



Xynthia Storm Surges modelling

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SHOM



Plan

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

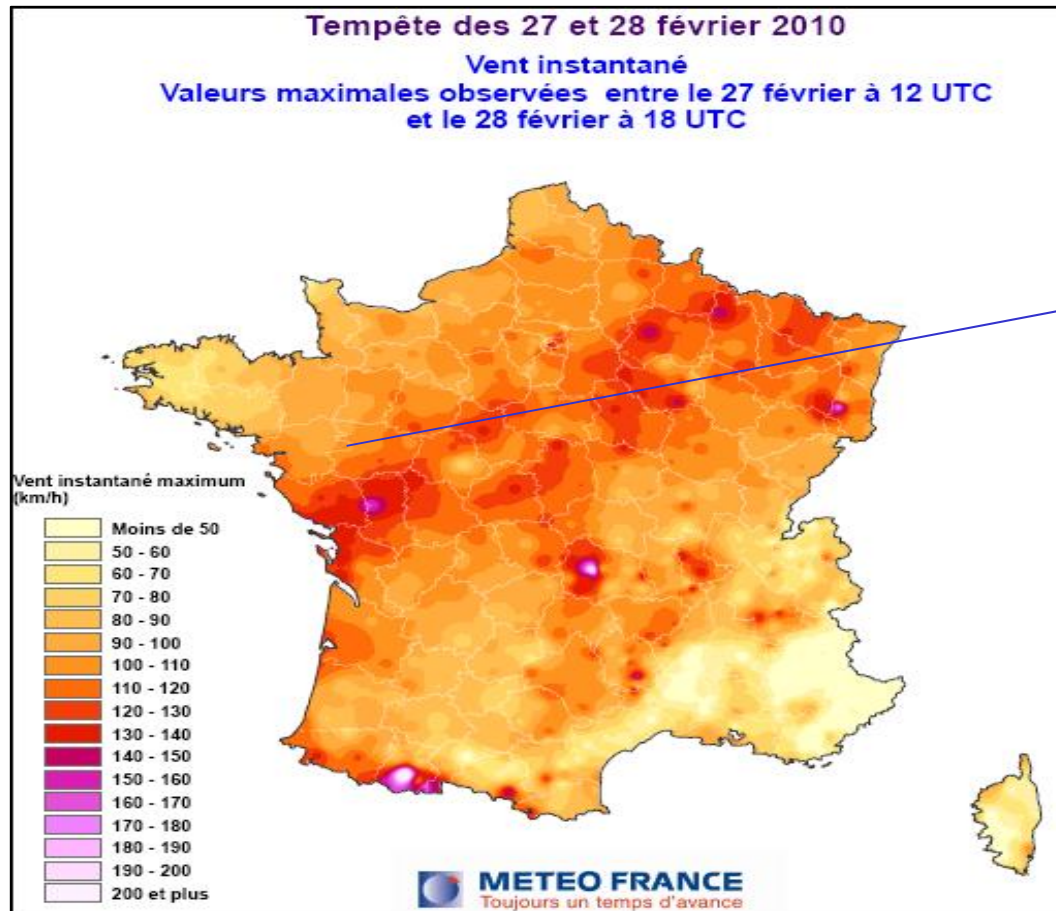


Xynthia Storm Description

