



# Xynthia Storm Surges modelling

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# Plan

- Xynthia storm description
- SHOM measurements during the storm
- Return period estimation
- Storm surge modelling
- Conclusion

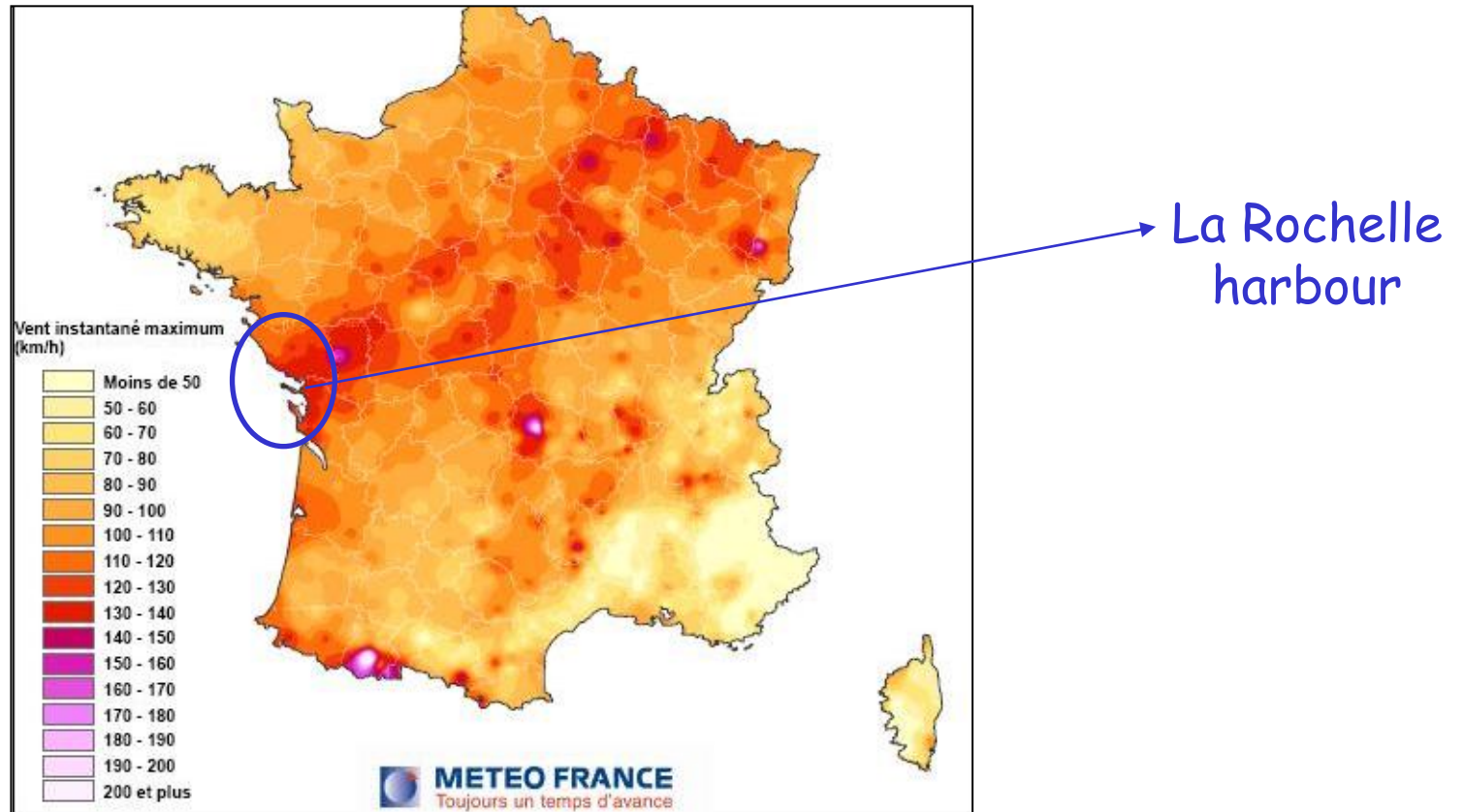


# Xynthia Storm Description

- 28 february 2010
- Maximum winds occurred at high water, during an equinoxial spring tide leading to very high sea levels
- Huge floodings, severe damage
- 53 dead people



# Xynthia Storm Description



Maximum instantaneous wind  
measured between 27/02/2010 12h UT and 28/02/2010 18h UT

