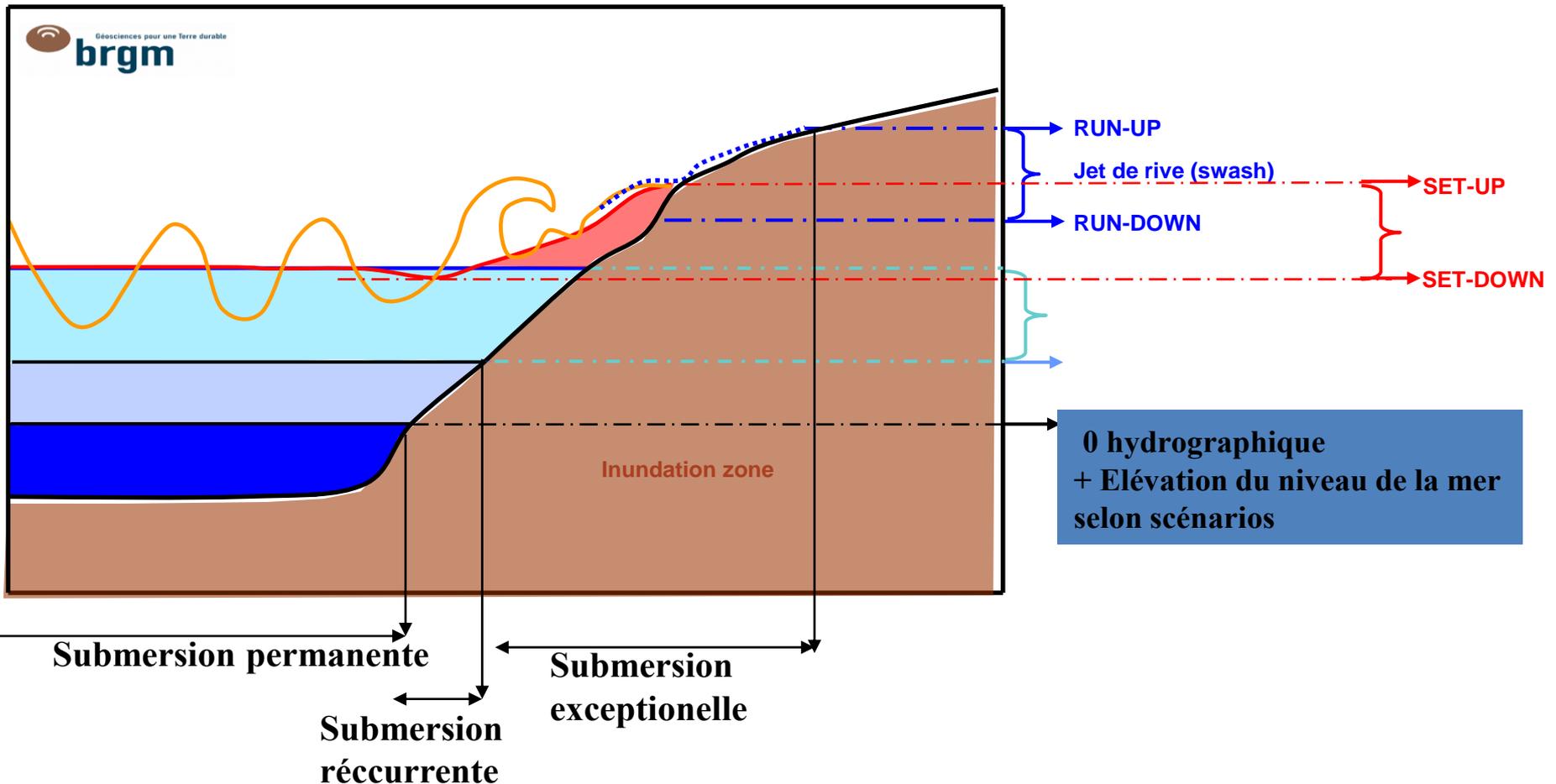


# Modèle vague à vague SURF-WB

- *M. Tissier (EPOC) – Thèse ANR MISEEVA, F. Marche (I3M), P. Bonneton (EPOC)*
- *D. Lannes (ENS Ulm), F. Chazel (INSA Toulouse), R. Pedreros, B. Poisson (BRGM)*

