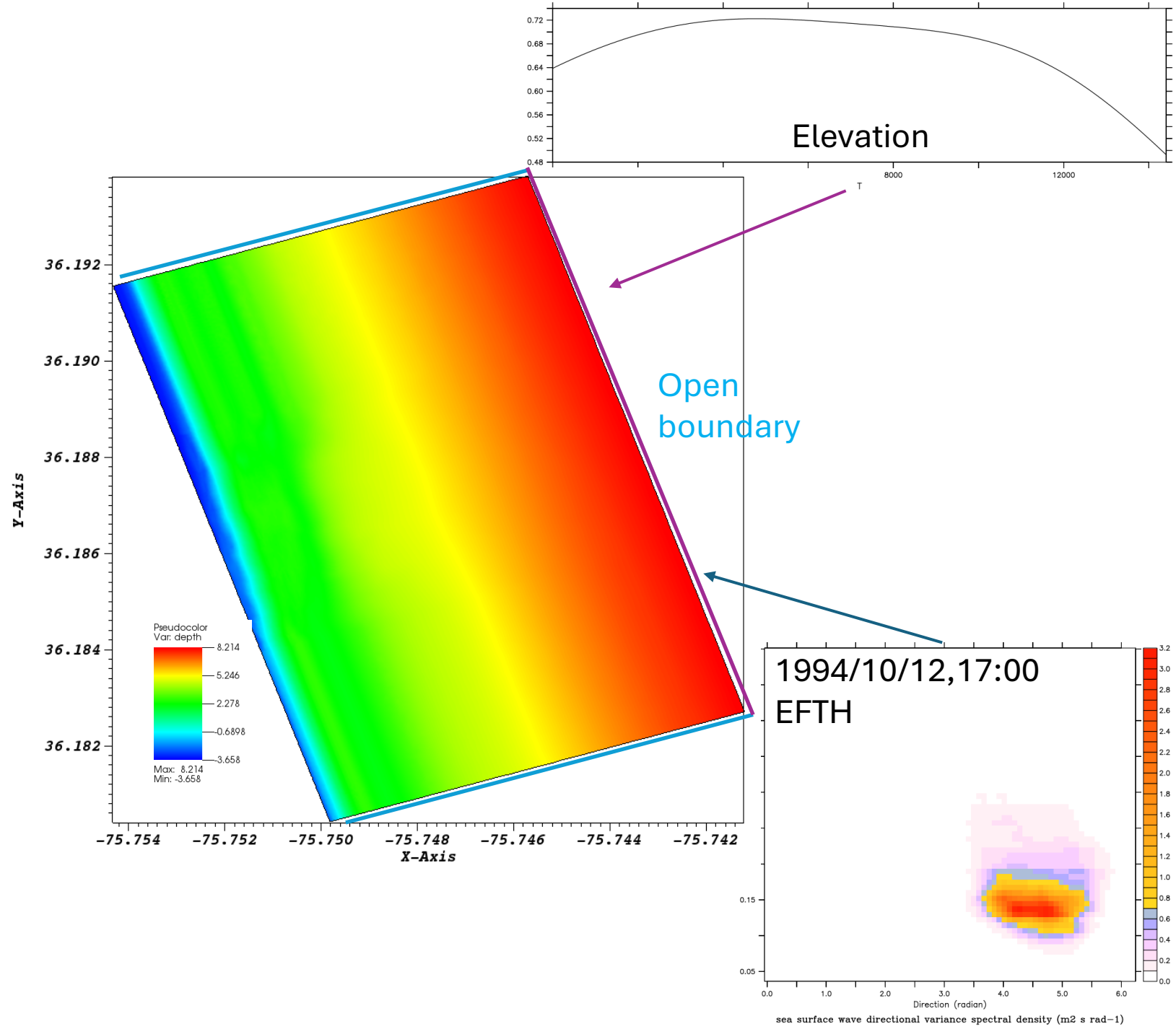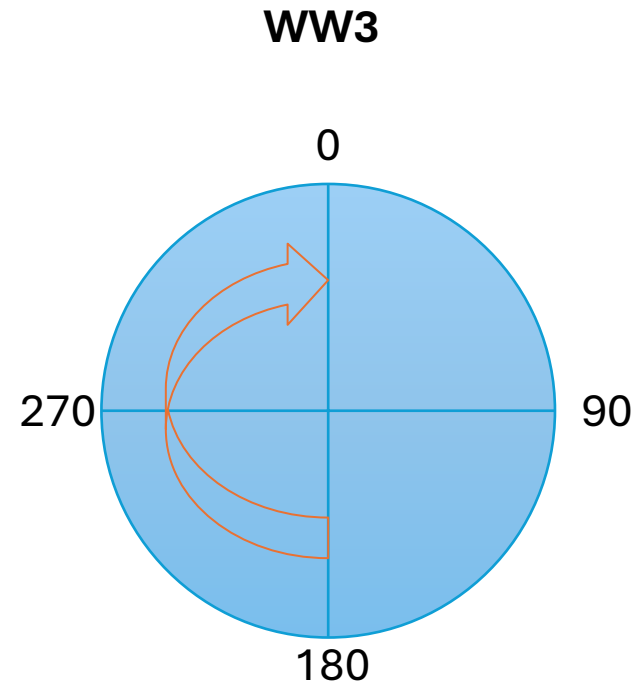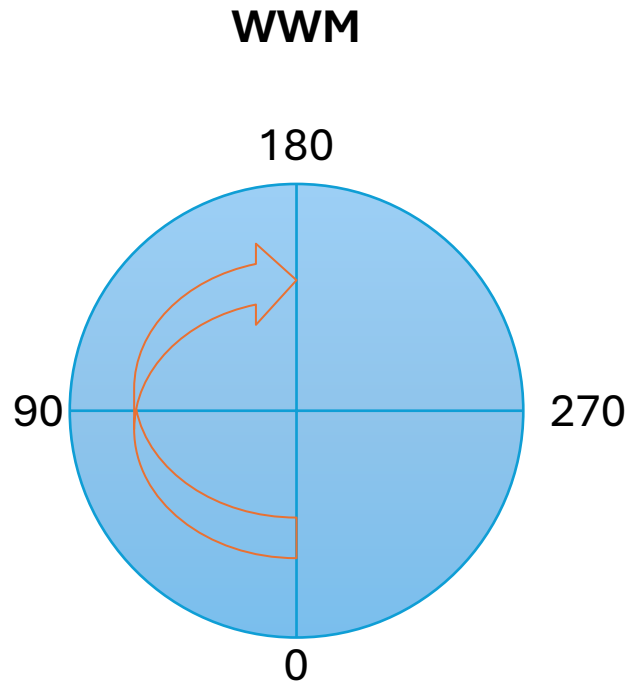# DUCK Test