# Xynthia Storm Description



La Rochelle during the storm





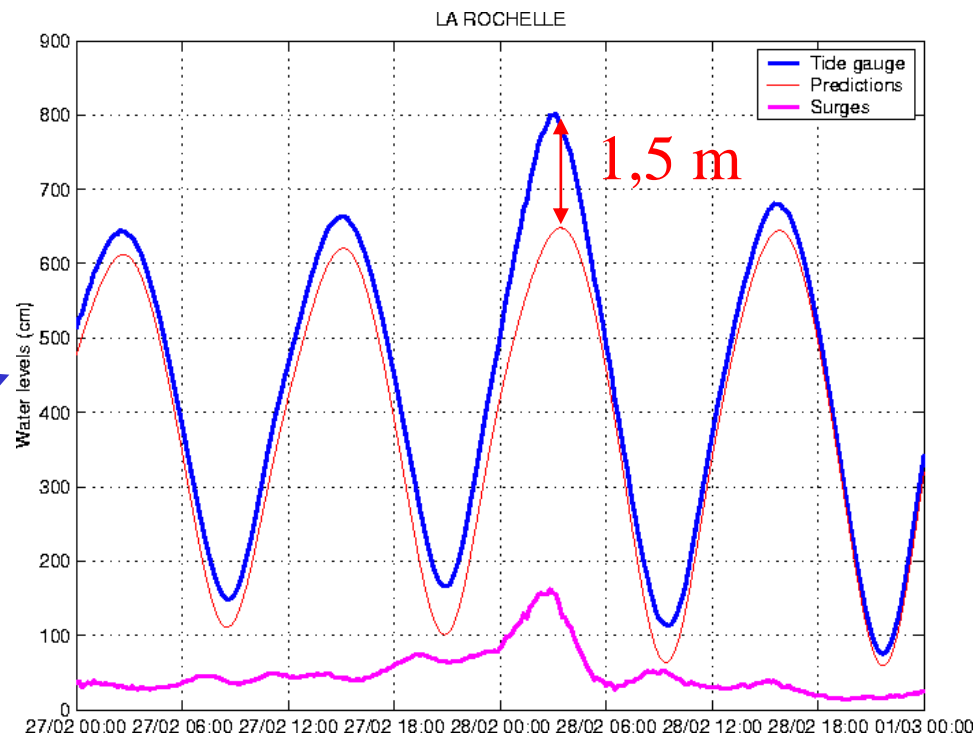
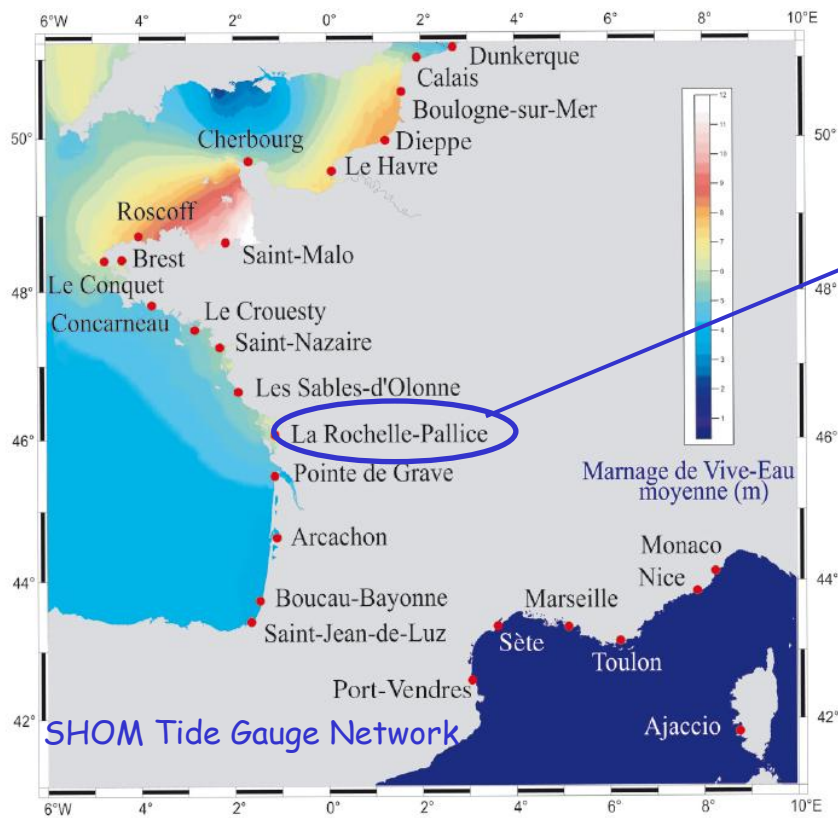