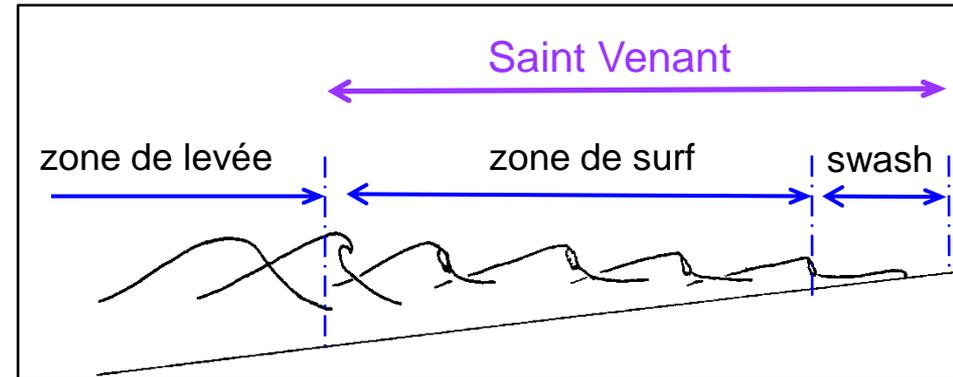
Description fine : déferlement, set-up, jet de rive, franchissement  $\Rightarrow$  approche vague à vague



## SURF-WB1 :

- Zones de surf et de swash

Résolution des équations de Saint Venant  
par méthode à capture de chocs  
*Marche et coll. 2007*



- Fortes variations bathymétriques ou topographiques :  
digues, bâtiments, ...



- Conditions de houle avant la zone de surf

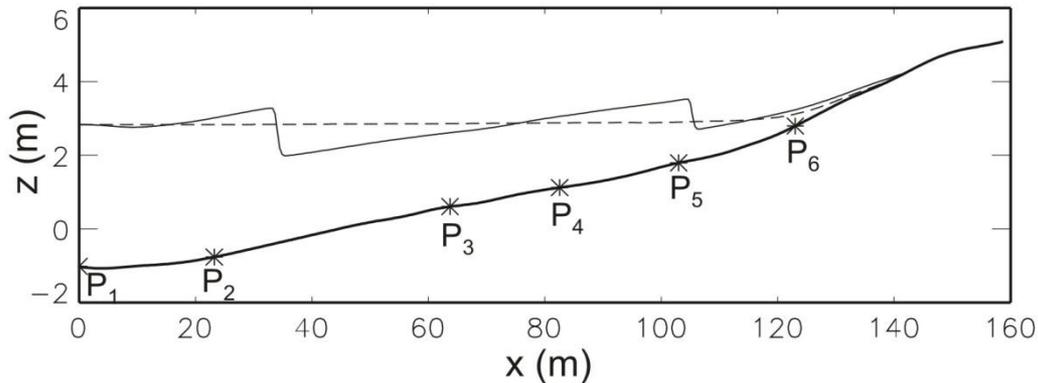
⇒ couplage SWAN / SURF\_WB *Poisson B. et Pedreros R.*

