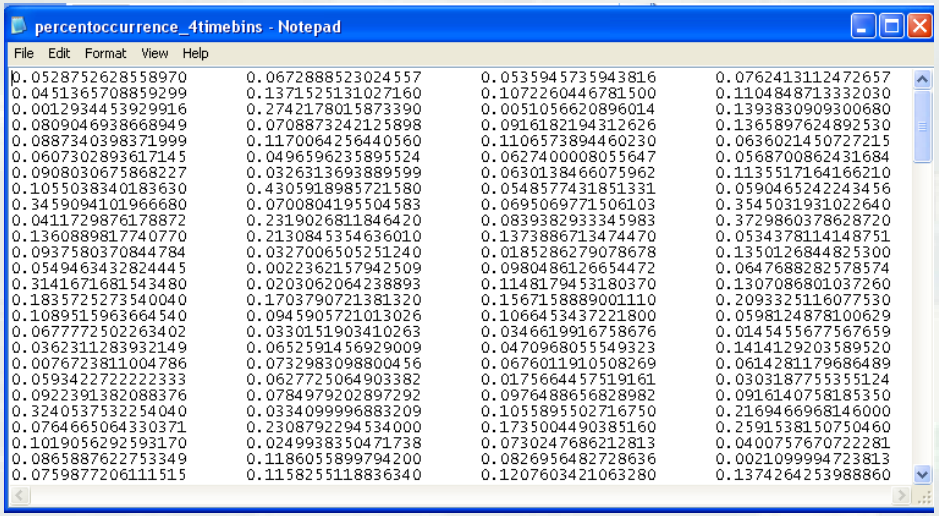
- In order to reduce computation time waves can be binned by height, period and direction
- Waves can also be divided into seasonal distributions of each characteristic binned event
- Spectrum can then be generated by inserting representative wave conditions into CMS-Wave

Binning Wave Data

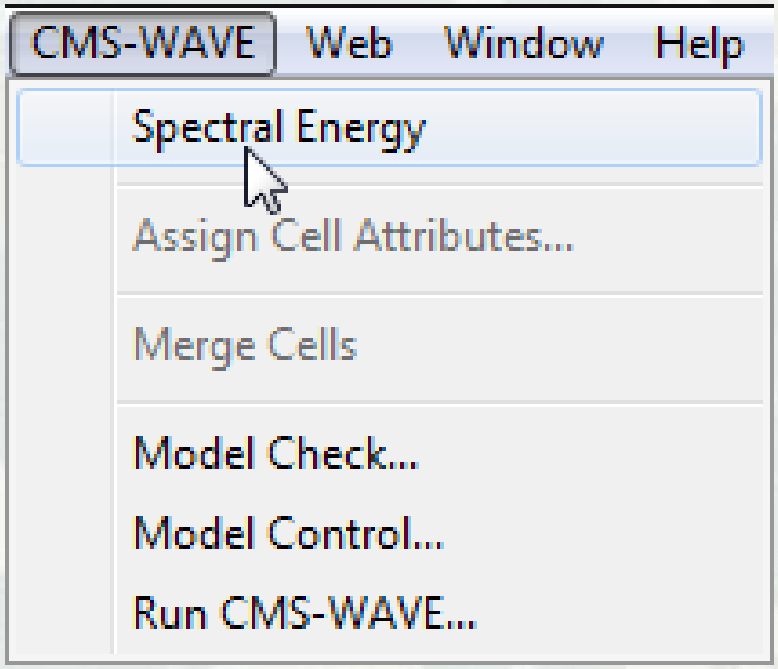
- Steps for Binning
  - Decide bin limits
  - Find average H,T, and Direction for each bin
  - Determine percent occurrence for each binned event
  - Write percent occurrence file for input into cms2map executable

