NTHMP - Mapping & Modeling Benchmarking Workshop: Tsunami Currents

9-10 February 2015

Benchmark Problem #4
Single long-period wave propagating onto a small-scale model of the town of Seaside, Oregon

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Methodology used in modeling benchmark problem 4

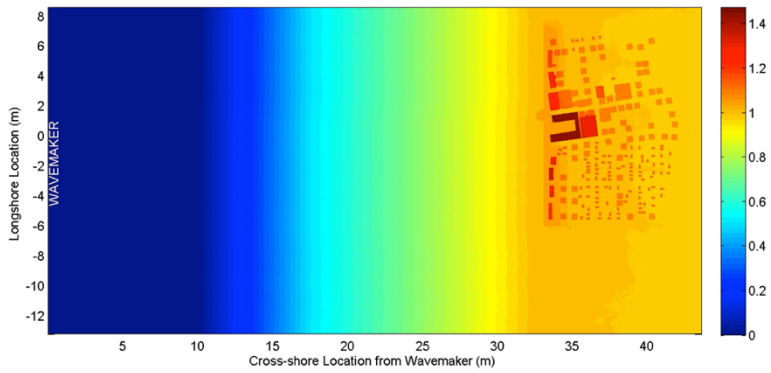
Method of Splitting Tsunamis (MOST) Model

- Numerical model developed by Titov and Synolakis (1998, 1995)
- Validated and verified through Synolakis et al. (2008, 2007)
- Used to generate propagation database and forecast inundation modeling

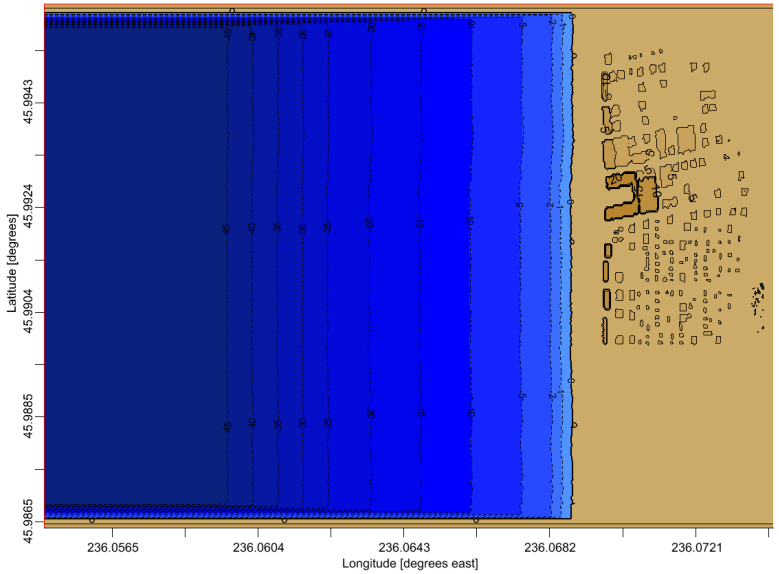
Community Model Interface for Tsunamis (ComMIT)

- Following the Indian Ocean tsunami of 26 December 2004, the UN established a coordinating group for the Indian Ocean Tsunami Warning and Mitigation System (IOTWS).
- This group recommended the establishment of a web-based community tsunami-flooding model. Hence, ComMIT has been developed by the NOAA Center for Tsunami Research (NCTR).
- User friendly interface to the MOST model and propagation database
- It is designed analogously to the U.S. tsunami forecast system

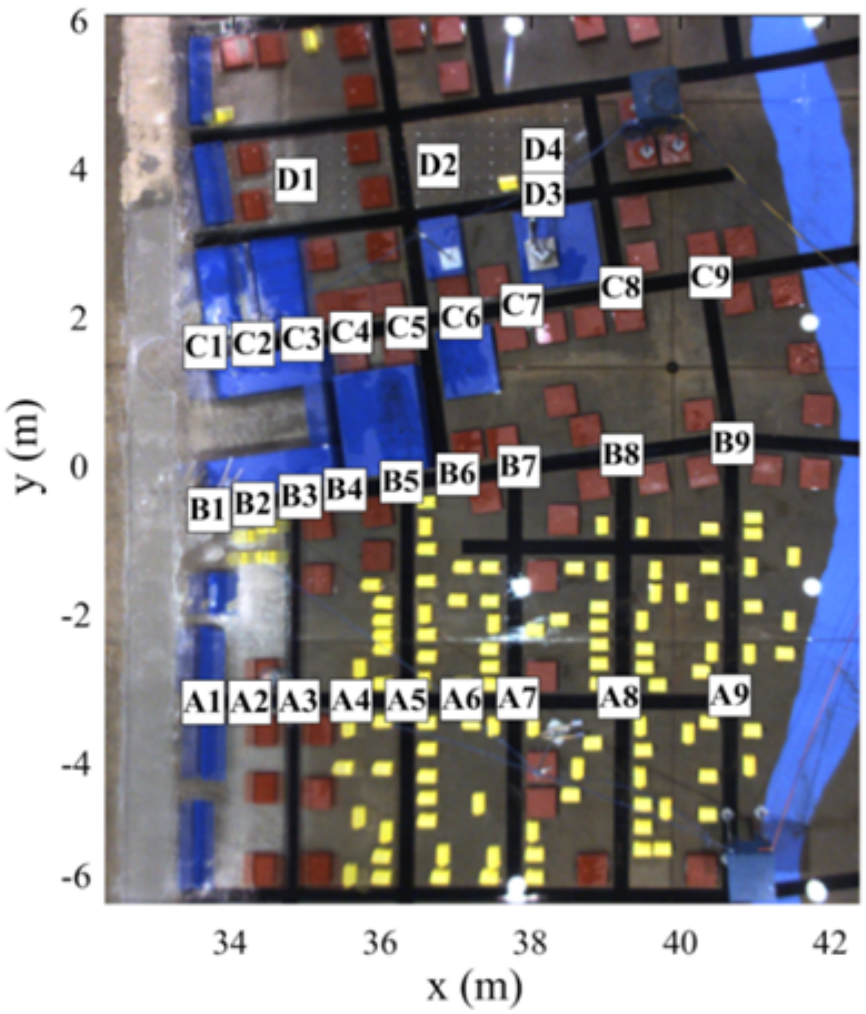
Modeling grid structure



Representation of bathymetry in the model scale



Representation of A-, B-, and C-grids in ComMIT (They are obtained at the same coordinates and resolutions (3 m) in the prototype scale)