- 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



La Rochelle
harbour

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

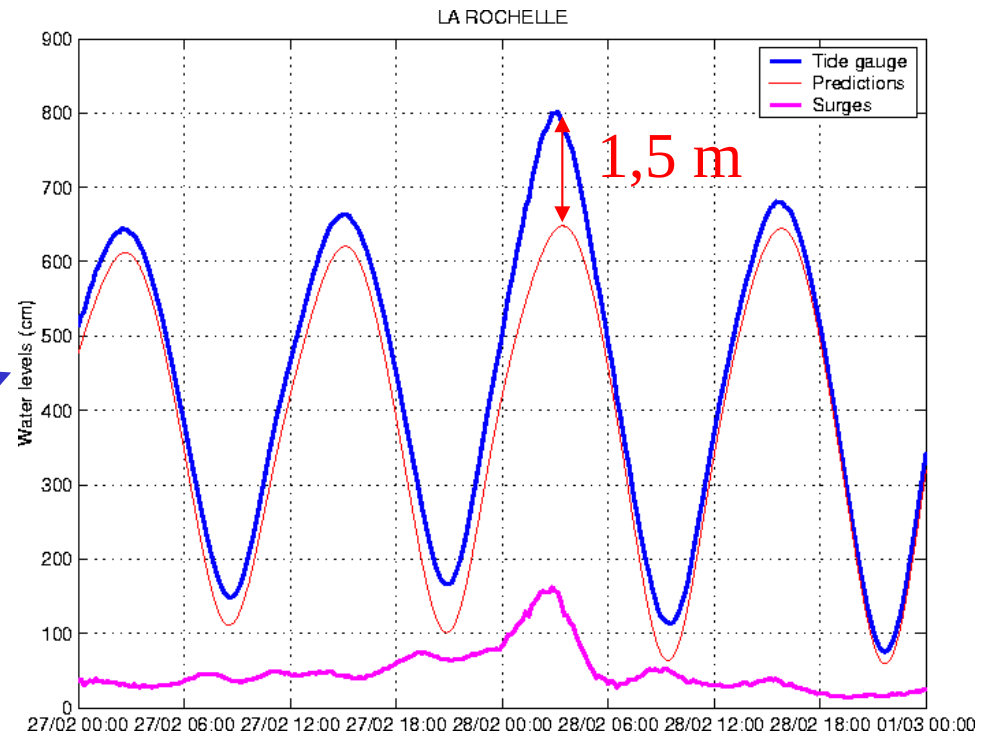
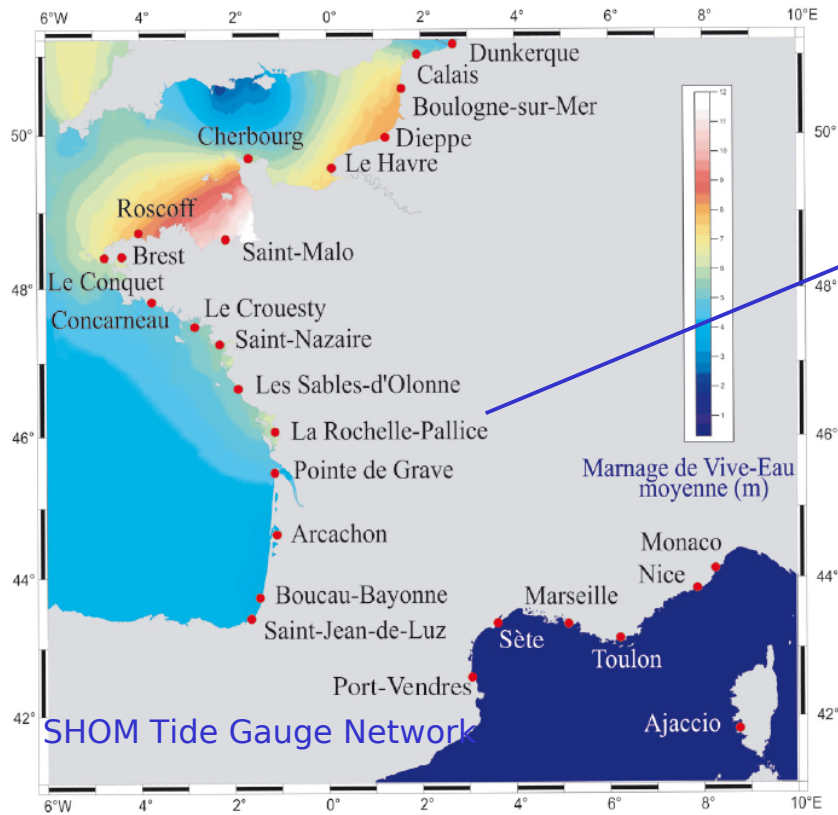