# Modèle vague à vague SURF-WB

## SURF-WB1 : Validations

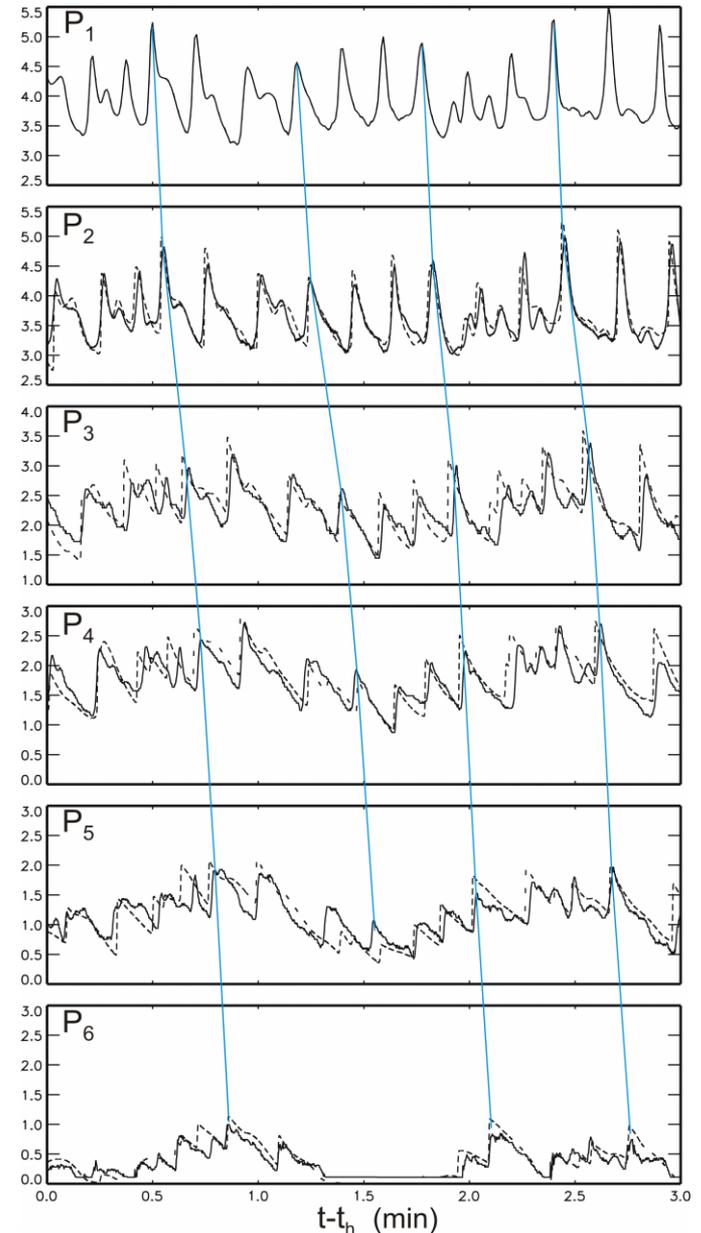
### Truc Vert Beach 2001

- ◆ Offshore wave conditions:  $\theta \approx 0^\circ$ ,  $H_s=3$  m,  $T_s=12$  s
- ◆ Maximum surf zone width: 500 m



Bottom topography and pressure sensor locations

◆  $\Delta x=0.4$  m,  $\Delta t=0.025$  s,  $f_r=0.015$

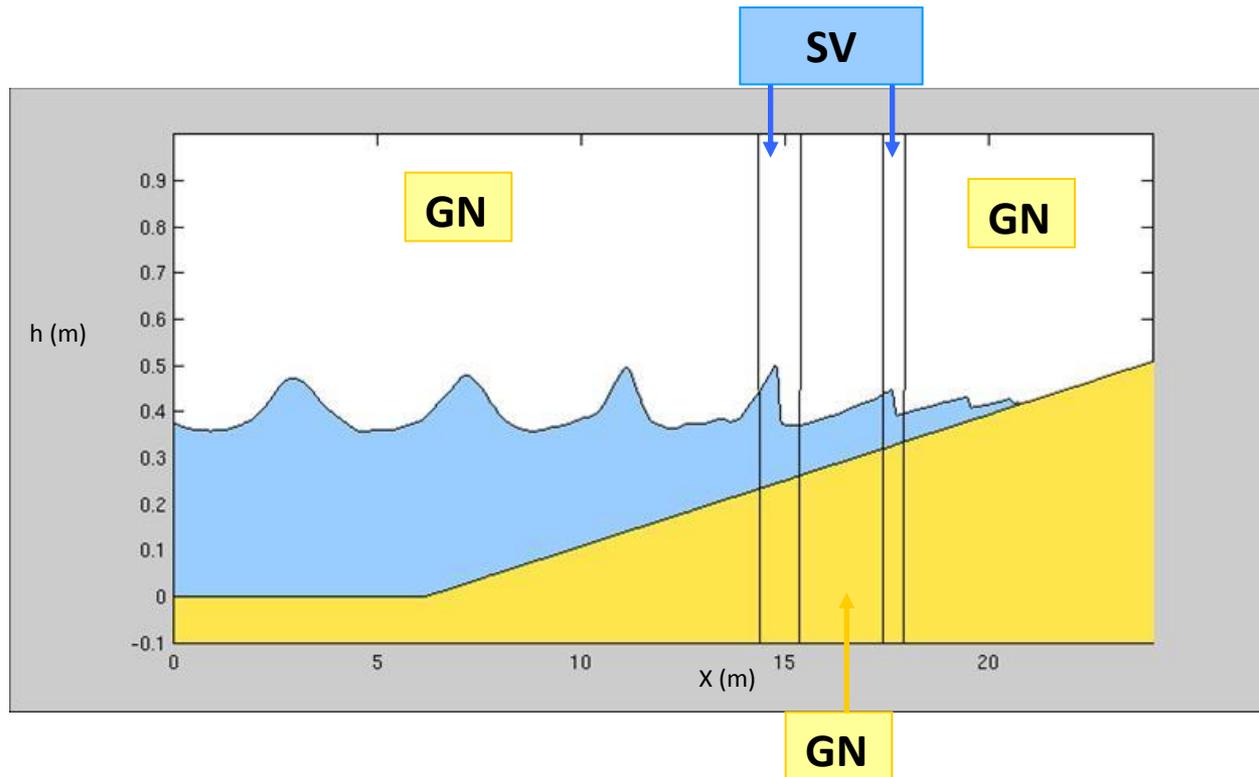
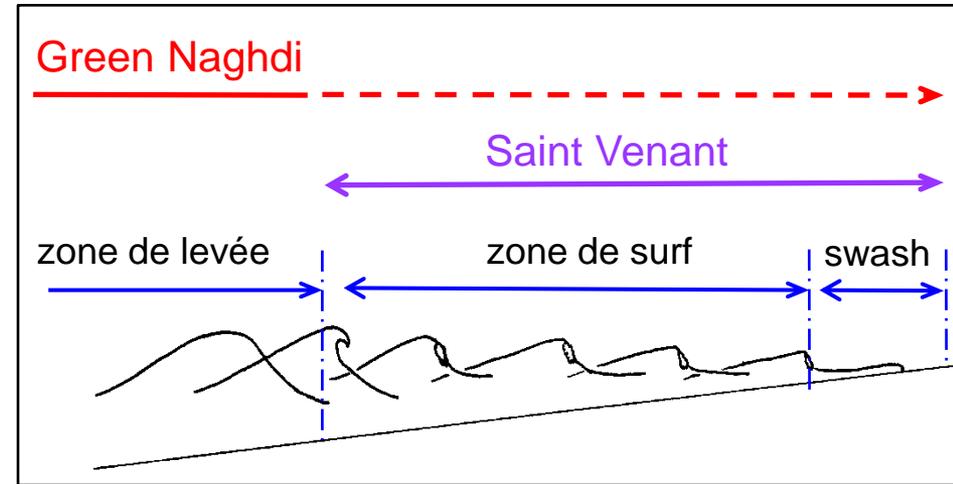