Location of wave gages

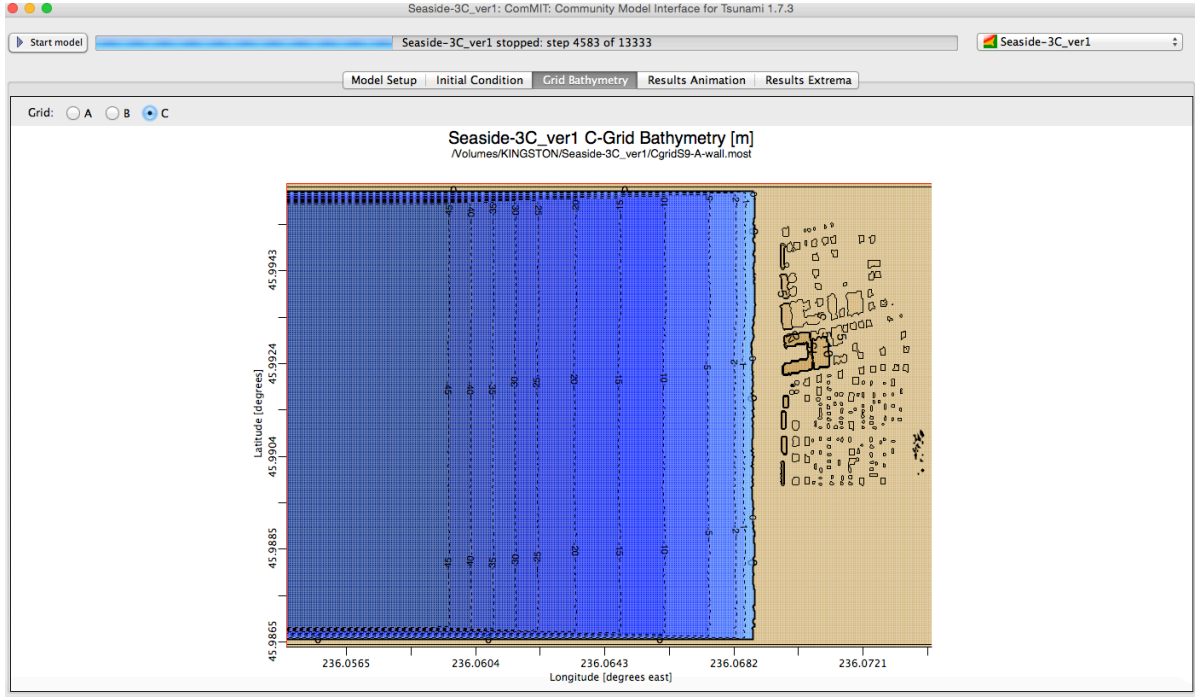
Prototype

to

model scaling

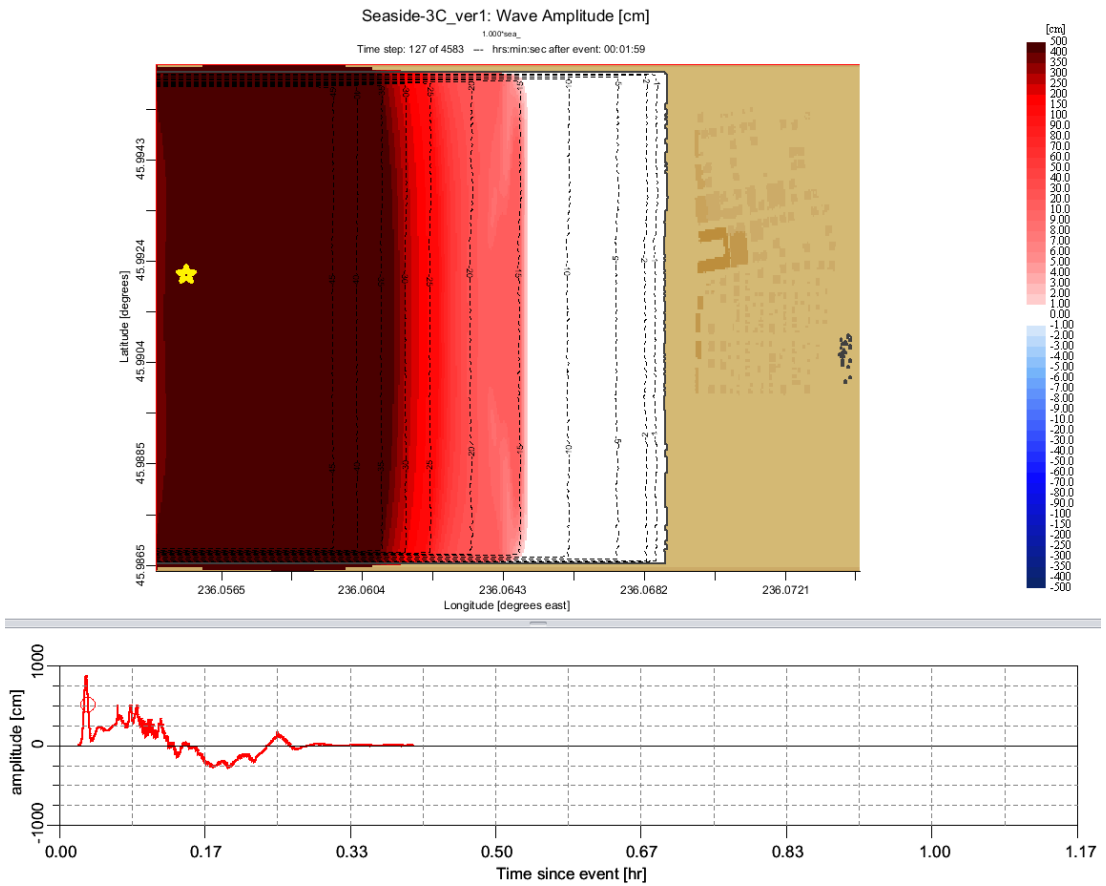
$l_{prototype} = 50\ l_{model}$

ComMIT model overview

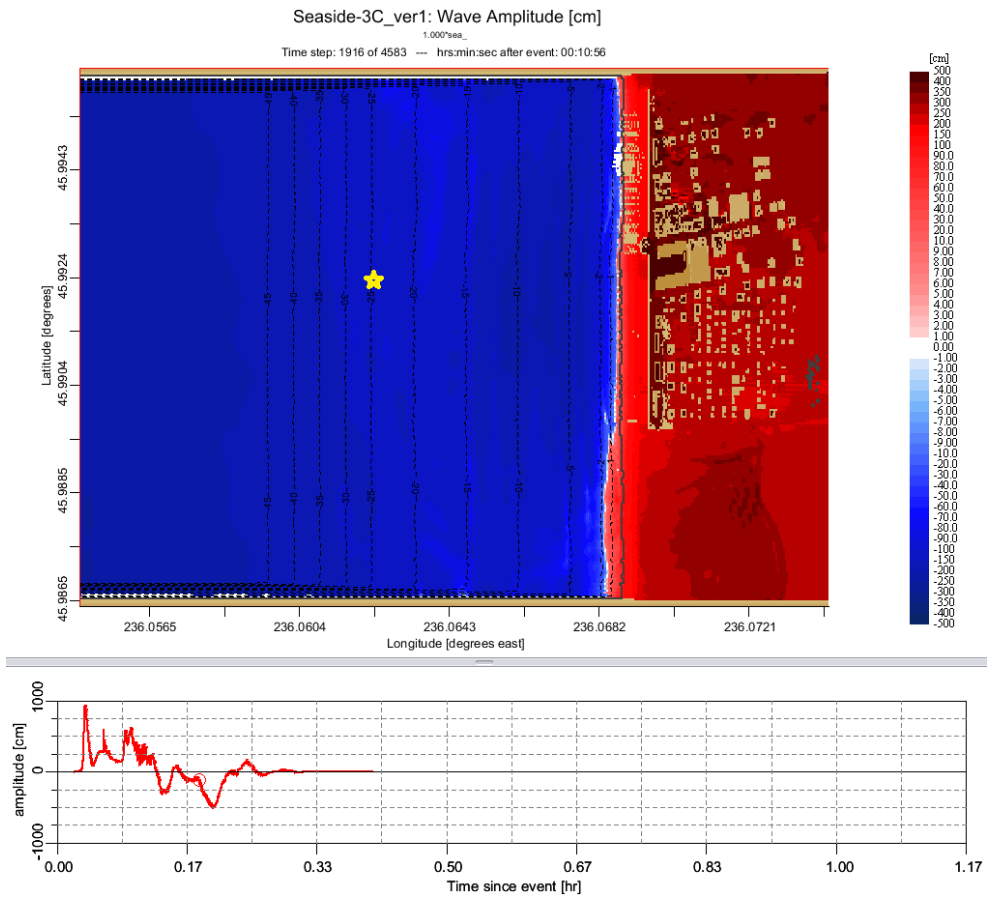


Green rectangle is only used for pointing out to the boundary condition in ComMIT environment.

Wave evolution

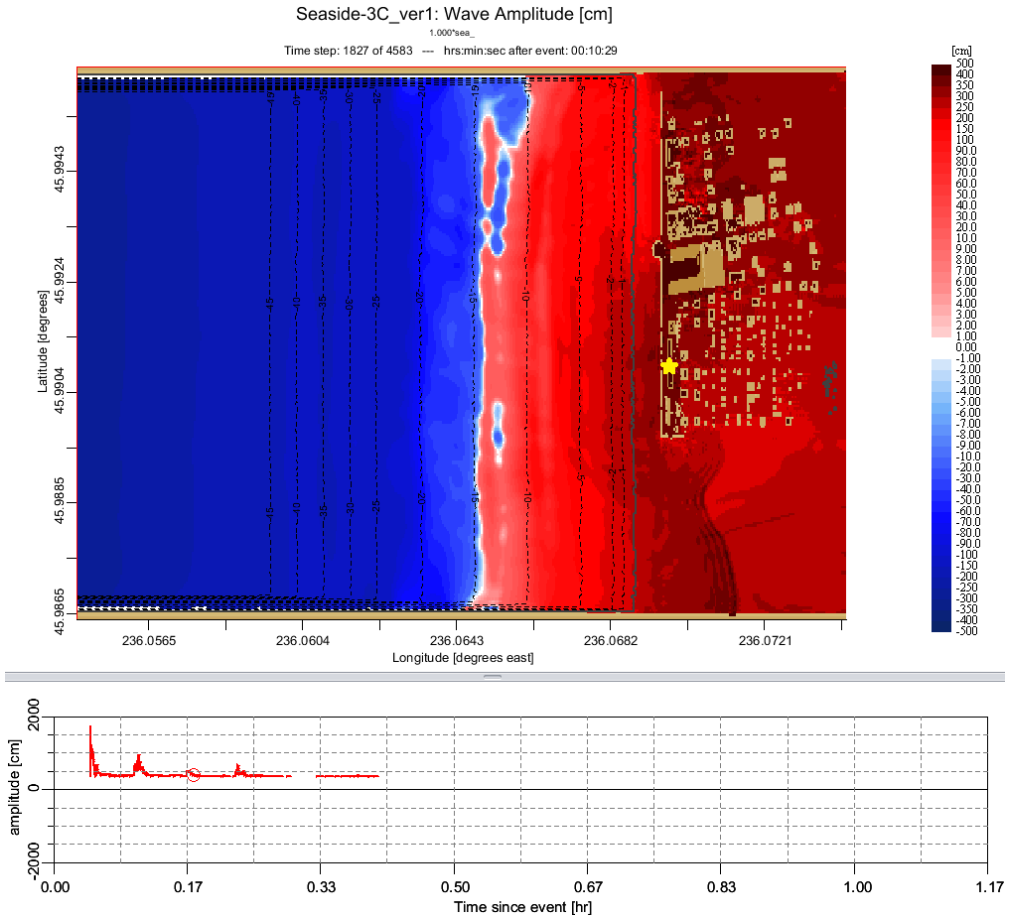


Time series of water surface elevation at the WG1 (yellow star)

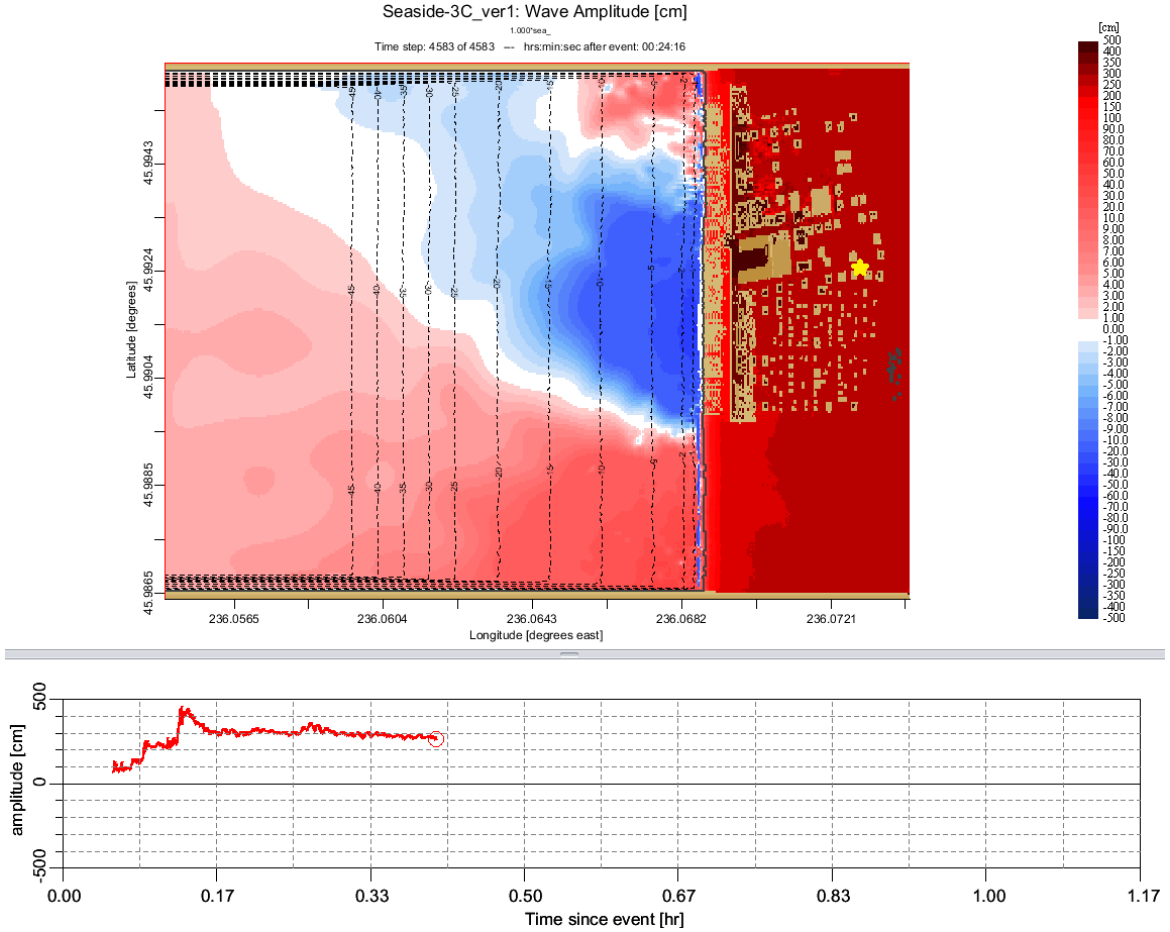


Time series at the WG3 (yellow star)

