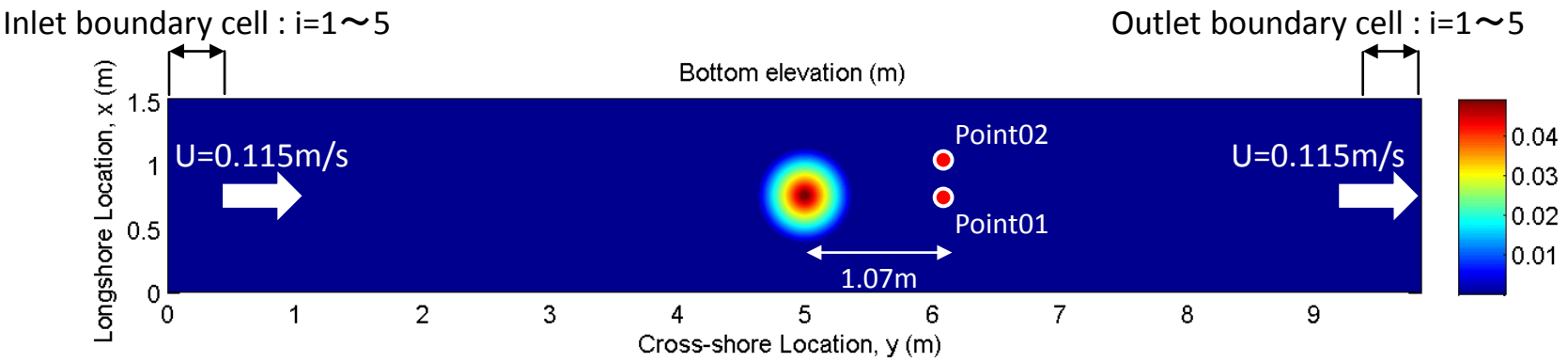
Benchmark01 Calculation Condition

Item	Value	Remarks
Dominant equation	Shallow-water equation (2D) or Navier-Stokes equation (3D)	2D:Using “STOC-ML” 3D:Using “CADMAS-SURF/3D”
Calculation Area	See following figure	
Grid size	dx=dy=0.01m (ML & CADMAS) dz=0.02m (CADMAS)	
Time interval	Auto	Max Limit = 0.005sec
Calculation time	200sec	
Initial water level	0.054m	
Manning n value	0.01 $s/m^{1/3}$	
Boundary condition	Inlet (Left boundary) : U=0.115m/s Side wall : Slip condition Outlet (Light boundary) : U=0.115m/s	Numbers of boundary cell : 5
Turbulent model	on	

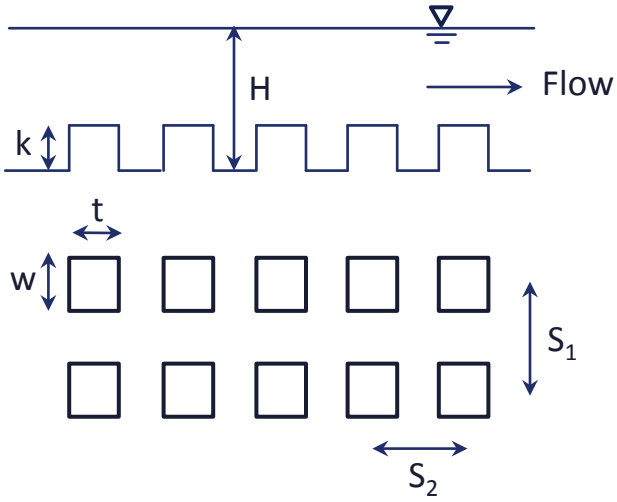


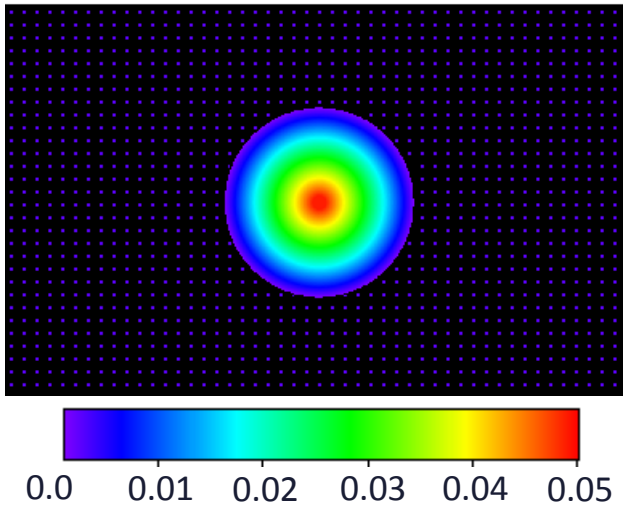
Manning n value

- In the CADMAS-SURF/3D , we can't set Manning n value directly, so we made asperity so that n value is 0.01m/s$^{1/3}$ by using following equation,

