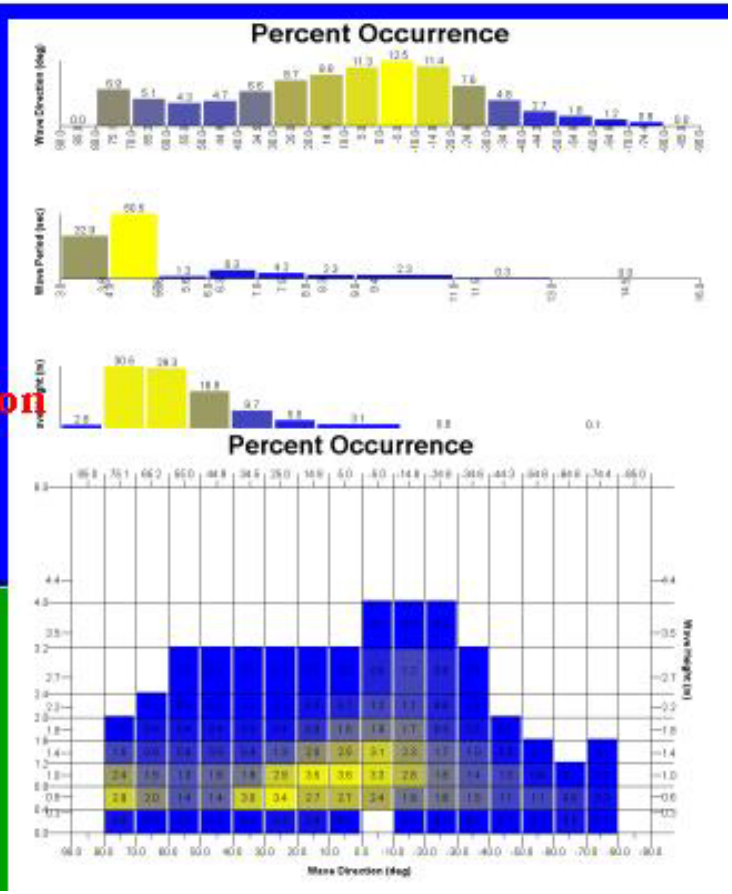
NEMOS
GENESIS – GENESIS/T
Demonstrations

NEMOS

Wave, Wind, & Water Level Editor
WIS Phase III Transformation
Wave Statistical Analysis and Visualization
Spectra Generation
Grid Generation
STWAVE
Wave Model Visualization
GENESIS
Tidal Current Editor
GENESIS/T

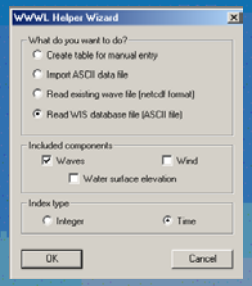


Procedures for Shoreline Change Modeling

- **Develop Offshore Wave Time Series**
  - Import to NEMOS
  - Phase III Transform
  - Transport Filter (threshold conditions)
  - Statistically Analyze (excluding calms)
  - Save Permutations

Wave, Wind, & Water Level Editor (WWWL)

Getting Data into Editor



- Manual Entry
  - *Specify metadata*
- Import ASCII File
  - *Specify metadata*
- Existing netCDF File
- Import WIS Database File

Wave, Wind, & Water Level Editor (WWWL)

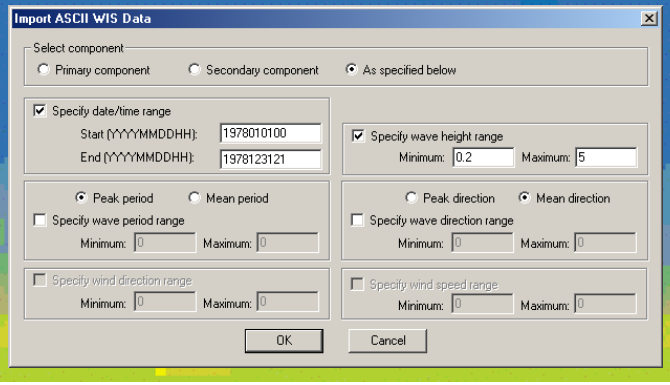
Import ASCII File (Time Series Format)

			— Parameter Toggles —		
	# of obs	Tag Type	Water Level	Waves	Wind
Line 1: header	1460	2	0	1	0

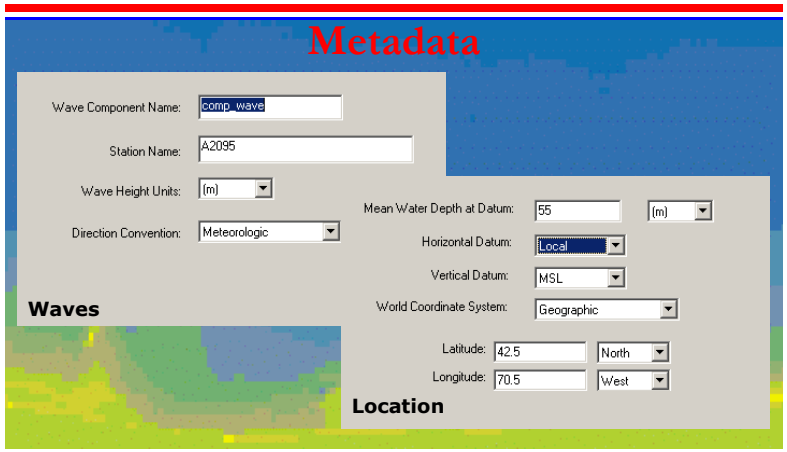
	Date	Time	H (m)	T (sec)	θ (deg)
Line 2: 1st obs	19760108	0	0.5	4	30
Line 3: 2nd obs	19760108	600	0.5	4	30
Line 4: 3rd obs	19760108	1200	1.5	5	30
Line 5: 4th obs	19760108	1800	2.5	5	30
Etc.					

Wave, Wind, & Water Level Editor (WWWL)

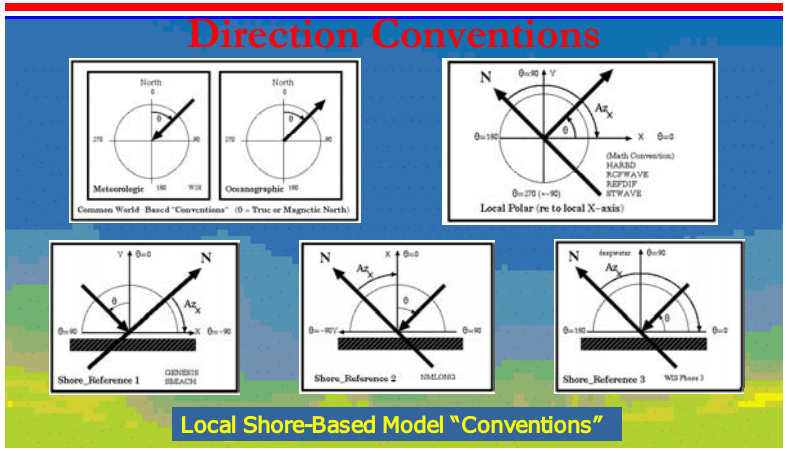
Import WIS Database File



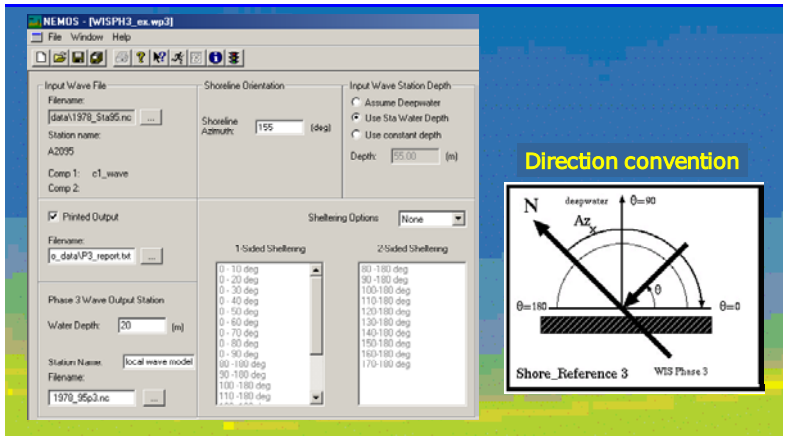
Wave, Wind, & Water Level Editor (WWWL)