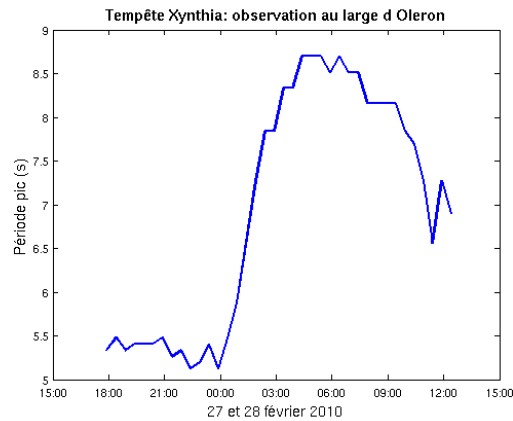
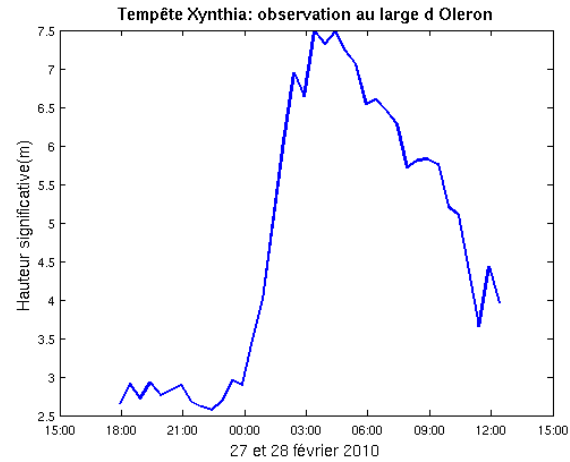
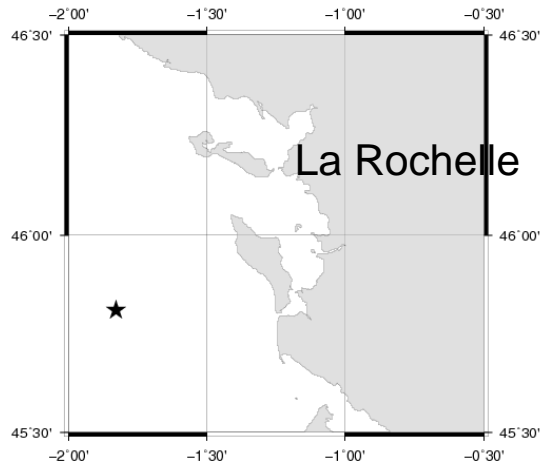


# SHOM measurements during storm

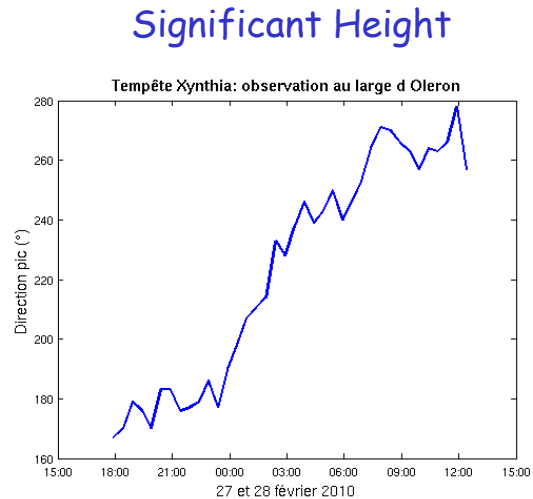


Measurements (blue), predictions (red), surge (pink)