# Modèle vague à vague SURF-WB

## SURF-WB2

*These de Marion Tissier (nov 2008-dec 2011)*

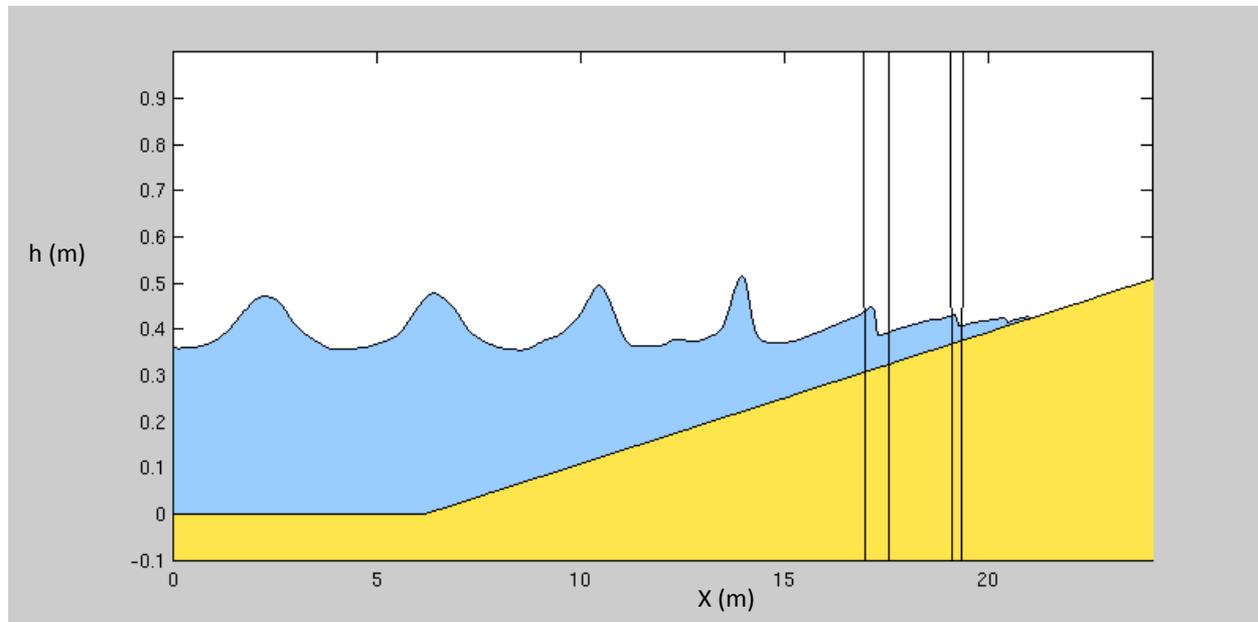
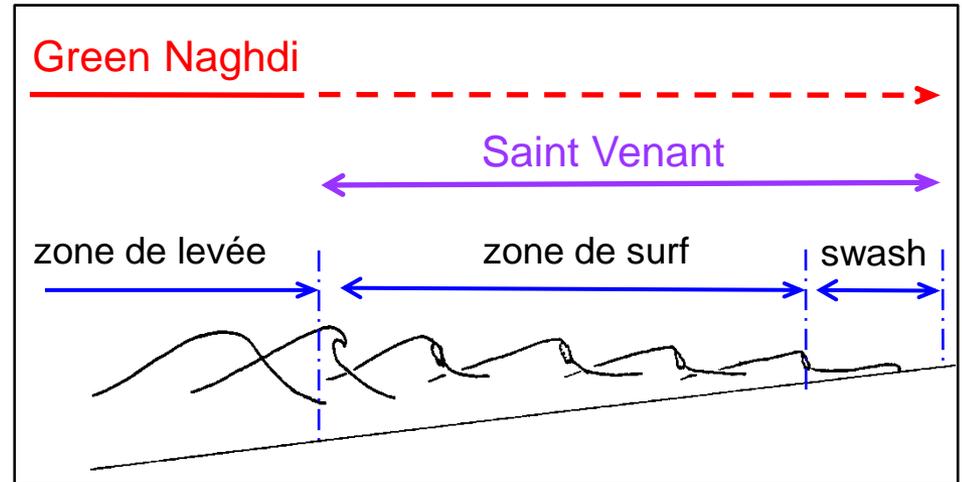
- Extension du domaine d'application à toute la zone littorale
- Traitement local du déferlement



