

Surcotes et submersions historiques horizons français et européen

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La *Mandränke* (submersion) des 11-12 octobre 1634 au Schleswig-Holstein

L'écosystème scientifique et institutionnel de la recherche

Contribution aux missions d'enquête parlementaire et sénatoriale sur
Xynthia par le groupe de recherche
SUBMERSIONS

La crise Xynthia à l'aune de l'histoire

Enseignements et enjeux contemporains d'une
histoire des submersions



Ex voto relatant la tempête de 1784 en Charente-Maritime (cathédrale de La Rochelle)

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Jacques Boucard
Frédéric Surville

2 juillet 2010

2010



2013-



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Resilience-Increasing Strategies
for Coasts – Toolkit



2013-2017

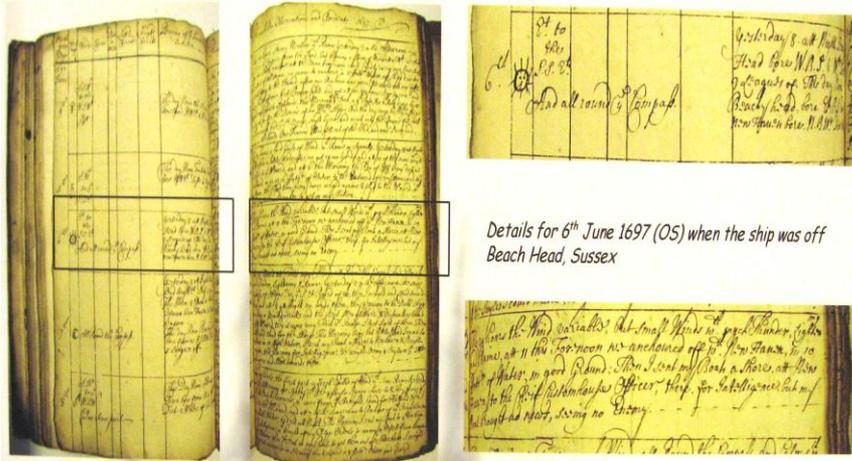
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2015-2018

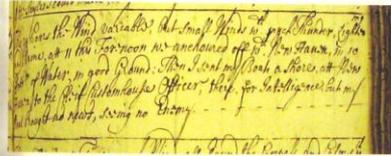
Plus que la surcote: la submersion

Une documentation pléthorique et très diverse



Pages and details from a typical logbook from the late seventeenth century. This example being from HMS Experiment (original held in the National Maritime Museum, Greenwich)

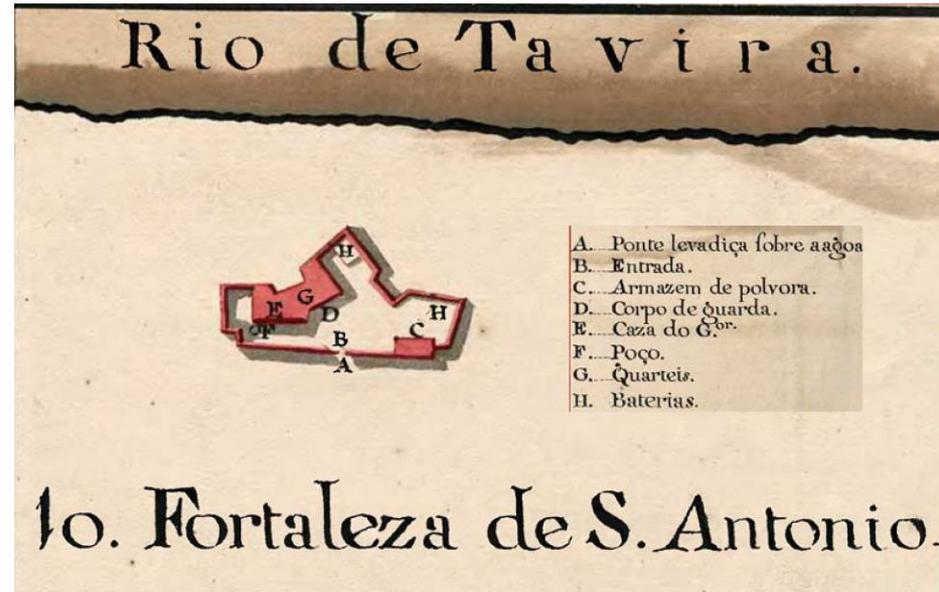
Details for 6th June 1697 (OS) when the ship was off Beach Head, Sussex



Extract of the logbook HMS Experiment, end 18th c The National Archives, BA 456

Bar	Flag	Clouds	Wind	Rain	Temp	Remarks	
13	6	2	SW		20	July 17 th 1705 Some sunshine generally winds at the day thunder showers about	
14	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
15	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
16	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
17	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
18	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
19	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
20	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
21	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
22	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
23	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
24	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
25	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
26	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
27	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
28	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
29	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.
30	20	17	66	59	2	SW 2	Wind chiefly from SW, some rain during or passing it.

Plans militaires Batteries de Ria Formosa (Algarve)



- A. Ponte levadica sobre a água
- B. Entrada.
- C. Armazem de polvora.
- D. Corpo de guarda.
- E. Casa do G.^{or}.
- F. Poço.
- G. Quarteis.
- H. Baterias.