# SHOM measurements during storm



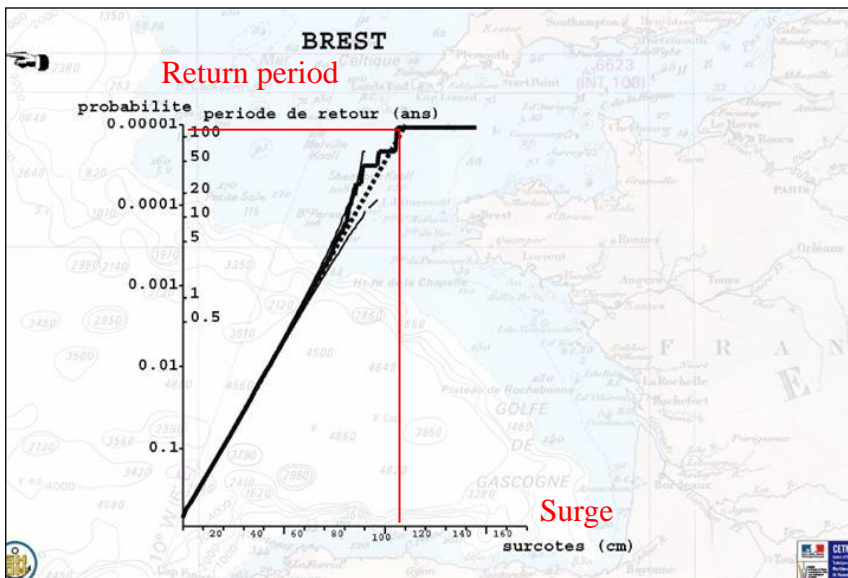
Pic period



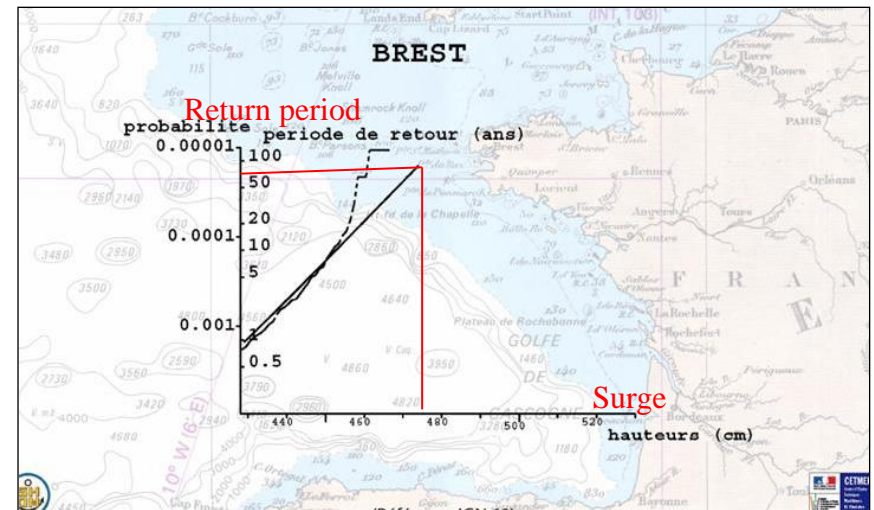
Pic direction

# Return period estimation

- Statistics to compute extreme sea levels
- Computation at each tide gauge where measurements > 10 years



