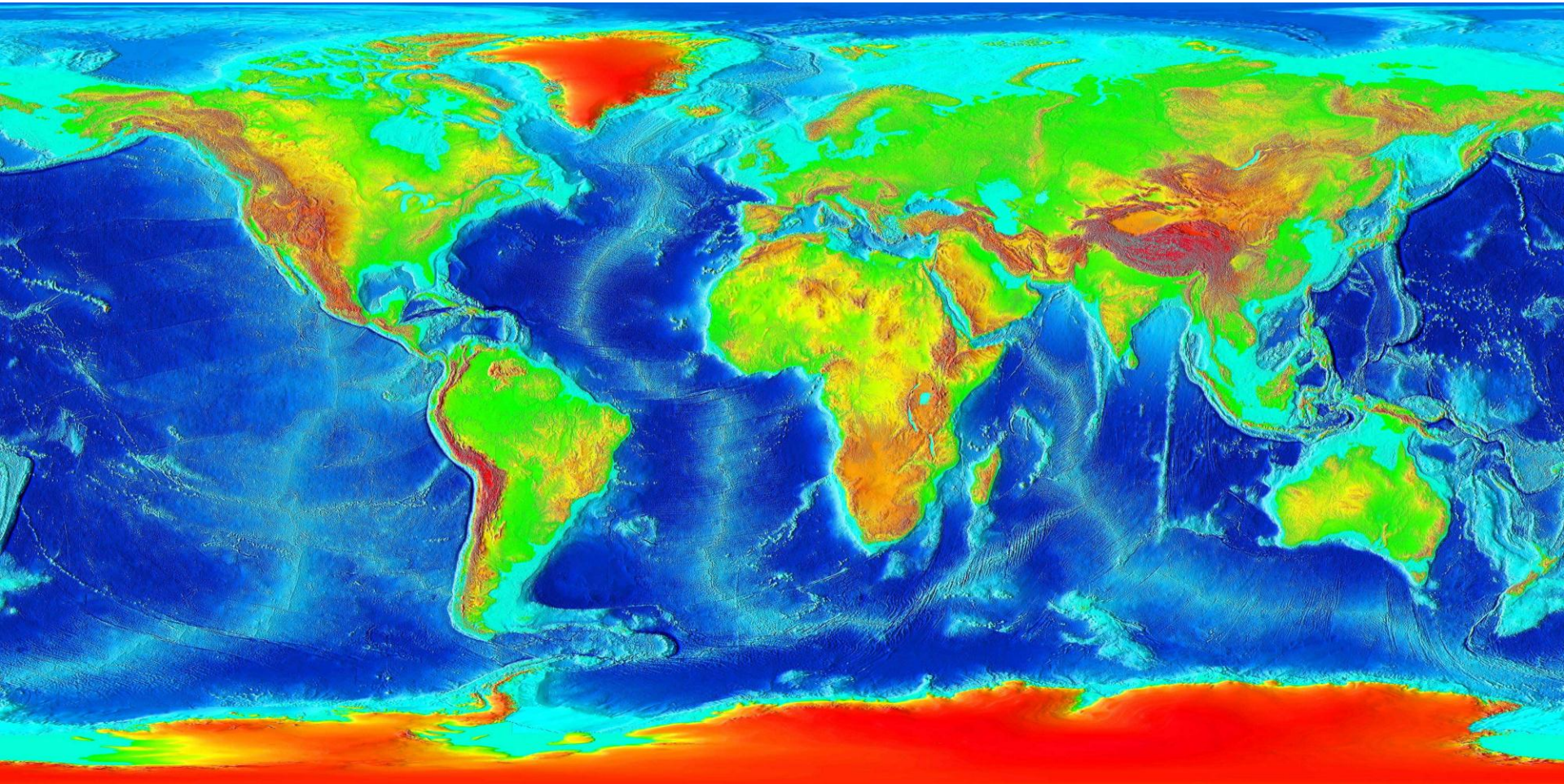


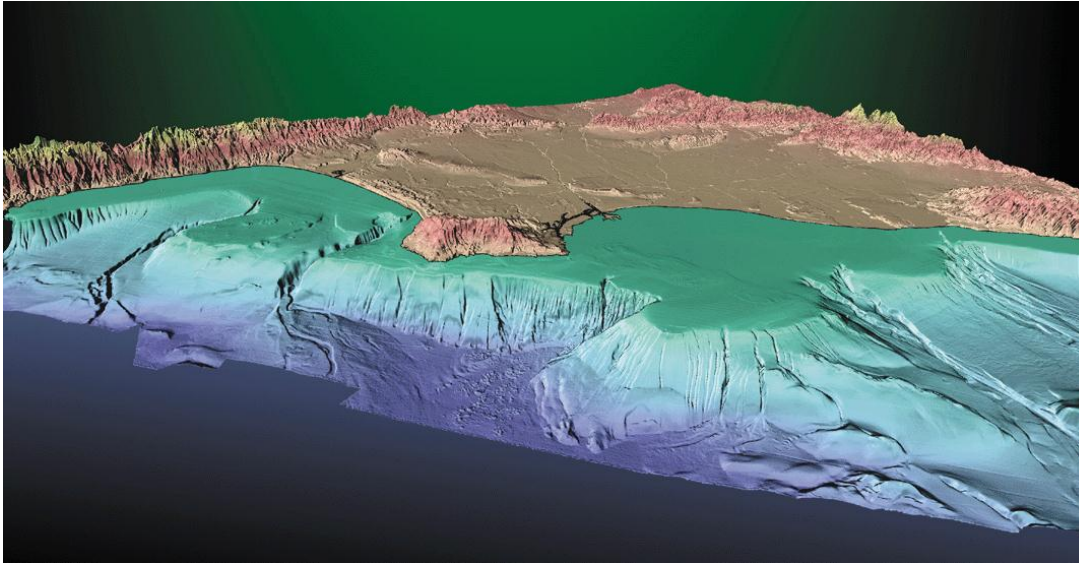
Hydrodynamique littorale et côtière

Ch. 1 : Introduction

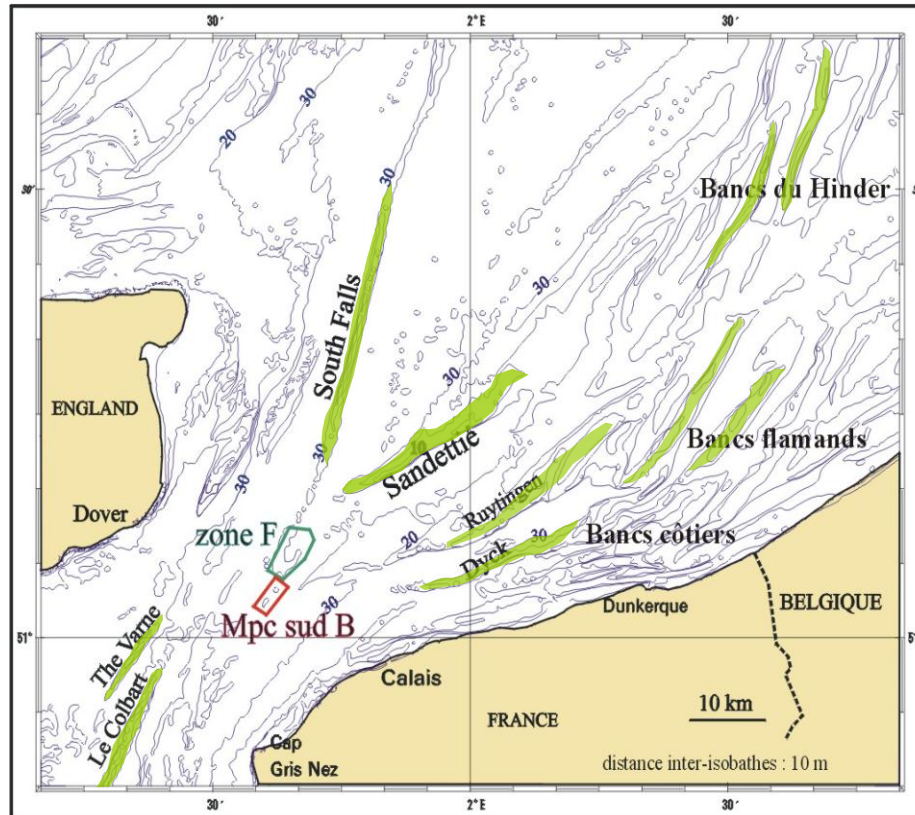
Bathymétrie océanique globale



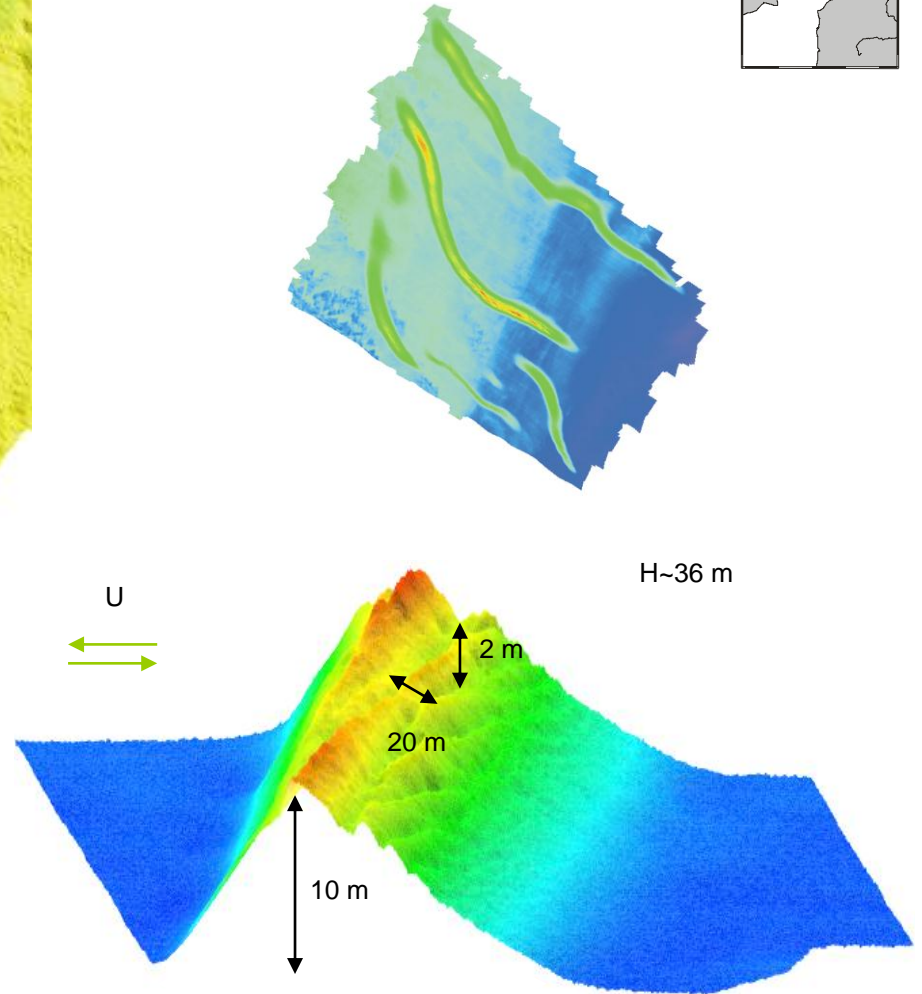
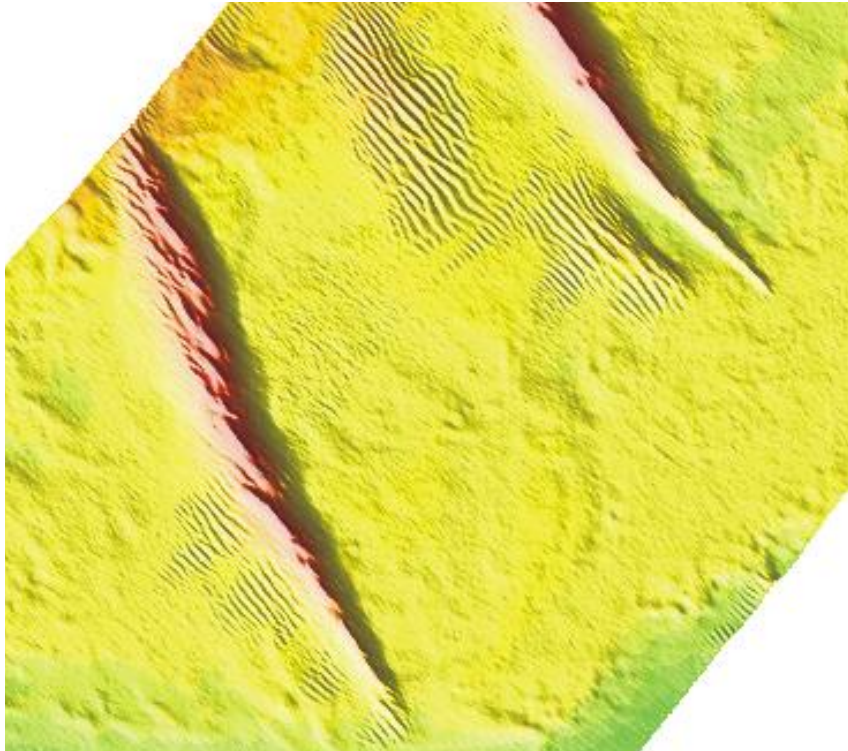
Plateau continental



Structures sous-marines



Structures sous-marines



Dunes et mégarides de sable du détroit du pas de calais (Source : D. Idier)

Plage sableuse

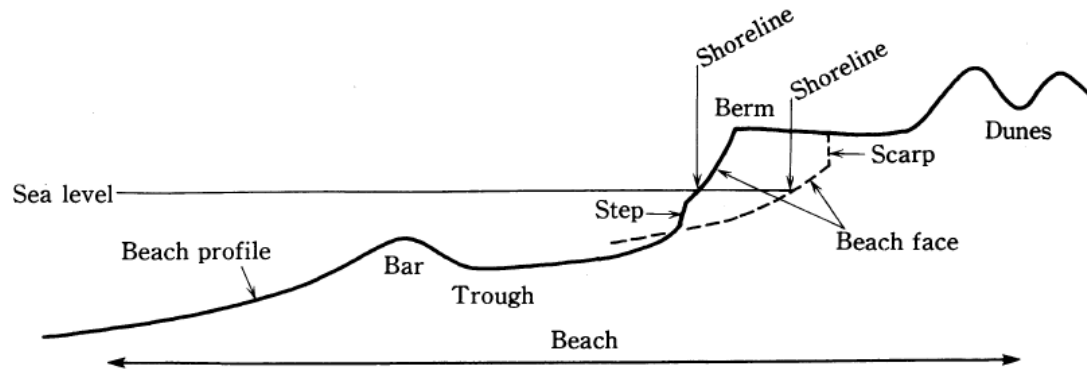


Figure 1.2 Typical beach profile.



« beach cusps »



« Barres/baïnes »