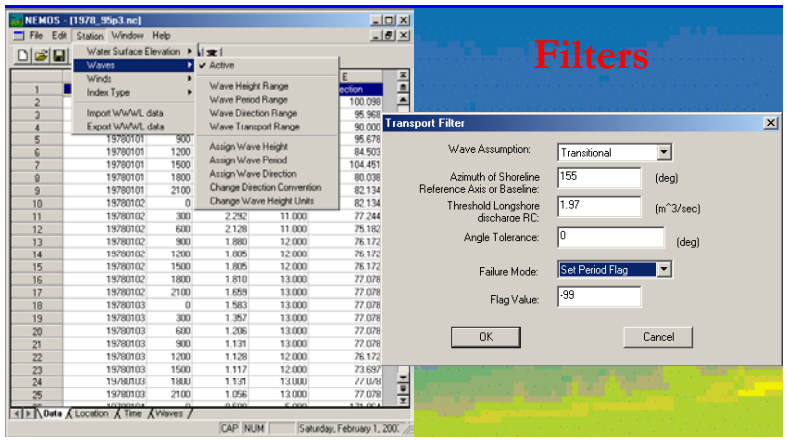
Wave, Wind, & Water Level Editor (WWWL)



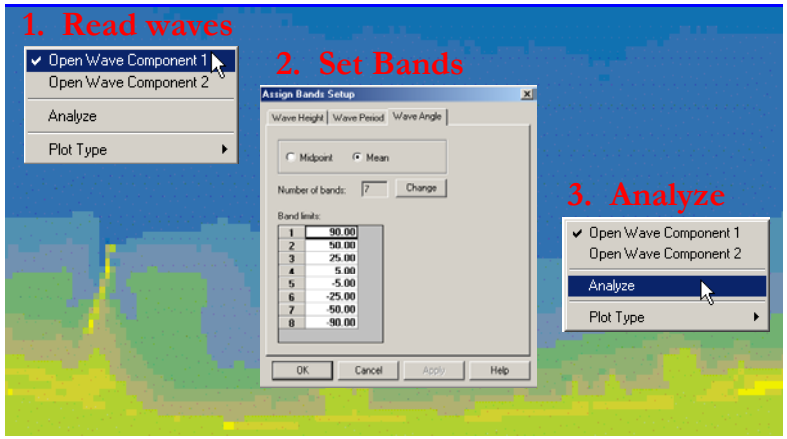
WIS Phase III Transformation (WISPH3)



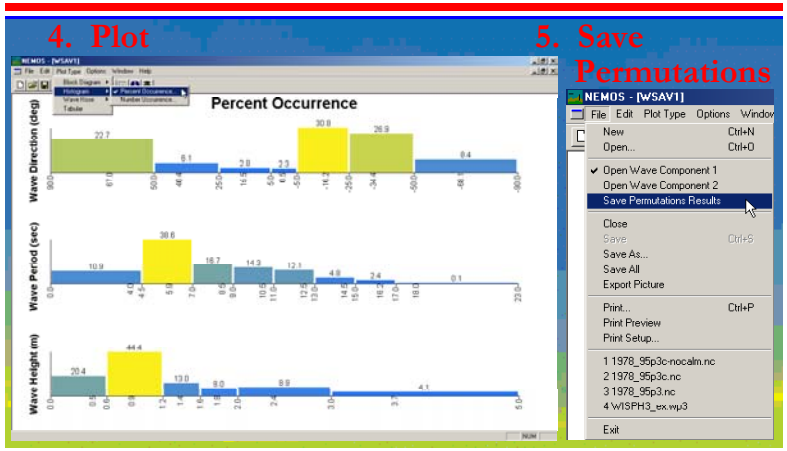
Wave, Wind, & Water Level Editor (WWWL)



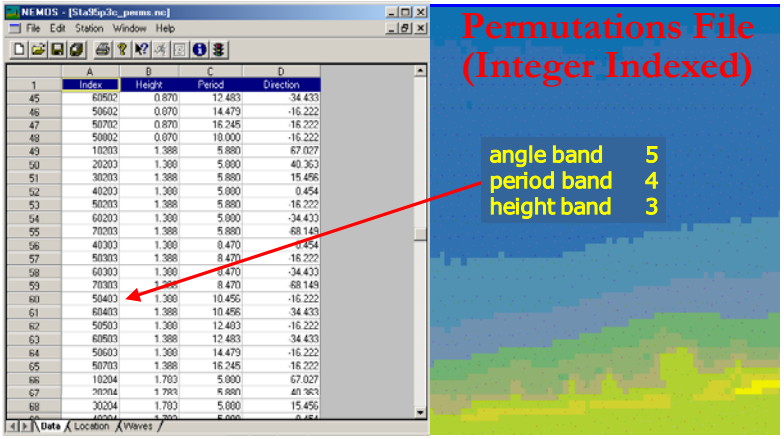
Wave, Statistical Analysis, & Visualization (WSAV)



Wave, Statistical Analysis, & Visualization (WSAV)

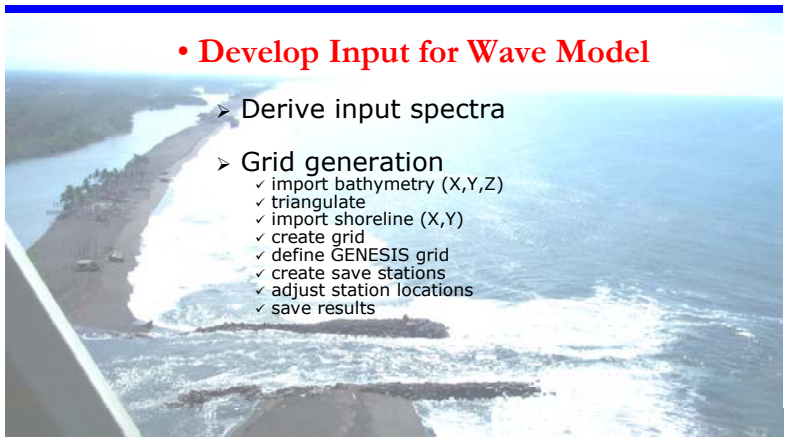


Wave, Wind, & Water Level Editor (WWWL)