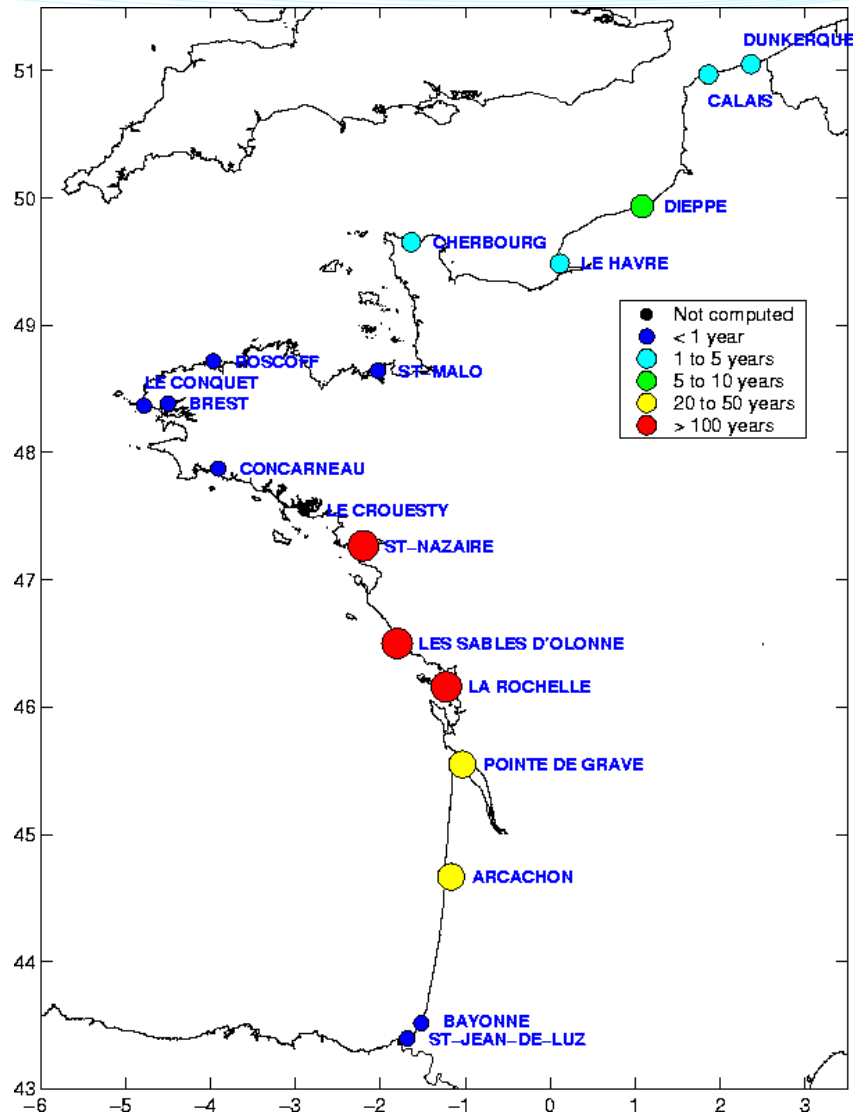
Surges distribution



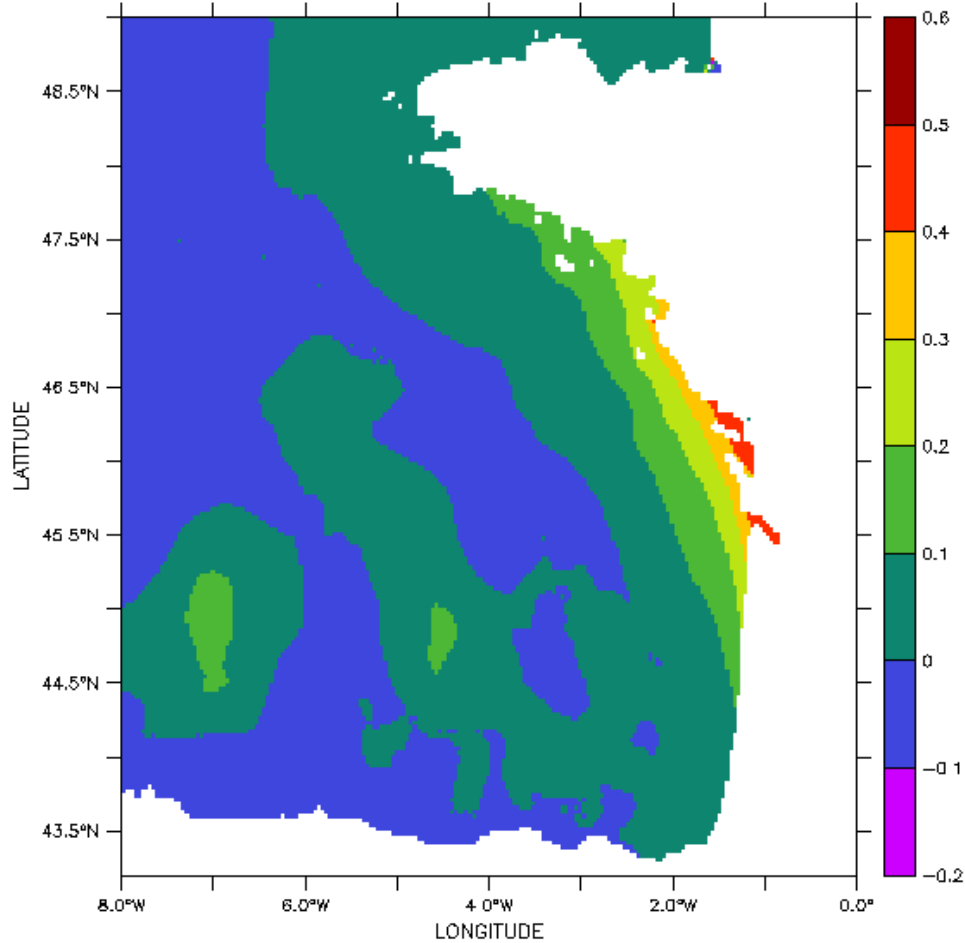
High Water extreme sea levels return period