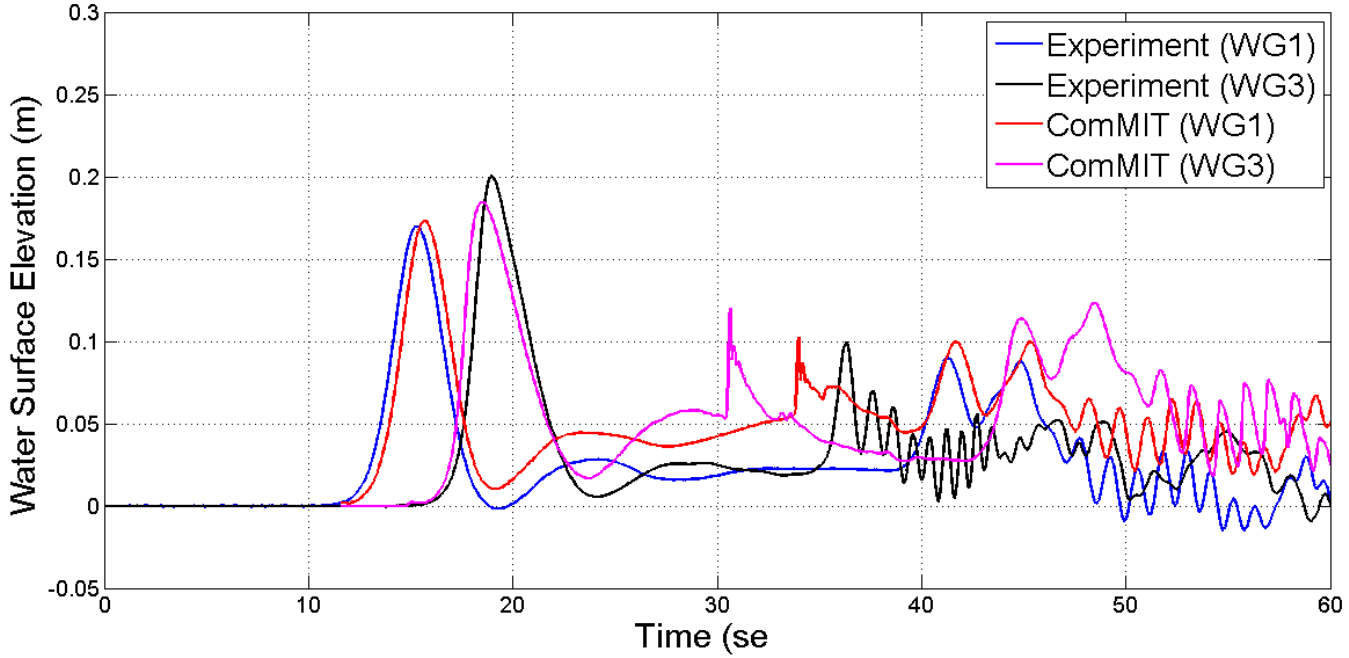
Wave evolution



Time series at the WGA1 (yellow star)

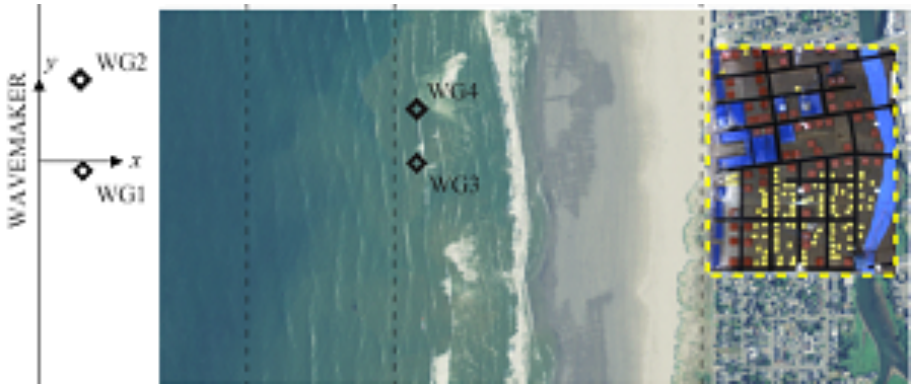


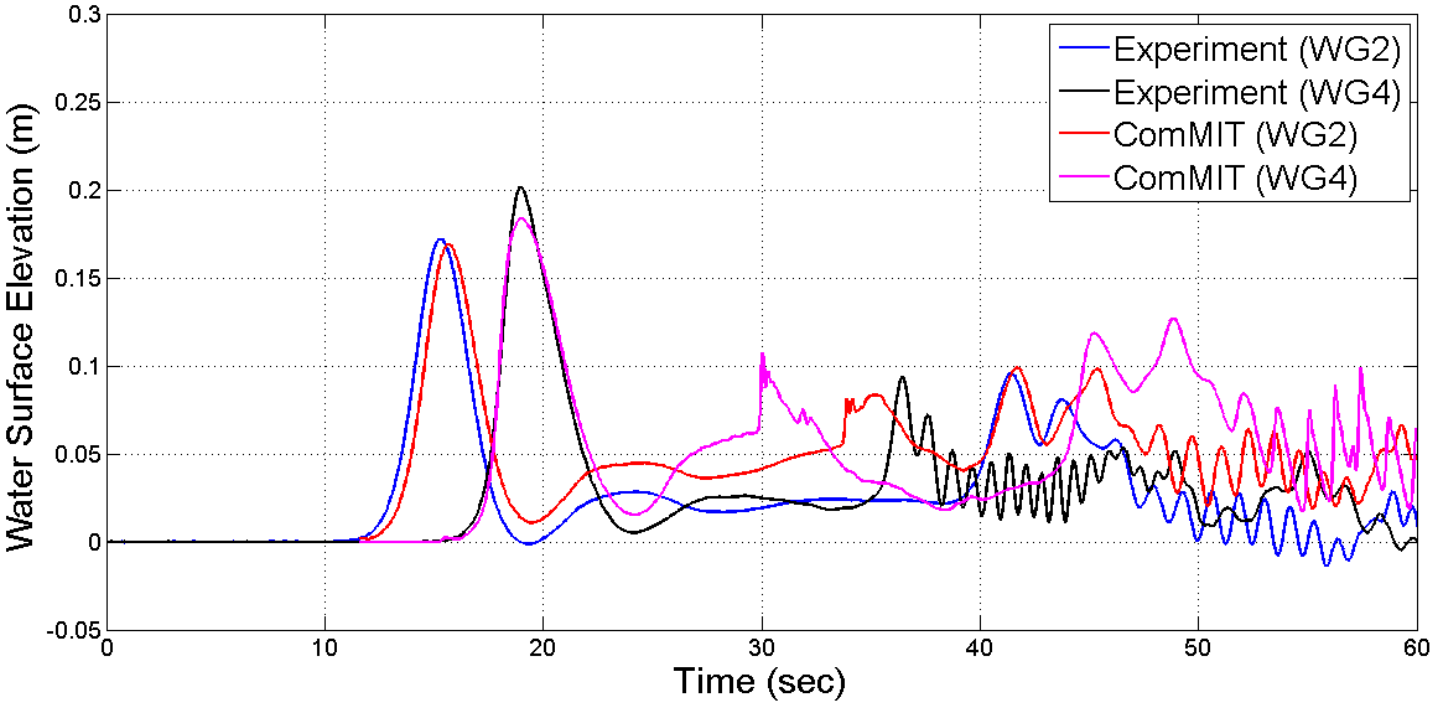
Time series at the WGB9 (yellow star)



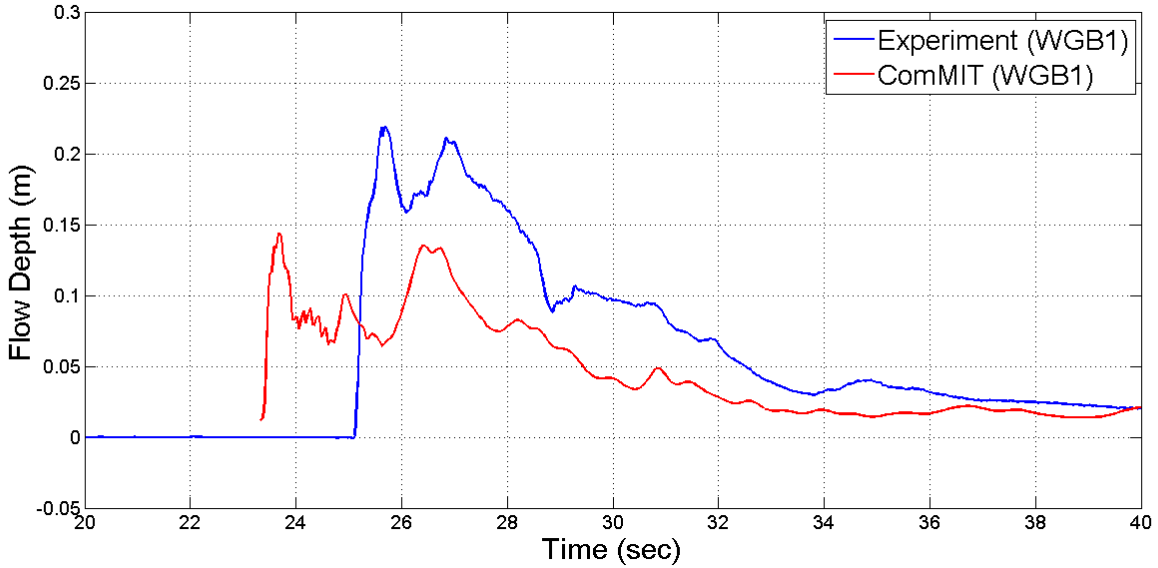
Incident wave comparisons at WG1 and WG3