$$\frac{R^{1/6}}{n\sqrt{g}} = 10.6\log_{10}\frac{H}{k} + 5.4\log_{10}\frac{S}{F} - 5.47$$

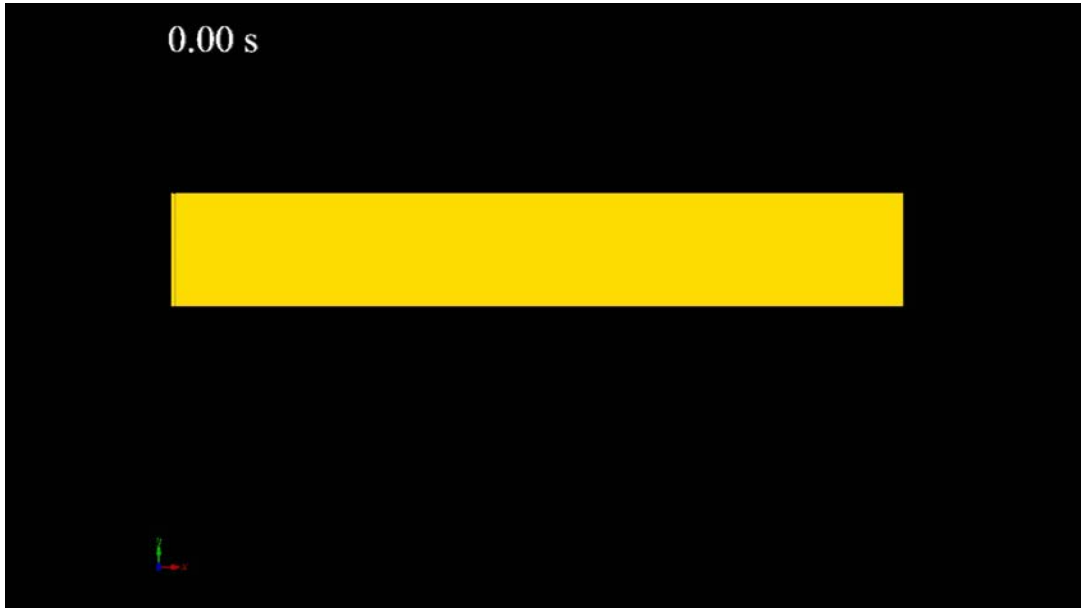
N:Manning value
H:depth from bottom
k:height of asperity
g:grabity acceleration
S:plane area which each asperity take charge of ($S_1 \times S_2$)
F:projected area of each asperity against flow