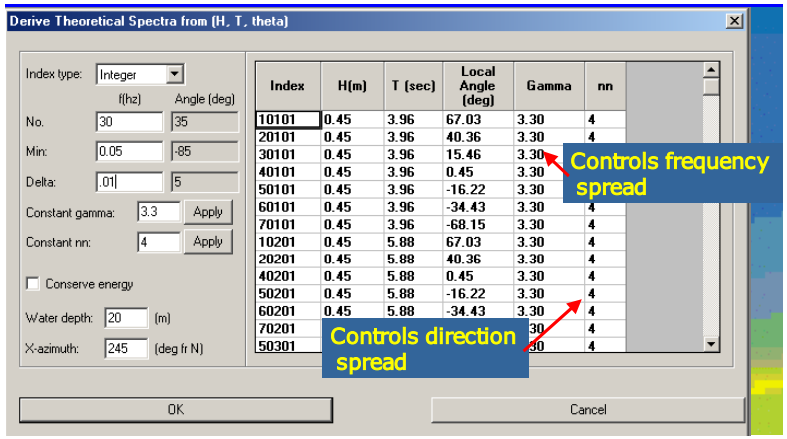
	A	B	C	D
1	Index	Height	Period	Direction
45	60502	0.870	12.483	-34.433
46	50602	0.870	14.479	-16.222
47	50702	0.870	16.245	-16.222
48	50802	0.870	18.000	-16.222
49	10203	1.388	5.880	67.027
50	20203	1.388	5.880	40.363
51	30203	1.388	5.880	15.456
52	40203	1.388	5.880	0.454
53	50203	1.388	5.880	-16.222
54	60203	1.388	5.880	-34.433
55	70203	1.388	5.880	-68.149
56	40303	1.388	8.470	0.454
57	50303	1.388	8.470	-16.222
58	60303	1.388	8.470	-34.433
59	70303	1.388	8.470	-68.149
60	50403	1.388	10.456	-16.222
61	60403	1.388	10.456	-34.433
62	50503	1.388	12.483	-16.222
63	60503	1.388	12.483	-34.433
64	50603	1.388	14.479	-16.222
65	50703	1.388	16.245	-16.222
66	10204	1.783	5.880	67.027
67	20204	1.783	5.880	40.363
68	30204	1.783	5.880	15.456

Procedures for Shoreline Change Modeling

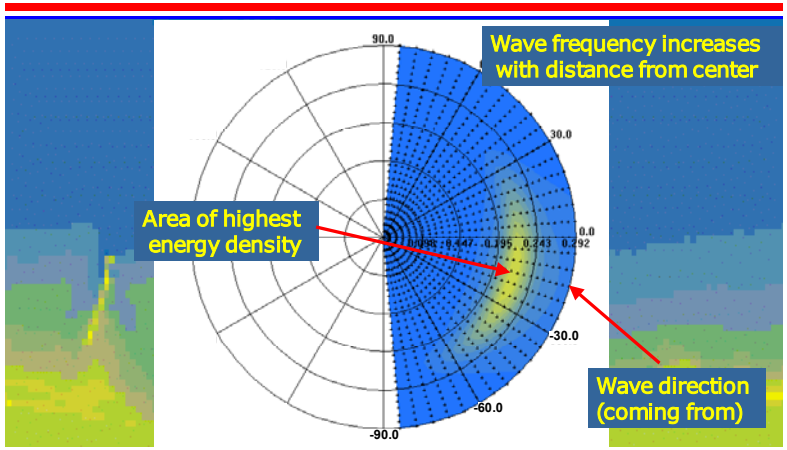


- **Develop Input for Wave Model**
  - Derive input spectra
  - Grid generation
    - ✓ import bathymetry (X,Y,Z)
    - ✓ triangulate
    - ✓ import shoreline (X,Y)
    - ✓ create grid
    - ✓ define GENESIS grid
    - ✓ create save stations
    - ✓ adjust station locations
    - ✓ save results

Spectra Generation (SPECGEN)

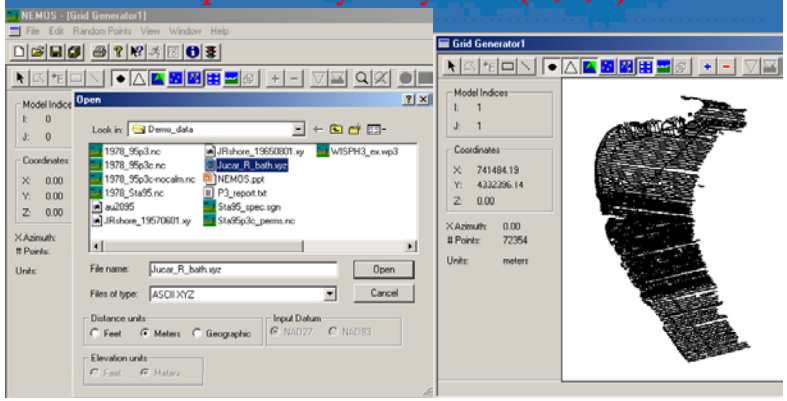


Spectra Generation (SPECGEN)



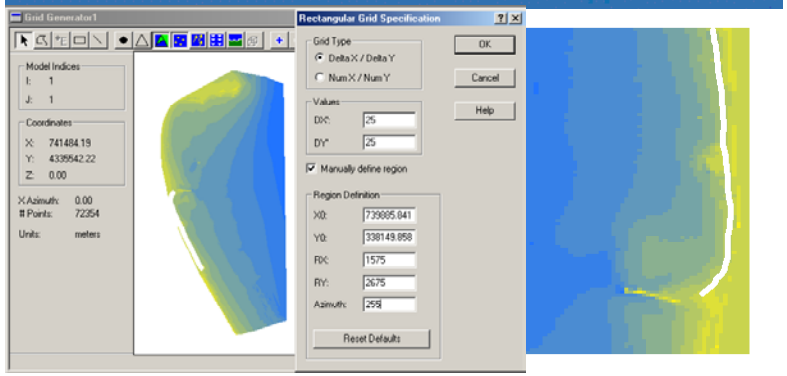
Wave Model Grid Generation (GRIDGEN)

Import bathymetry data (X,Y,Z)

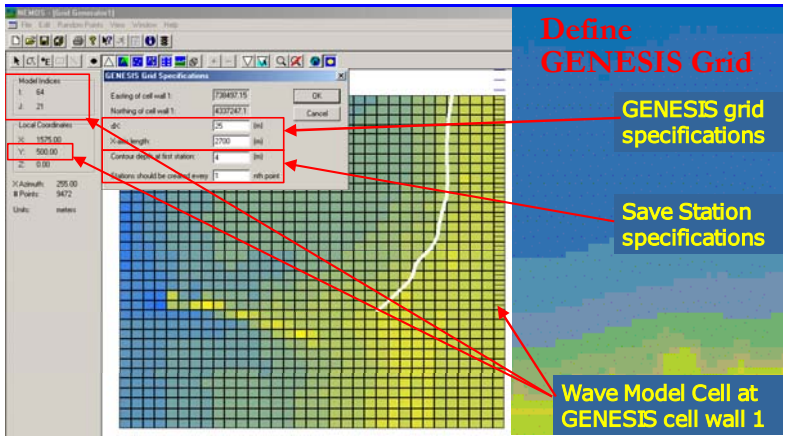


Wave Model Grid Generation (GRIDGEN)

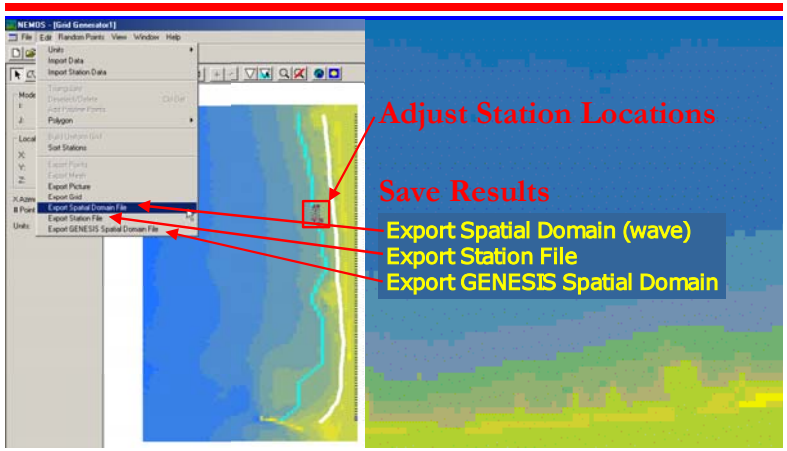
Triangulate / Import Shoreline data (X,Y) / Build Grid