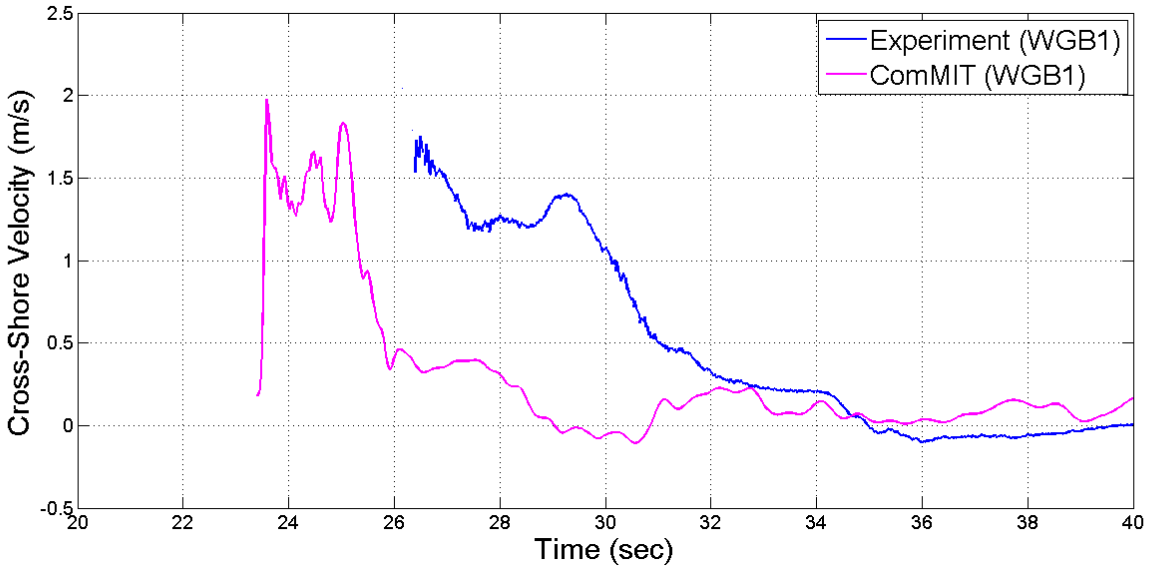
Incident wave comparisons at WG2 and WG4