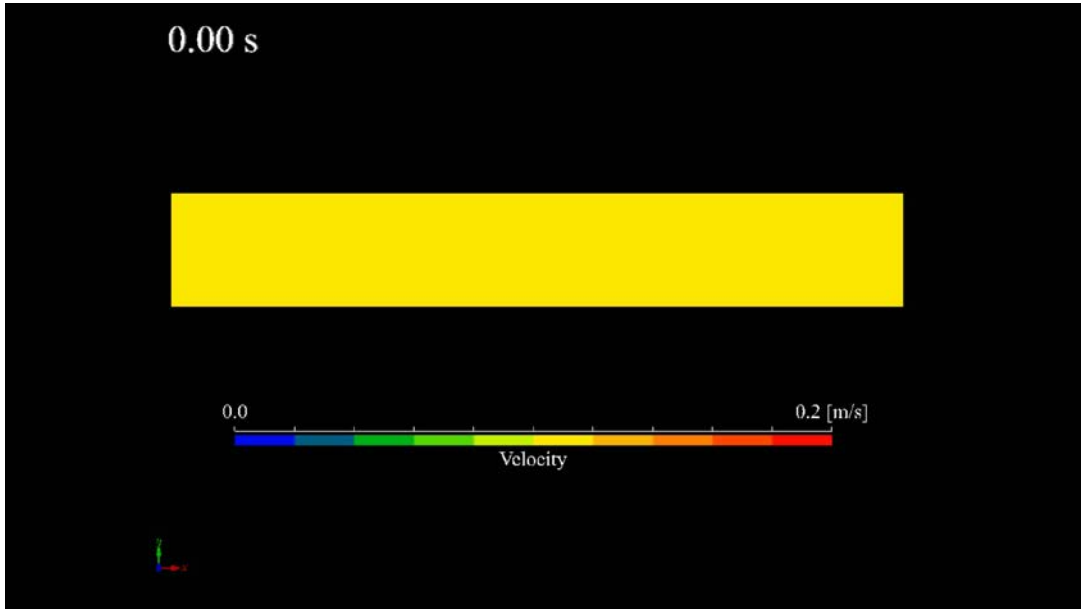


Result

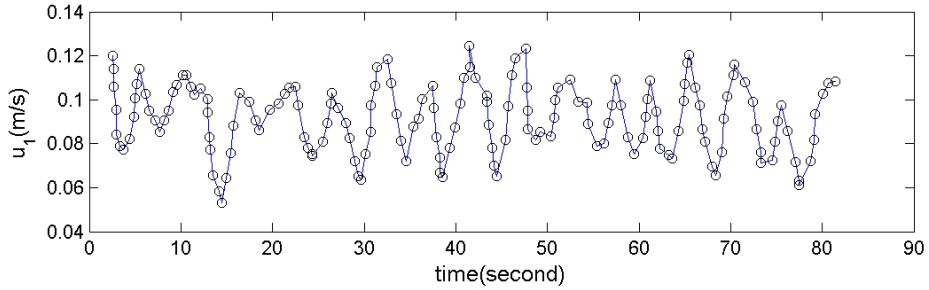
STOC-ML

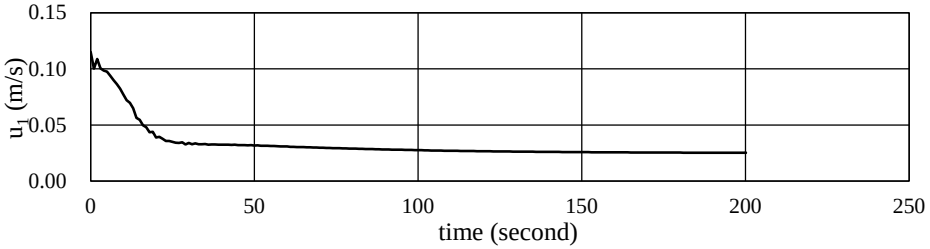


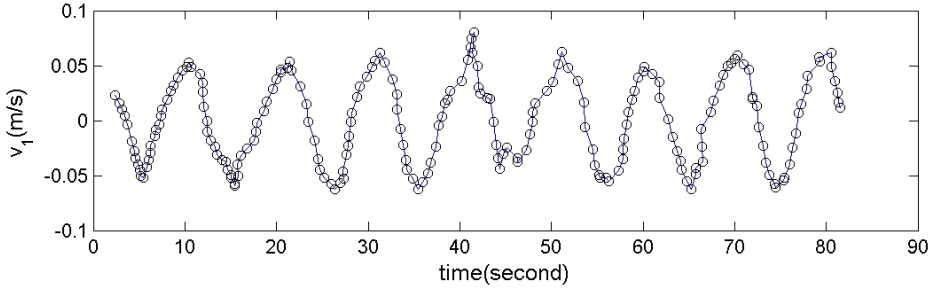
CADMAS-SURF/3D

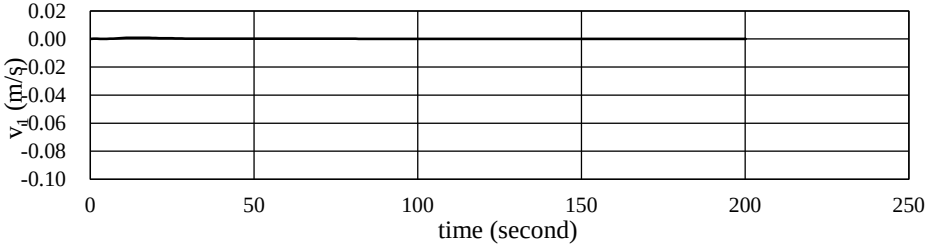


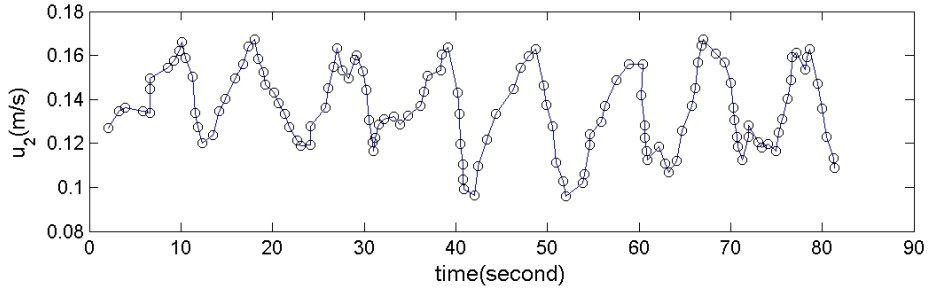