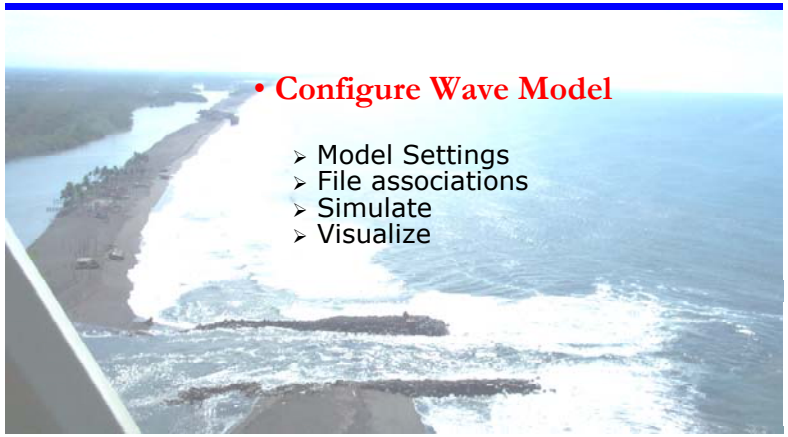
Wave Model Grid Generation (GRIDGEN)



Wave Model Grid Generation (GRIDGEN)

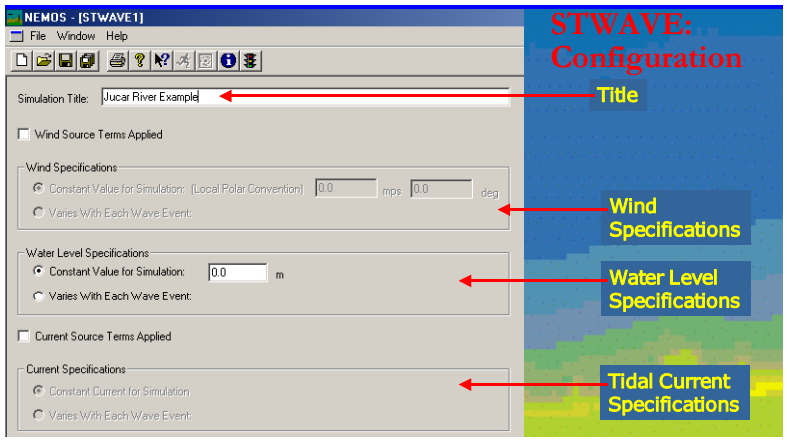


Procedures for Shoreline Change Modeling

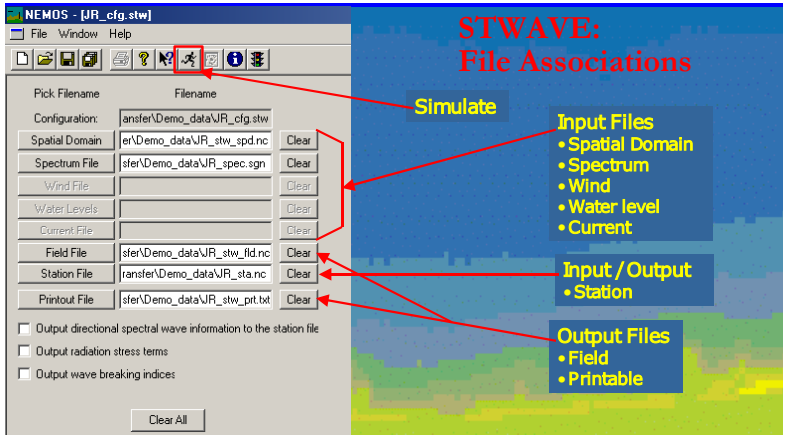


- **Configure Wave Model**
  - Model Settings
  - File associations
  - Simulate
  - Visualize

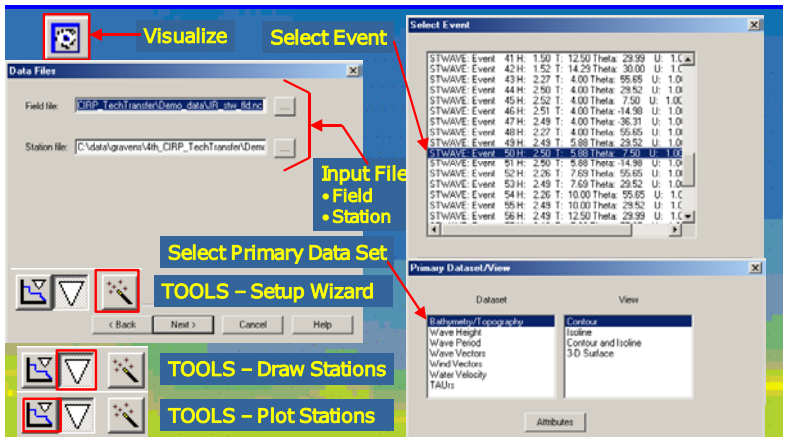
STWAVE



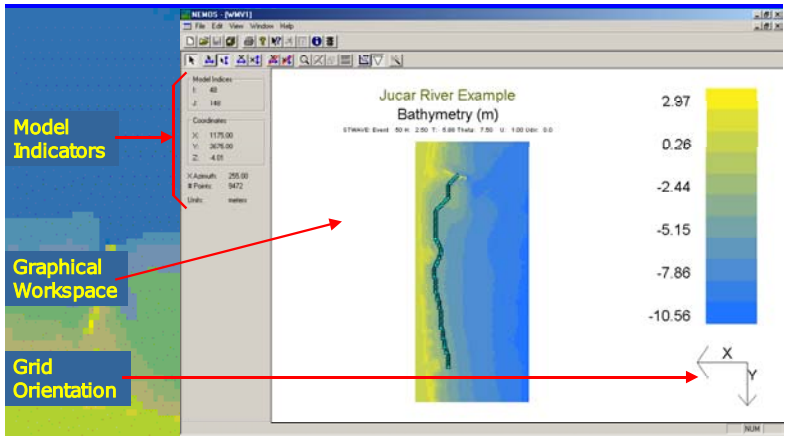
STWAVE



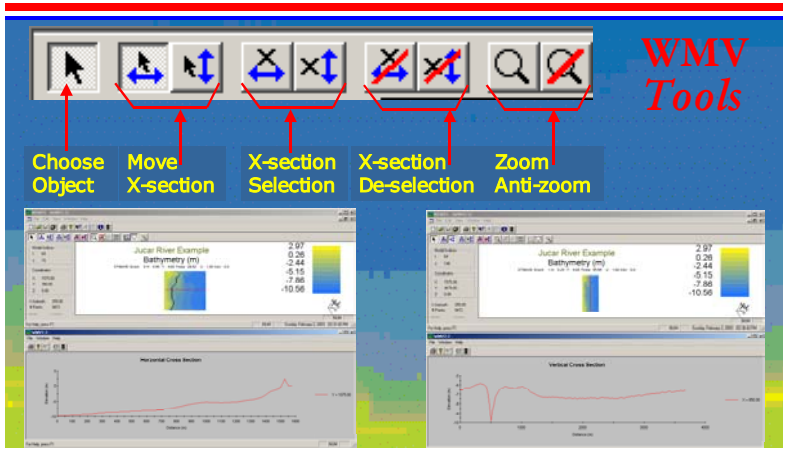
Wave Model Visualization (WMV)