- Only elevation + wave spectrum density as forcing
  - No ATM (datm) component

- Both SCHISM and WW3 use same mesh

- Period: 1994/10/12, 1700~2100

- Test branch:
  - feature/coastal_app, c9d2936, LON coupling test
    - WW3 switch:
      NCO PDLIB SCOTCH SCRIP SCRIPNC NOGRB DIST MPI PR3 UQ FLX0 SEED ST4 STAB0 NL1 BT1 DB1 MLIM FLD2 TR0 BS0 RWND WNX1 WNT1 CRX1 CRT1 O0 O1 O2 O3 O4 O5 O6 O7 O14 O15 IC0 IS0 REF0
  - feature/schism_3d, 51fc37a, VOR coupling test
    - WW3 switch:
      NCO PDLIB SCOTCH NOGRB DIST MPI PR3 UQ FLX0 SEED ST4 STAB0 NL1 BT4 DB1 MLIM FLD2 TR0 BS0 RWND WNX1 WNT1 CRX1 CRT1 O0 O1 O2 O3 O4 O5 O6 O7 O14 O15 IC0 IS0 REF0

Elevation

Open boundary

Pseudocolor
Var: depth
8.214
5.246
2.278
-0.6898
-3.658
Max: 8.214
Min: -3.658

1994/10/12,17:00
EFTH

sea surface wave directional variance spectral density (m2 s rad−1)

direction definition in input spec nc file

WWM

WW3

- In netcdf file:
  - If direction< 300, assume unit is radian, else will be degree!
  - Direction can be unsorted.
  - The code will sort and do interpolation for you.