Littoraux - Falaises

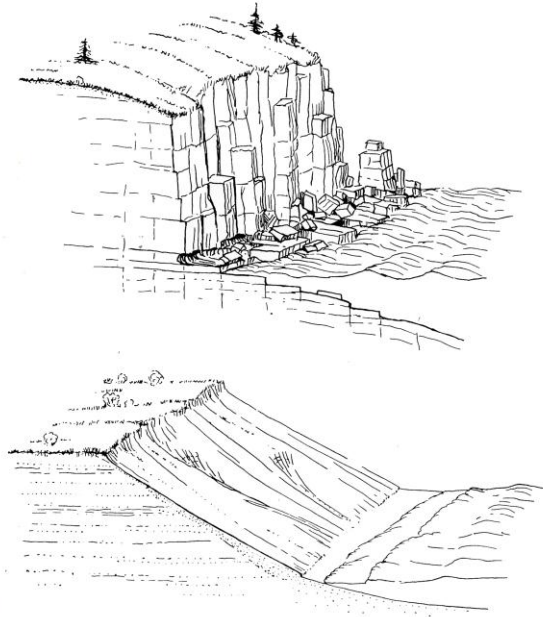


FIGURE 20.6 The nearly vertical cliff (above) is typical of the granite coast of Maine, while the gentler marine scarp of sand and gravel (below) is found on Cape Cod and other localities where glacial sediments are being eroded. (Drawn by A. N. Strahler.)



Punta degli Schiavi cliff (Sector 2). We can observe the bare upper slope, the deep gullies cut in the lower slope, the erosional Triangular facets, as well as the narrow pebbly beach and the eroded edges of layers of the wave-cut bench in the foreshore.