Percent Occurrence Guidelines

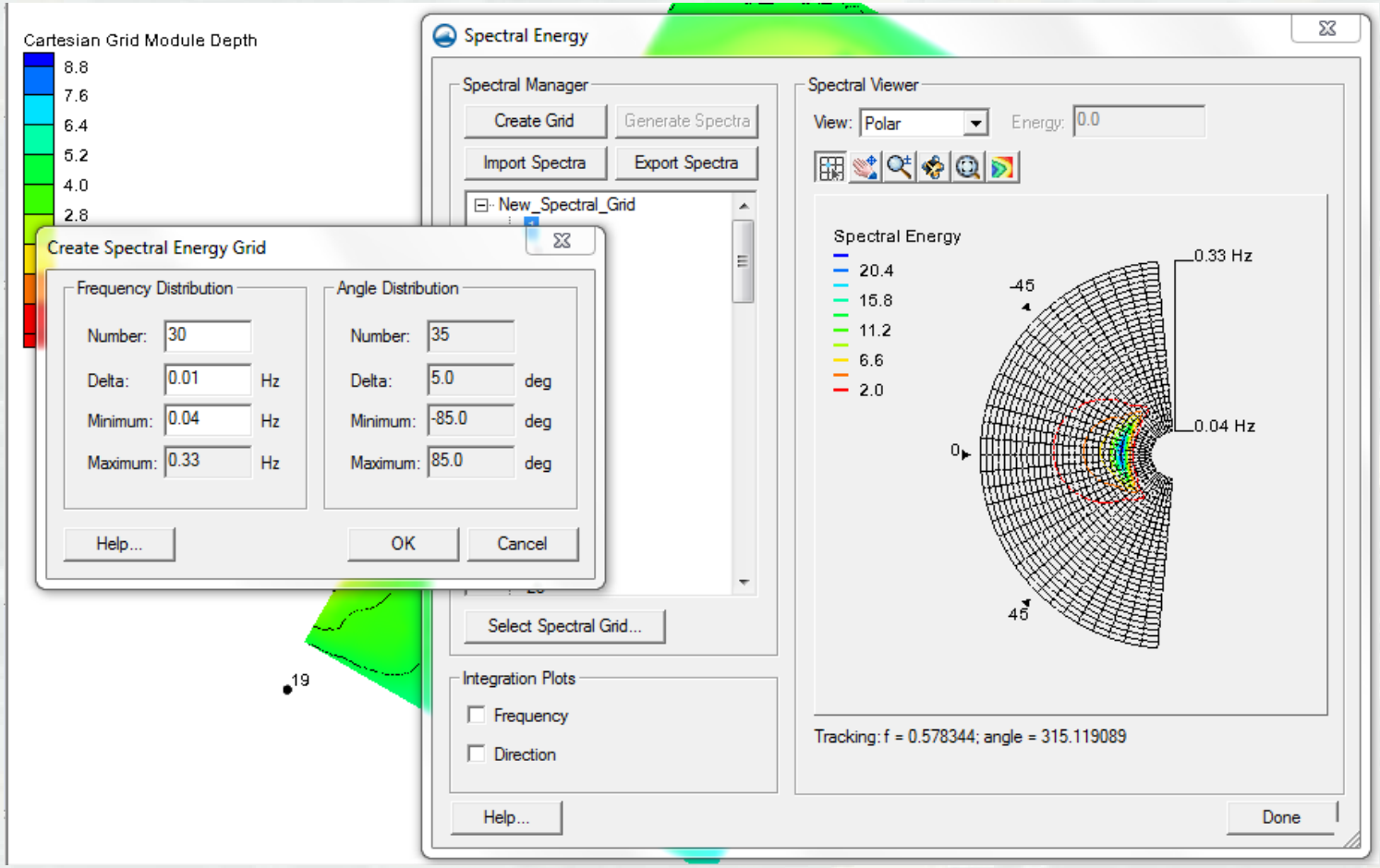
- Rows represent one wave event
- Percent occurrence for each sequential time period are written in each row separated by spaces