- Can read netcdf/ascii file:
  - Direction unit is degree in Netcdf, but radian in Ascii.
  - Direction MUST be sorted.
  - Direction can be shifted with a factor to match larger efth.
    - **Set SPECTRUM%THOFF (value is -0.5~0.5)**
    - **Example: THOFF=0.5, and number of direction=12 (interval=30 degree), 1st degree=15.**

frequency definition in input spec nc file

WWM

- In netcdf file:
  - Frequency is monotonic increasing, usually set as 0.04~0.4 Hz.
  - Code will do interpolation for you.

WW3

- Can read netcdf/ascii file:
  - Frequency is defined with formula.
    - Increment factor: XFR
    - 1st frequency: FREQ1
    - Number of frequencies: NK
  - The code only use 1st & last frequency with "NK" to derive full list.
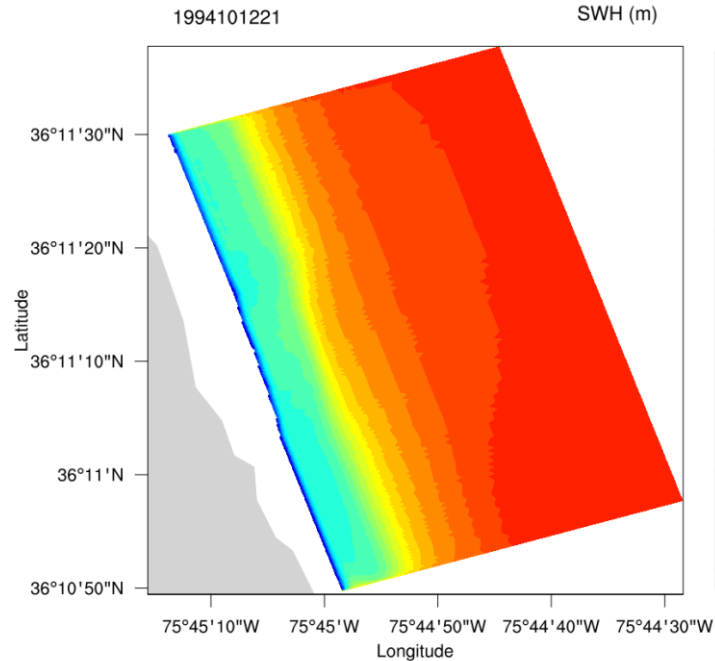
  - **FREQ1 * [XFR^0,XFR^1,XFR^2,…,XFR^{NK-1}].**

Standardalone WW3 result

Max Hs=2.19m
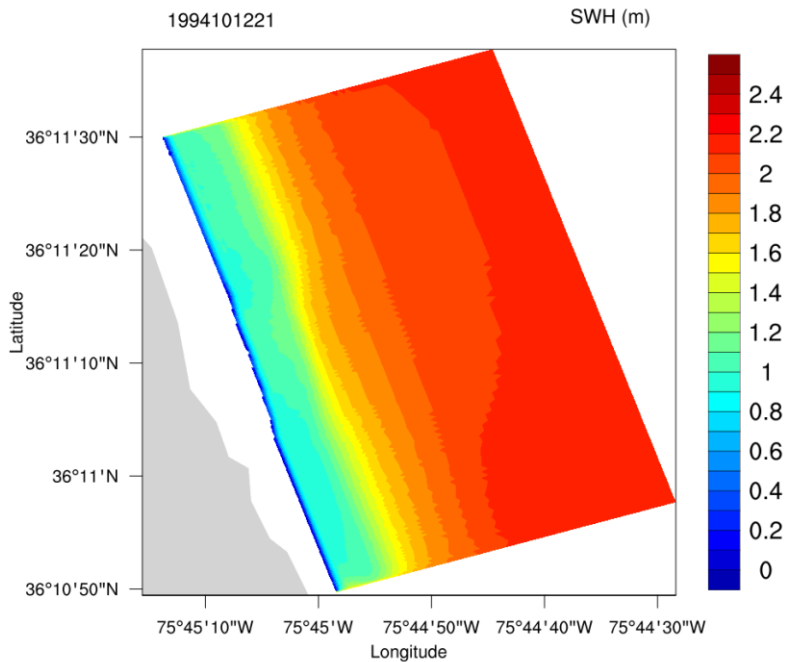
No. of frequency:62
No. of direction:72