Deltas

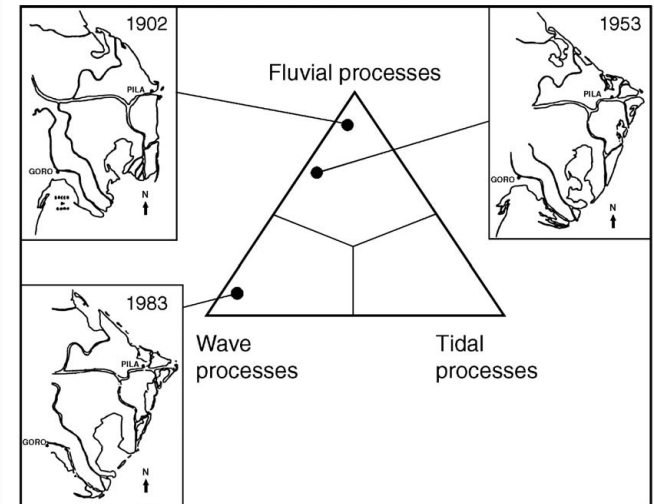
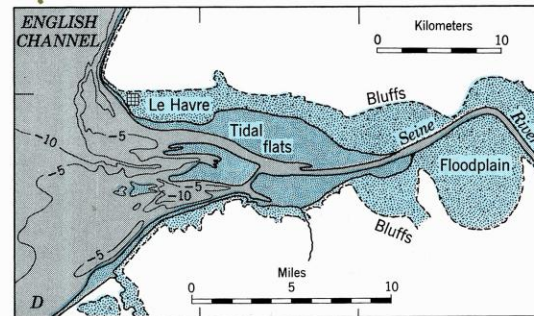
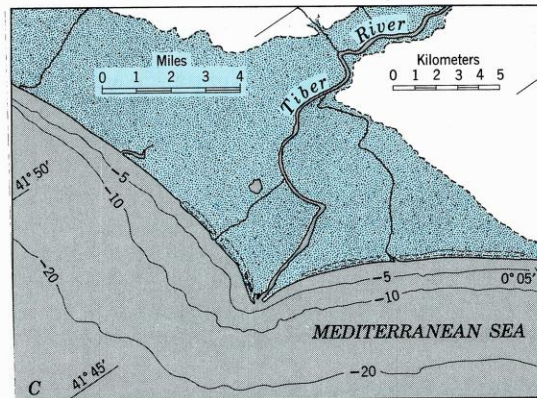
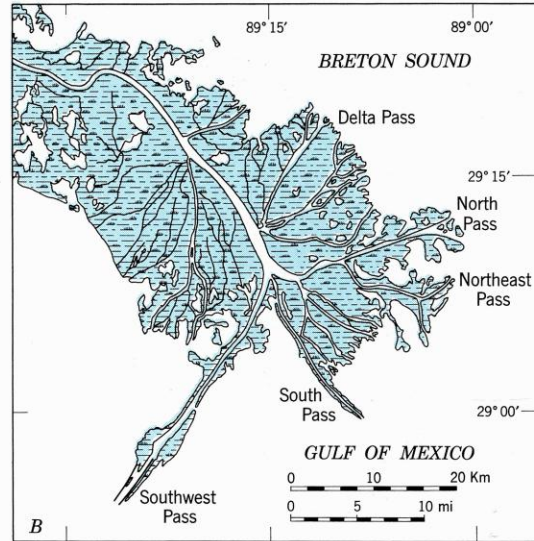
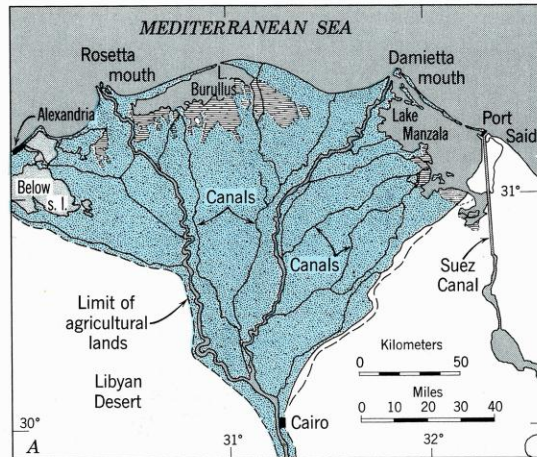
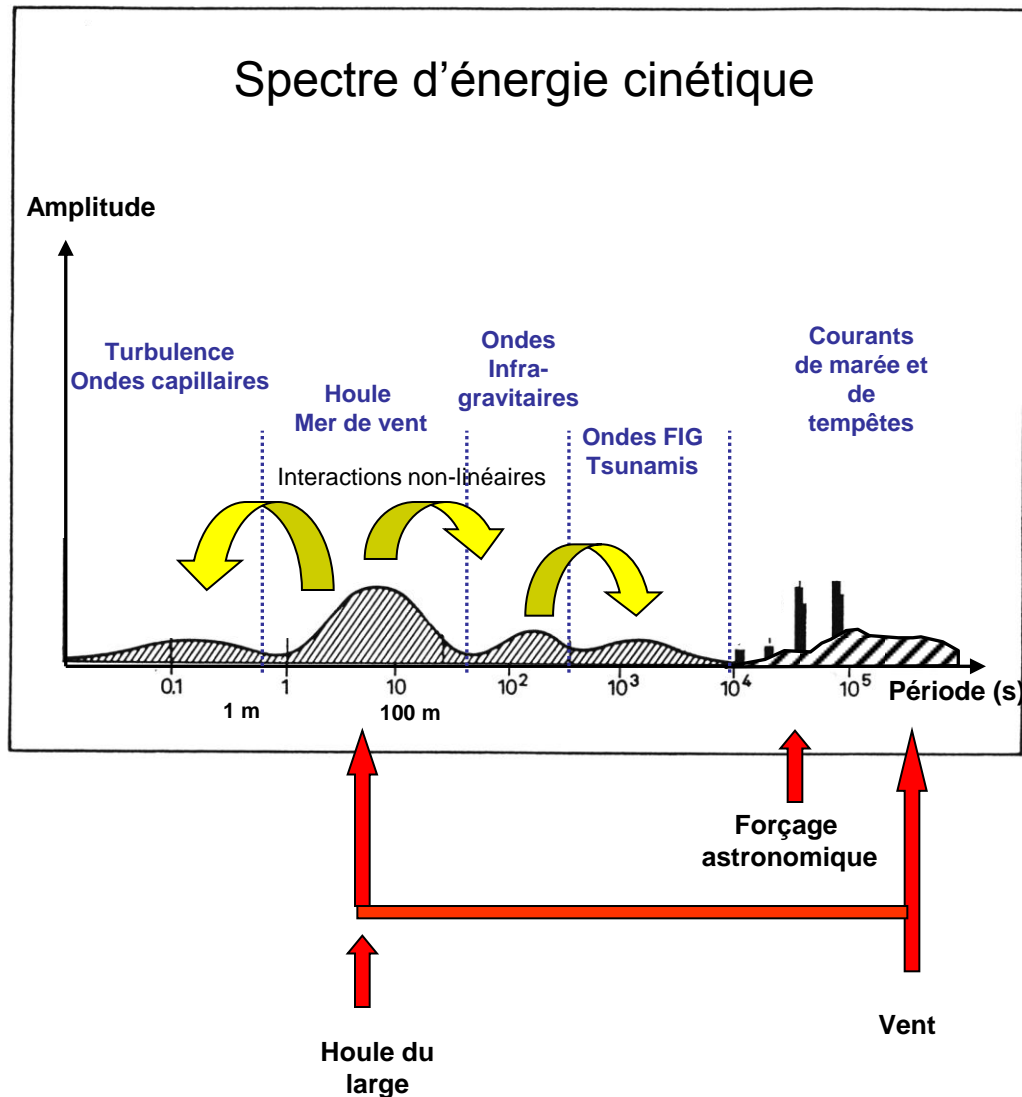


Fig. 3. Morphological evolution of the Po Delta (after Simeoni et al., 2000a, modified).