# Modèle vague à vague SURF-WB

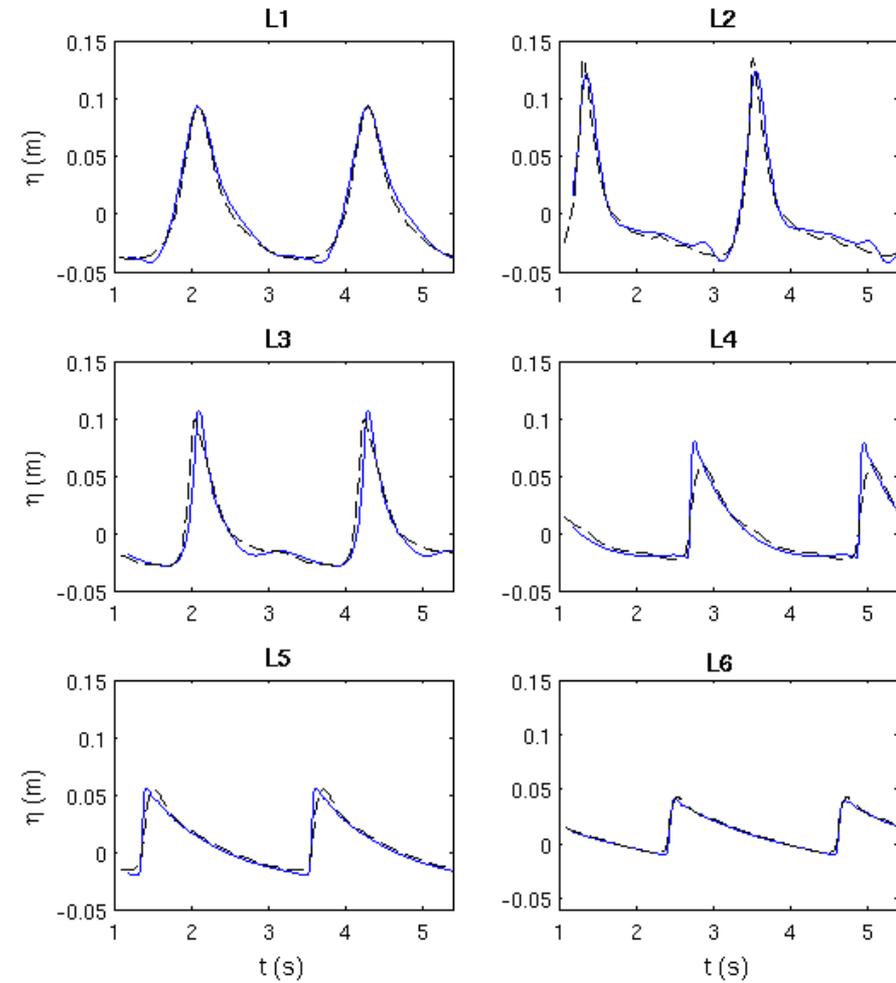
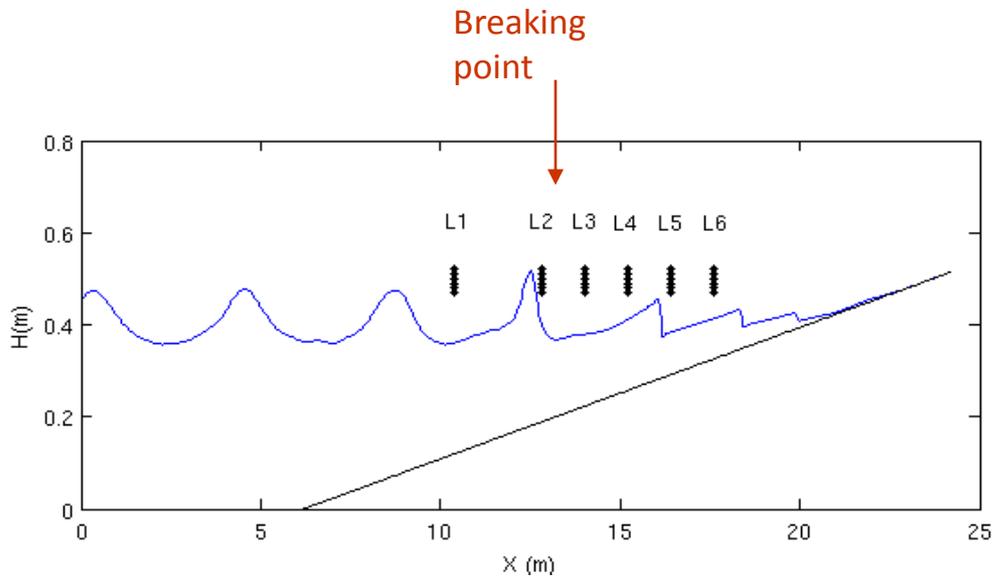
## SURF-WB2