Max Hs=2.19m

No. of frequency:62
No. of direction:24
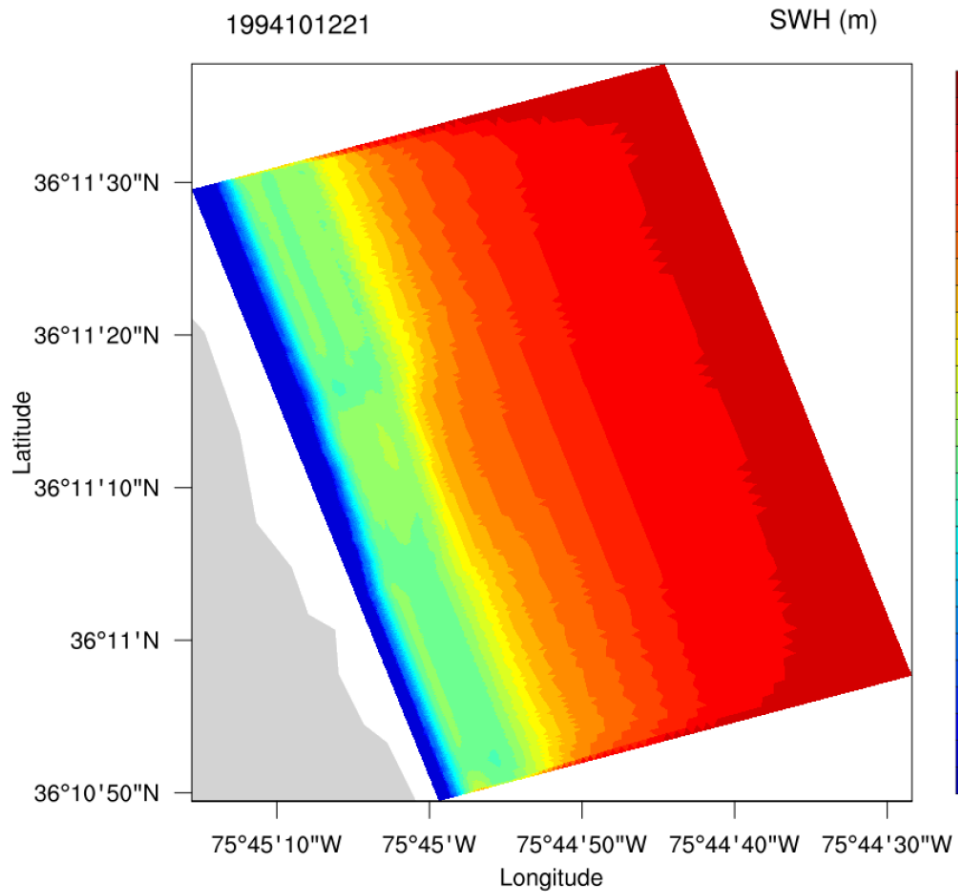Shift degree:7.5 degree

Max Hs=2.19m
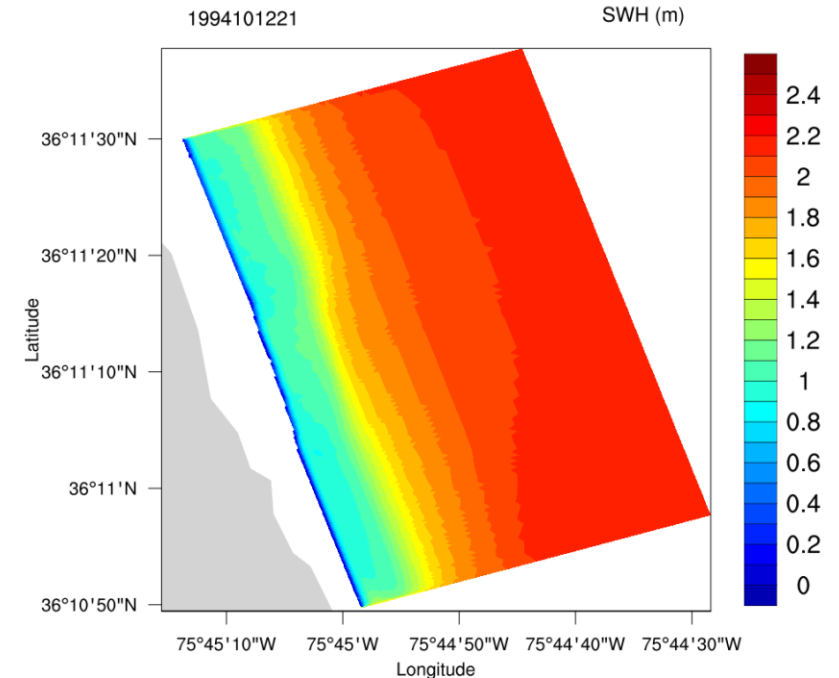
No. of frequency:62
No. of direction:12
Shift degree:15 degree