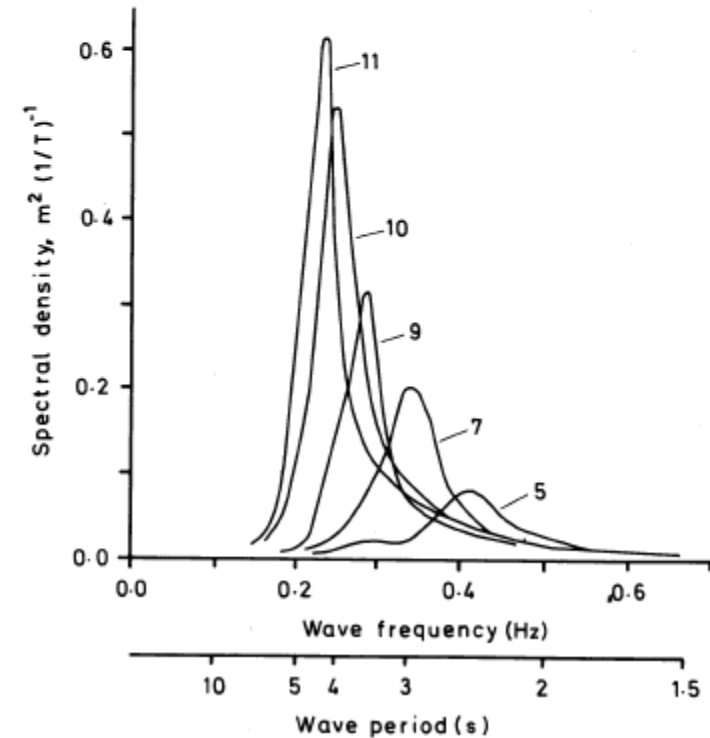
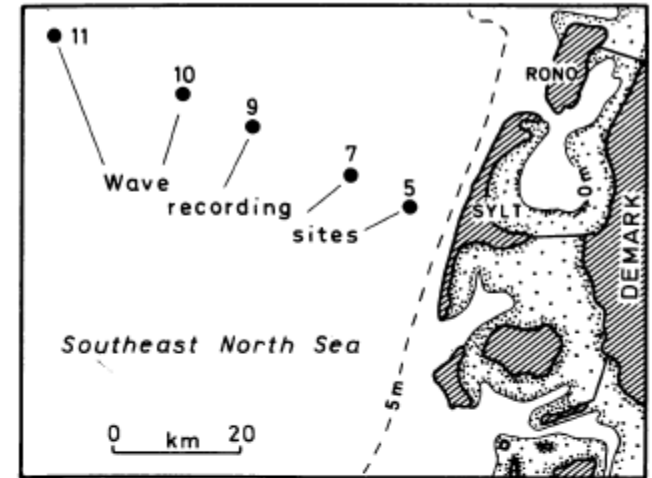
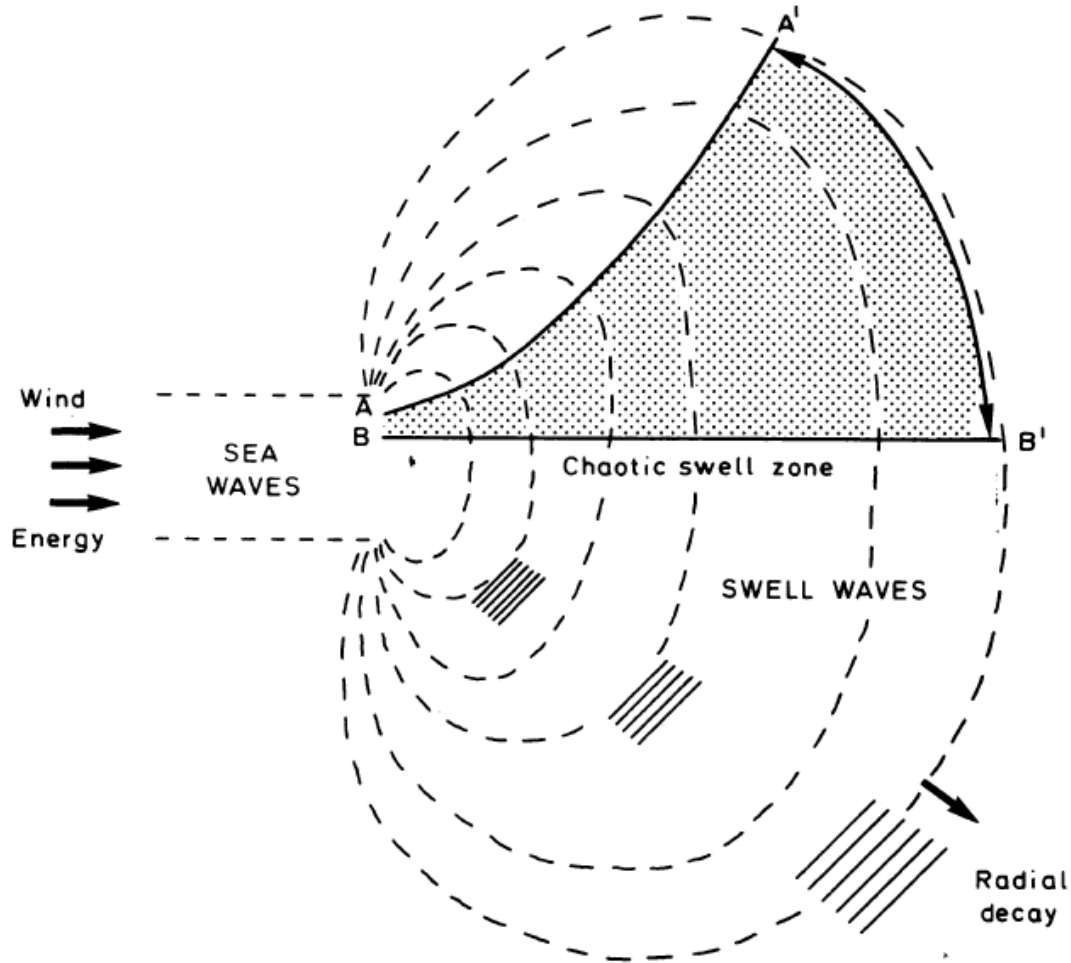
FIGURE 20.41 Deltas. (A) The Nile delta has an arcuate shoreline and is triangular in plan. (B) The Mississippi delta is of the branching, bird-foot type with long passes. (C) The Tiber delta on the Italian coast is pointed, or cusped, because of strong wave and current action. (D) The Seine delta is filling in a narrow estuary.

Processus hydrodynamiques en zones littorales et côtières



- Grande gamme d'échelles
- Apports d'énergie sur certaines gammes de fréquence
 - Houle
 - Tempêtes (vents + pression)
 - Marées