- Extension du domaine d'application à toute la zone littorale
- Traitement local du déferlement



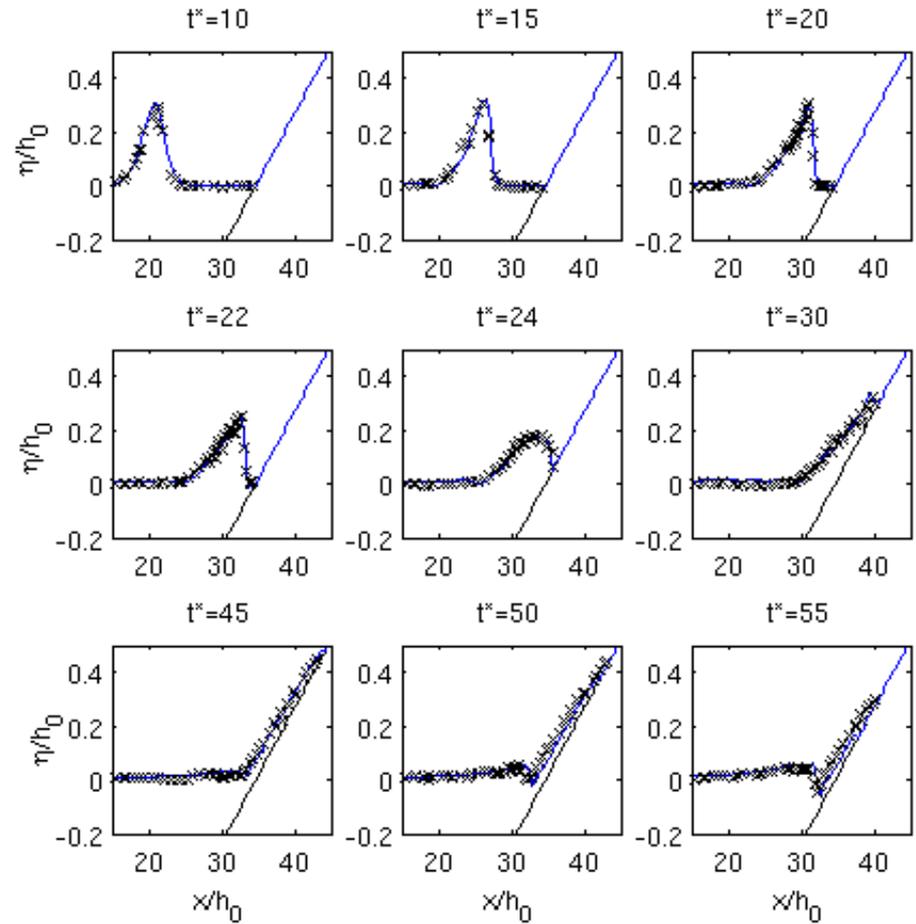
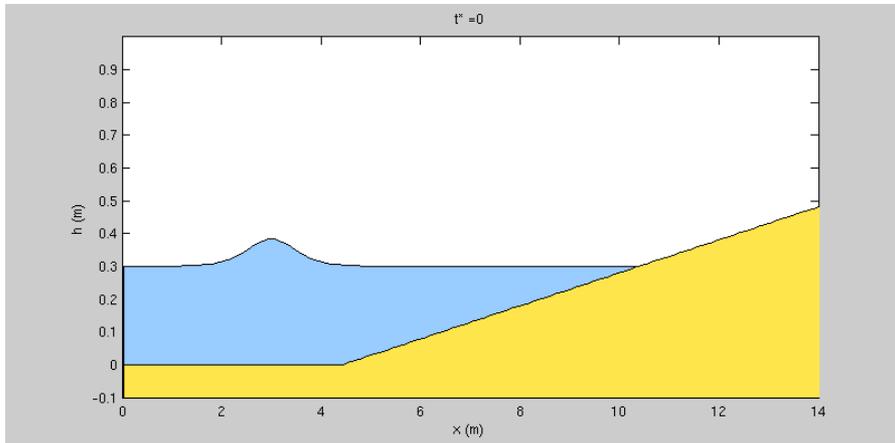
## SURF-WB2 : Validations