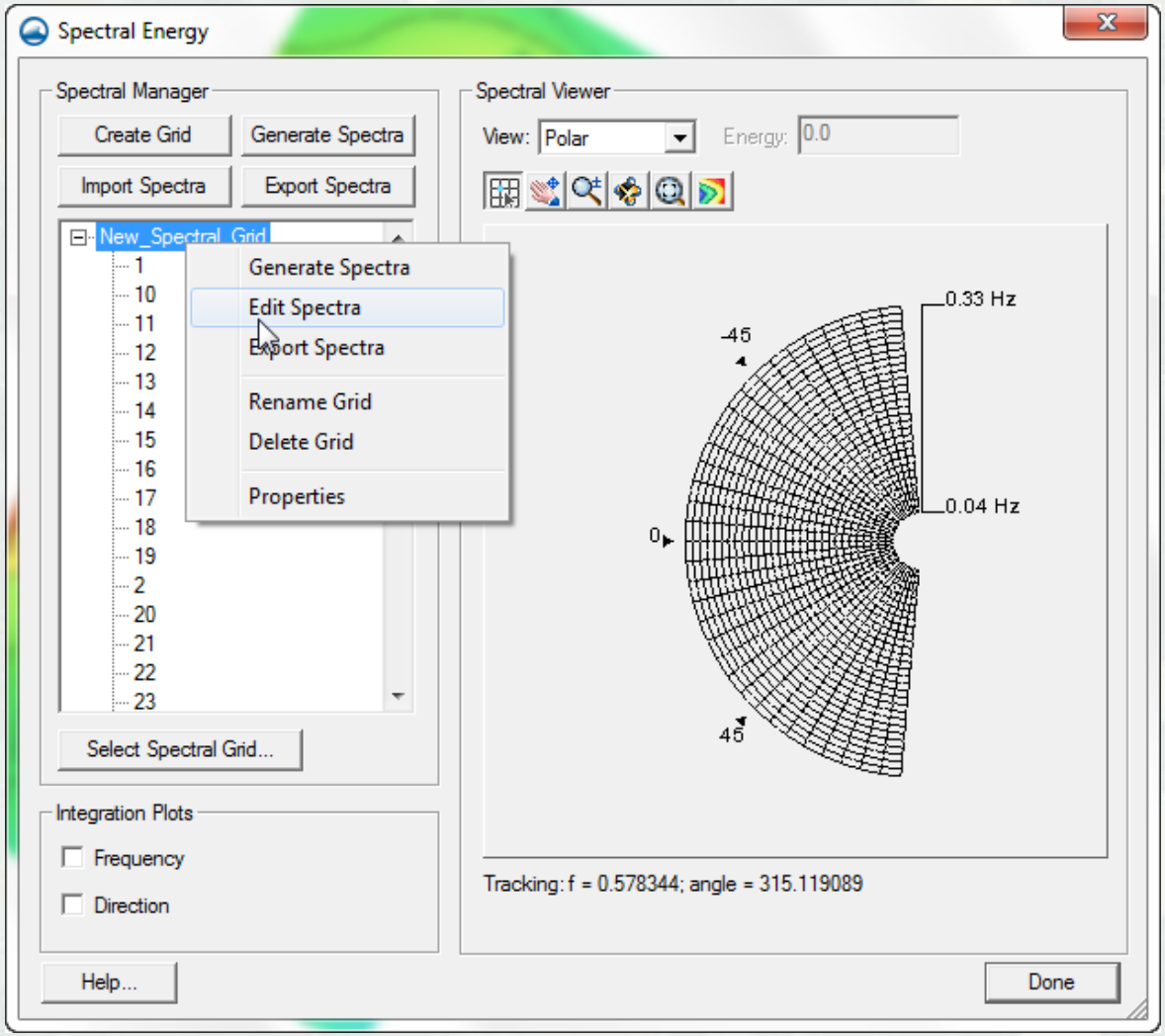
Developing Wave Spectra



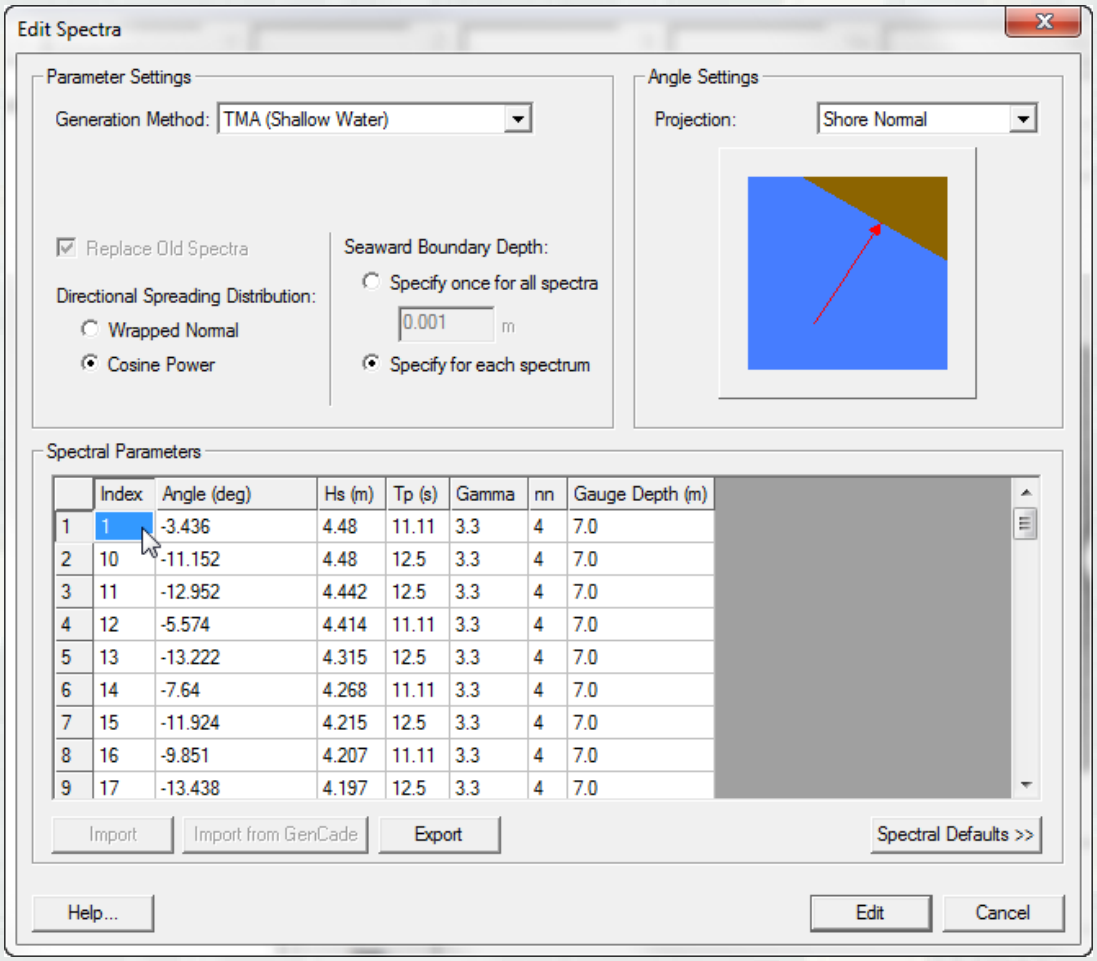
Developing Wave Spectra