Xynthia Storm Description





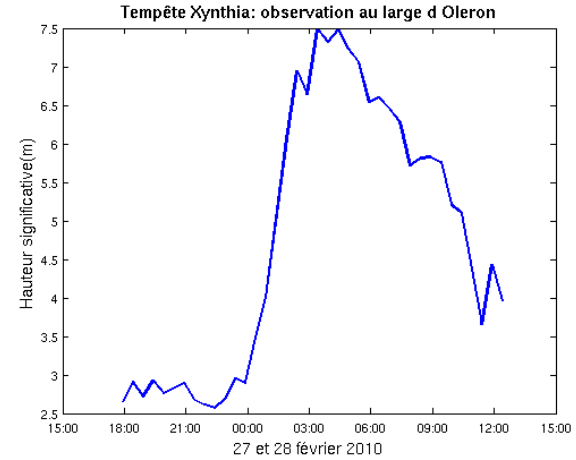
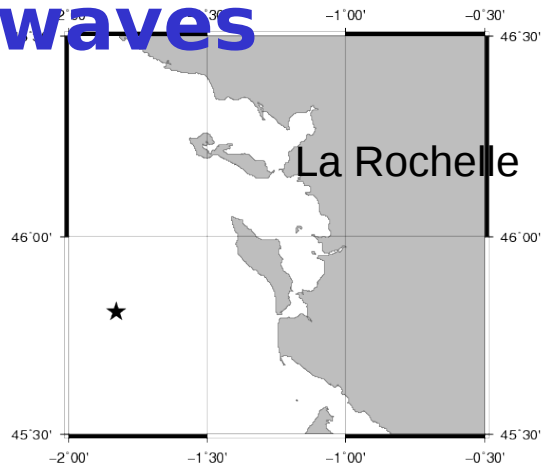
SHOM measurements during storm : sea level height



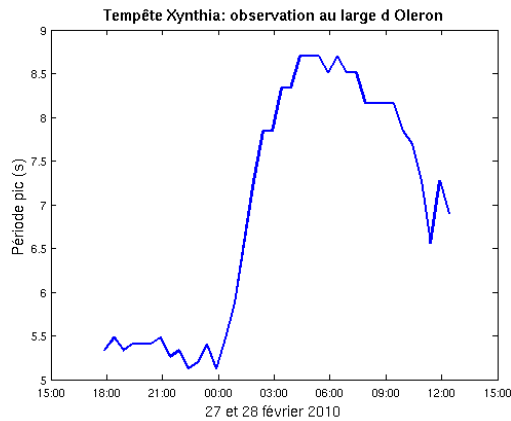
Measurements (blue), predictions (red), surge (pink)