Private diaries: Extract of Thomas Barker's Journal, 1750-1789 (Met Office Library)

10. Fortaleza de S. Antonio



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A overabundant documentation

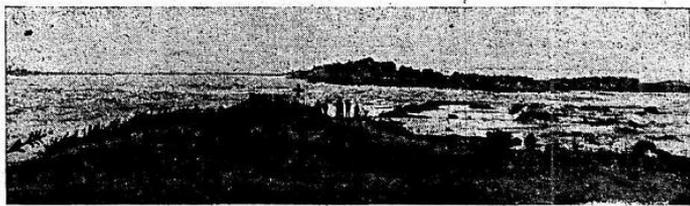


L'Ouest-Eclair

25 MARS
25 CENTIMES

UNE PARTIE DU LITTORAL VENDEËN MENACÉ PAR LA MER

Plus de 120 hectares ont déjà été gagnés par les eaux
Mais le village de La Faute, au sujet duquel on avait de sérieuses craintes,
paraît, momentanément, grâce aux travaux de fortune exécutés,
hors de danger.



(Cliché Berthel, Lucan.)
La croix (+) indique la brèche de 300 mètres pratiquée par la mer dans les dunes et par laquelle les
eaux envahissent les terres.
Une deuxième brèche s'est ouverte dans la direction indiquée par la flèche et à 300 mètres de la première.
Dans le fond et à droite, la ferme des « Violettes », menacée par les eaux.



(Cliché Berthel, Lucan.)
Les terrains submergés (plus de 120 hectares). Au premier plan, on aperçoit la route de La Faute à la
Tranche qui est coupée sur une longueur de 1.500 mètres environ.
Cette photographie a été prise en avant du village de La Faute.

Submersion à La Faute-sur-Mer (France) lors de la tempête du 25 mars 1928



Submersion du 15 février 1941 Ria Formosa area, Portugal

Folha do Domingo, 30 mars 1941

DEPOIS DO CICLONE

Comissão Distrital de Socorro às Vítimas

Esta comissão iniciou os seus trabalhos de harmonia com as instruções da Comissão Nacional e é constituída pelos srs. Major Monteiro Leite, governador civil, dr. José Correia do Nascimento, presidente da Junta da Província, e P. José Gomes da Encarnação, representante de S. Ex.ª Reverendíssima o Bispo da Diocese.

Incumbe à comissão colher informes para o recenseamento regional dos sinistrados que deverão ser socorridos pela Comissão Nacional e socorrer as necessidades urgentes de alimentação provenientes dos desastres ocasionados pelo ciclone, aplicando a este fim os donativos recolhidos na área do distrito de Faro.

A comissão deliberou tornar público que aceita do nativos para tal fim, os quais poderão ser entregues ao Governo Civil.

Sabemos que vai ser lançado um apêlo à população algarvia, solicitando meios para poder atenuar a desgraça que, no dia 15 de Fevereiro último, levou a miséria a muitos lares da nossa província.

A comissão recebeu, até 22 de Março, os seguintes donativos: Sr. G. G. Coventry Mallet e D. Cecília Margaret Mallet, 1.000\$00; Margarite Janes 50\$00 Total 1050\$00

A «Mocidade Portuguesa», de Oihão, resolveu promover uma festa cujo produto liquido se destina a reforçar os fundos da comissão distrital.

O gesto simpático e altruista dos membros da colônia inglesa, no Algarve, que espontaneamente enviaram os donativos mencionados, logo após o ciclone e a atitude galharda dos filiados olhanenses da «M. P.» serão seguidos por outros que a comissão espera de todas as almas bem formadas.

Tempêtes et submersions en images: l'ex-voto



**Notre-Dame Chapel, Honfleur, 1770
(Normandy, France)**

Parish of San Francisco, Lerici, 1877 (Liguria, Italy)



Temporale sofferto il Buco nominato Antonio Camogli, Capitano Giobatta Truffino, la notte del 20 Settembre 1877, innanzi nell'Isola Ludovico Trifolice. Essendosi perduti si raccomandarono a N. S. e in fatti ottennero la grazia che si sono levati da si gran pericolo. Poichè il marinaio Bonarini con zelo dona il presente, a N. S. dell'Anno

Ex-voto of Ferragudo, 1774 (Algarve, Portugal)



*M. J. T. S. N. S. DA CONCEIÇÃO DE FERRAGUDO A OESTE ANTO
MONTUNGRIA E SUA COMPANHIA DOALCARUELHE DE HUMCA
NDE TEMPORAL QUE SE UTRAMPERDIDOS E PERMETENDO A UELAD
OESTALAS. SELE MURODELESHIINDOTA ADARACOSTA E MDOIS DE
FUEREIRO DE 1774 ANOS.*