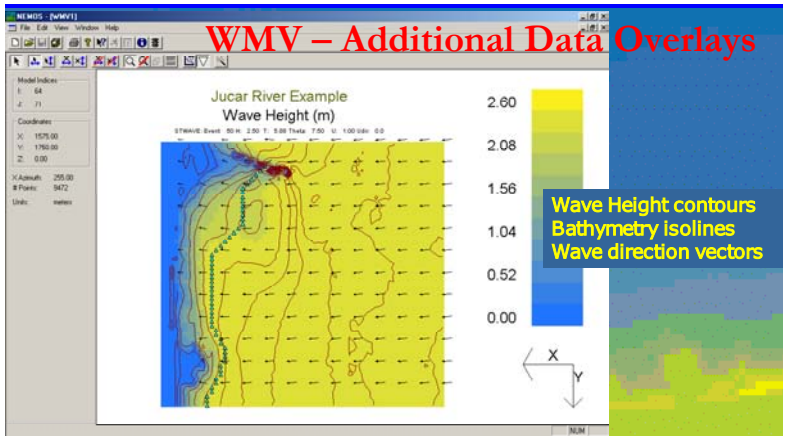
Wave Model Visualization (WMV)



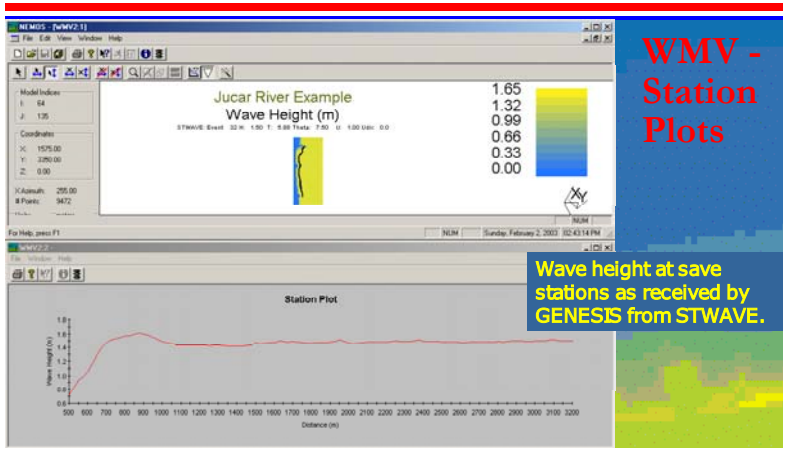
Wave Model Visualization (WMV)



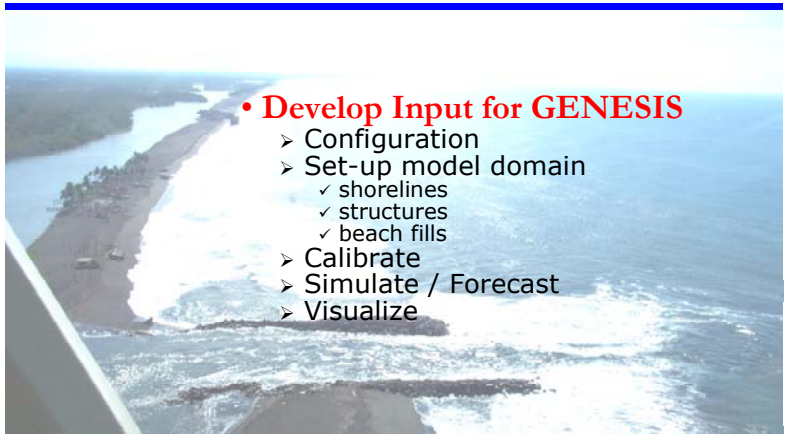
Wave Model Visualization (WMV)



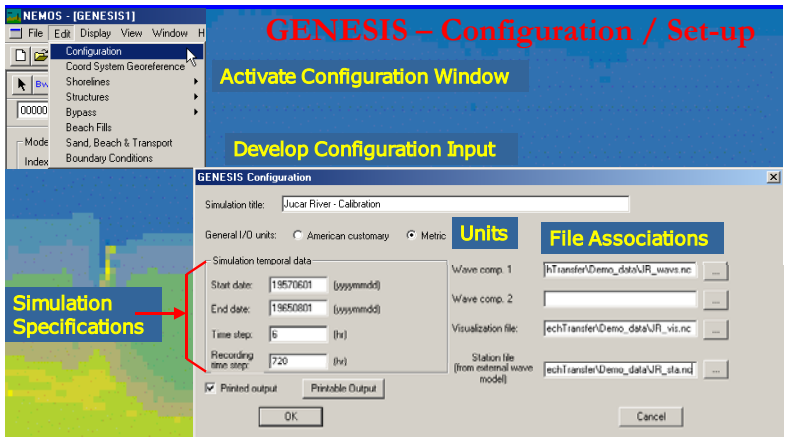
Wave Model Visualization (WMV)



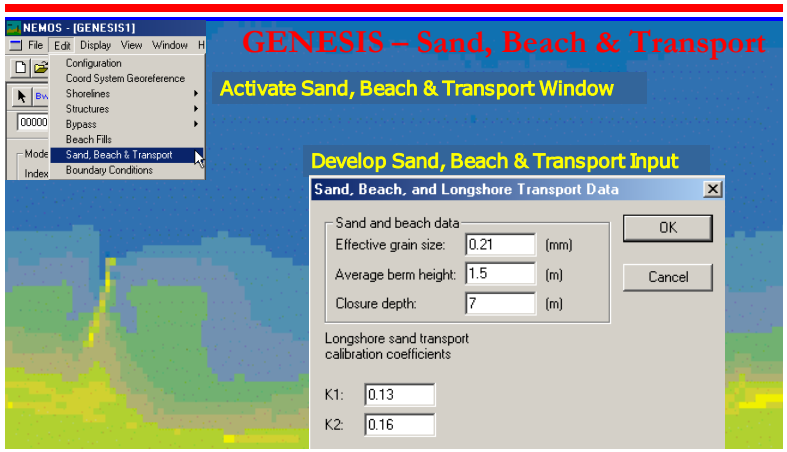
Procedures for Shoreline Change Modeling



