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Using a multi models approach to assess coastal exposure to marine inundation within a global change context

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In the recent years, marine submersion have been devastating low lying shores and inducing human and economic damage. Exposure to such events is likely to increase in the coming century due to a predicted sea level rise (IPCC 2007), adding to storm surges.

The ANR VMC MISEEVA project aims to assess the shore vulnerability to storm and sea level rise taking into account a likely climate change. to get a better understanding of past event and apply this knowledge to future exposure of French coast.

Numerical modeling helped to define present and future exposure of languedocian coastal zone ‘(Southern France) to marine inundation at a regional scale, and on a focused zone of kilometric size.
Permanent (sea level rise), recurrent((sea level rise + tide), or exceptional (sea level rise,tide +storm surge) was assessed for 2010,2030 and 2100, using different hypotheses of sealevel rise (IPCC 2007average values :0.07m in 2030,0.35m in 2100 , Rahmstorf 2007 : 1m in 2100)

Different works on Mediterranean storm ((Lionello 2002, IMFREX 2003) suggest a slight decrease in frequency, but no significant trend. The November 1982 centenal storm modeled condition were therefore use as a likely centenal storm in the coming century.Shore waves characteristics were modeled with SWAN, and the surge including atmospheric surge and tidal surge were modeled with MARS 2DH).

The inundated surfaces at regional scales were obtained by (i) calculation of water height semi-empirical formulae and crossing this information with the IGN DTM; At local scale more precise data was obtained by using the SURF WB code for modelling the run-up, on LIDAR DTM.Uncertainty due to input data and DTMs quality are to be assessed by comparison of those two scales.

Results of this modeling are the base document that allow to evaluate possible damages of assets at stake in the coastal zone and adaptation capacity in the coming century and draw a picture of possible futures depending on different hypotheses of protection and developpement strateg (Vinchon et al, 2010)