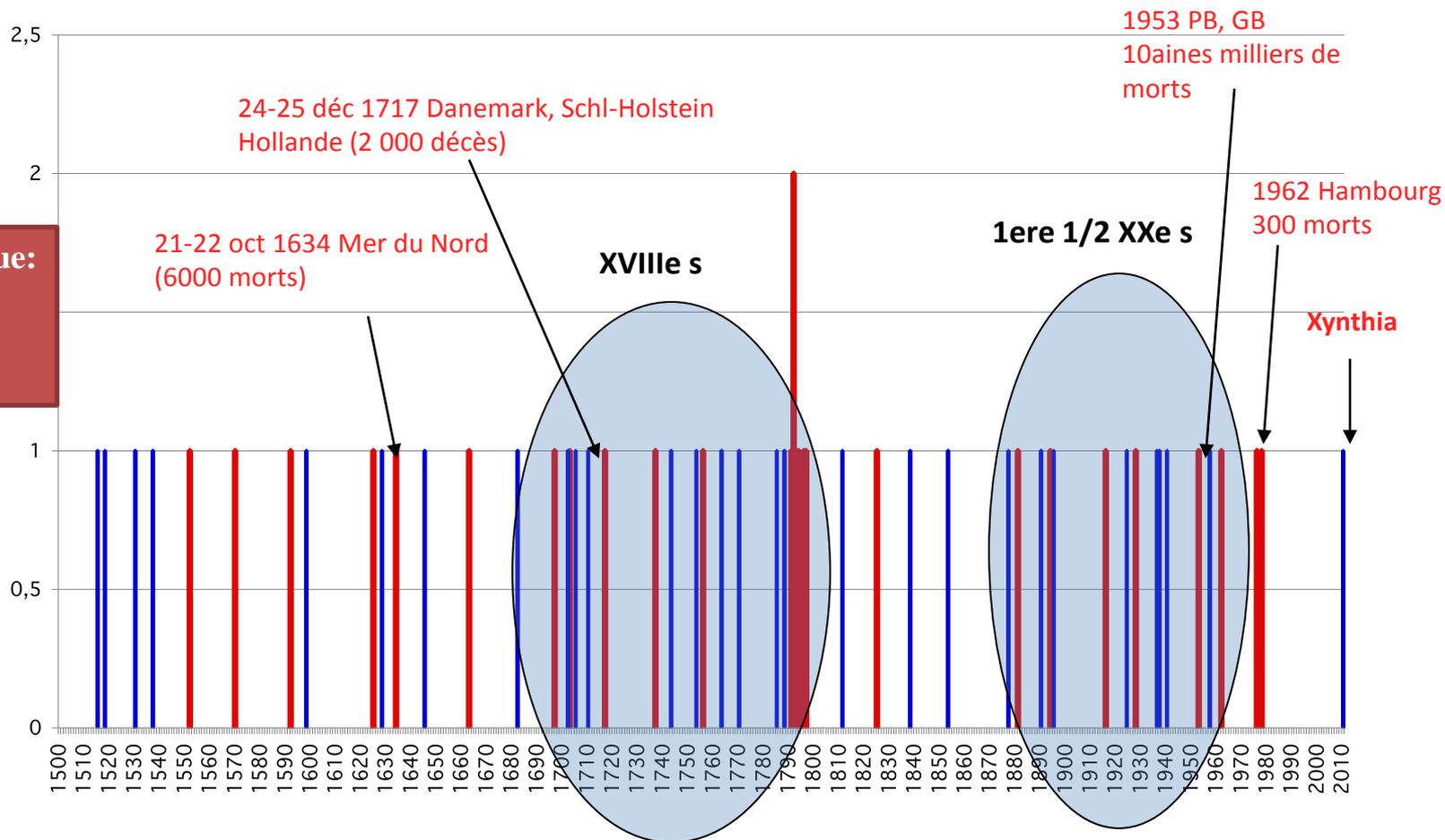
L'approche factuelle

Chronologie et fréquence

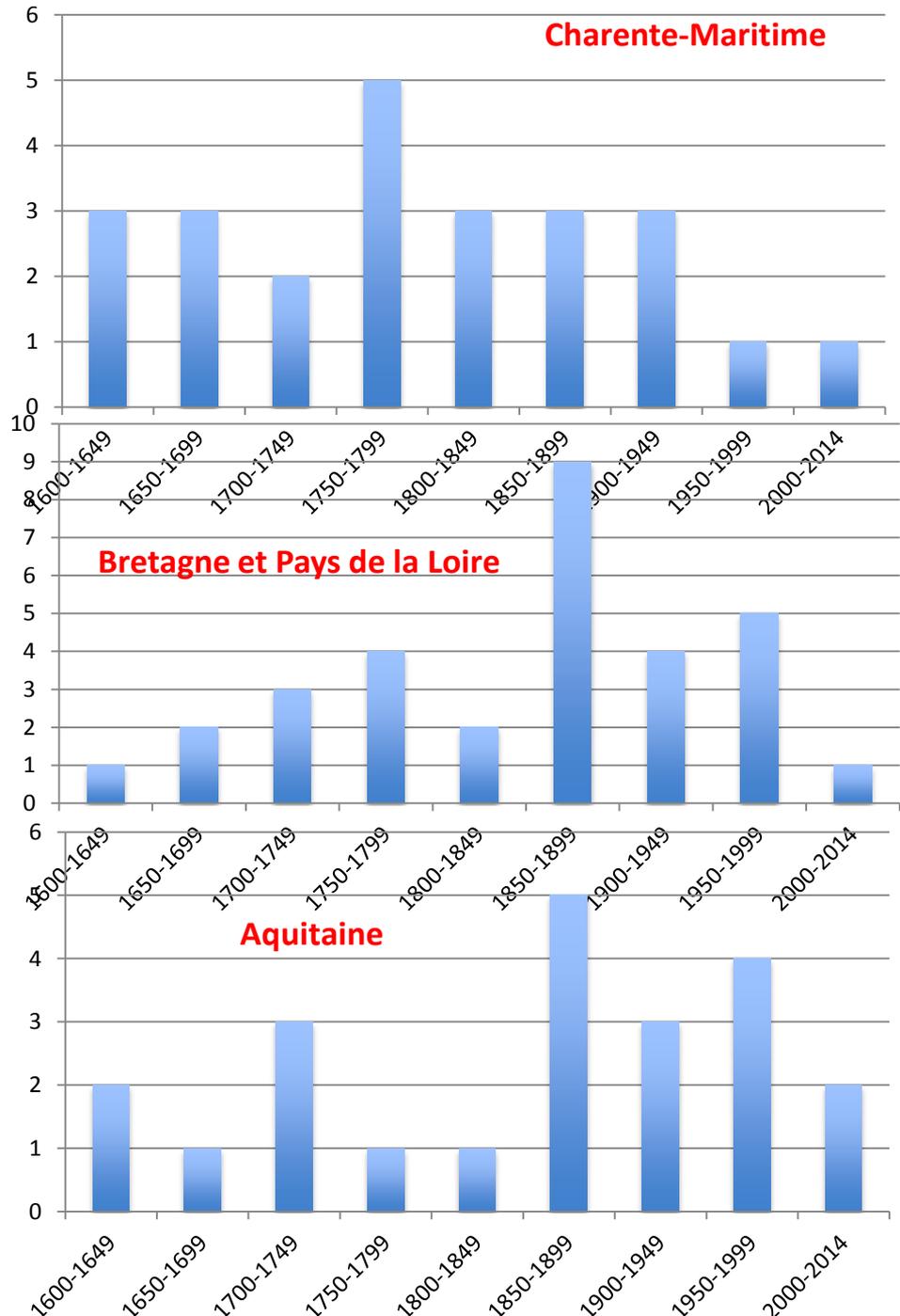
La submersion: un élément de permanence historique et contradictoire

- Arc atlantique français: 29 événements
- Mer du Nord (France exclue): 27 événements

France Atlantique:
29 événements
RP: 17,2 ans



**À l'échelle régionale:
une forte variabilité chronologique
1600-2014**



Un défi pour l'historien: mesurer l'intensité

Option 1: la vulnérabilité



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Nature du contenu historique: l'exemple des submersions dans le Norfolk

Extract of the 'North Norfolk' database

4	Event	Start date	Duration	Peak significant wave height (direction)	Maximum water level (location; see key below table)	Maximum wind intensity (direction)	River flooding	Reported casualties (regional level)	Reported damage to Buildings/infrastructure at case study site	Reported damage costs (regional level)	Intervention measures at case study site
16	8	08/10/1690				NW			A north westerly gale linked with a high tide. The 1 bank broke and 66 acres (264ha) of wheat, presumably already winter sown, was covered under 6 feet (1,80m) of water. The water reached a depth of 20 feet (6m) at Cley quay and several houses including the George Inn were under 4 feet (1,20m) of water (Hooton, 1996 and NRO, Cley Parish Registers)	4 wheat and winter sown are flooded	