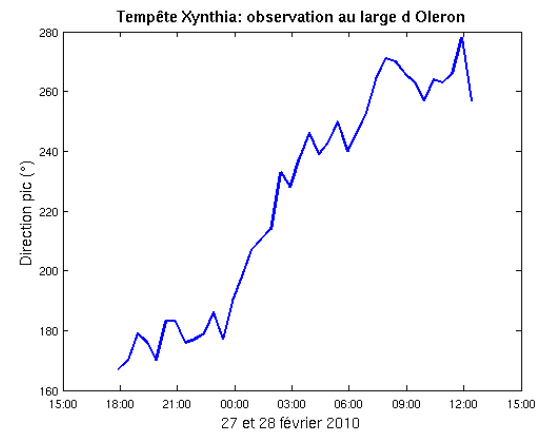
SHOM measurements during storm : waves



Significant Height



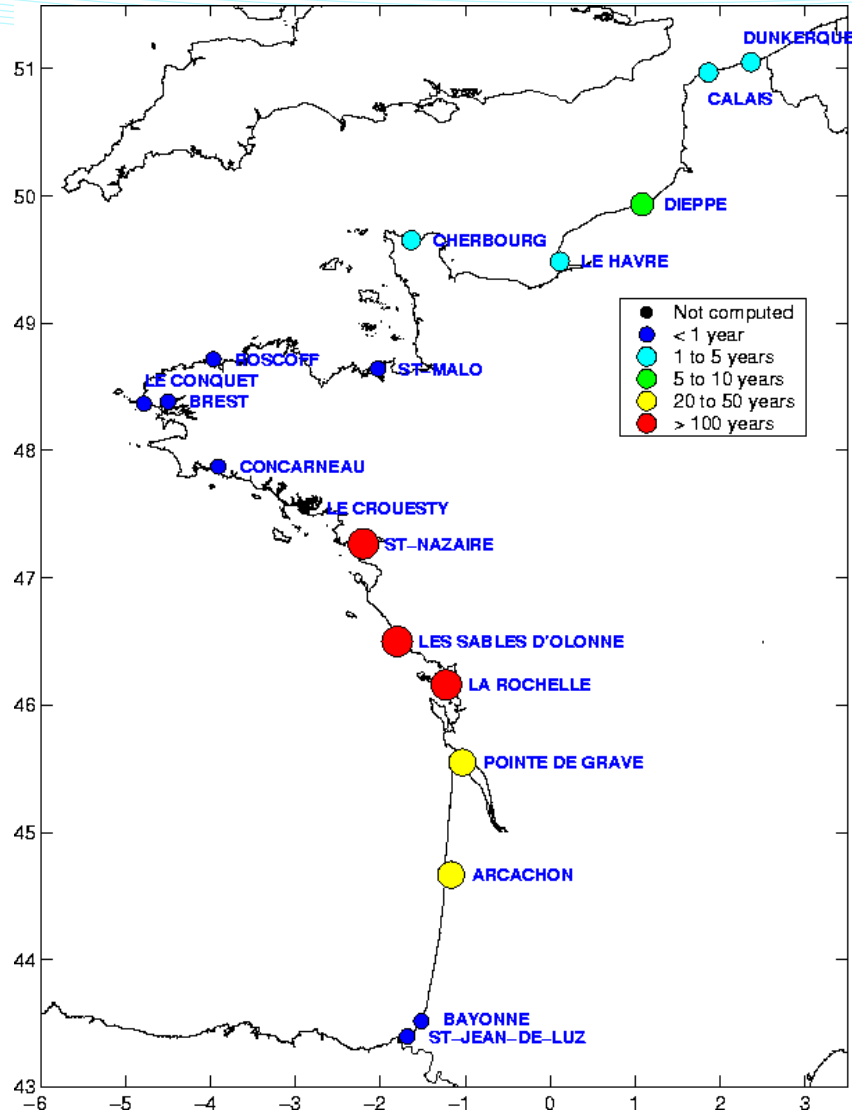
Pic period



Pic direction