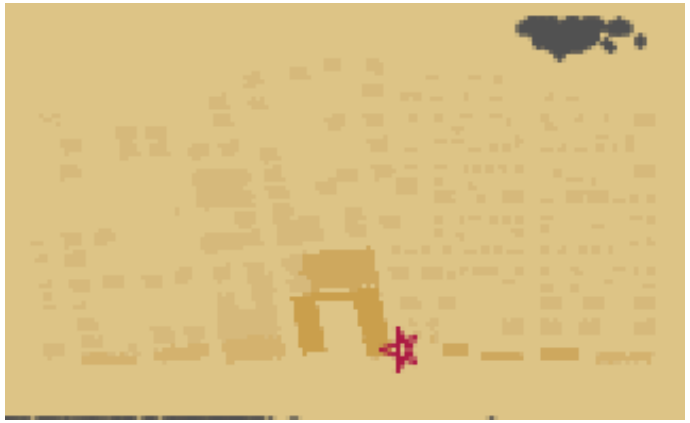


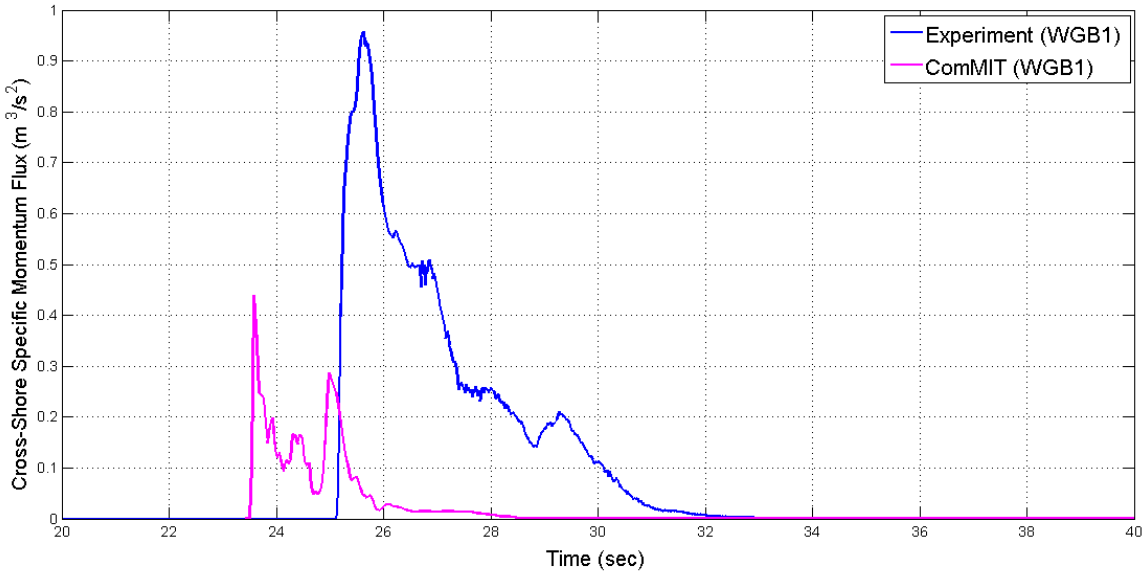


Comparisons at WGB1

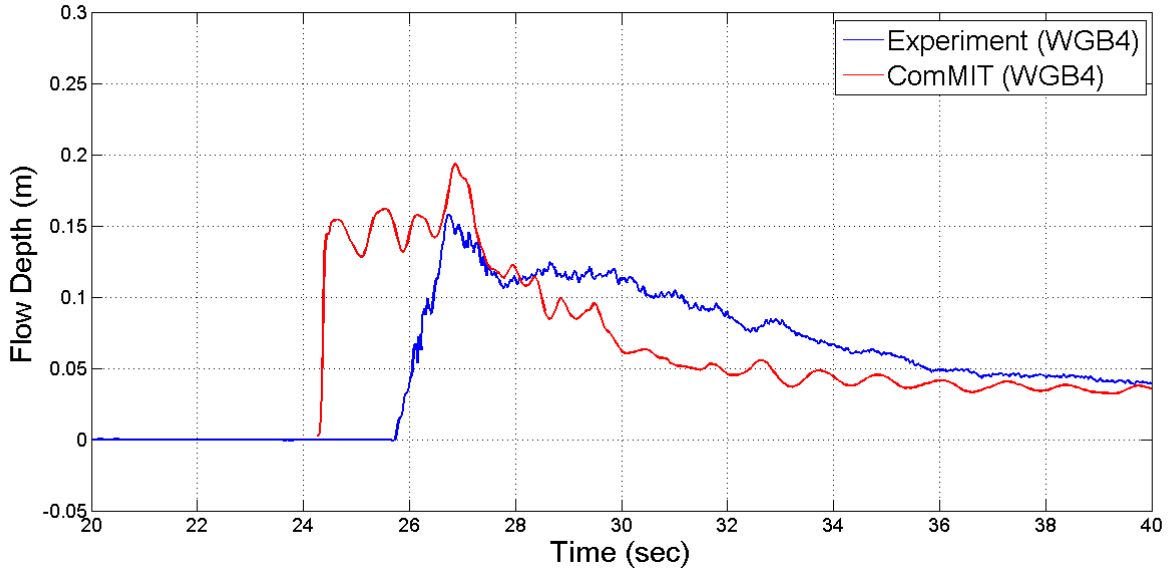


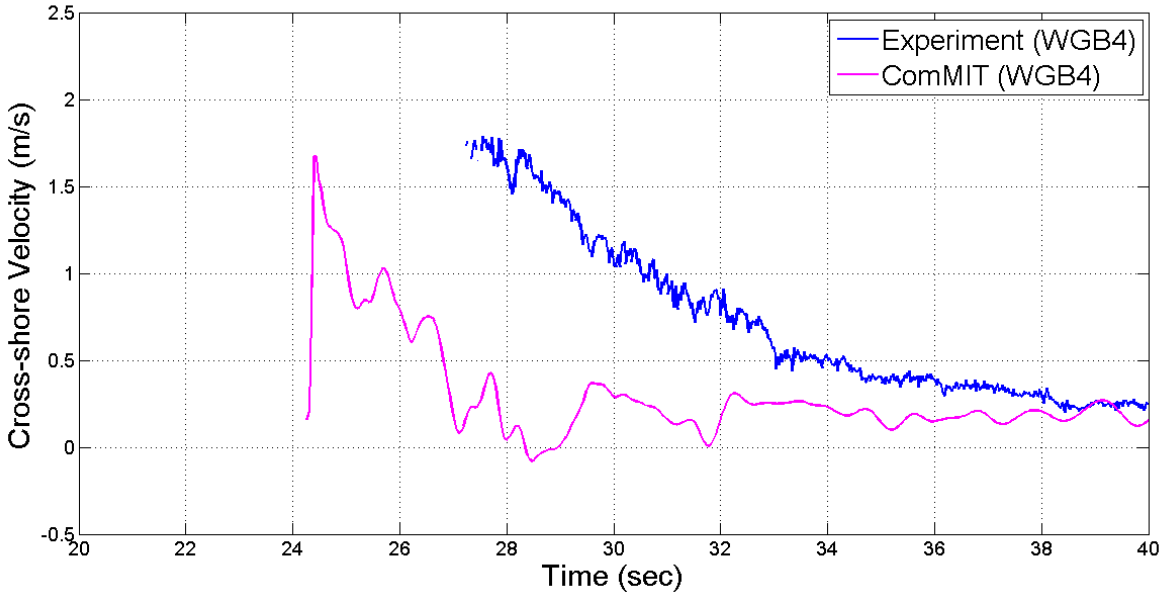


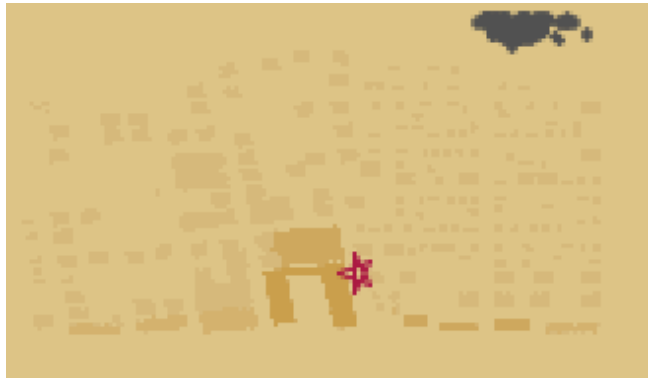


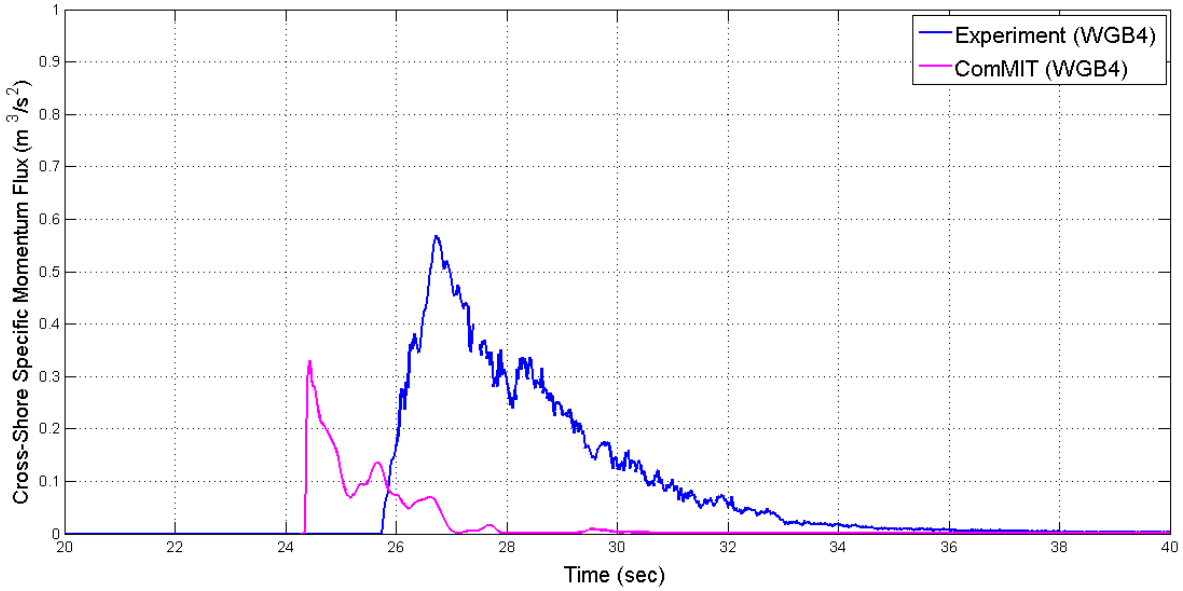


Comparisons at WGB4

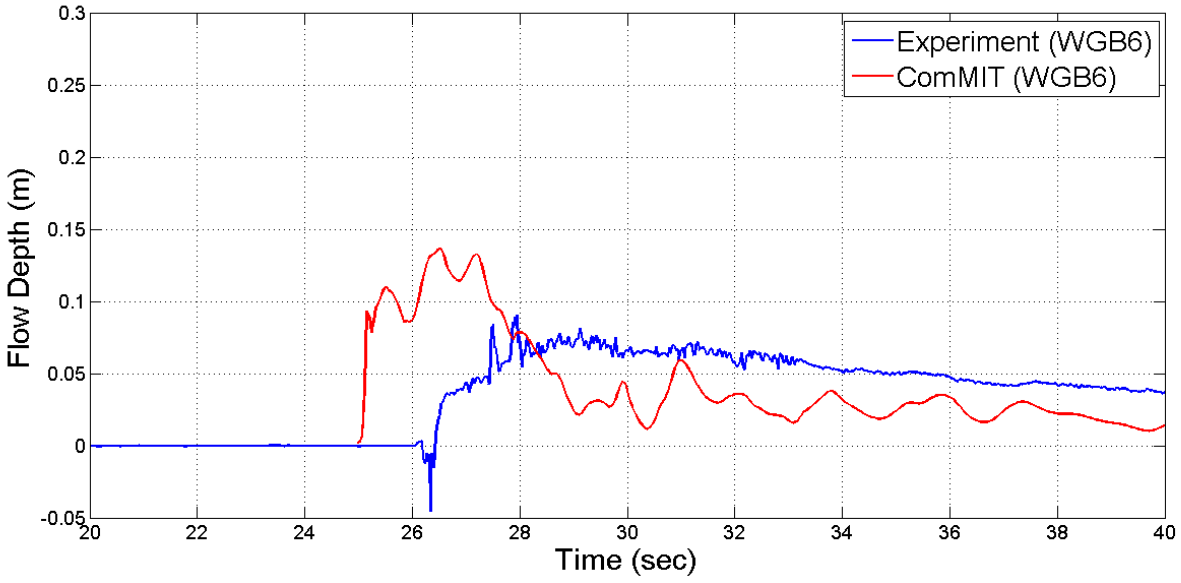


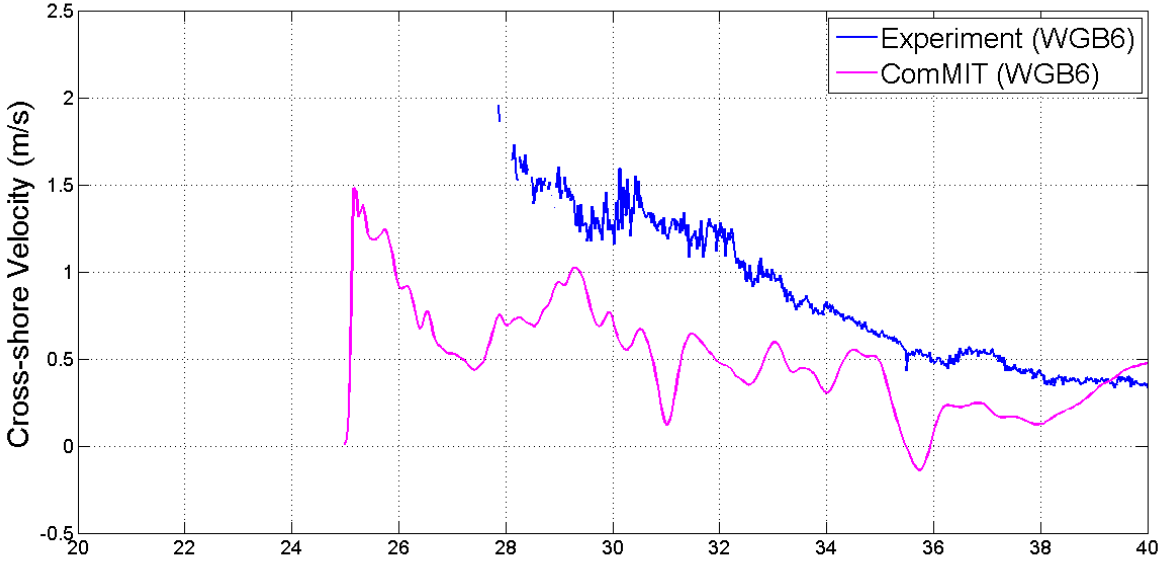