This setting is chosen in couple test

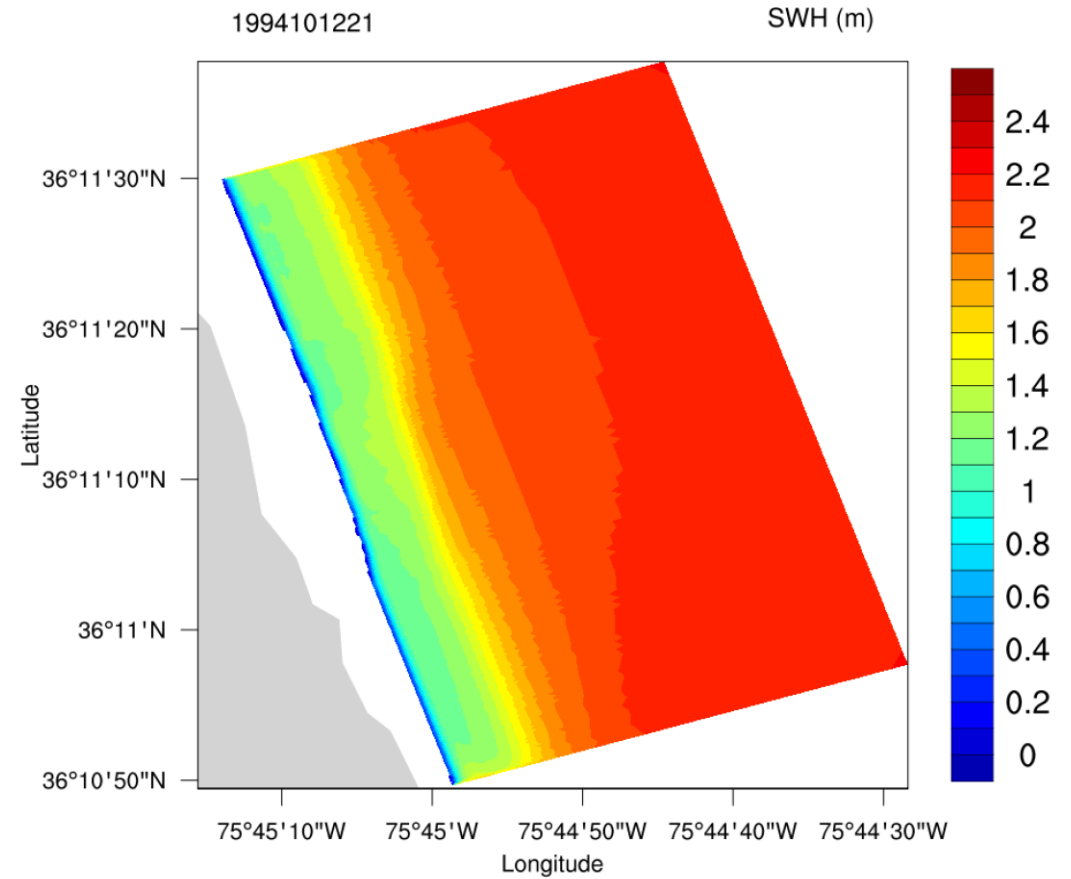(In SCHISM-WWM, both number are set 12.)