*(full line : measurements, dotted line : statistic law - Gumbel law)*

# Return period estimation

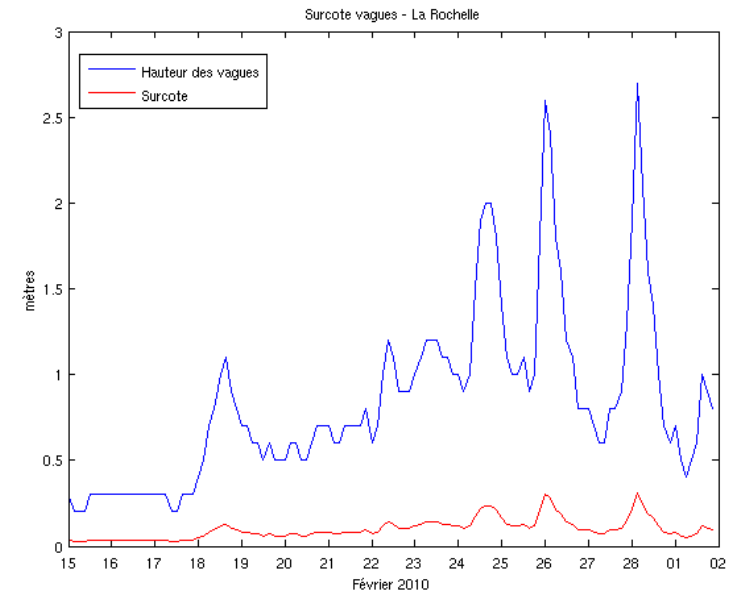
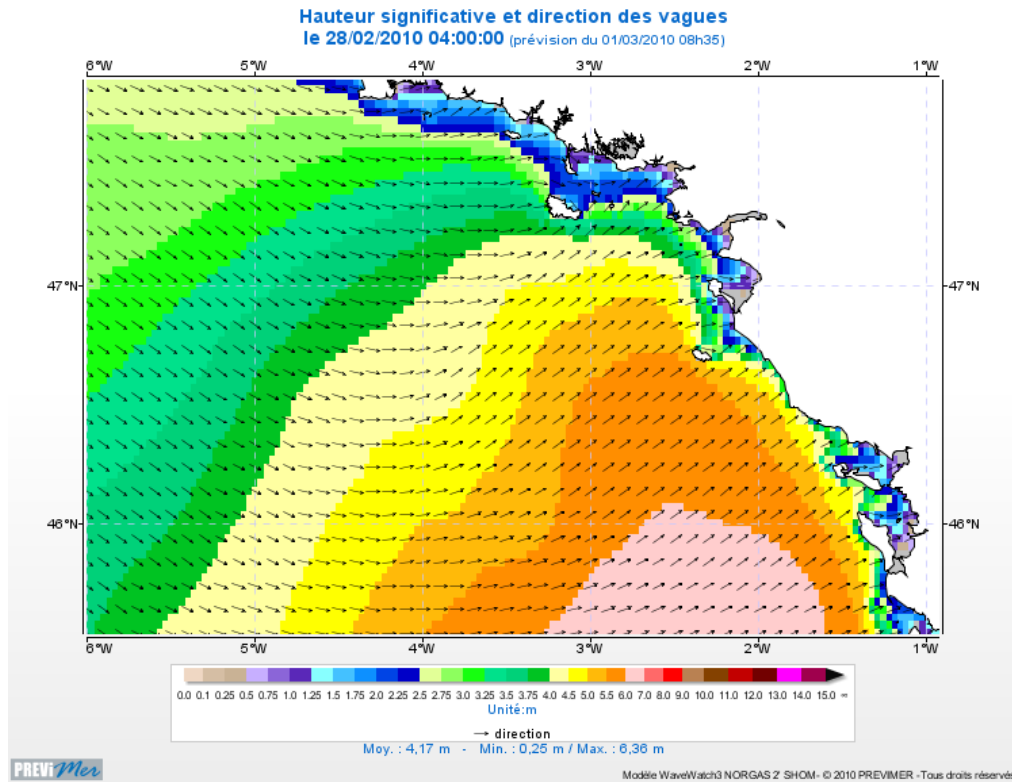