### Expérience de Cox (1995)



## SURF-WB2 : Validations

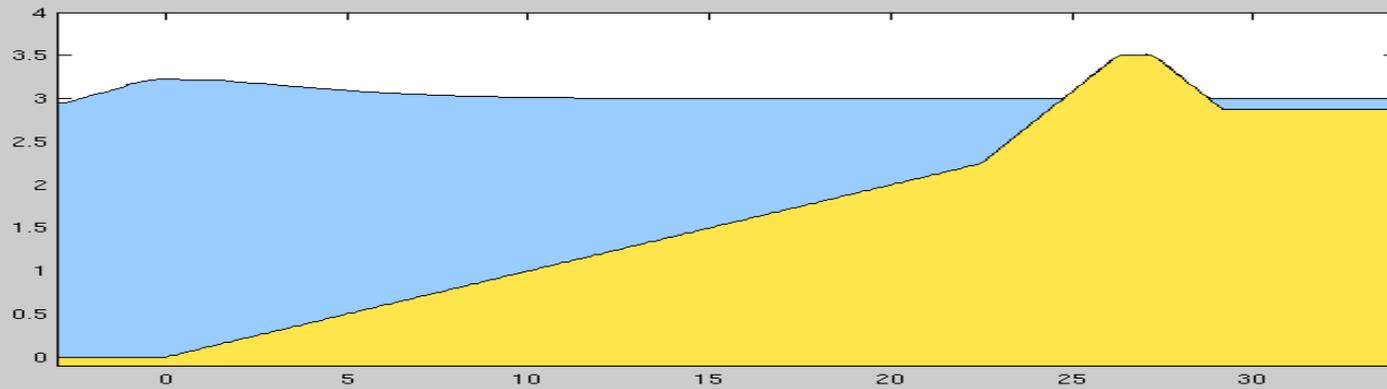
### Expérience de Synolakis (1987)