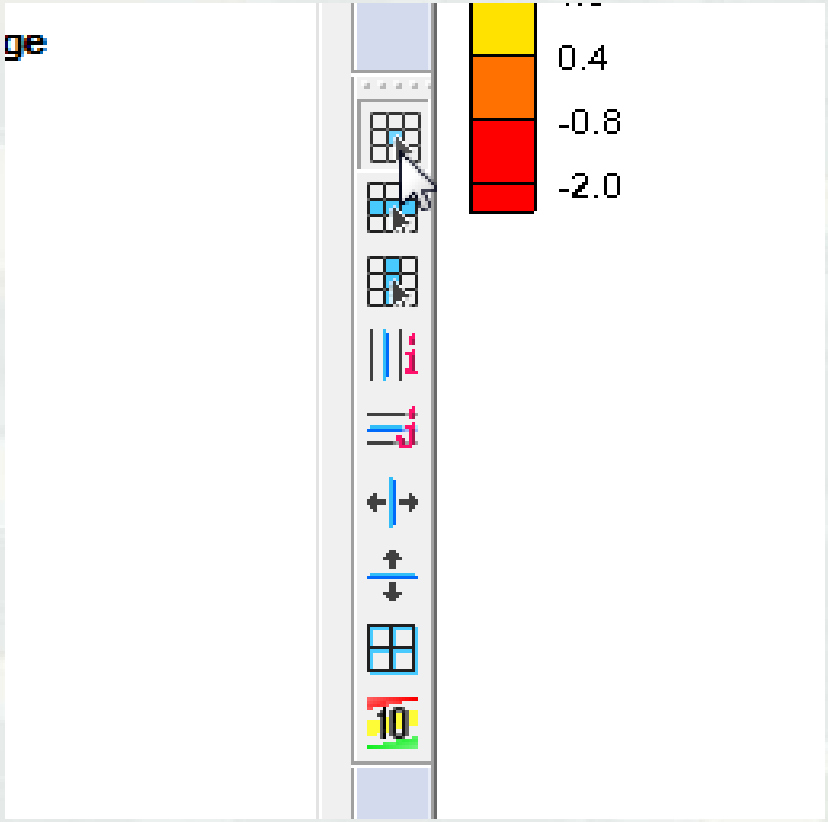
Developing Wave Spectra



Developing Wave Spectra

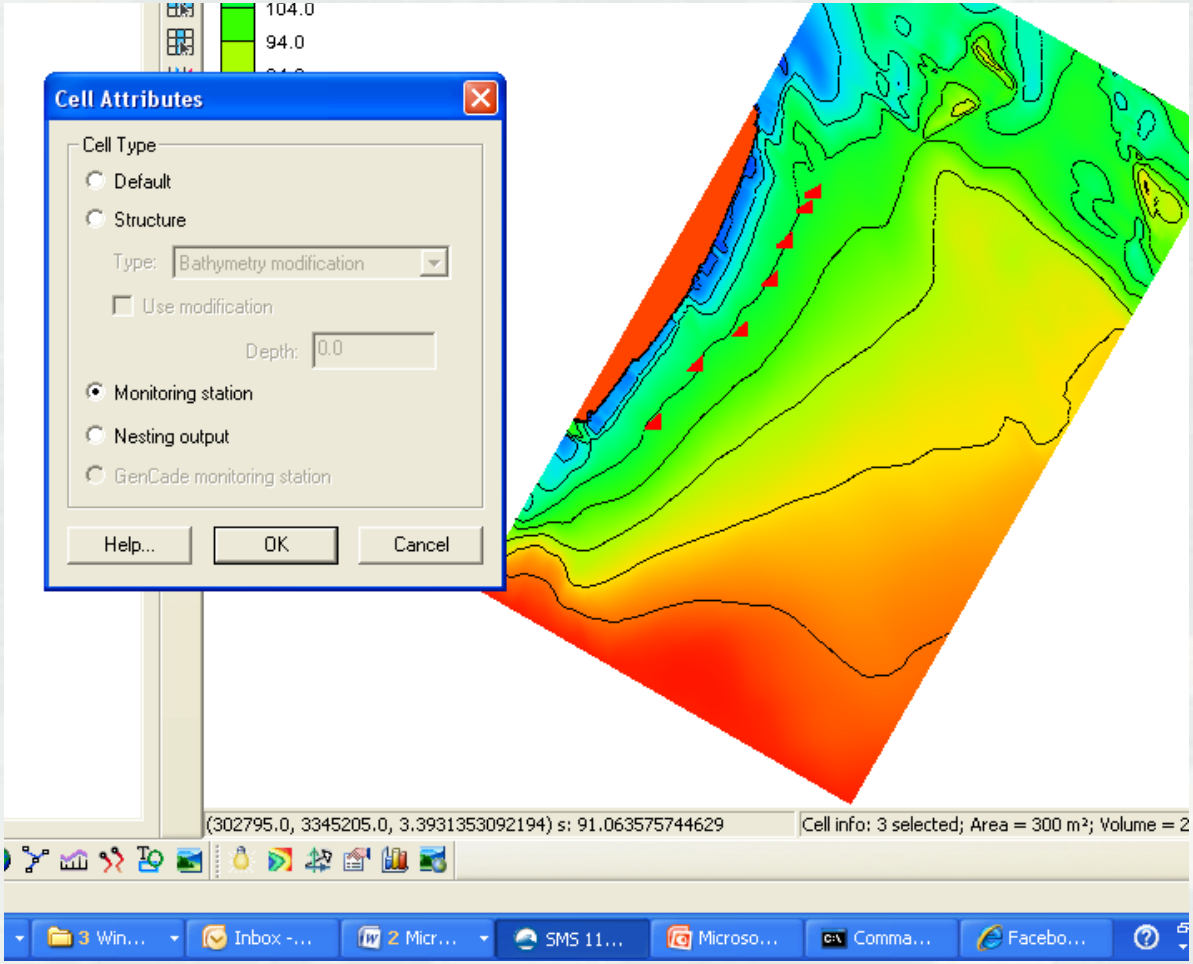


Creating Observation Points



- Click on select cell button
- Hold Shift key while selecting multiple save stations
- Right click on screen and select Cell Attributes tab