Génération et propagation de la houle

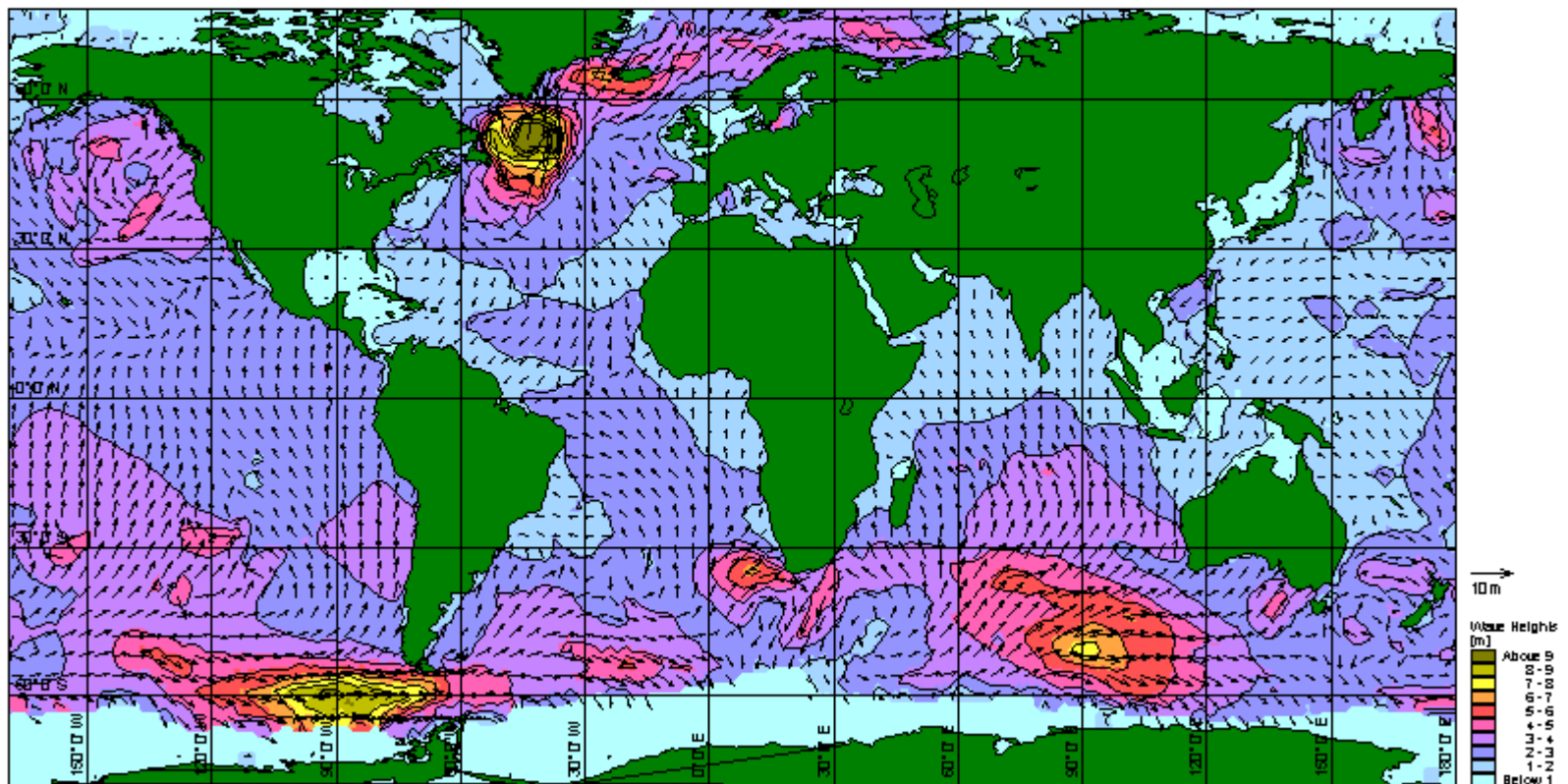


Modélisation du champ de houle planétaire

ObjectId = 15059 **The World Significant Wave Height and Direction**

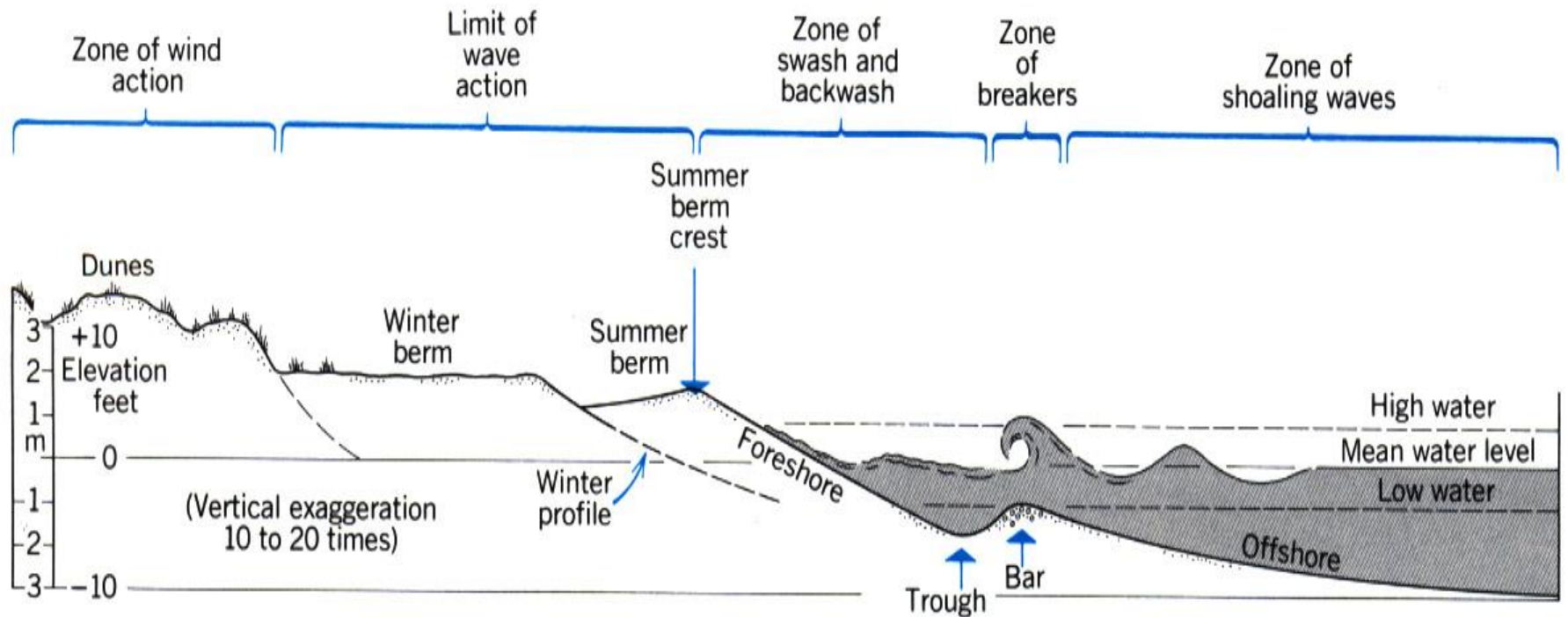
Forecast Period: 2009-10-14 00:00:00 to 2009-10-16 00:00:00 UTC Checking: W:\Waterforecast\webroot\Production\animations\GP28x29a24c

Showing: 15/10/2009 10:00 UTC



10/15/2009 10:00:00

Transformation de la houle en milieu peu-profond



(d'après Strahler et Strahler 1992)

Réfraction-diffraction

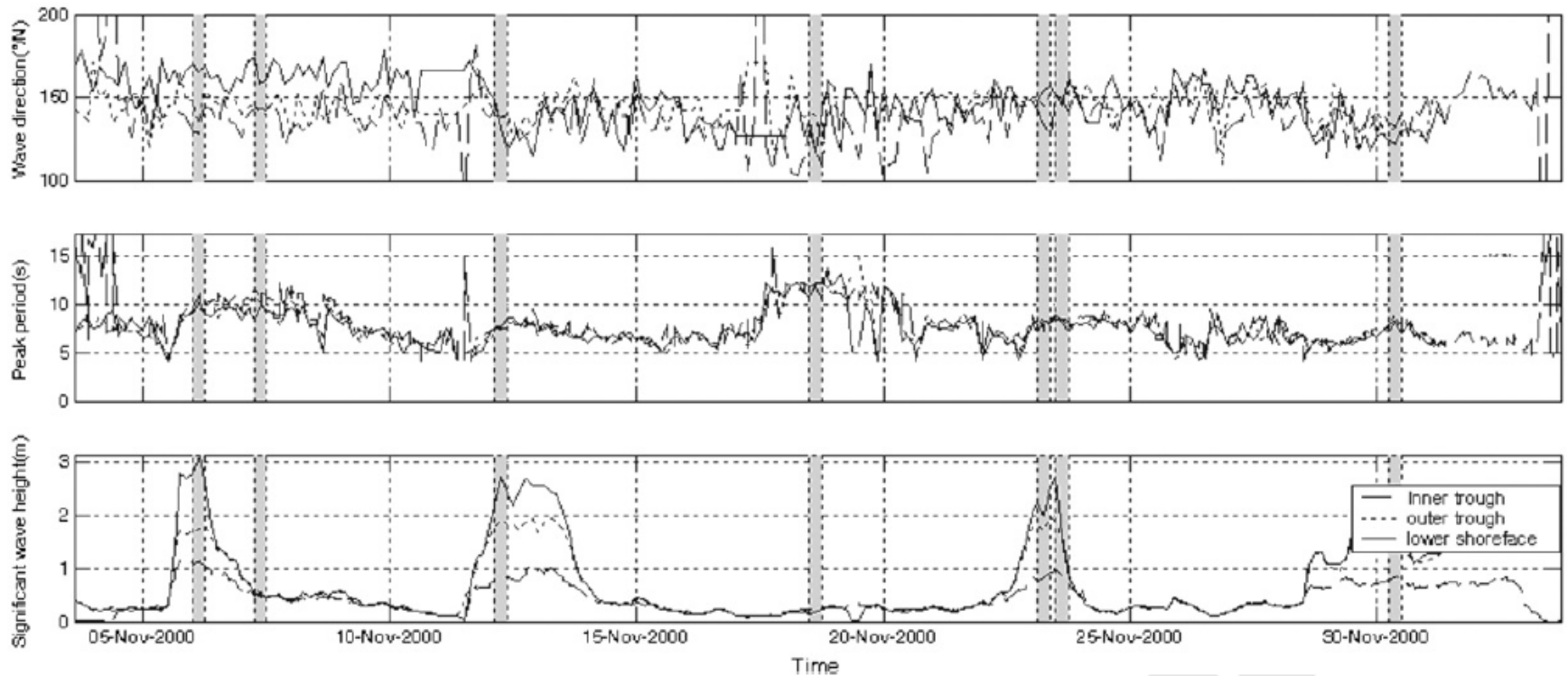


Réfraction de la houle



Diffraction et réfraction de la houle

Variabilité temporelle du champ de houle



Courants de houle – longitudinaux

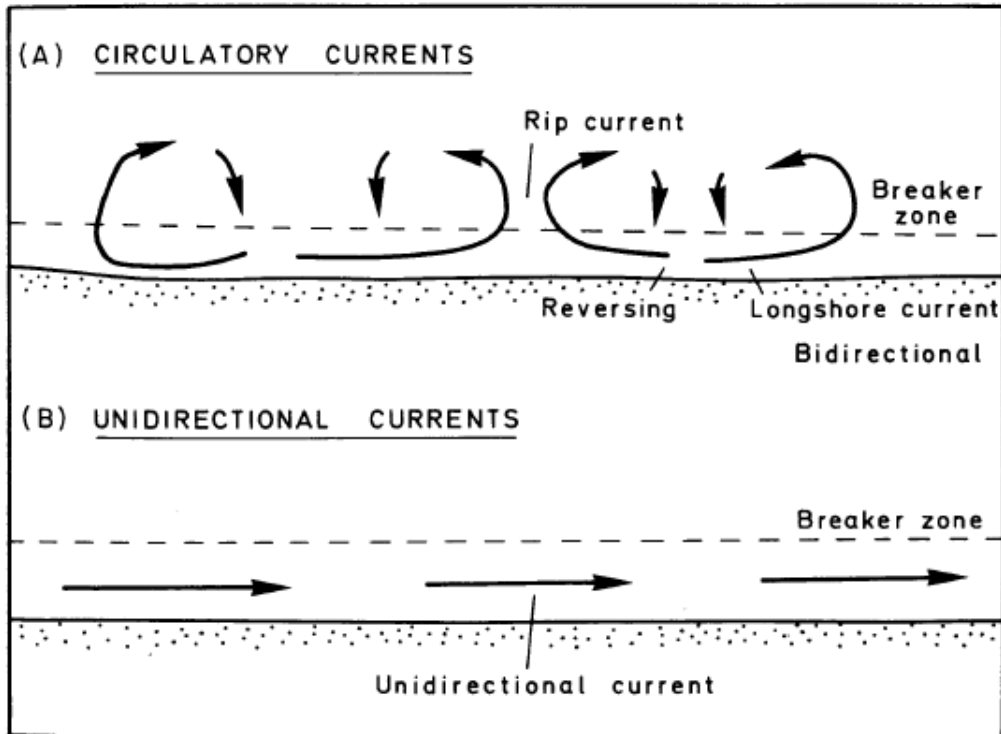
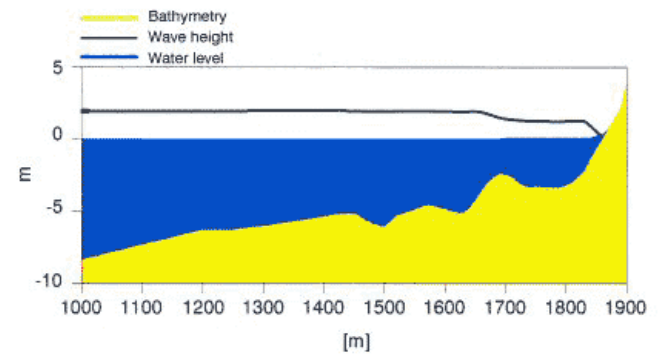
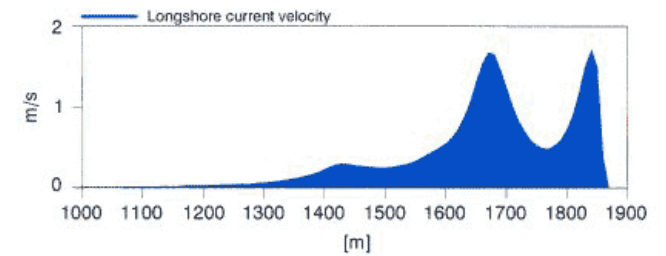


Figure 35. Two types of longshore current pattern.