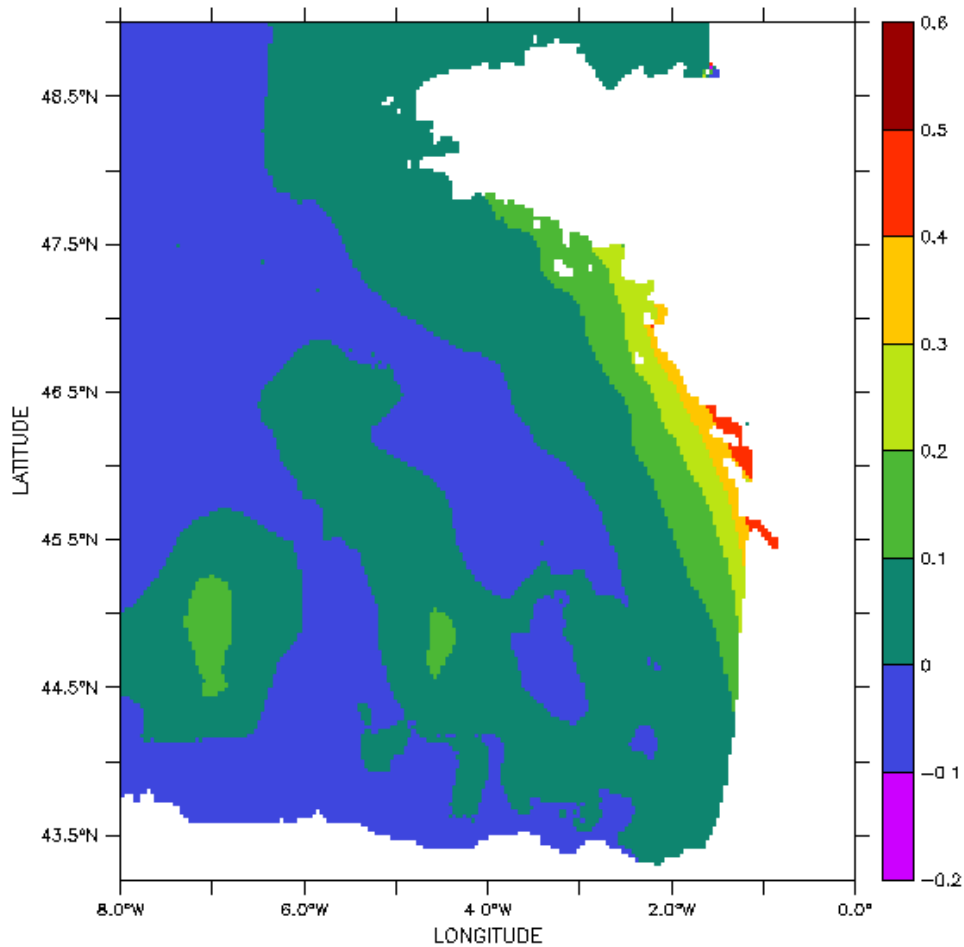


Return period estimation





Storm surge modelling

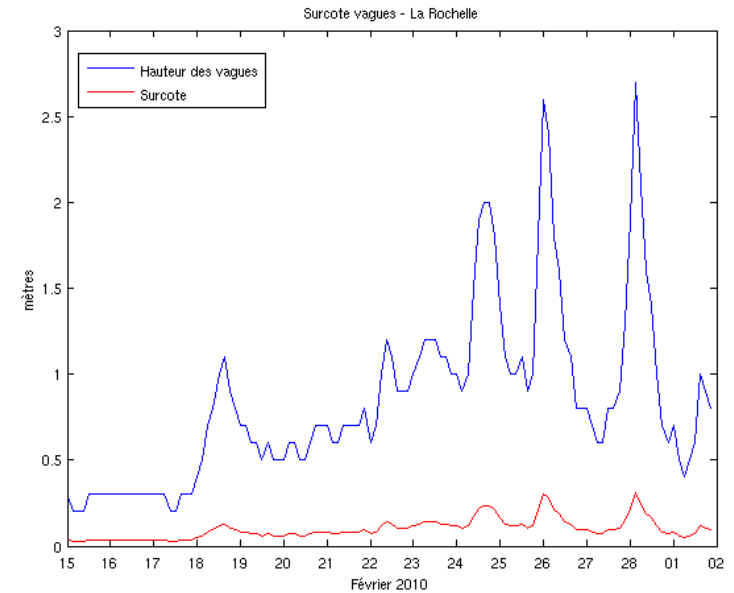
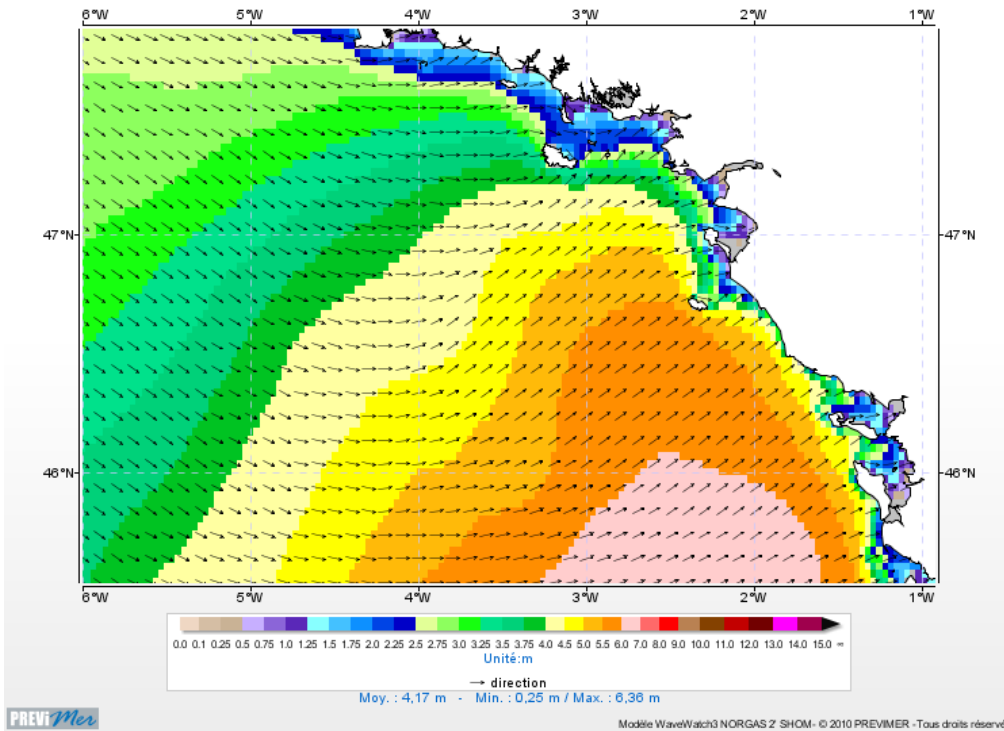