17	9	15/02/1735	2			NW			A north westerly storm sprang up on the Sunday night of the 15/02 and continued to blow until the following Tuesday morning when it coincided with a high spring tide. Cley was described as almost demolished and its inhabitants had to take to upstairs rooms to avoid drowning and had to clamber out of first floor windows into boats to be taken to safety. 9 feet (2,70m) of water stood on the marshes and the damage was just as great all the way to King's Lynn (Gough Mss. British Library)	7 massive destruction in Cley	6 Inhabitants find refuge in upstairs rooms and boats take them to safety
18	10	07/02/1741							About 6.00am a very great tide drowned all the marshes on both sides of the channel, broke down the greatest part of the marsh banks, especially the East Bank which was almost wholly destroyed. It washed down the greatest part of the wall next Salthouse road. Witnesses state that this tide was much greater than that in the year 1735 (Hooton, 1996 and NRO, Cley Parish Registers).	It destroyed about 40 acres (160ha) of wheat in the marshes	9 see other case study sites

Historical content:

1. Damaged dunes and seawalls
2. Height of water
3. Flooded territory (street, quay, village, city...) --> cartographie//valeurs assurées
4. Damaged harvest (wheat, salt)
5. Destroyed houses
6. Evacuation of the inhabitants (1st floor, abandonment of houses)
7. Cut roads
8. Erosion and its consequence (threat or disappearance of Inns in England)
9. Cattle and/or human losses



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RESEARCH & INNOVATION

FP7



Affectation de valeurs en fonction du type de dommages (humains et matériels)