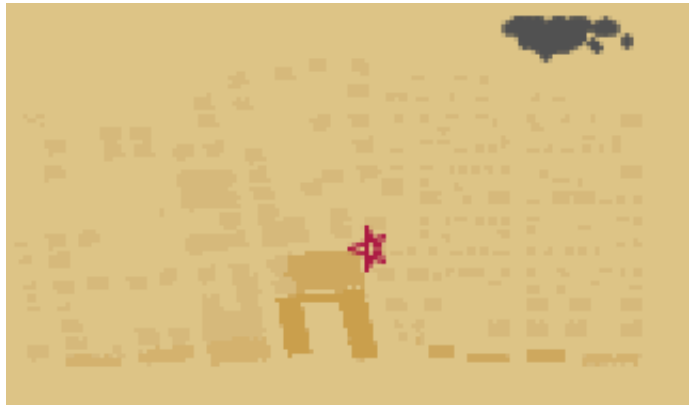


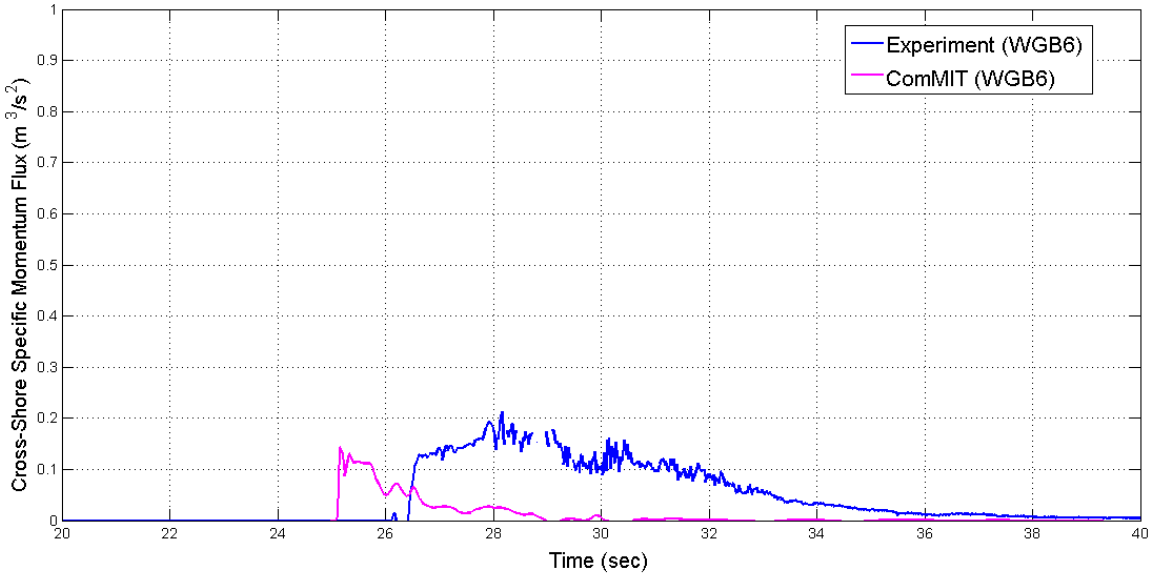


Comparisons at WGB6

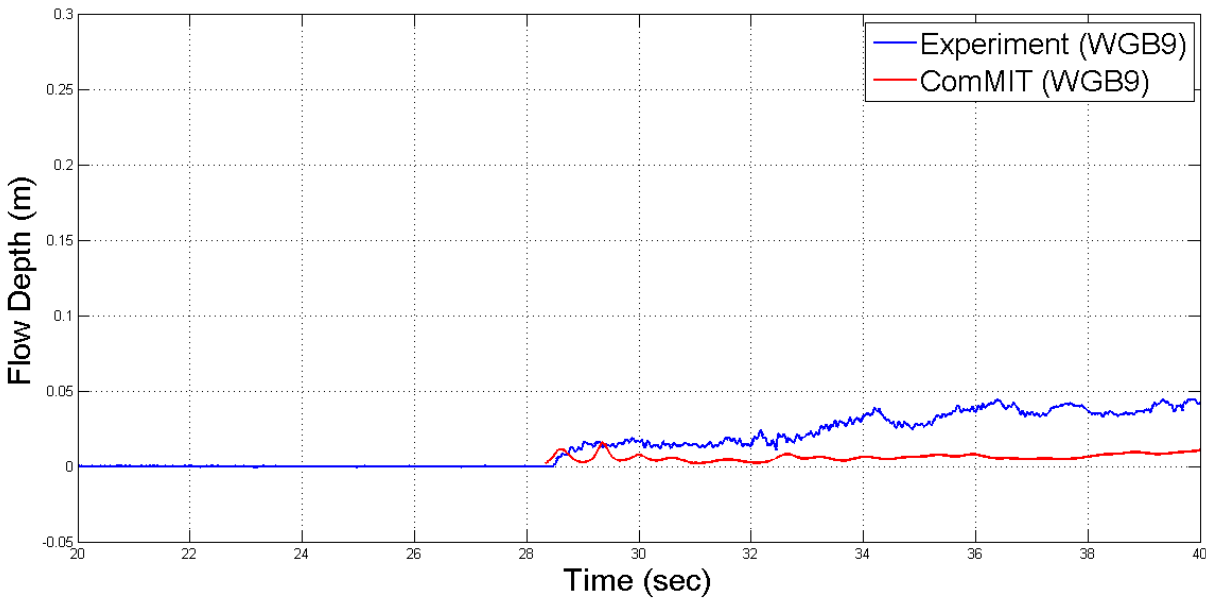


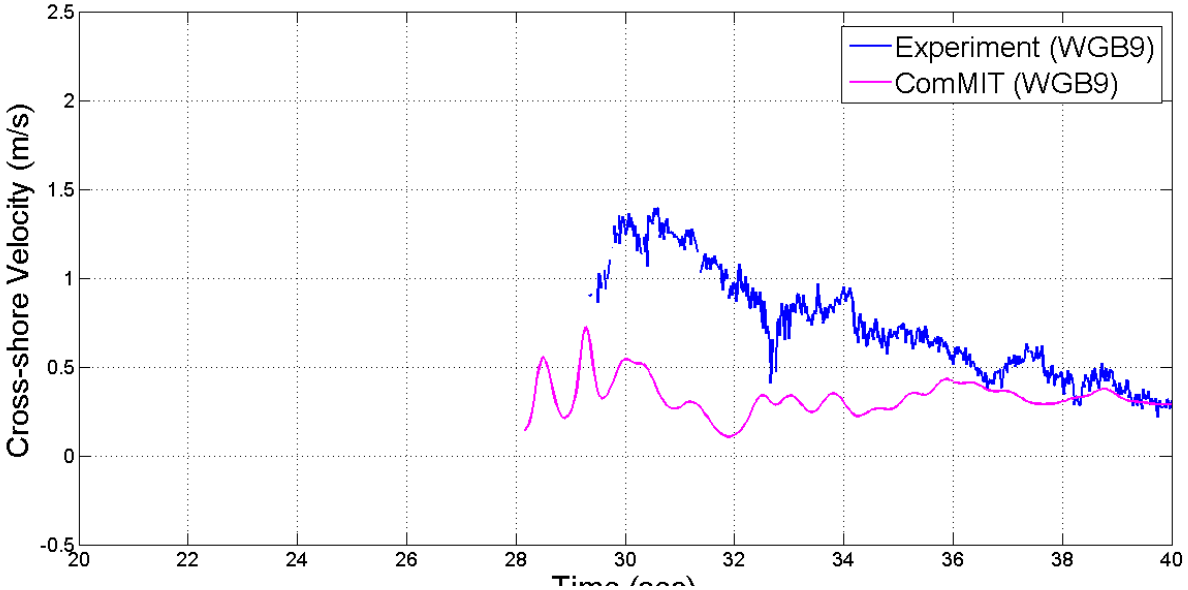


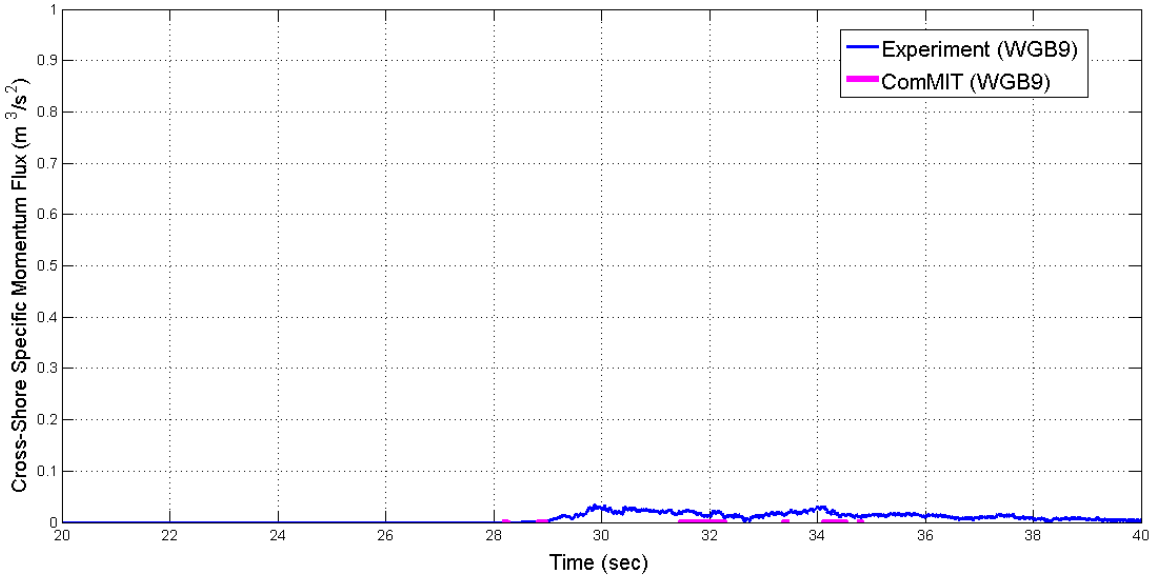




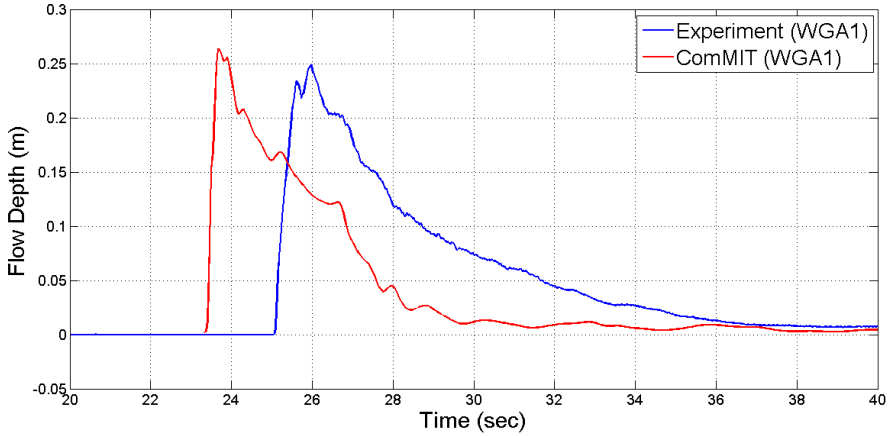
Comparisons at WGB9

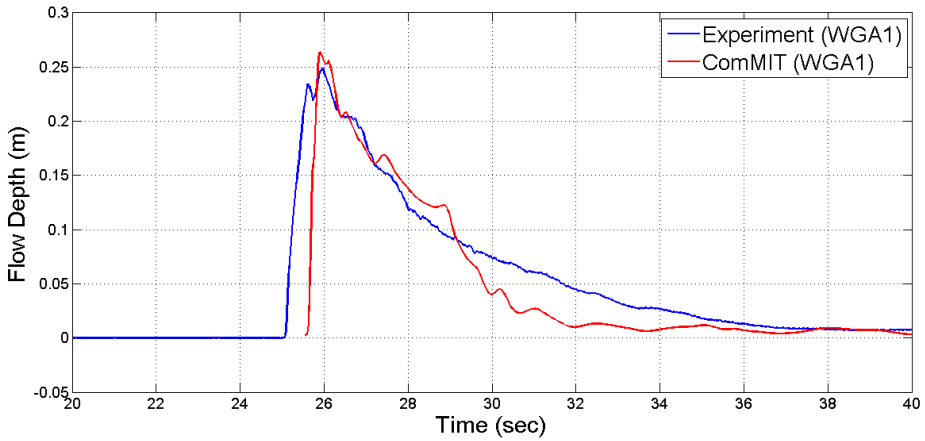