Result STOC-ML

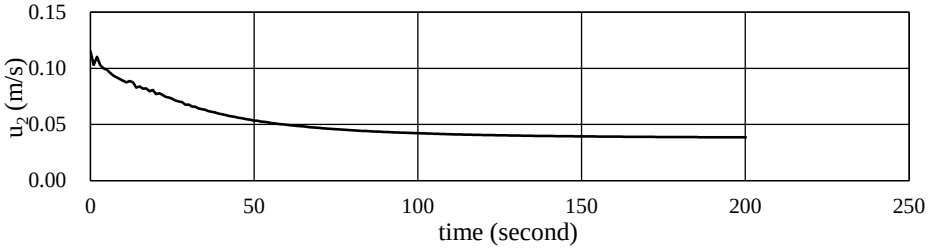


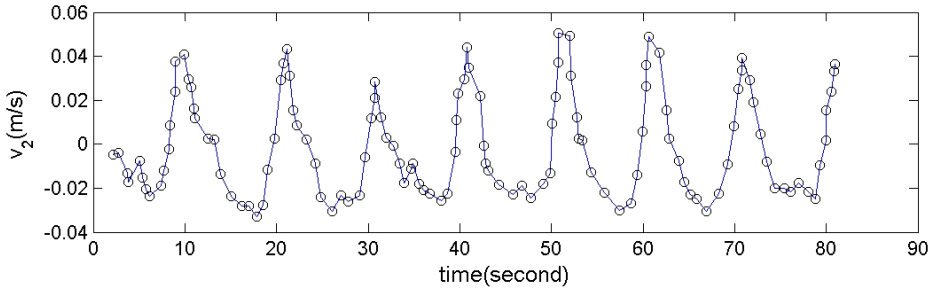


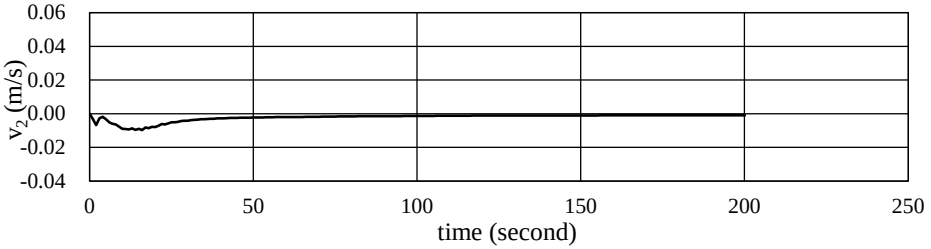




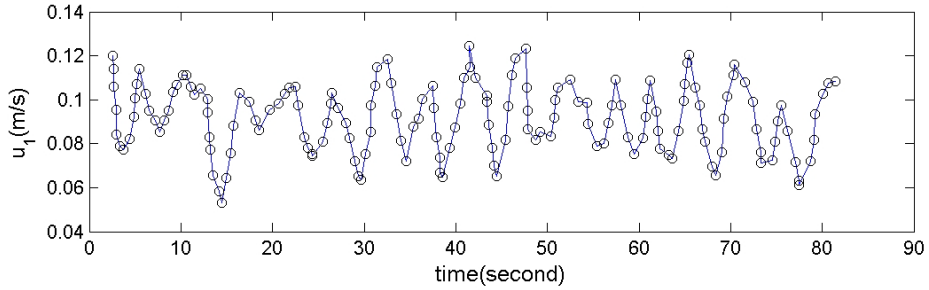


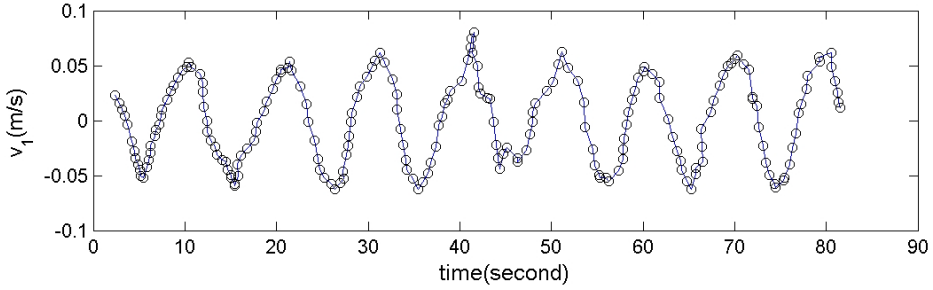