Génération de la marée

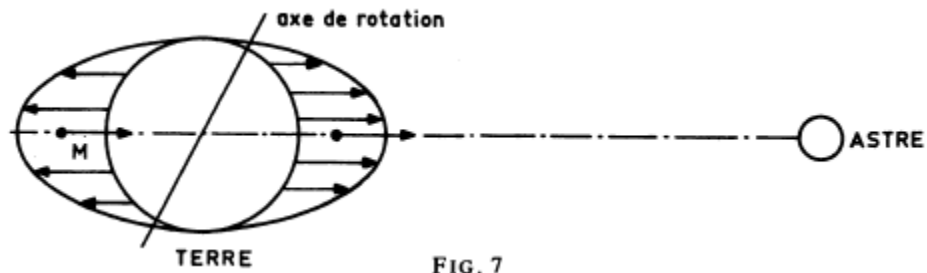


FIG. 7

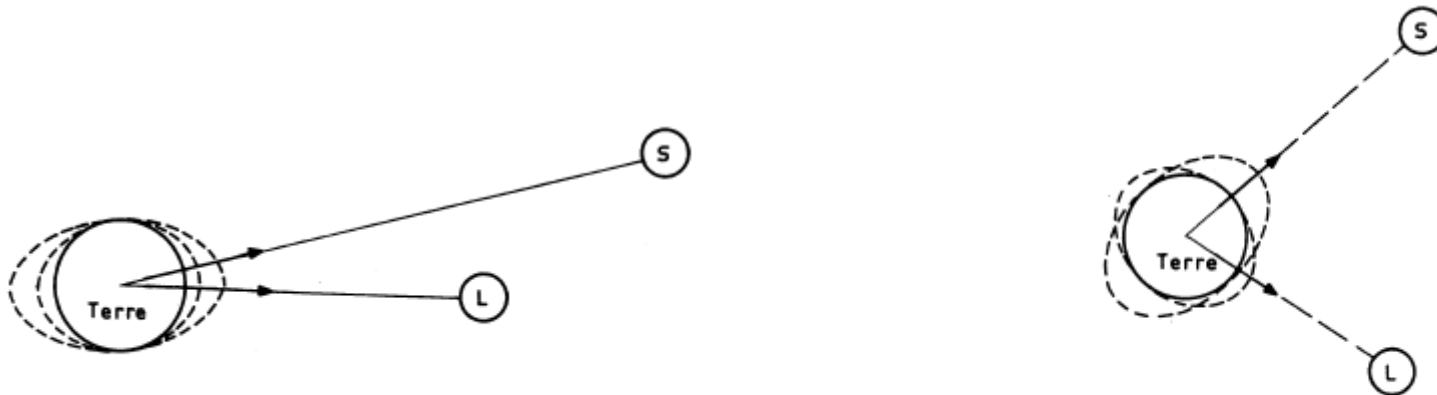
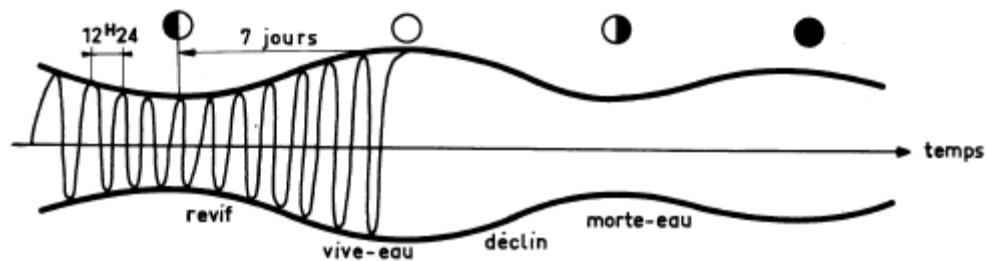
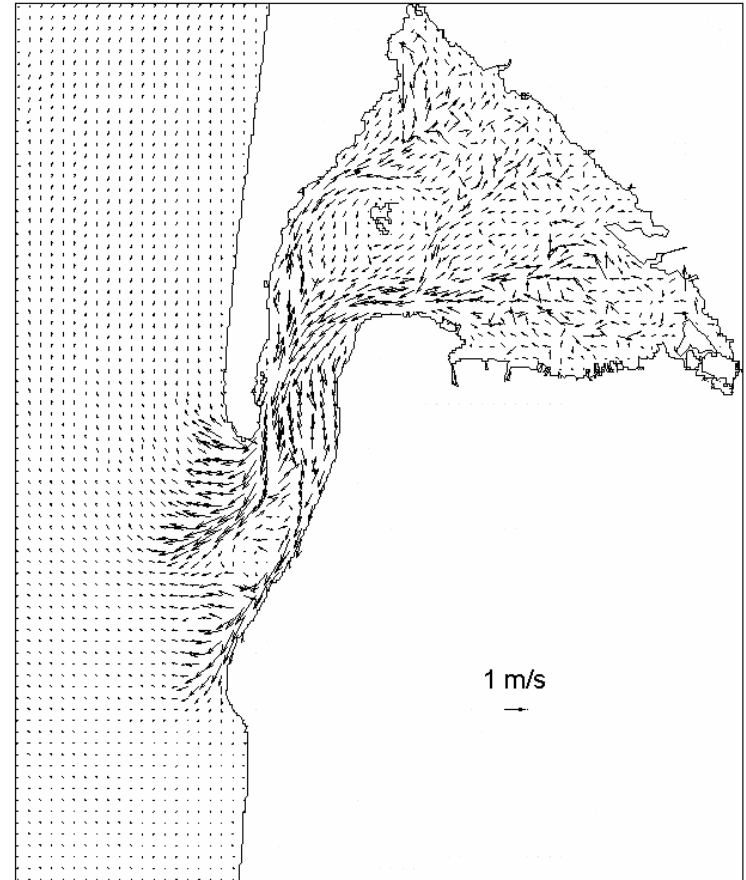
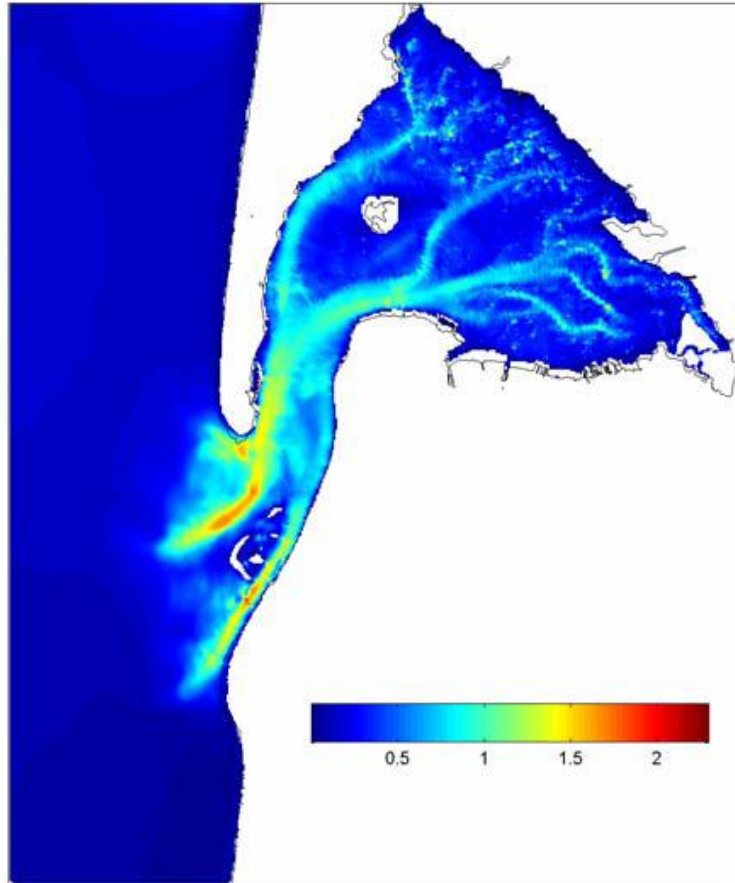


FIG. 9. – Position des astres en vive-eau.

FIG. 11. – Position des astres en morte-eau.