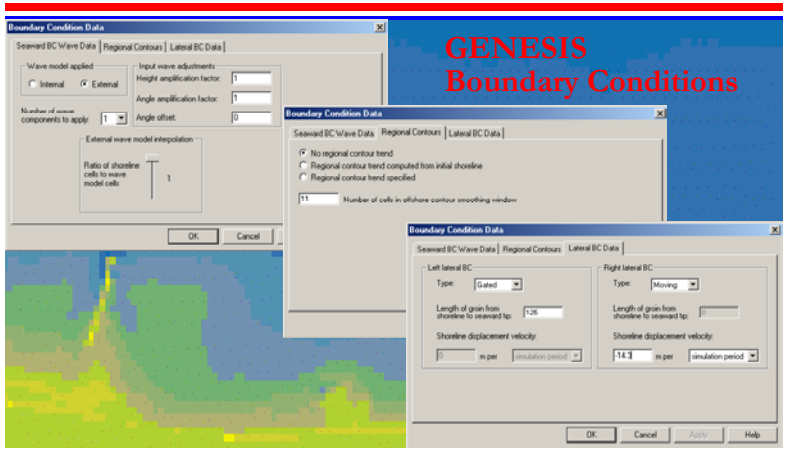
GENESIS



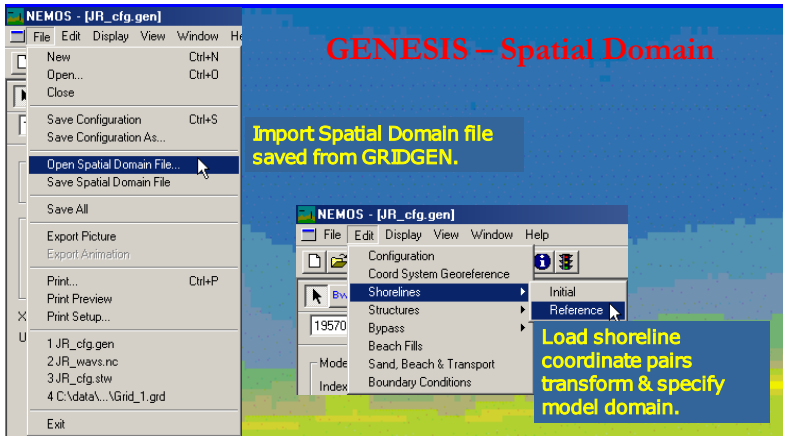
GENESIS



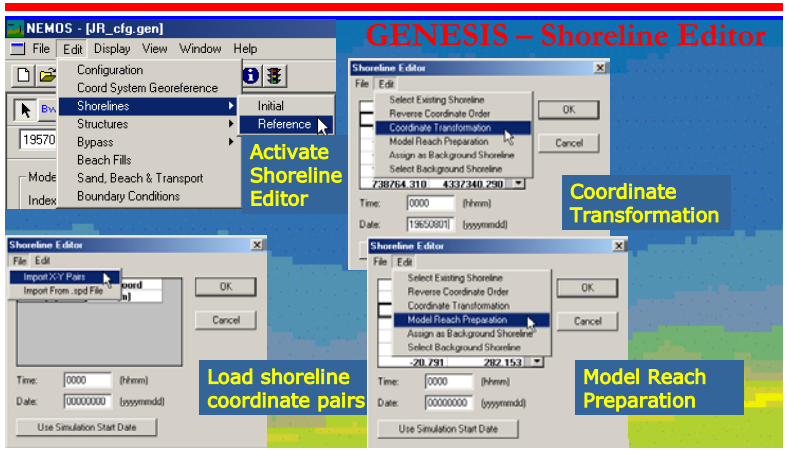
GENESIS



GENESIS



GENESIS



GENESIS

Setting the GENESIS Origin: Shoreline data transformation (the manual procedure)

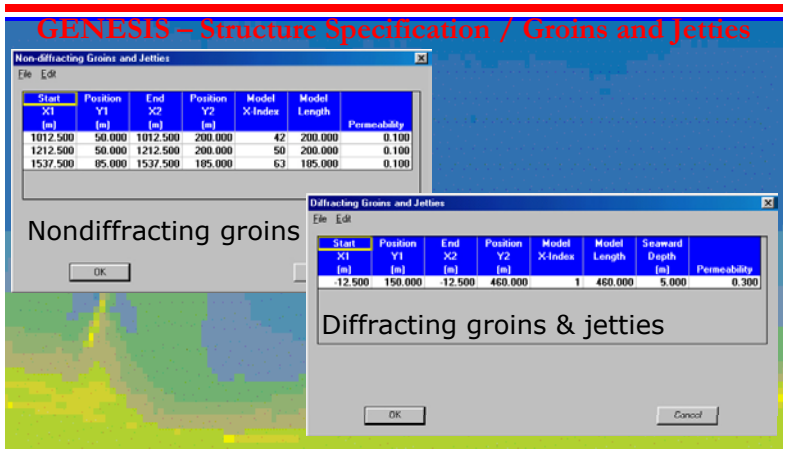
1. The coordinates of the target GENESIS origin are E: 738497.152, N: 4337247.181
2. The 1st point inside the GENESIS model domain in the 1957 shoreline data set is the 3rd data point, its coordinates are E: 738733.430, N: 4337308.330
3. The delta-E is 236.277, and delta-N is 61.149
4. The distance between the GENESIS origin and the data point is SQRT(61.149**2+236.277**2) = 244.062
5. The angle from due east to the data point is arctan (61.149/236.277)= 14.510 deg, the angle from due east to the GENESIS Y-axis is 15 deg.

GENESIS

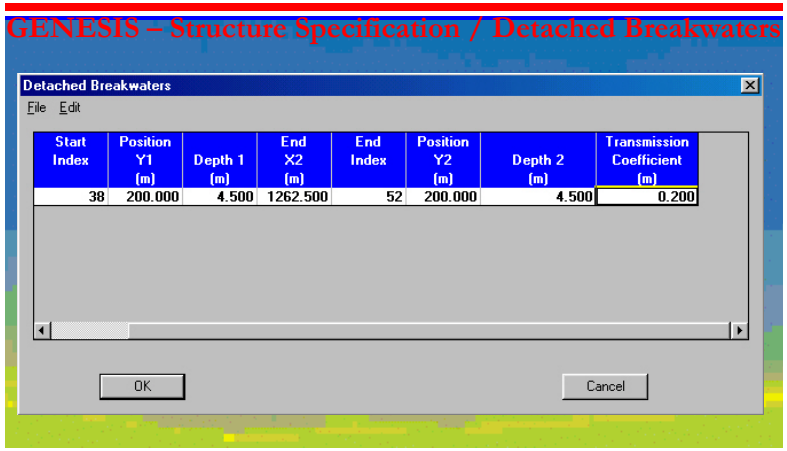
Setting the GENESIS Origin: Shoreline data transformation (the manual procedure)

6. The coordinates of the 3rd data point in the GENESIS coordinate system should be
   X_{GEN} = 244.062 * SIN(15-14.510) = 2.088
   Y_{GEN} = 244.062 * COS(15-14.510) = 244.053
7. Rotate the shoreline data into the GENESIS system orientation without translation of the origin. The coordinates of the second data point are E: -3998317.821, W: 1836144.120
8. The required translations are:
   X_T = 3998317.821 + 2.088 = 3998319.909
   Y_T = 244.053 – 1836144.120 = -1835900.067
9. Rotate the shoreline data into the GENESIS system orientation using the calculated translations, check origin.

GENESIS



GENESIS



GENESIS

GENESIS – Structure Specification / Complex Structures

Complex Structures (T-groins, L-groins, etc.) are specified via a combination of *diffracting* groins and *detached breakwaters*. Diffracting groins and detached breakwaters comprising complex structures must connect at their tips. The water depth and distance from the X-axis (model length) must be identical at the connection of the diffracting structures.

GENESIS

GENESIS – Structure Specification / Seawalls

Seawalls

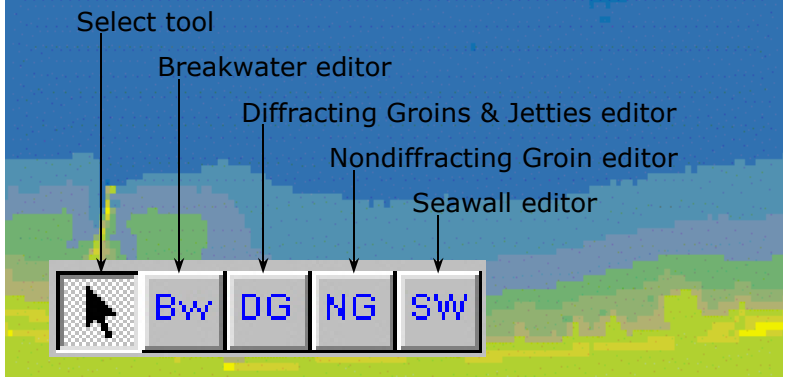
File Edit

Start X1 (m)	Start Index	Position Y1 (m)	End X2 (m)	End Index	End Y2 (m)
0.000	1	232.086	25.000	2	203.635
25.000	2	203.635	50.000	3	183.312
50.000	3	183.312	75.000	4	168.070
75.000	4	168.070	100.000	5	151.812
100.000	5	151.812	125.000	6	132.505
125.000	6	132.505	150.000	7	115.231
150.000	7	115.231	175.000	8	98.972
175.000	8	98.972	200.000	9	87.795