Creating Observation Points



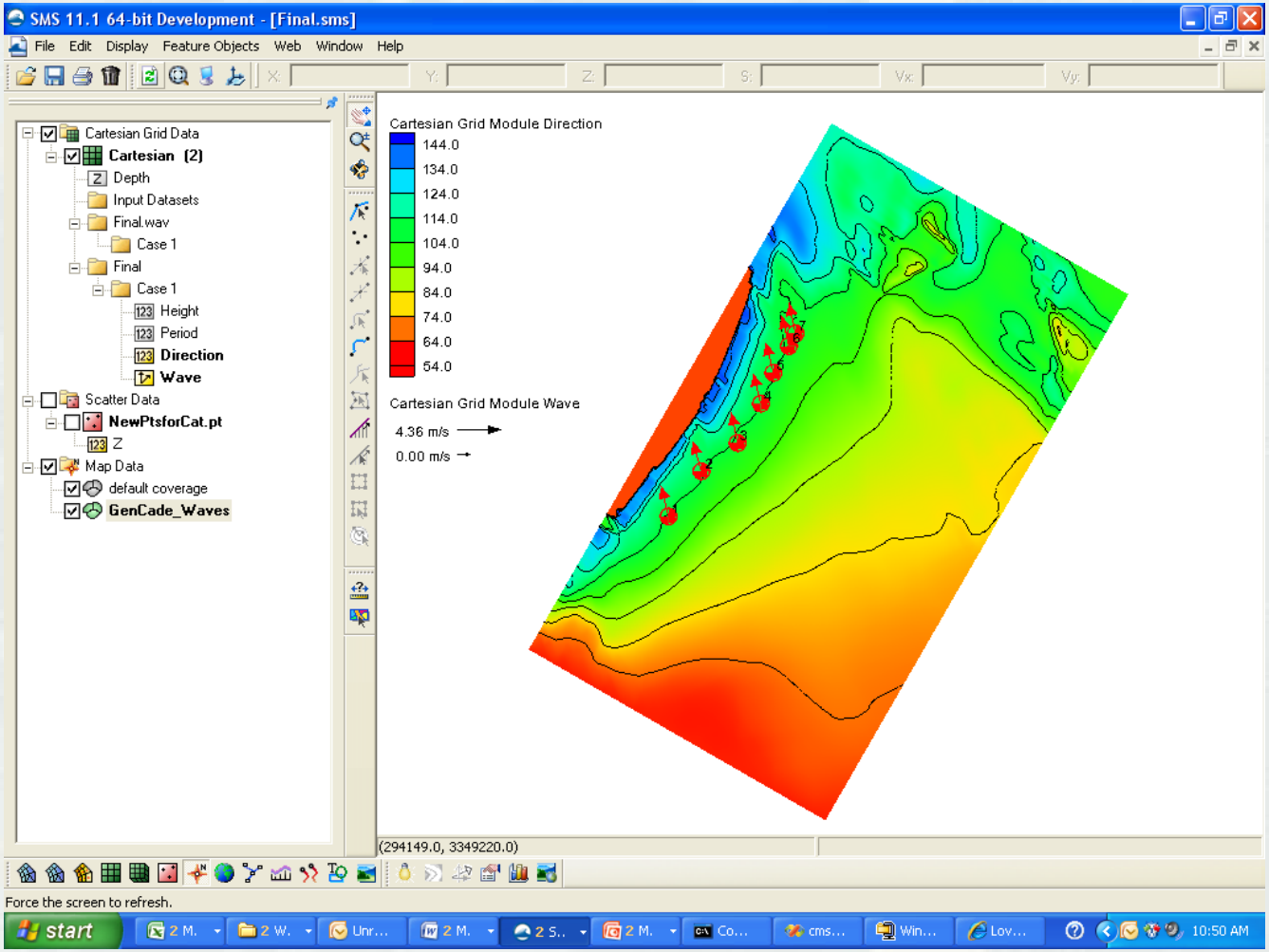
Writing .ctrl for CMS2MAP

- The .ctrl file contains the cards necessary for CMS2MAP to write to either an existing GenCade grid or a .map file readable in SMS

Writing .ctrl for CMS2MAP

Control Card	Description	Default Value
SIMFILE:	CMS-Wave control file (*.sim):	*Required Input*
STDFILE:	CMS-Wave options file (*.std):	*Required Input*
DEPFILE:	CMS-Wave depth file (*.dep):	*Required Input*
SELHTSOUTFILE:	CMS-Wave station output file (selhts.out):	*Required Input*
CMSTSFLAG:	Flag for CMS to GenCade conversion mode: <1> = time-series (process-based) mode …(1 CMS wave event ➔ 1 GenCade Wave) <0> = steady state mode……(1 CMS wave event ➔ Many GenCade Waves)	1
FREQFILE:	**[if CMSTSFLAG = 0]** ➔ % Frequency of Occurrence file (ASCII file: 1 row per CMS-Wave event x 1 column per time period to distribute output over)	*Required Input if CMSTSFLAG = 0*
NTIMEBINS:	**[if CMSTSFLAG = 0]** ➔ Number of time periods to distribute output time series over	1
RANDOMFLAG:	**[if CMSTSFLAG = 0]** ➔ Flag for random temporal distribution: <0> = same order as input wave events <1> = randomly distributed	0