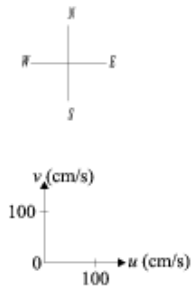
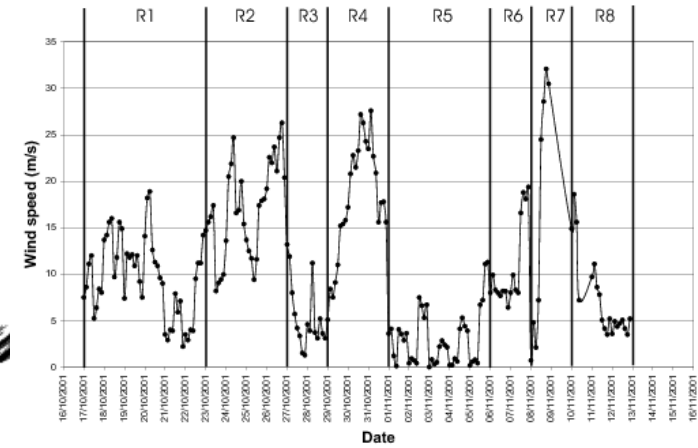
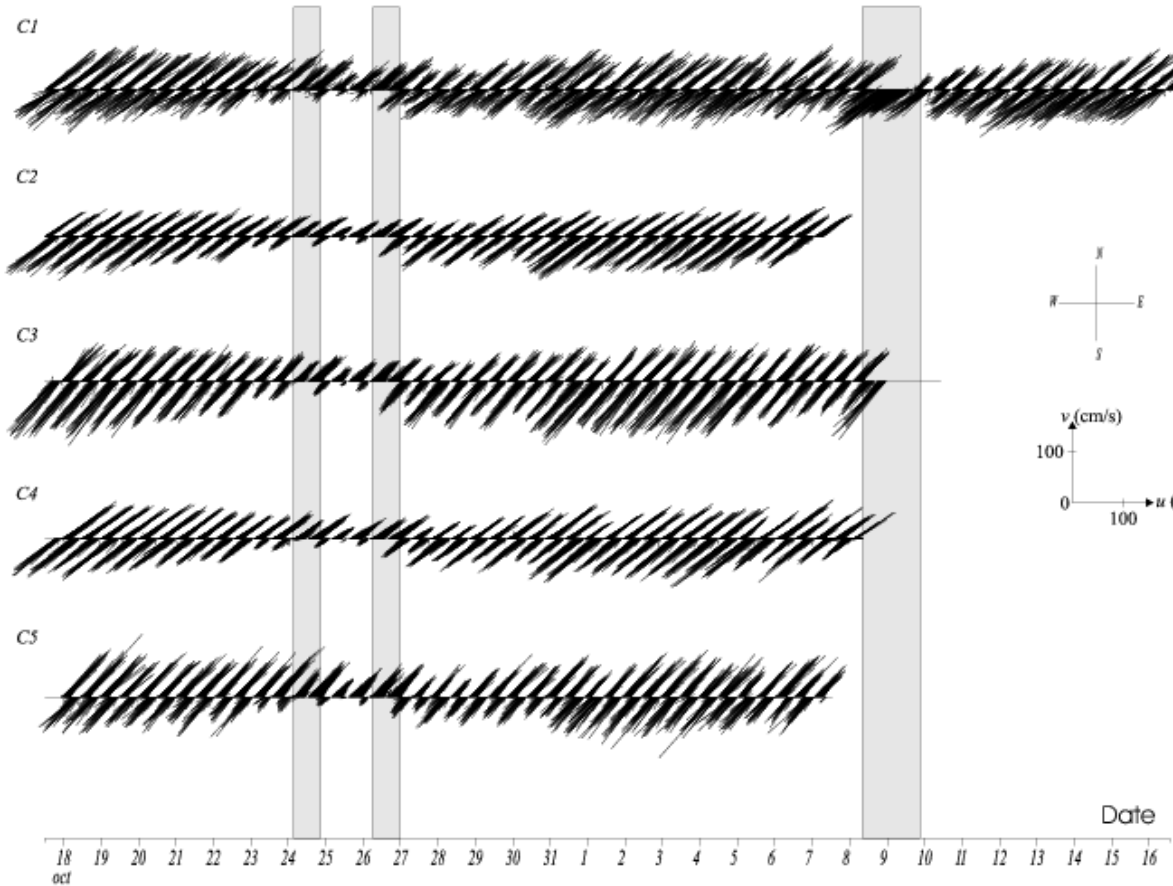


Courants de marée



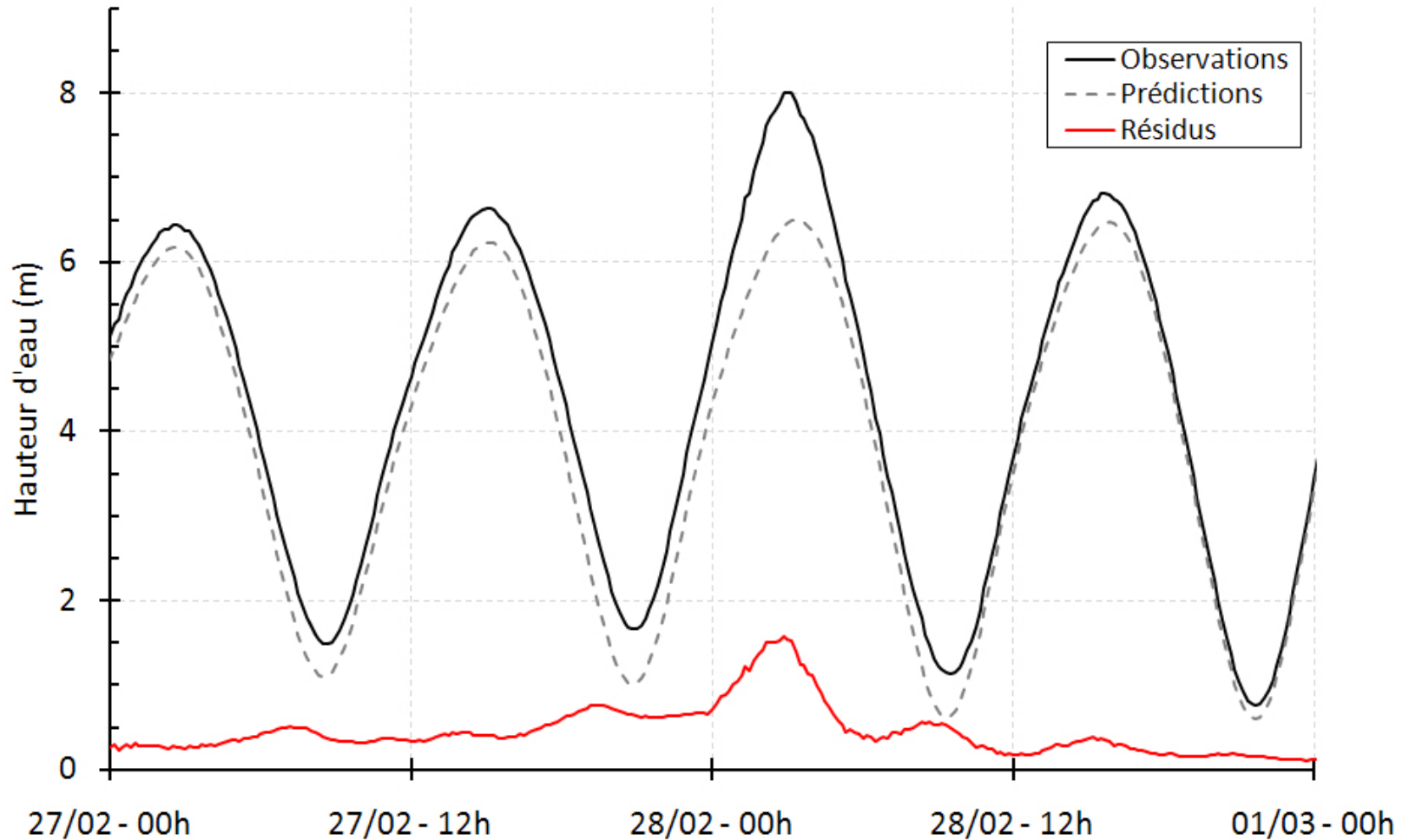
Courants de marée maximums dans le bassin d'Arcachon (Ifremer)