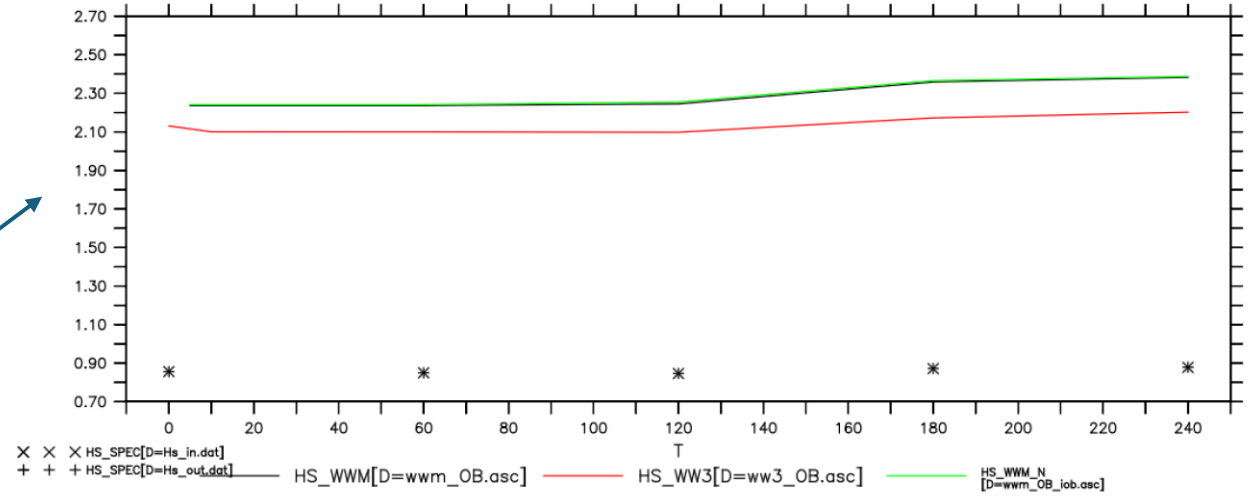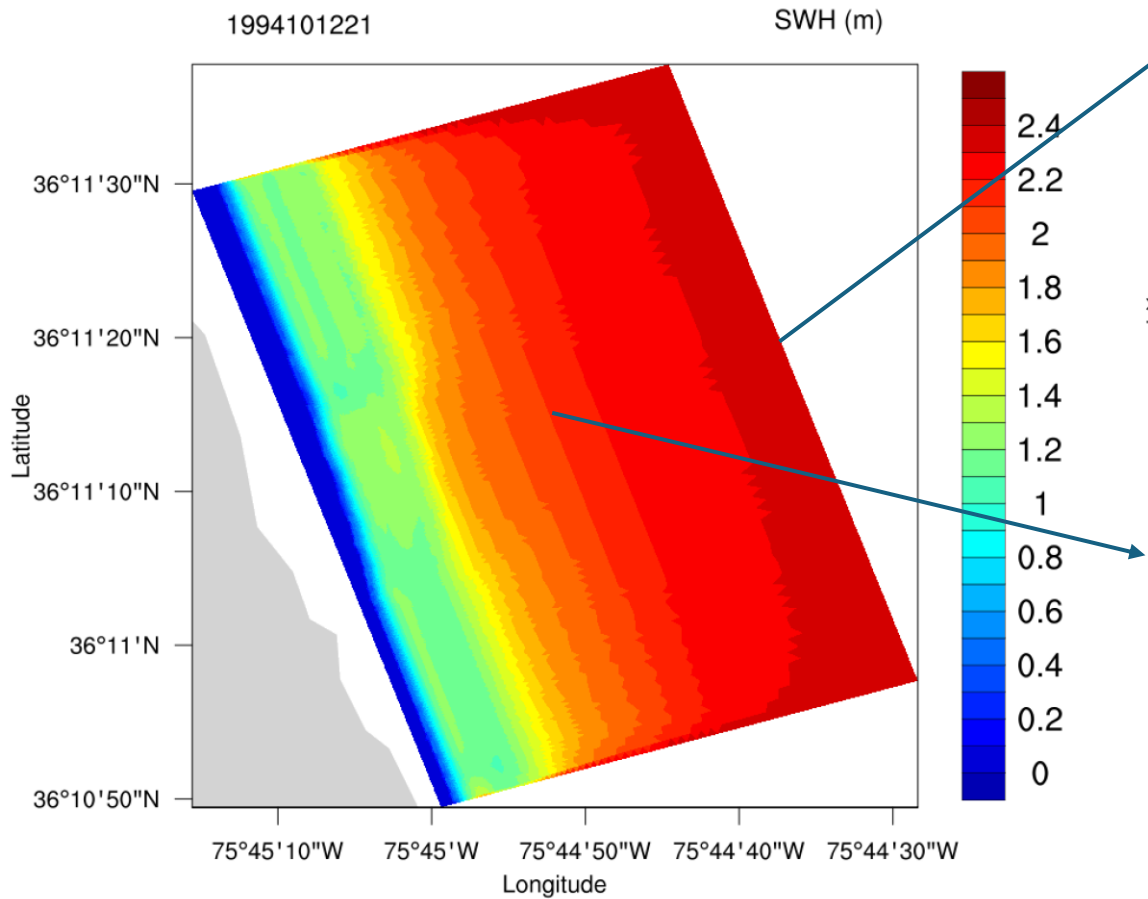
SWH comparison