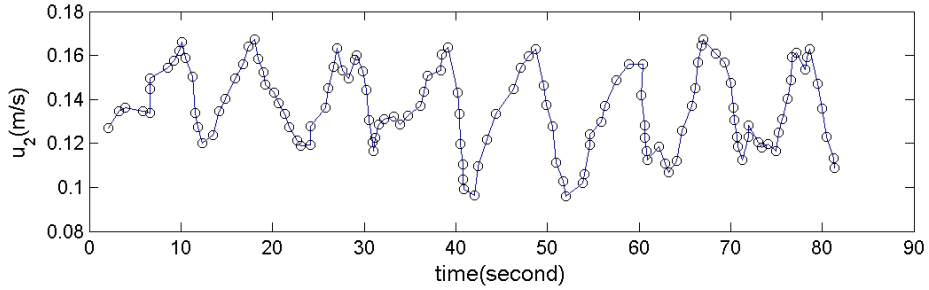


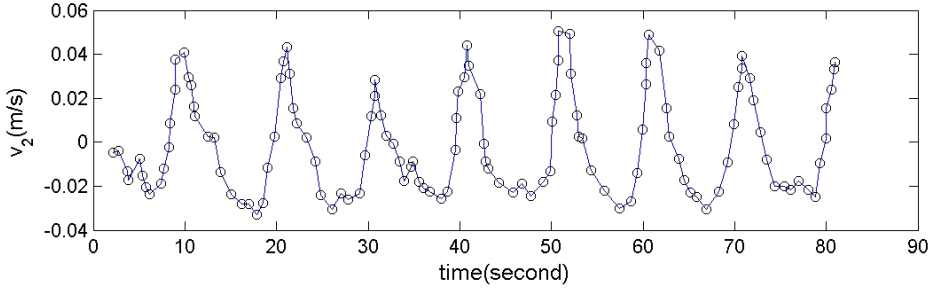


Result CADMAS

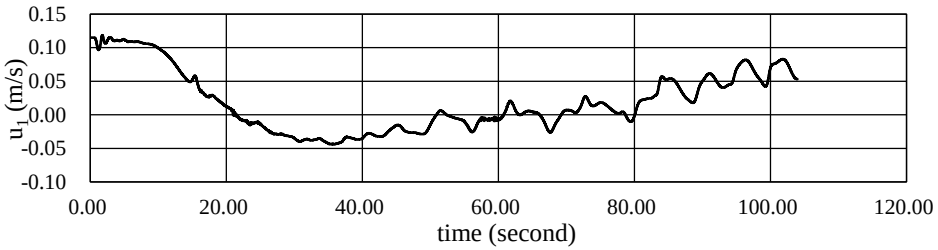


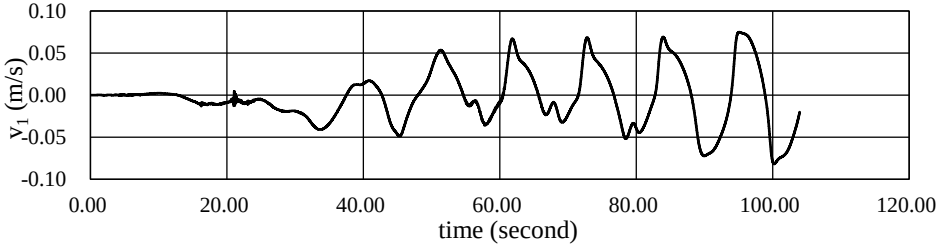


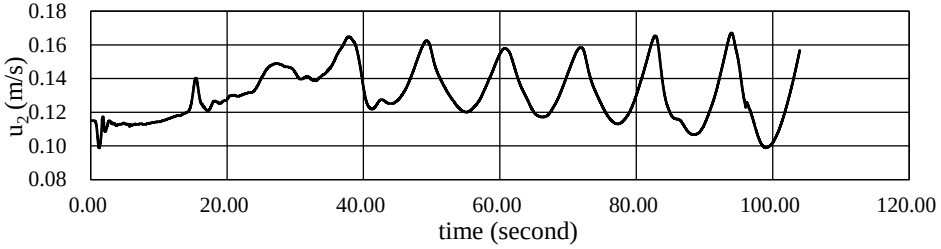


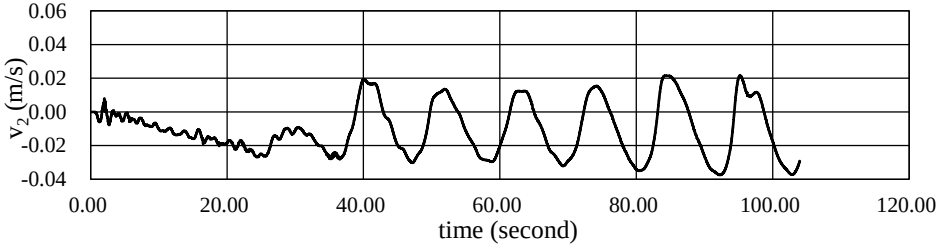


CADMAS-SURF/3D