Wind surge modelling with HYCOM
28 february 2010 at 2h UT
(grid 3km)



Storm surge modelling

Hauteur significative et direction des vagues
le 28/02/2010 04:00:00 (prévision du 01/03/2010 08h35)

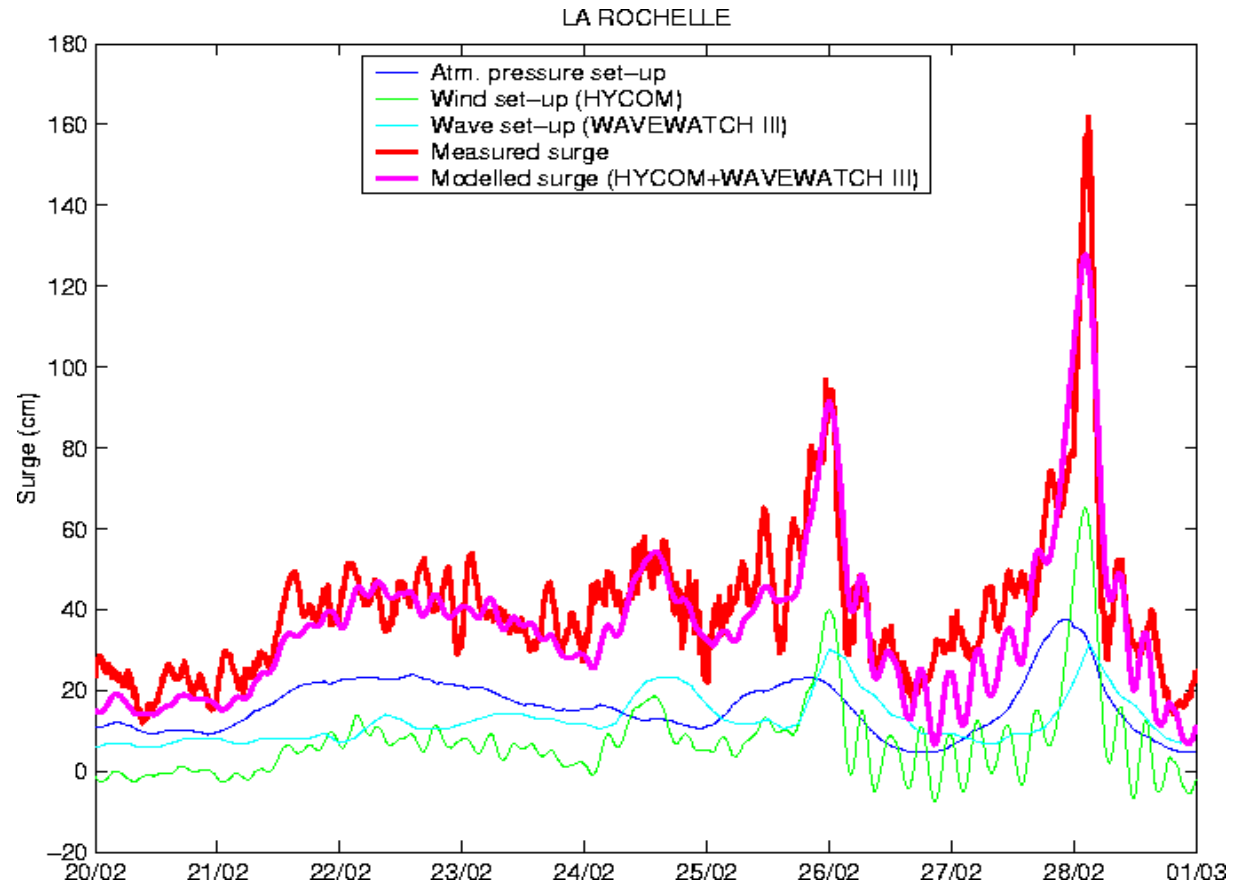


Wave heights (in blue)
and wave set-up (in red)