Max Hs=2.39m

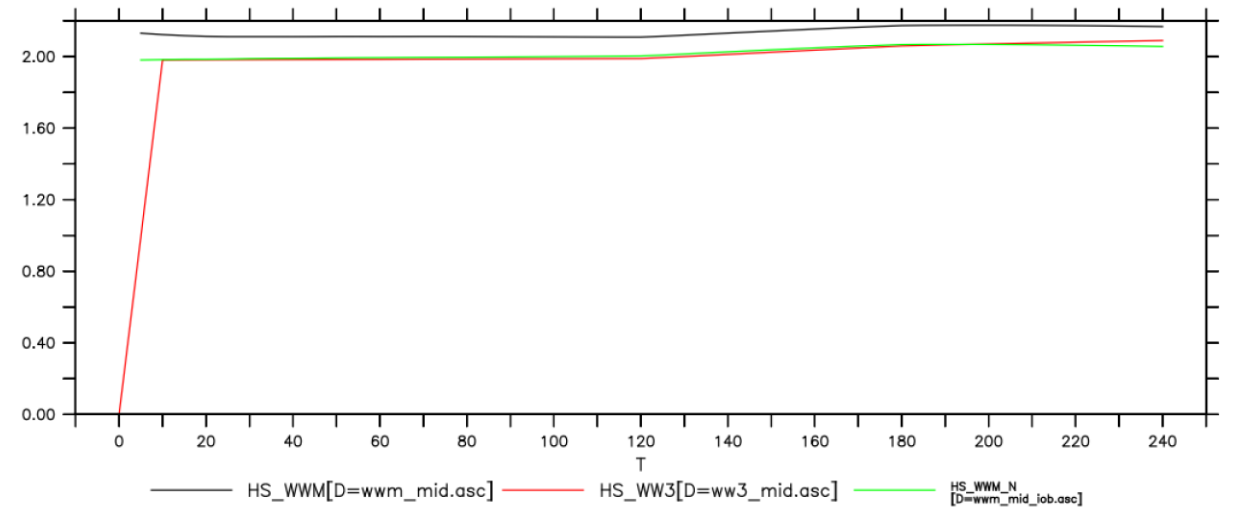SCHISM-WW3 has similar Hs,
Max Hs = 2.20m

SCHISM-WWM
(VOR coupling)

SCHISM-WW3
(VOR coupling)