FORMATOUT:	Flag for output format: <SMS_Map_Wave_File> = SMS Map File; <GenCade_Wave_File> = GenCade Wave Files	SMS_Map_Wave_File
MAPFILE:	**[if FORMATOUT = SMS_Map_Wave_File]** ➔ Output Time Series SMS *.map file	GenCade_SMS.map
STARTDATE:	Output time series start date <yyyymmddHHMMSS>	19000101000000
TIMESTEPOUT:	Output time series timestep (hours)	3.0
TSOUTLENGTH:	Output time series length (hours)	8760.0 (1 year)
GENFILEIN:	**[if FORMATOUT = GenCade_Wave_File]** ➔ <Optional> Existing GenCade Control Filename	GenCade_waves.gen
X0:	**[if GENFILEIN not supplied]** ➔ GenCade Grid X-Origin	0.0
Y0:	**[if GENFILEIN not supplied]** ➔ GenCade Grid Y-Origin	0.0
AZIMUTHGEN:	**[if GENFILEIN not supplied]** ➔ <Optional> GenCade Grid Azimuth	Same as CMS-Wave
NX:	**[if GENFILEIN not supplied]** ➔ Number of GenCade Grid Cells	0
DX:	**[if GENFILEIN not supplied]** ➔ GenCade Grid Cell Resolution/Width	0.0

SMS Wave Stations



Future Work

- Finalize binning code to allow binning for seasonal distributions
- Write .eng files for use in CMS-Wave