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



Conclusion

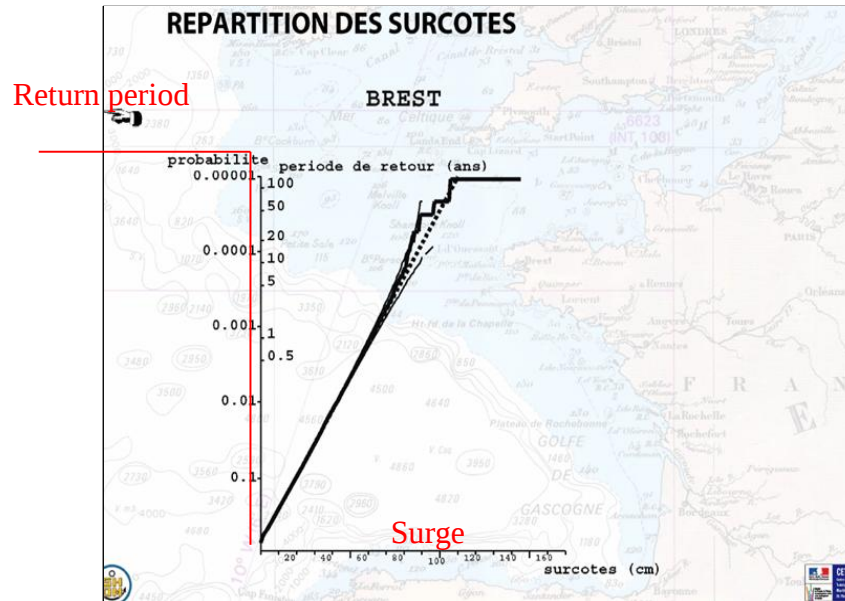
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Return period estimation

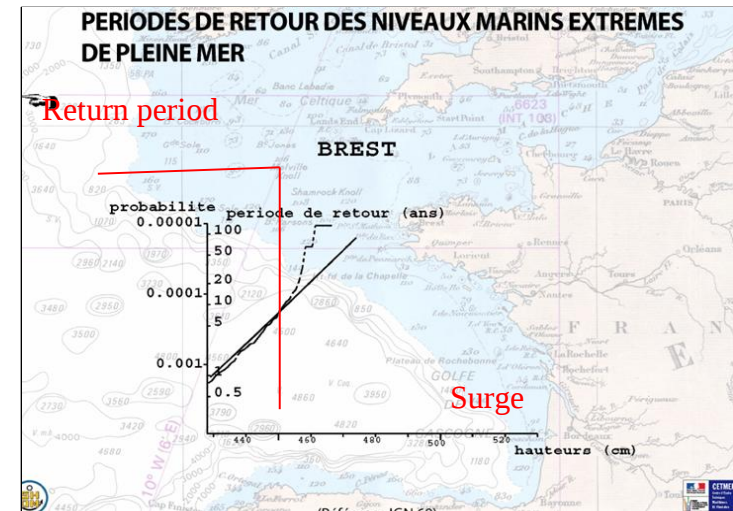


Statistics to compute extreme sea levels

- 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)