OK Cancel

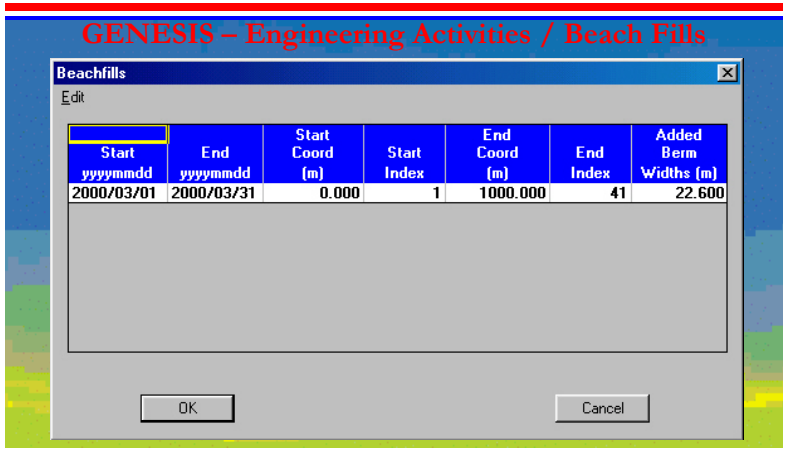
GENESIS

GENESIS – Structures / Graphical Specification



GENESIS

GENESIS – Engineering Activities / Beach Fills



Start yyyymmdd	End yyyymmdd	Start Coord (m)	Start Index	End Coord (m)	End Index	Added Berm Widths (m)
2000/03/01	2000/03/31	0.000	1	1000.000	41	22.600

GENESIS

GENESIS – Engineering Activities / Bypassing (uniform distribution)

Uniform Bypassing Distribution

Edit

Start yyyymmdd	End yyyymmdd	Start Coord (m)	Start Index	End Coord (m)	End Index	Total Bypassing Rate m³/hr
2000/10/01	2001/03/31	750.000	31	750.000	31	6.870
2000/10/01	2001/03/31	1000.000	41	1000.000	41	6.870
2001/10/01	2002/03/31	750.000	31	750.000	31	6.870
2001/10/01	2002/03/31	1000.000	41	1000.000	41	6.870
2002/10/01	2003/03/31	750.000	31	750.000	31	6.870
2002/10/01	2003/03/31	1000.000	41	1000.000	41	6.870
2003/10/01	2004/03/31	750.000	31	750.000	31	6.870
2003/10/01	2004/03/31	1000.000	41	1000.000	41	6.870

OK Cancel

GENESIS

GENESIS – Engineering Activities / Bypassing (non-uniform distribution)

Non-Uniform Bypassing Distribution

yyyymmdd

Start date: 19830521

End date: 19870930

Number of bypassing intervals: 2 Change

Start End

Index 58 61 Change

Coord 1425 1500 Change

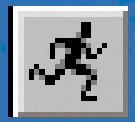
Start yyyymmdd	End yyyymmdd	Coord	Index	Bypassing Rate 1 (m³/m/hr)	Bypassing Rate 2 (m³/m/hr)
1983/05/21	1985/10/15	1425.000	58	0.035	
		1450.000	59	0.050	
		1475.000	60	0.065	
		1500.000	61	0.080	
1986/04/28	1987/09/30	1425.000	58		0.060
		1450.000	59		0.090
		1475.000	60		0.120
		1500.000	61		0.150

OK Cancel

GENESIS

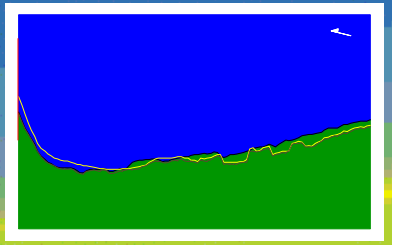
GENESIS – Simulation

- Save *Spatial Domain* file.
- Save *Configuration* file.
- Simulate.



GENESIS – Visualization

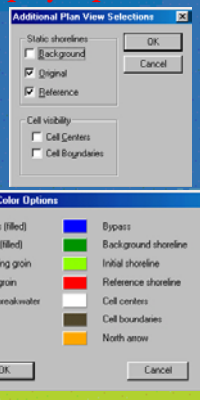
- The graphical workspace can be exported to an enhanced metafile, windows metafile, or a Bitmap file.



GENESIS

GENESIS – Visualization / Display Options

- Additional Plan View Selections
- Plan View Colors
- Undistorted Plan View (toggle)
- Shoreline Comparison Plots
- Xport Rate Plots

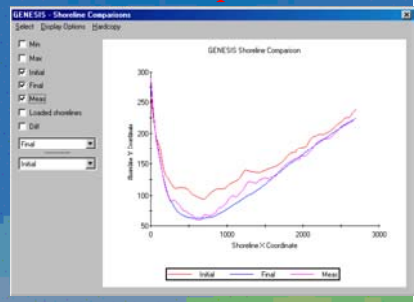


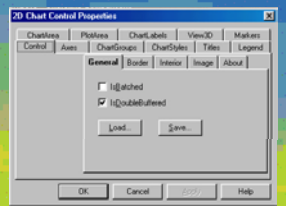
- Animation controls
- Date pull-down
- Simulate control
- Snap to grid indicator
- Zoom tool controls
- Shoreline toggle

GENESIS

GENESIS – Visualization / Shoreline Comparison Plots

- Min (landward-most)
- Max (seaward-most)
- Initial
- Final
- Measured
- Loaded shorelines (animation)
- Diff (shoreline change)
- Shorelines to difference



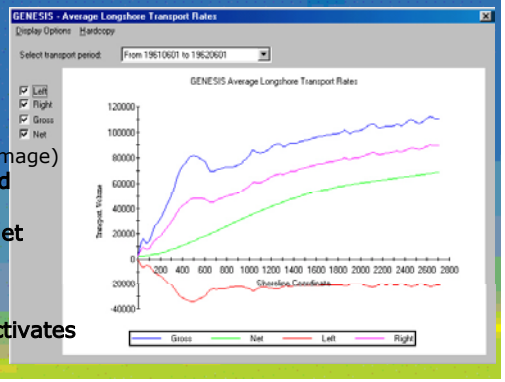


- Right mouse button activates 2D Chart Controls.

GENESIS

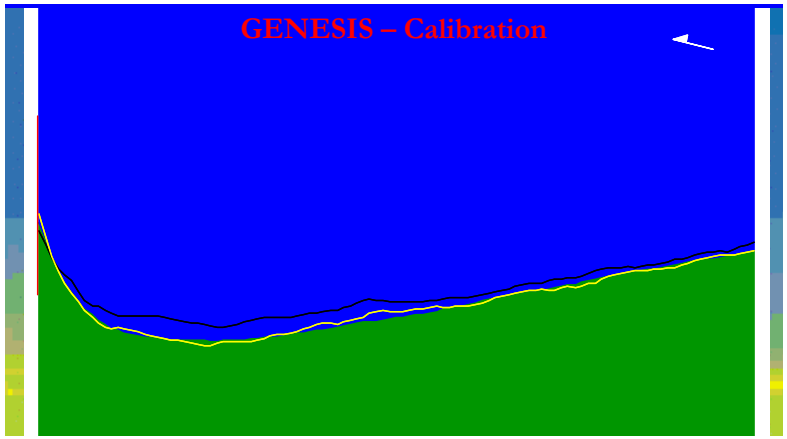
GENESIS – Visualization / Transport Rate Plots

- Display Options
  - (line colors)
- Hardcopy
  - (print or export image)
- Select Transport period
  - (pull-down)
- Right, Left, Gross, & Net
  - (display toggles)



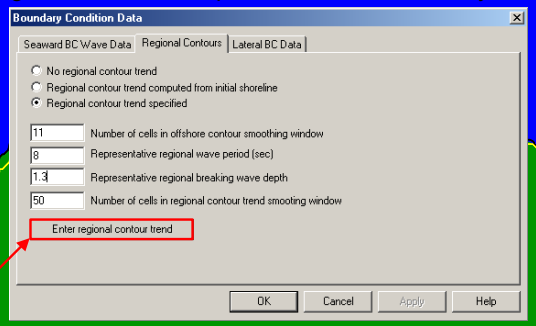
- Right mouse button activates 2D Chart Controls.