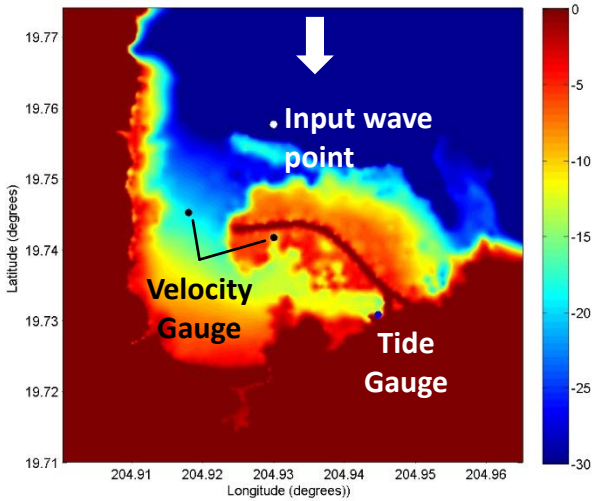


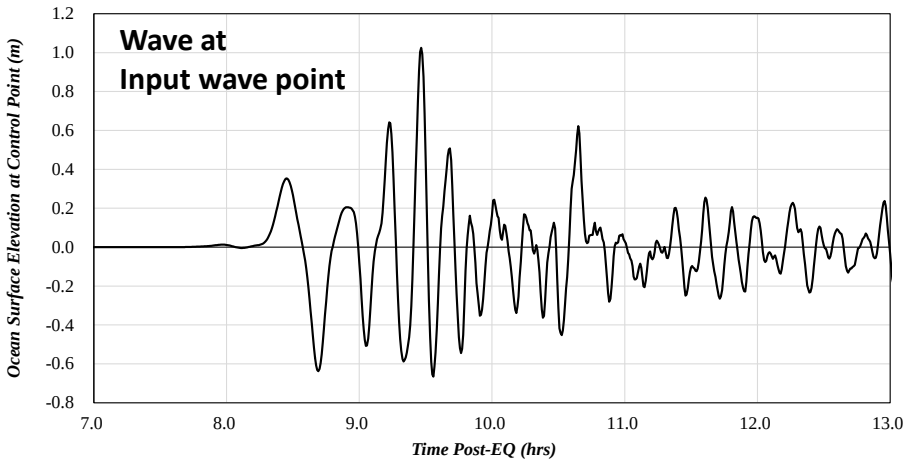




Benchmark02 Calculation Condition

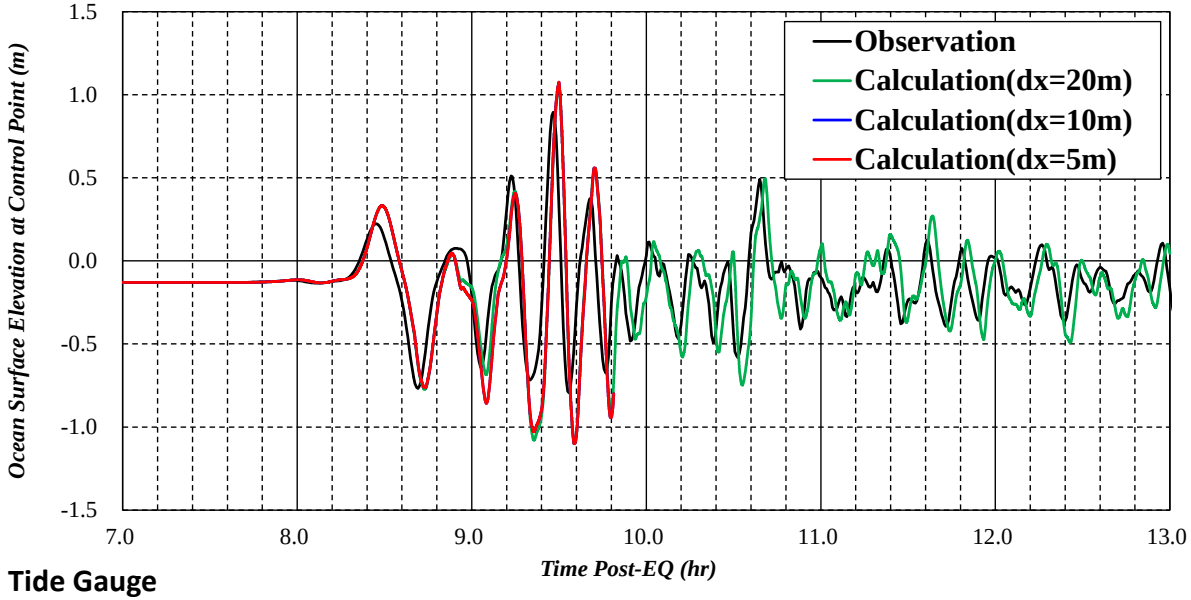
Item	Value	Remarks
Dominant equation	Shallow-water equation (2D)	Using “STOC-ML”
Calculation Area	See previous slide	
Grid size	dx=dy= 20m , 10m , 5m	
Time interval	Auto	Max Limit = 0.05sec
Calculation time	21,600sec	
Initial water level	−0.13m	
Manning n value	0.025 $s/m^{1/3}$	
Boundary condition	North boundary：Inlet wave Other boundaries：Open	
Turbulent model	off	