Hs time series

$$H_s = 4\sqrt{\iint E(f, \theta)\,\mathrm{d}f\,\mathrm{d}\theta},$$
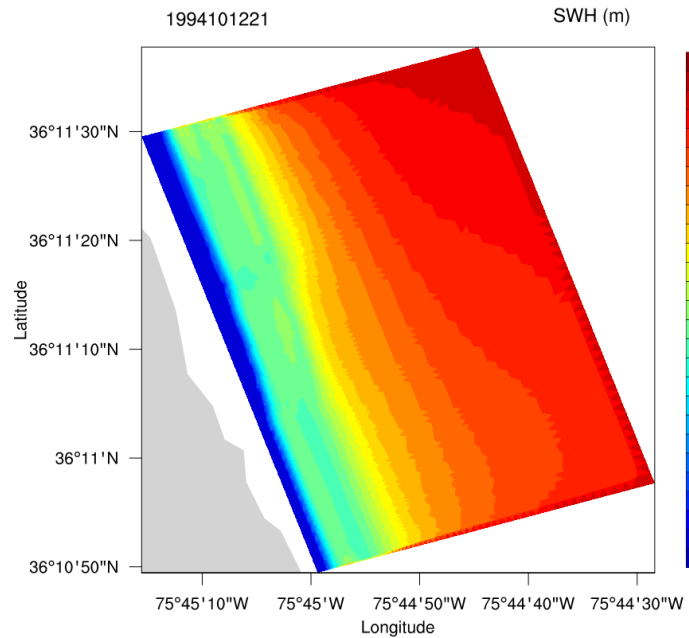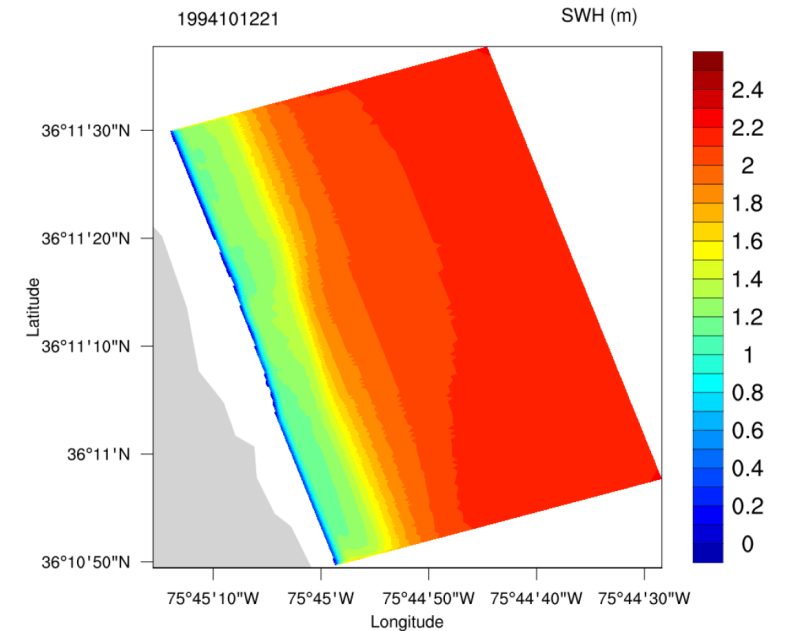
SCHISM-WWM/WW3 with different spec nc
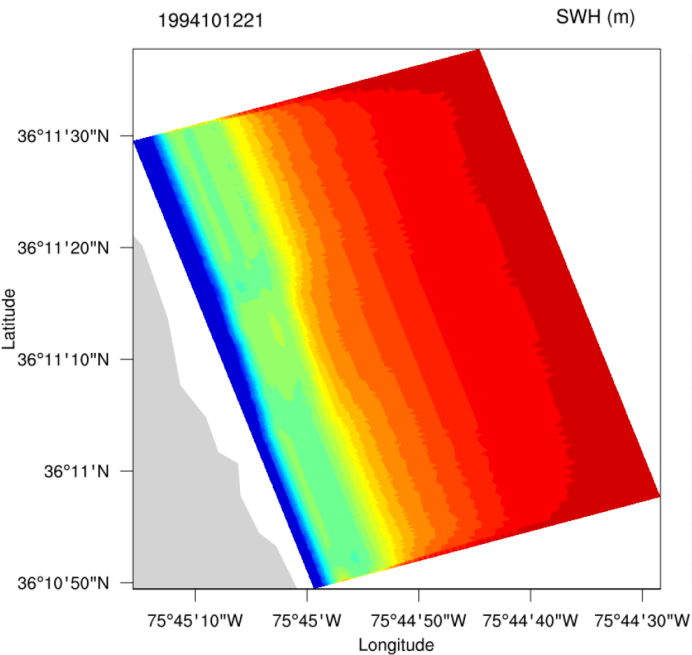
SCHISM-WWM
Original SPEC nc

SCHISM-WWM
Interpolated SPEC nc

SCHISM-WW3
Interpolated SPEC nc