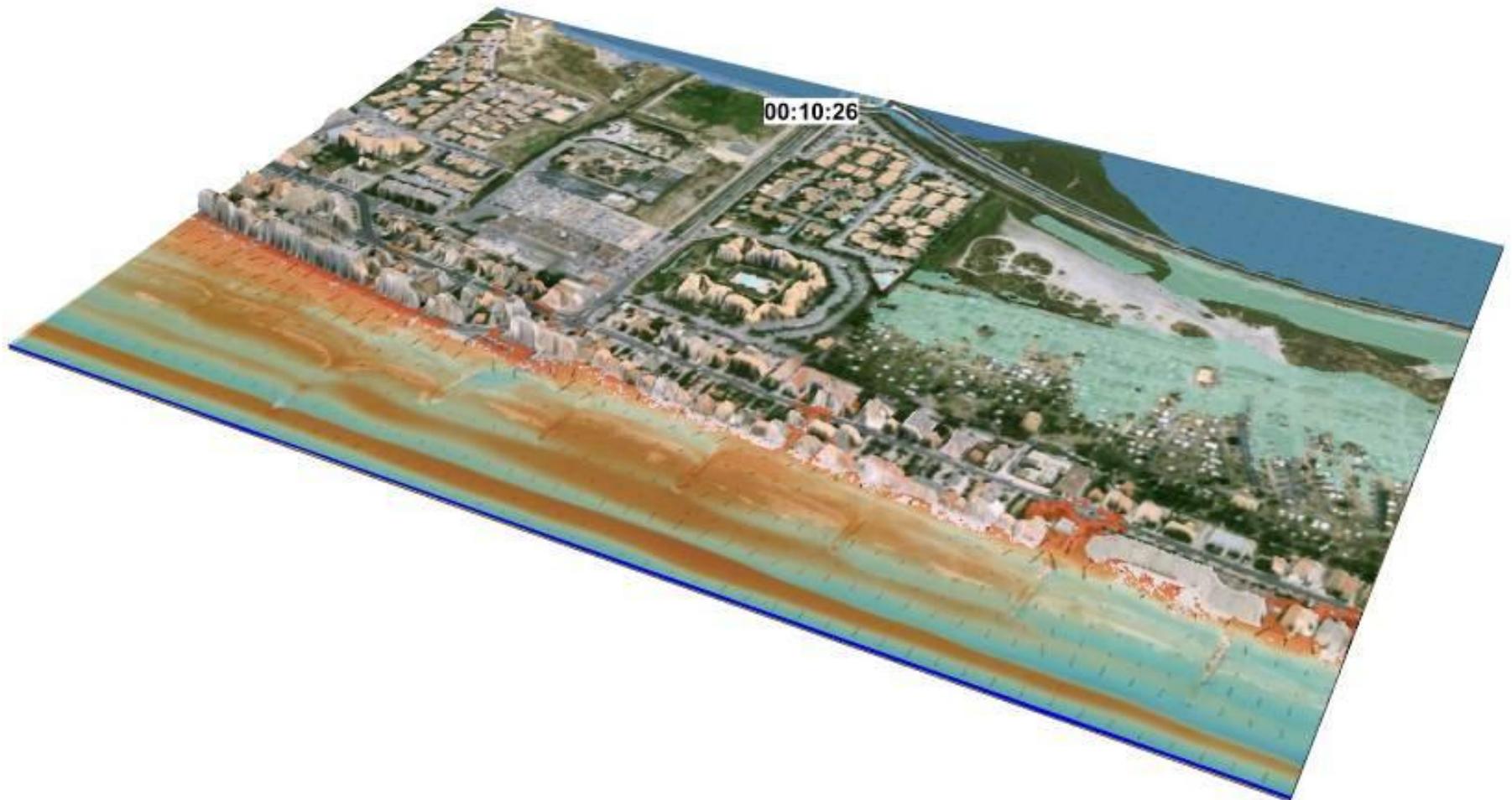
Spatial snapshots --  $t^* = t(g/h_0)^{1/2}$

## SURF-WB2 : Validations

### Franchissement de digue



**SURF-WB : un outil performant pour décrire la propagation des vagues de la zone de levée Jusqu'aux phénomènes de franchissement et de submersion**



## Publications

Bonneton, P., Chazel, F., Lannes, D., Marche, F. and Tissier, M. 2010 A splitting approach for the fully nonlinear and weakly dispersive Green-Naghdi model. *J. Comput. Phys.*, 230 (4), 1479–1498, doi:10.1016/j.jcp.2010.11.015

Bonneton P., E. Barthelemy, F. Chazel, R. Cienfuegos, D. Lannes, F. Marche, M. Tissier 2011 Recent advances in Serre-Green Naghdi modelling for wave transformation, breaking and runup processes. *European Journal of Mechanics - B/Fluids, In Press.*

Tissier M., P. Bonneton, R. Almar, B. Castelle, N. Bonneton, A. Nahon 2011 Field measurements and non-linear prediction of wave celerity in the surf zone. *European Journal of Mechanics - B/Fluids, In Press.*

Tissier, M., Bonneton, P., Marche, F., Chazel, F., and Lannes, D. 2011 Nearshore dynamics of tsunami-like undular bores using a fully nonlinear Boussinesq model. *Journal of Coastal Research*, SI 64, in press.

Tissier, M., Bonneton, P., Marche, F., Chazel, F., and Lannes, D. 2011 A new approach to handle wave breaking in fully non-linear Boussinesq models. *Coastal Eng.*, submitted.

## Prix

**Tissier, M.**, Bonneton, P., Marche, F., Lannes, D. and Chazel, F. 2010 Green-Naghdi Modelling of Wave Transformation, Breaking and Runup, Using A High Order Finite-Volume Finite-Difference Scheme. 32nd International Conference on Coastal Engineering