Severity index.xlsx

Rechercher dans la feuille

Calibri (Corps) 12

Accueil Mise en page Tableaux Graphiques SmartArt Formules Données Révision

Modifier Police Alignement Nombre Format Cellules Thèmes

B26

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Impacts and mark														
2		Mark				Mark						Mark			
3	Coastal defenses				People evacuation						Flooded territory				
4	seawalls	1			1st floor	1					10-99 ha	1			
5					evacuation of houses	2					100-199 ha	2			
6											200-299 ha	3			
7	Infrastructures				Human losses						300-399 ha	4			
8	quays	1			1 to 9	1					etc				
9	bridges	1			10 to 19	2									
10	piers	1			20 to 29	3					Environmental impacts				
11	roads	1			etc						uprooted trees	1			
12	power cut	1									dune breach	1			
13					Livestock losses										
14					10 to 19	1					erosion	1			
15	Buildings				20 to 29	1									
16	chimeys	1			30 to 39	1					Economical impacts				
17	roofs	1			etc						harvests (weat, salt, fishing)	1			
18	a few buildings, houses and huts	2									shipwreck	1			
19	factories	3													
20	village or city surrounded by water	4									Financial cost				
21	major part of the city or village	5									50 to 99 000 €	1			
22											100 000 to 199 000 €	2			
23											200 000 to 299 000€	3			
24											etc				
25															
26															
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Feuil1 +