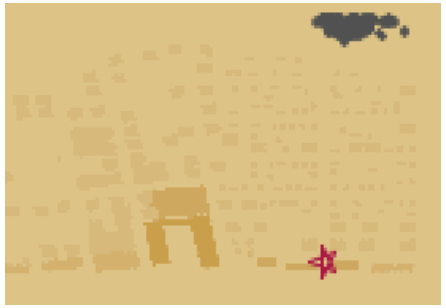


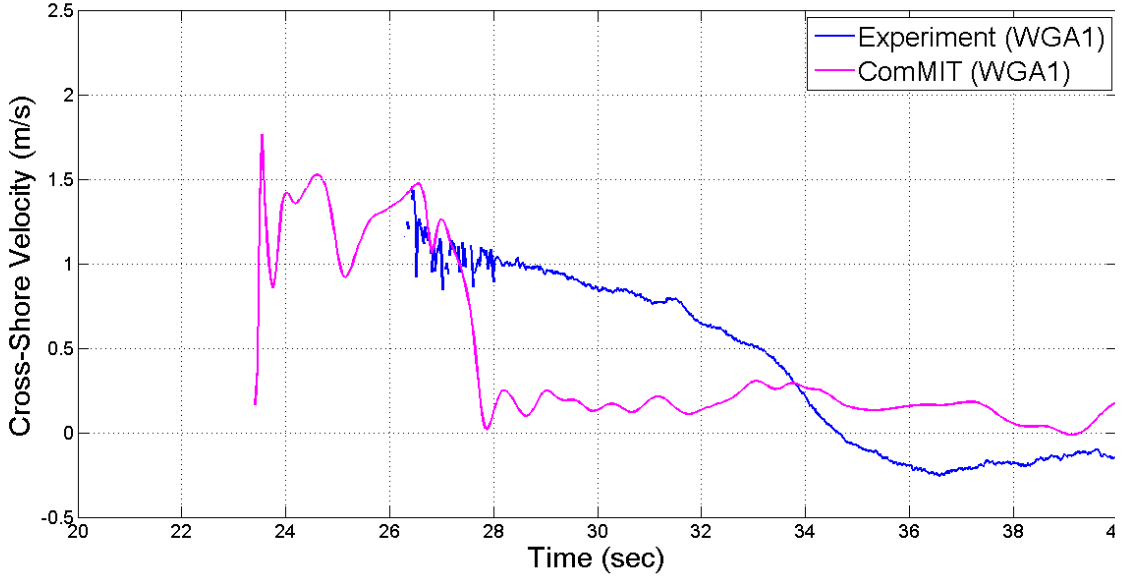
Comparisons at WGA1

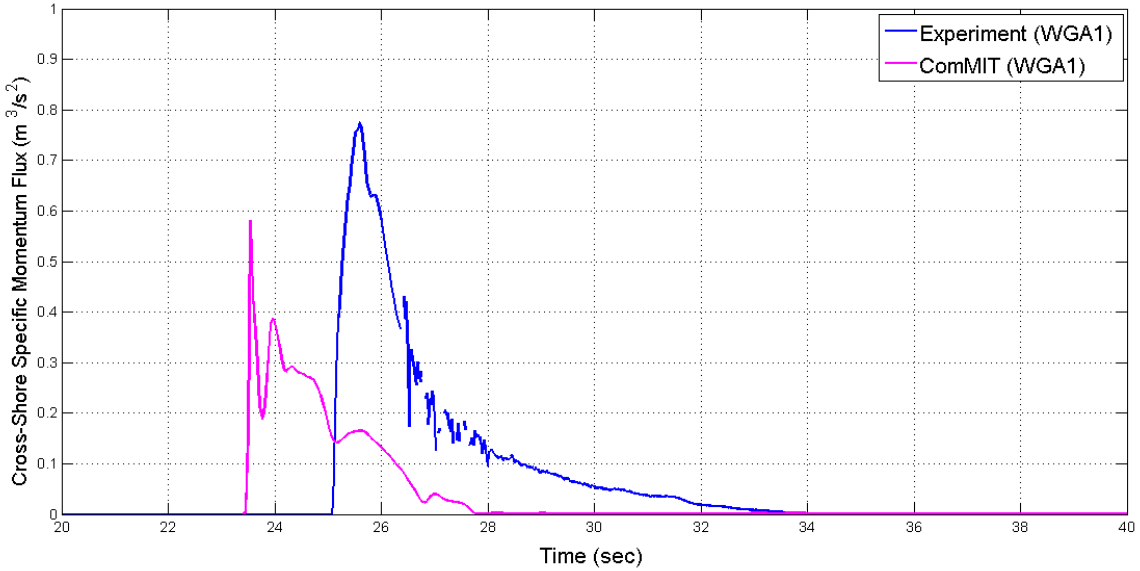




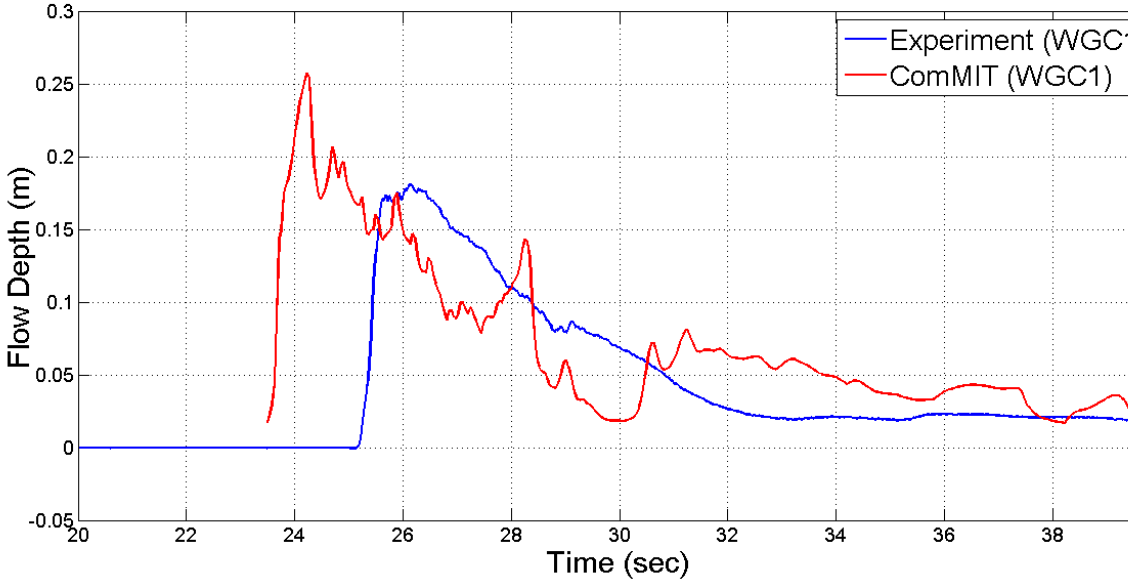
Shifted on time

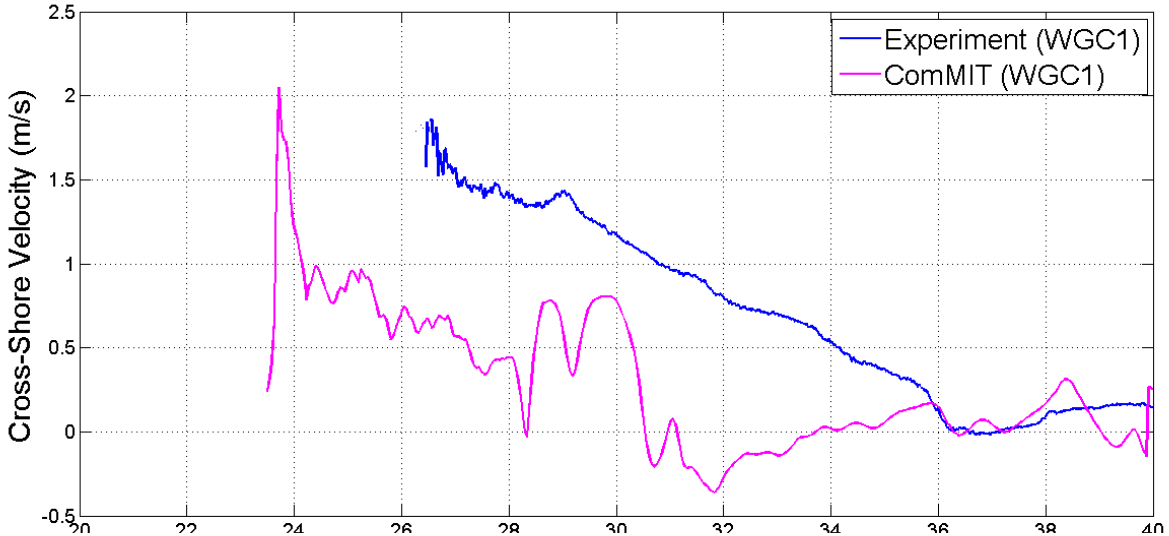


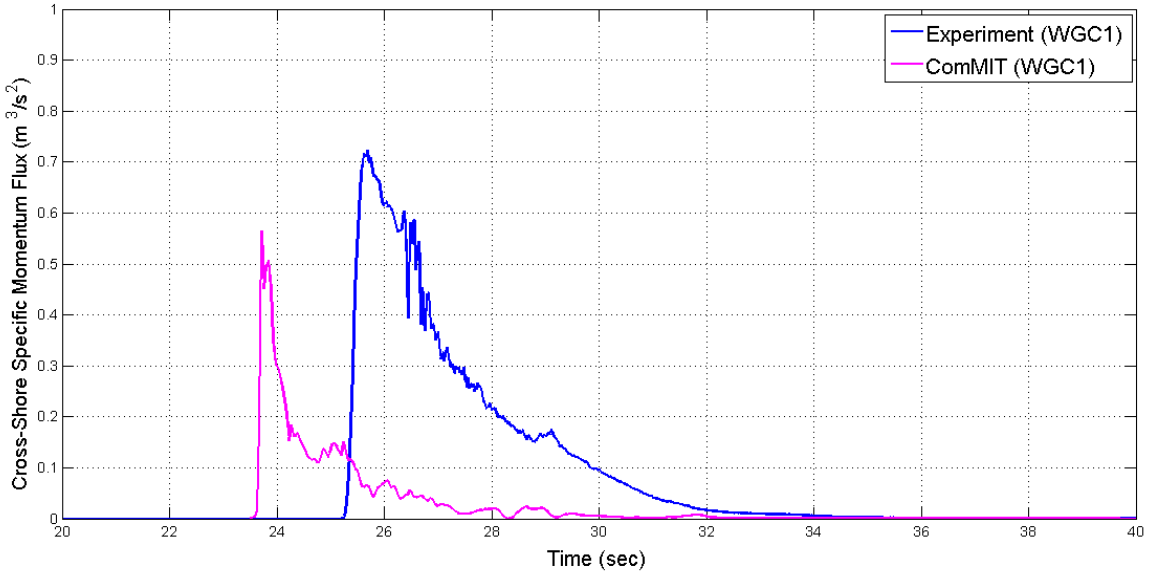




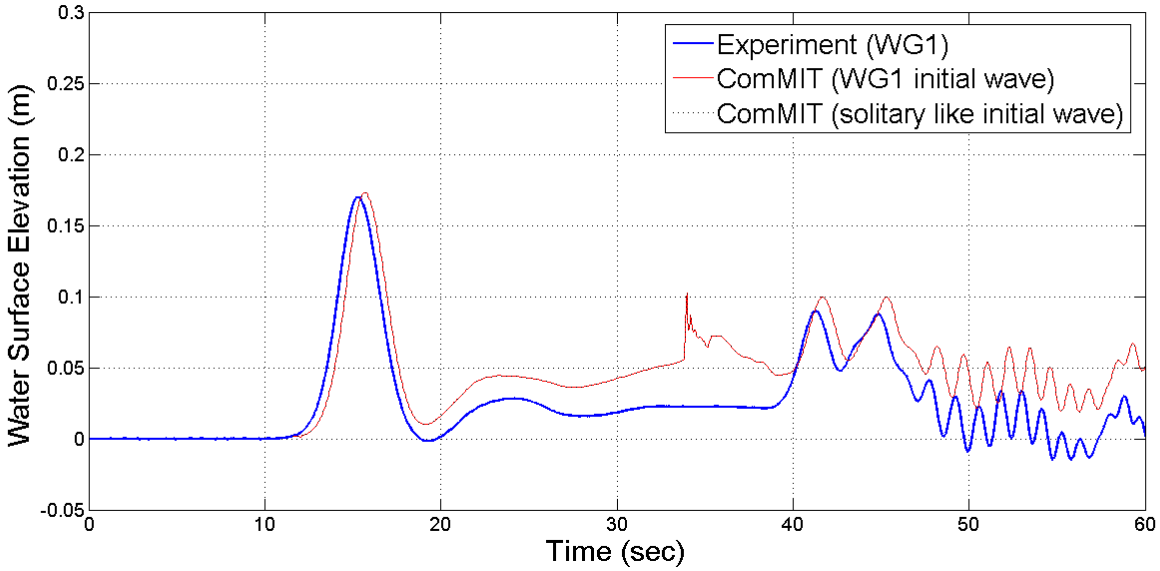
Comparisons at WGC1

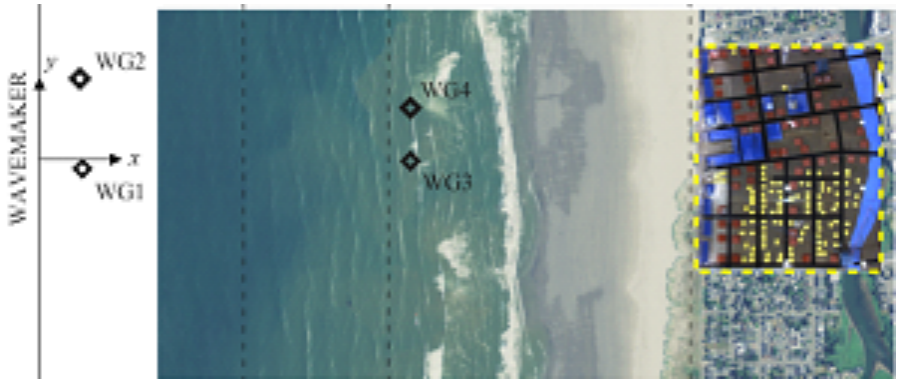