GENESIS



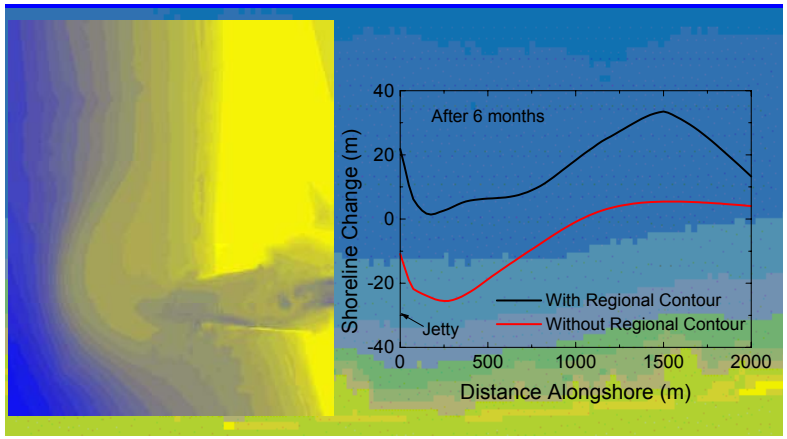
GENESIS/T Regional Contour

- The regional contour is imported at Edit →Boundary Conditions



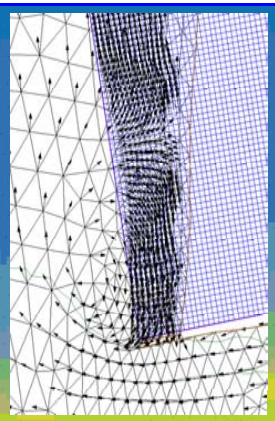
- The "Enter regional contour trend" button invokes the Shoreline Editor for importing regional trend data

GENESIS/T Regional Contour



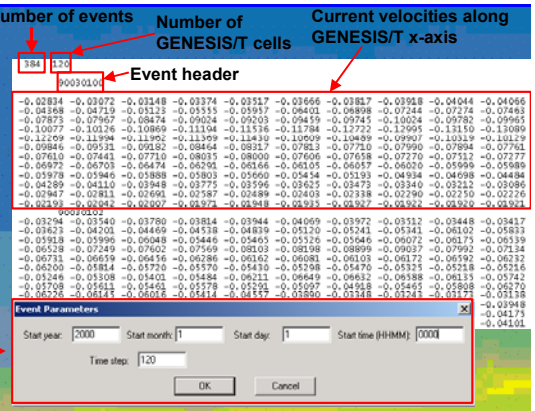
GENESIS/T Tidal Currents

- A time series of tidal current velocities is created externally



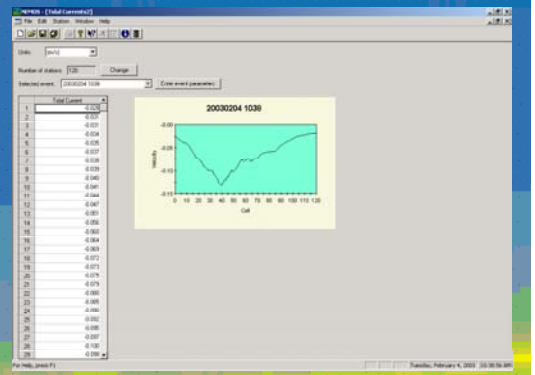
GENESIS/T Tidal Currents

- From within the Tidal Current Editor, a properly formatted ASCII tidal current file is imported at File→Import Data
- Date and time parameters are entered in the Event Parameters dialog box

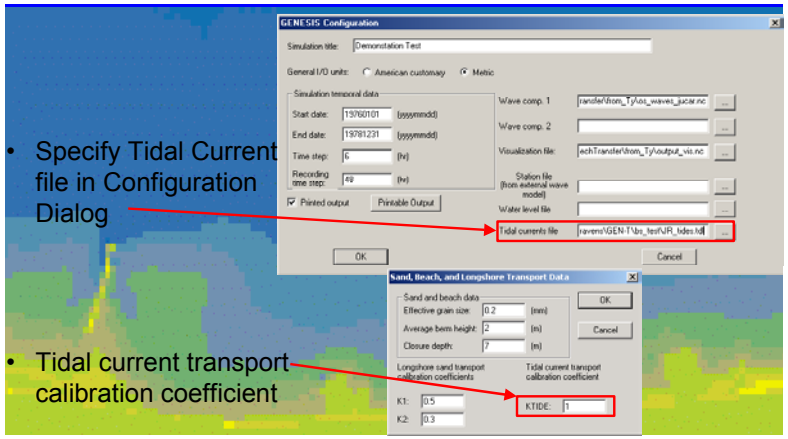


GENESIS/T Tidal Currents

- The tidal current time series events can be visualized with the Tidal Current Editor.
- The time series is saved as a *.tdl file.



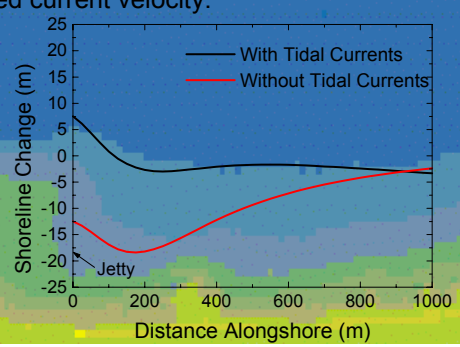
GENESIS/T Tidal Currents



- Specify Tidal Current file in Configuration Dialog
- Tidal current transport calibration coefficient

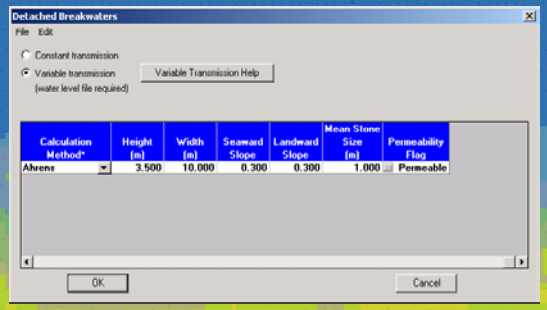
GENESIS/T Tidal Currents

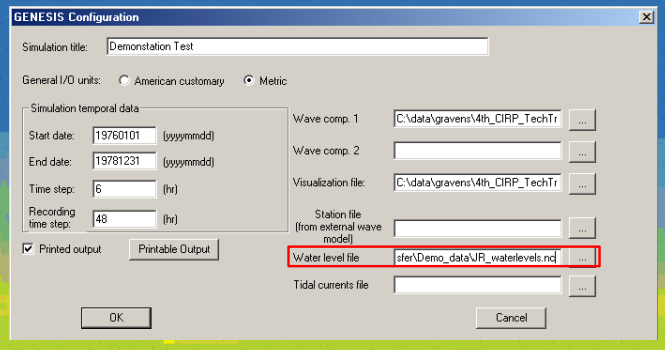
- Shoreline response is calculated by superimposing the imported tidal current velocities on a calculated wave induced current velocity.



GENESIS/T
Variable Transmission

- Variable transmission data is input at:
  Edit →Structures→Detached Breakwaters



GENESIS/T
Variable Transmission

- Variable transmission requires input of a water levels file, specified at the Configuration Dialog