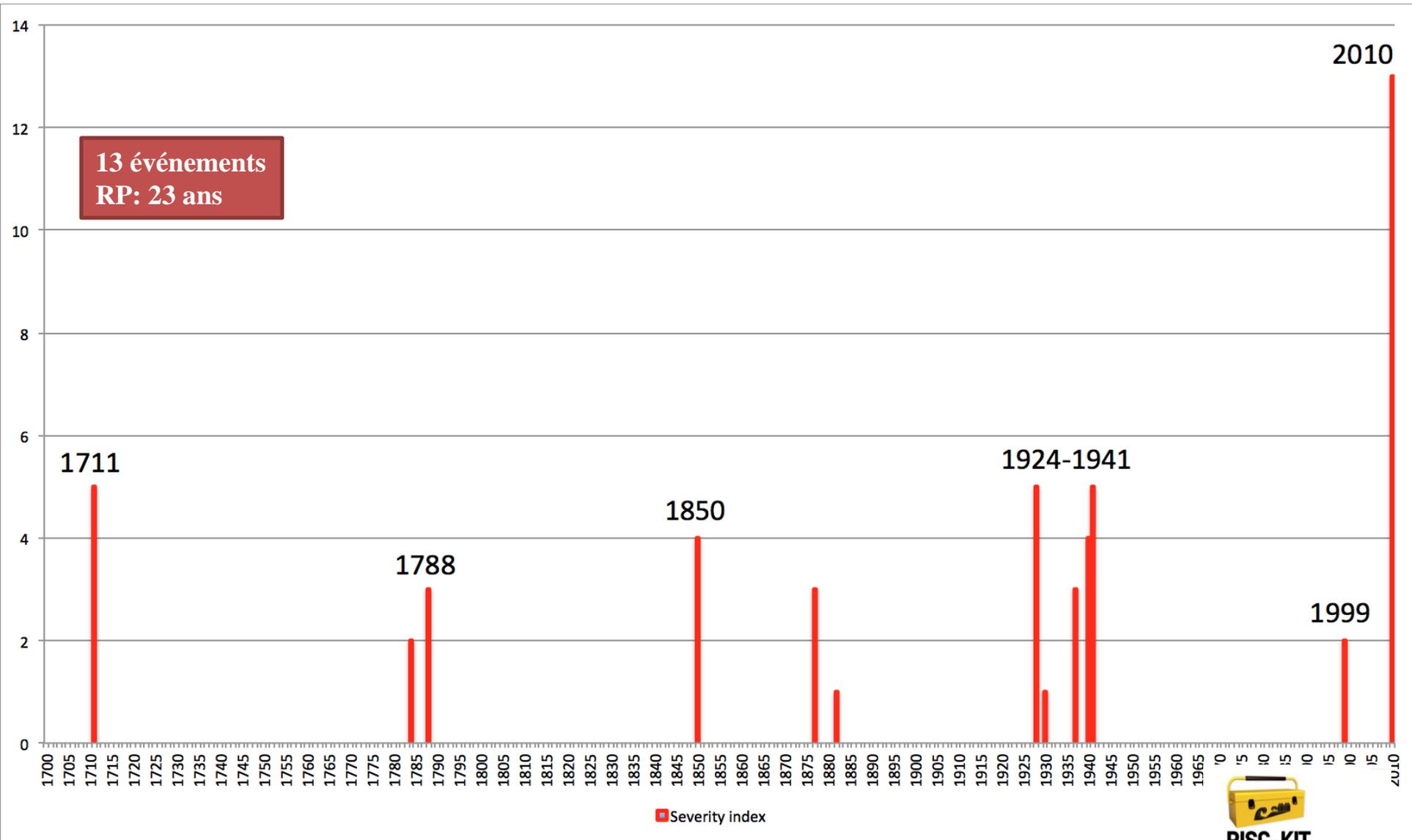


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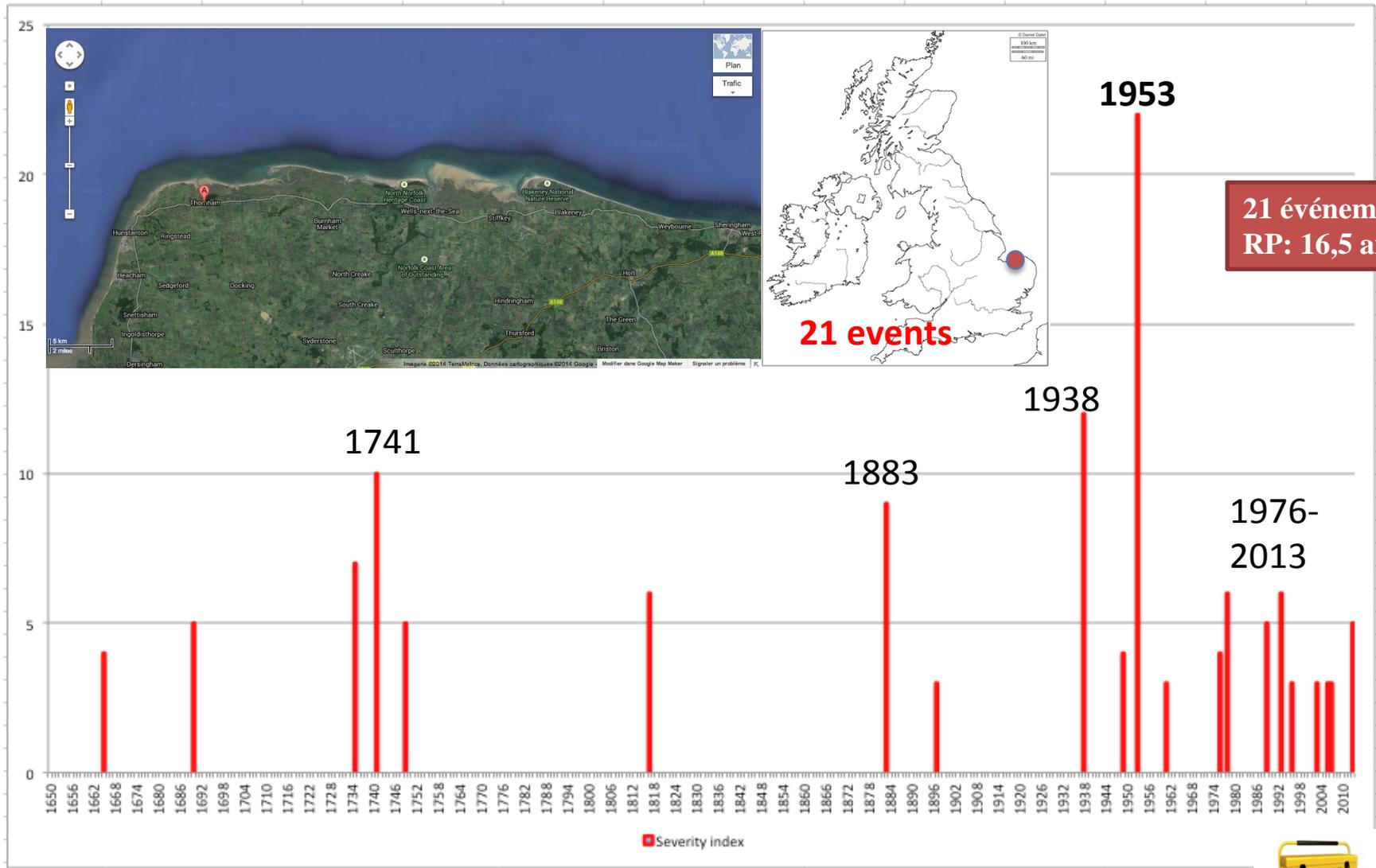
La Faute-sur-Mer (France) 1711-2010



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North Norfolk (UK) 1665-2013



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Option 2: mesurer les vagues historiques a minima

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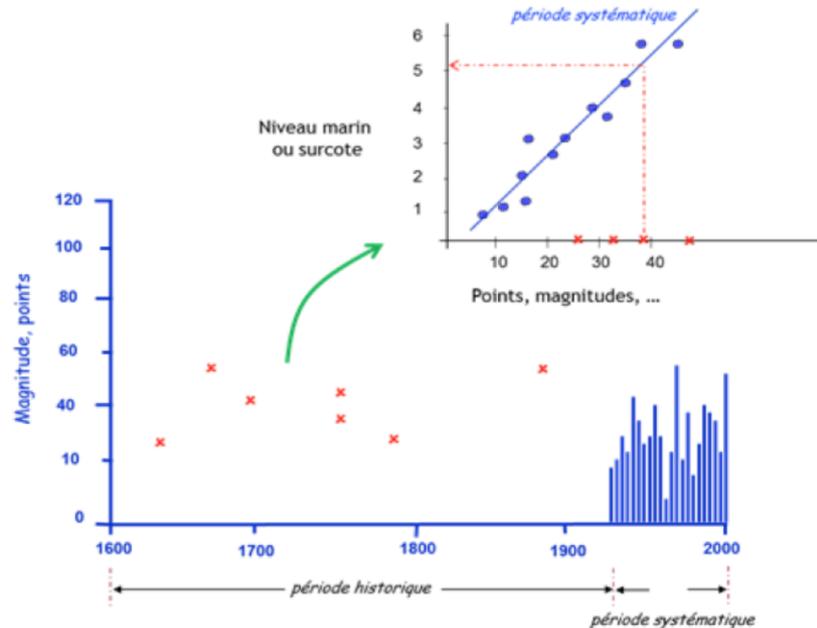
Expérimentation en cours en collaboration avec Yasser Hamdi (IRSN) pour le site de Gravelines