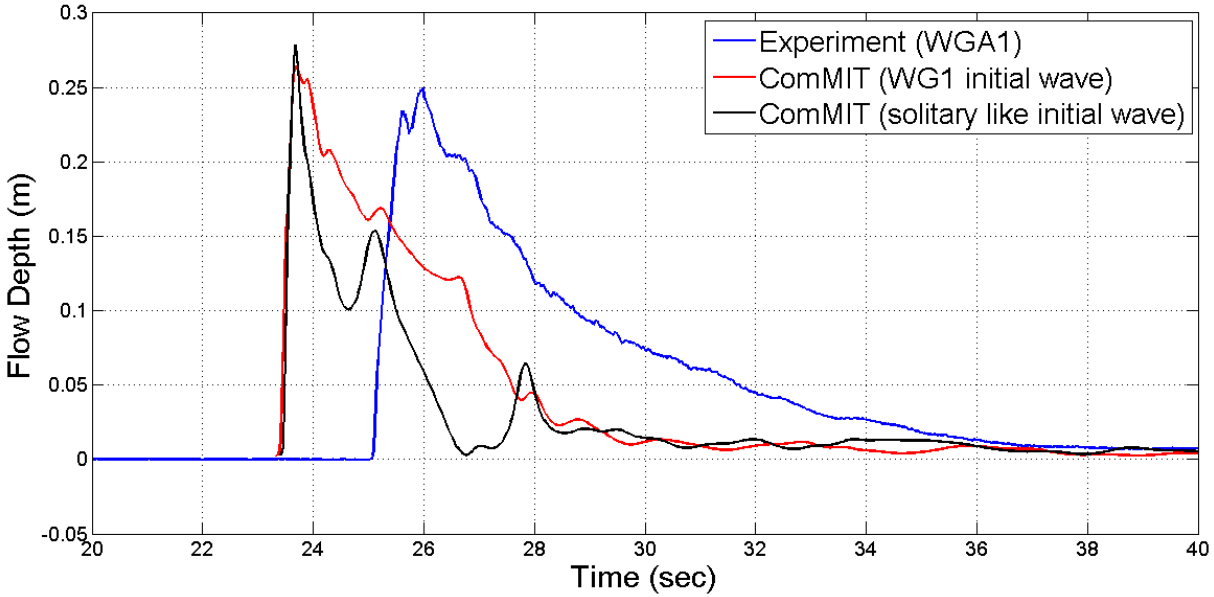




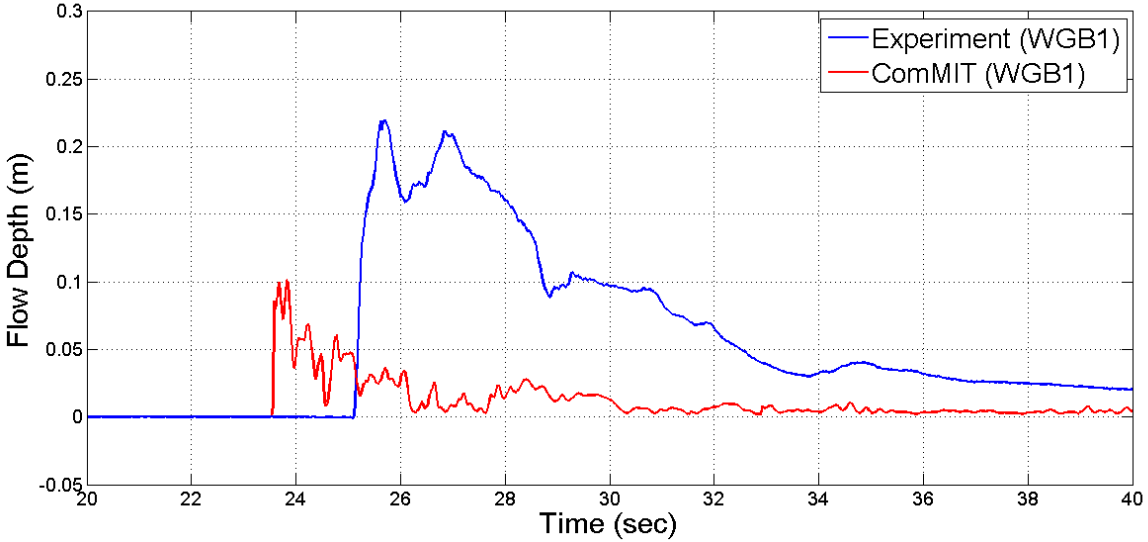
Comparisons of WG1 initial wave and solitary like initial wave at WG1 and WGA1



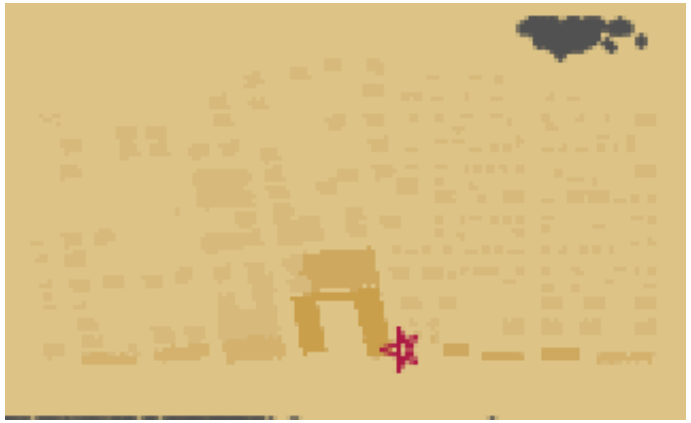
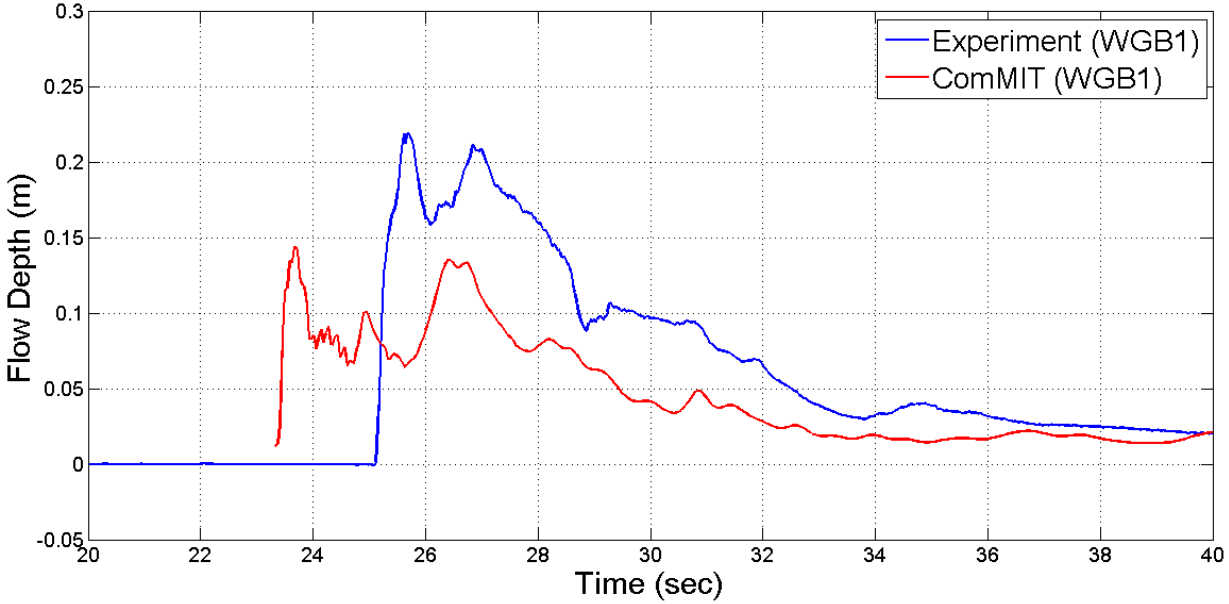




Comparisons at WGB1 for 1 m and 3 m grid resolutions



1 m grid resolution



3 m grid resolution