# Storm surge modelling



Wind surge modelling with HYCOM  
28 february 2010 at 2h UT  
(grid 3km)

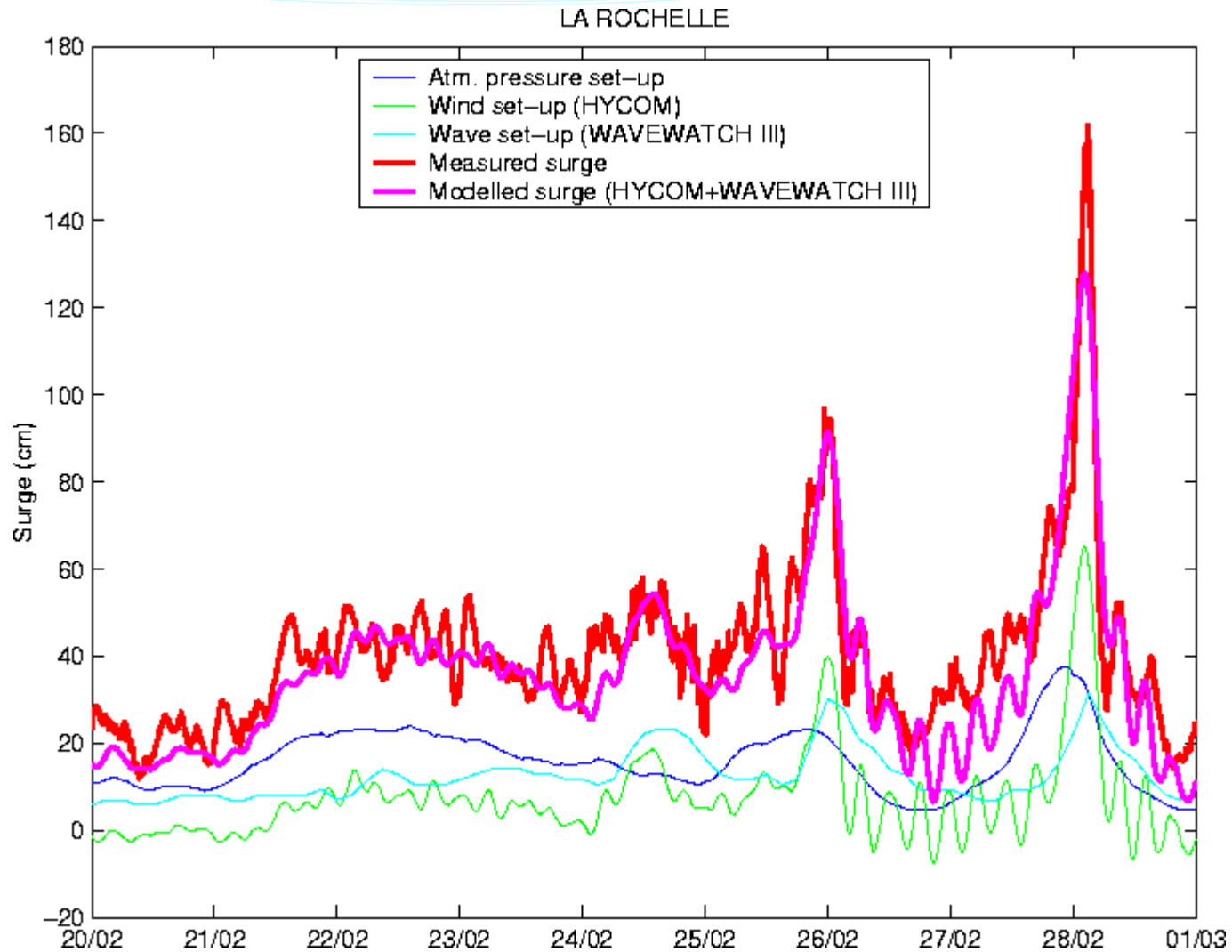
# Storm surge modelling



Wave heights (in blue)  
and wave set-up (in red)

Wave heights and directions modelling  
with WAVEWATCH III (NOAA)  
28 february 2010 at 4h

# Storm surge modelling





# Conclusion

- Tide gauge network measurements and statistics studies allowed to compute **return period**
- To take into account **wave set-up** is important to improve surge modelling
- This study showed the importance of **grid resolution** and **wind forcing spatial and temporal resolution**
- Development and improvements of operational surge models to take part in warning systems