Principes:

- Identification de repères cités dans les archives lors d'une submersion
 - Niveau de l'eau atteint sur le repère (d'après les archives)
 - Caractéristiques techniques des repères (métrage)

Méthode Y Hamdi:

- Application d'une régression linéaire
 - entre les niveaux marins (ou les surcotes) observées récemment
 - et la variable historiques (hauteurs repères submergés)
- > la droite de régression sert à estimer les surcotes historiques



L'exemple de la submersion d'avril 1680 à Dunkerque

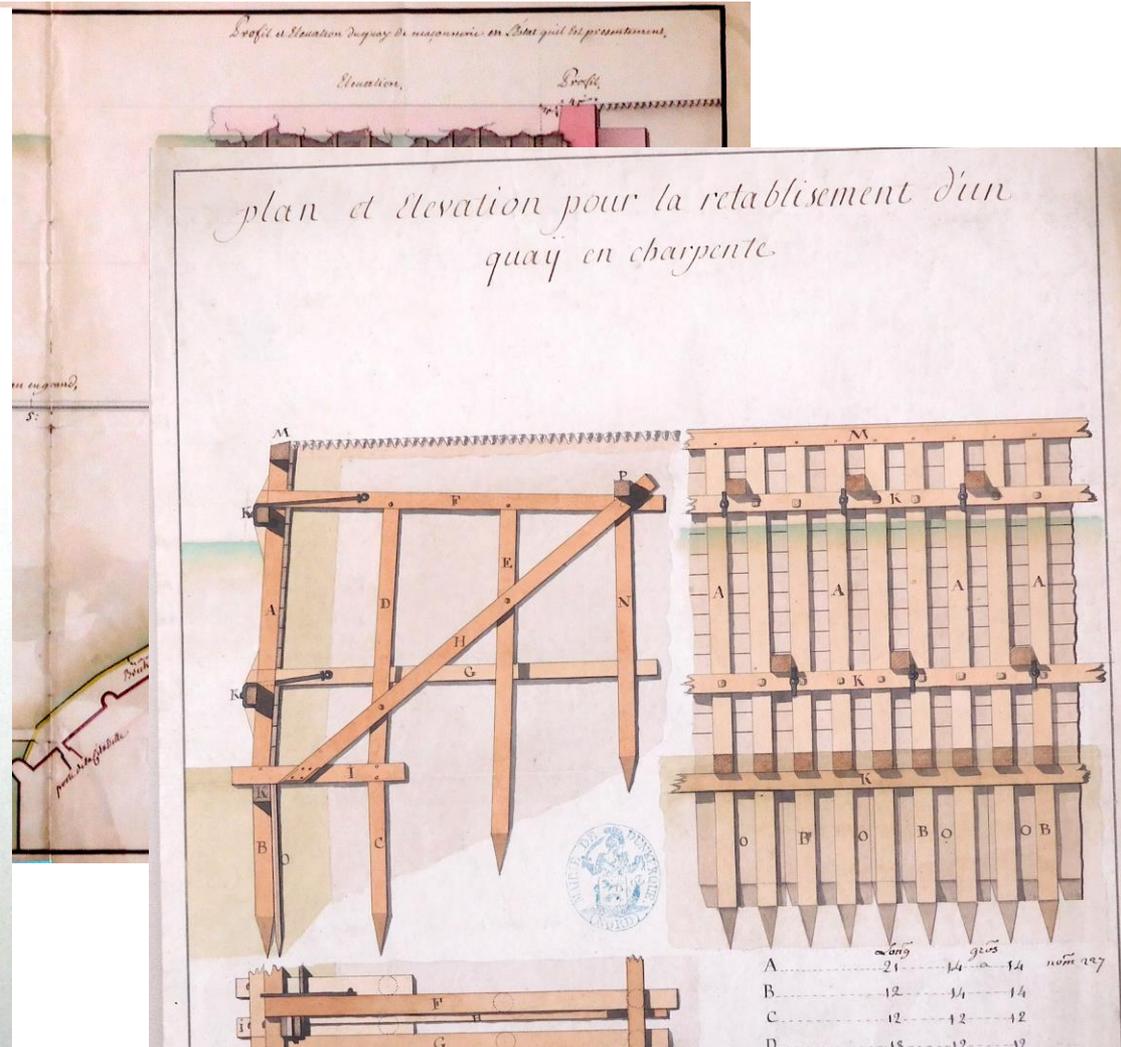
2366:13:4

Conditionnée vanc mee dat mijn Coelic hooft
 12. april 1680
 Baauw Buiaghtme ende schepenen deser Heeren
 van den Conynck Belien ten Besteden het vermaachen ofte
 Repareren vande muur vande Kaye byde
 Citadelle Brugge beginnende vander Ronden theoux
 aende waeterproeste vande panne tot entrent der
 Ronden theoux die haet teynen vander Conynck
 ofte Quylmagaryns
 Voor leest