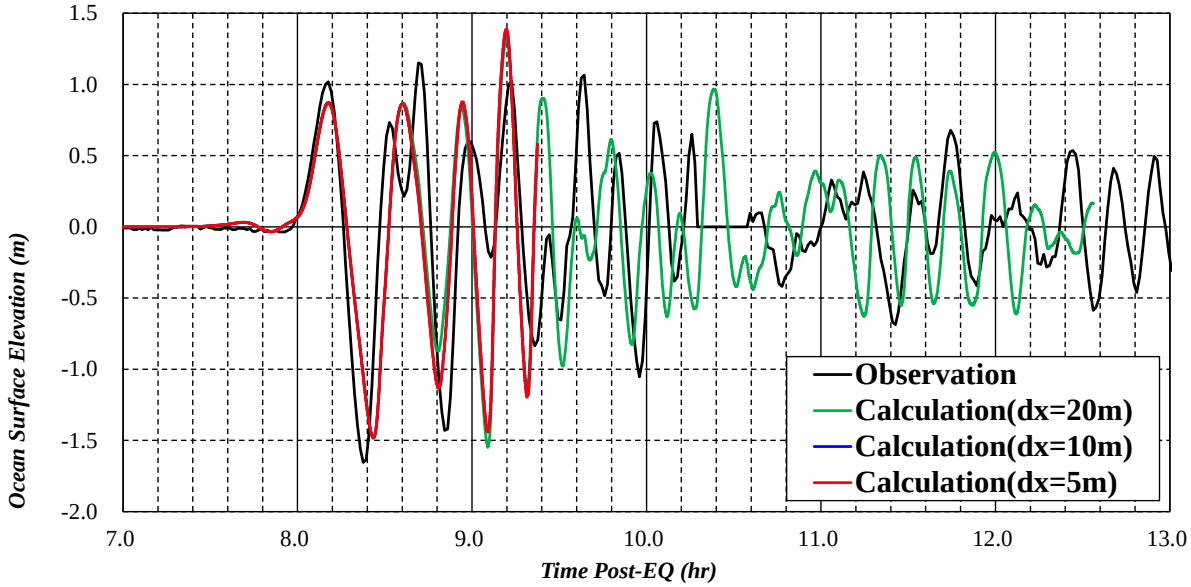


Result (Tide gauge)

Point of Input wave



Tide Gauge

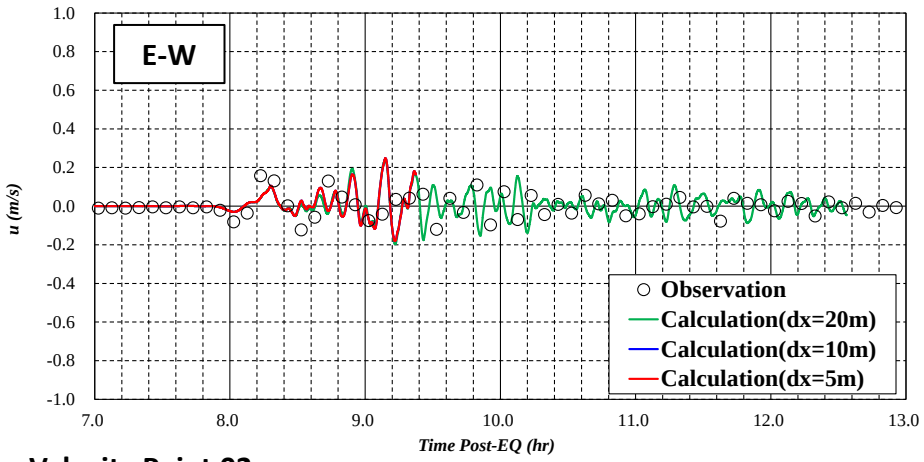


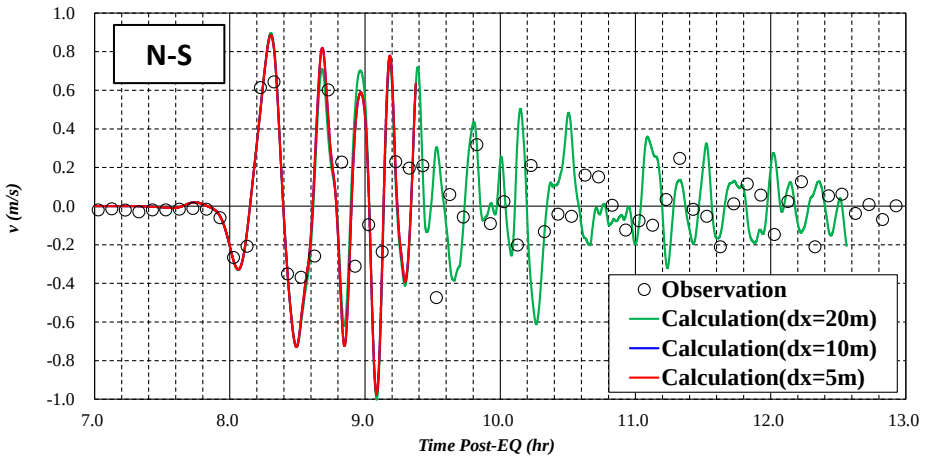
- Calculation result reproduced observation data at some level.
- Accuracy of calculation is less affected by grid size in this case.

Result (Velocity gauge)

- At point01, calculation reproduced N-S direction observation data until 2nd wave at some level.
- At point02, calculation couldn't reproduce observation data.
- Accuracy of calculation is less affected by grid size in this case.

Velocity Point 01





Velocity Point 02