Sal den annemer deffineren alle het slyck
 ende vlychtheyt dat soude mogen belten tot het
 maachen van het selue werck ende sal syn werck
 draeghe houden van het waeter dat hij behoorelyck
 waerken can alles tynnen Coste

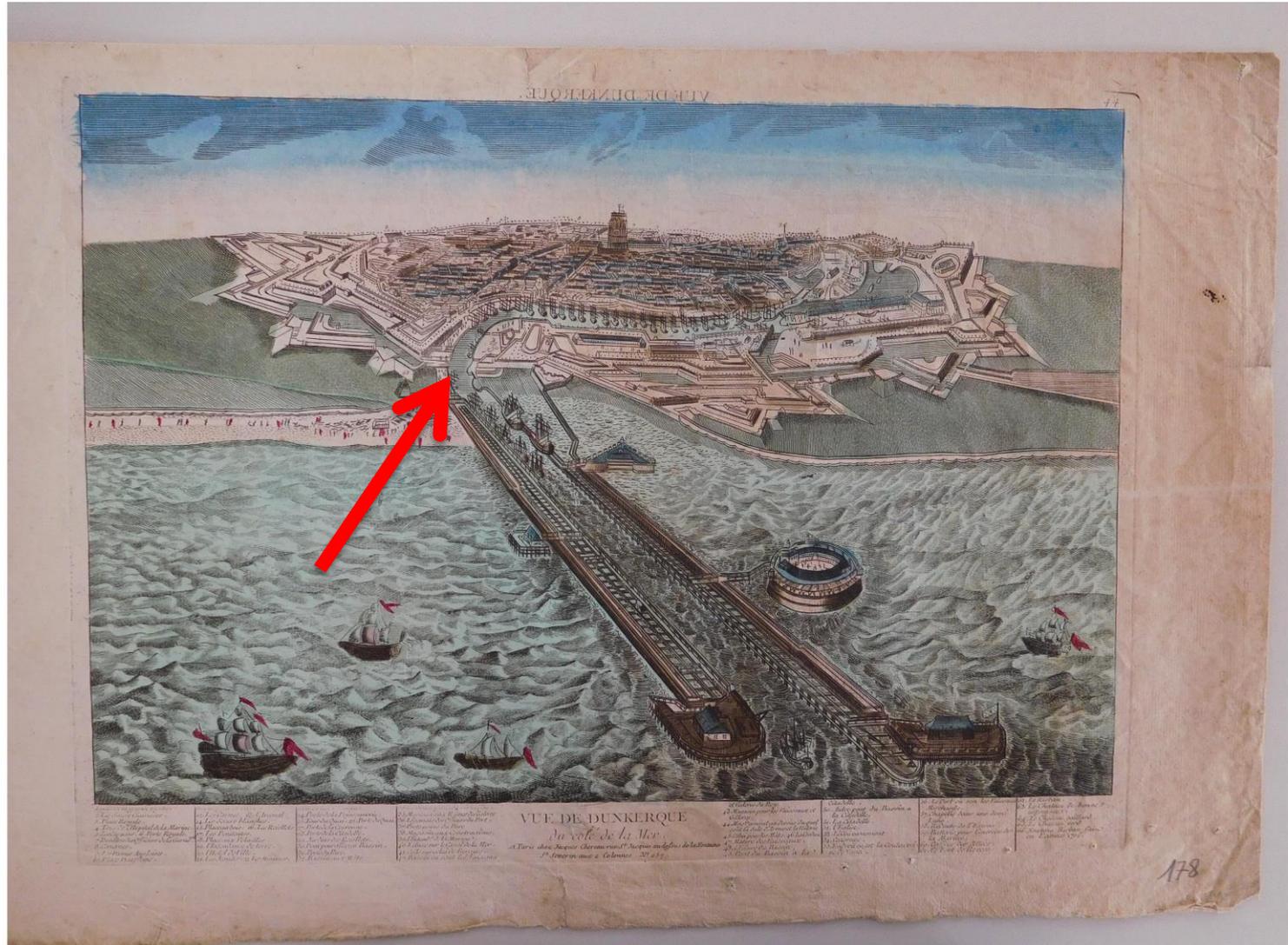
Den annemer sal wel vistenen het oude
 mettemet dat daer noch tegunveordich is staende
 ende het selue afftichen met behoorelyck verband
 soo breed ende soo dieper als het selue quadt sal
 syn beuonden

Den annemer sal wederom opmetten de selue
 veruallen muur In goede belansche mooste

Expérimentation en cours en collaboration avec Yasser Hamdi (IRSN) pour le site de Gravelines

L'exemple de la submersion d'avril 1680 à Dunkerque



Conclusion

Historical ecosystem approach can contribute to coastal risk reduction and promote ecological goals

Socio-economic, cultural and historical diversity can benefit of a very favorable welcome from local people and policy makers

***In memory of the great tsunamis of 1896 and 1933... remember these disasters and never
build your houses on this side***

Stele of the village of Aneyoshi (near Fukushima)