Variabilité des courants de marée et de tempête

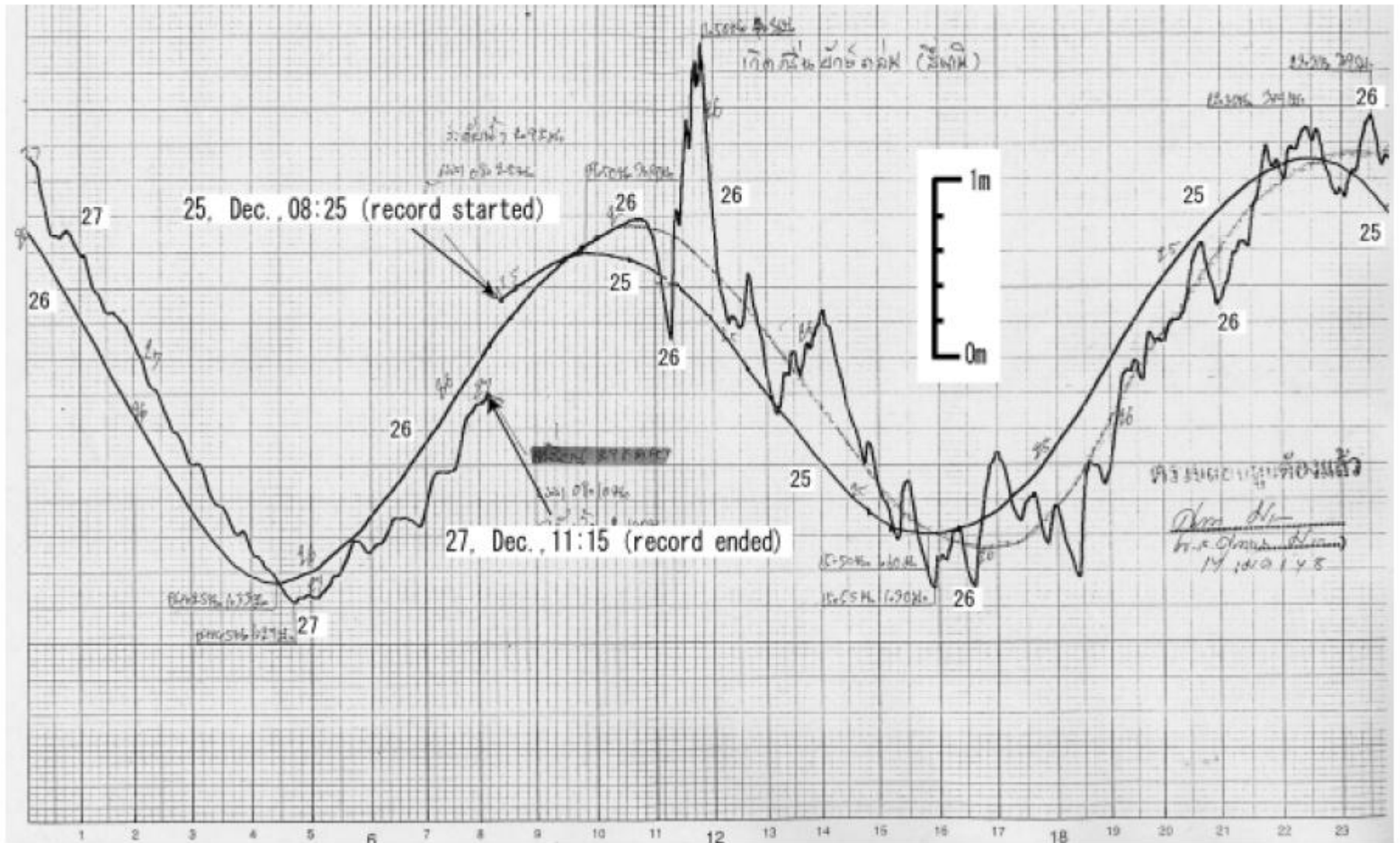


Surcôtes provoquées par la tempête Xynthia

Enregistrement du niveau de la mer à La Pallice : 27-28 février 2010

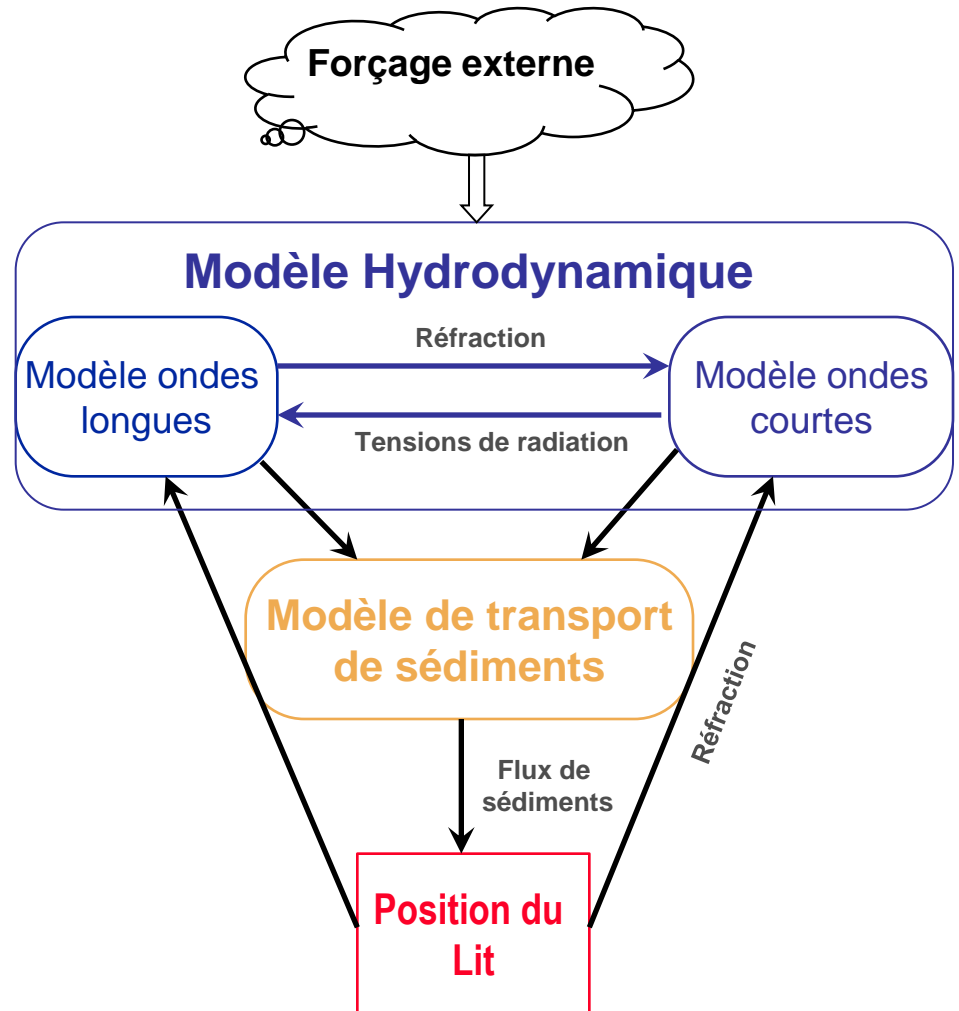
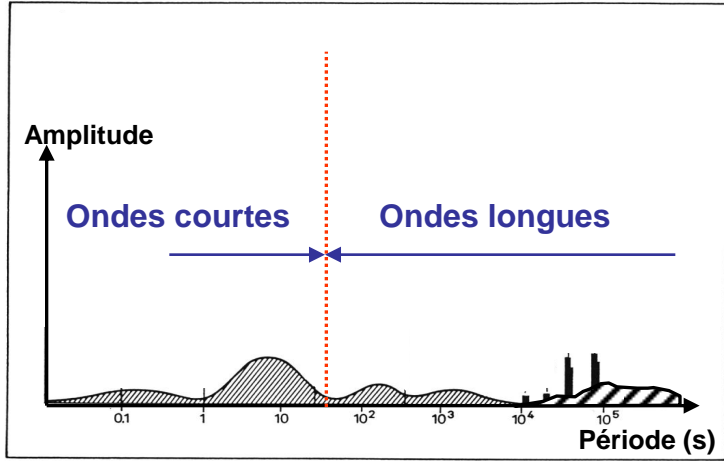


Surcôte provoquée par un Tsunami



Modèle hydro-sédimentaire

Spectre d'énergie cinétique

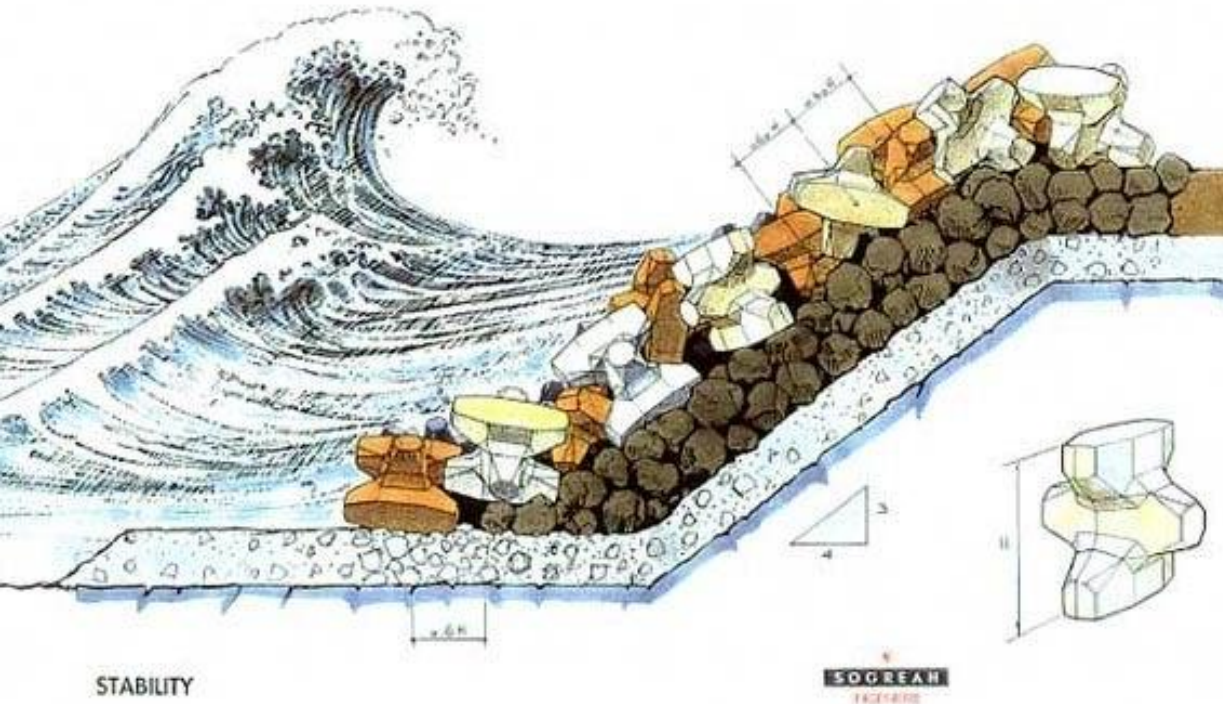


Infrastructures - Ports

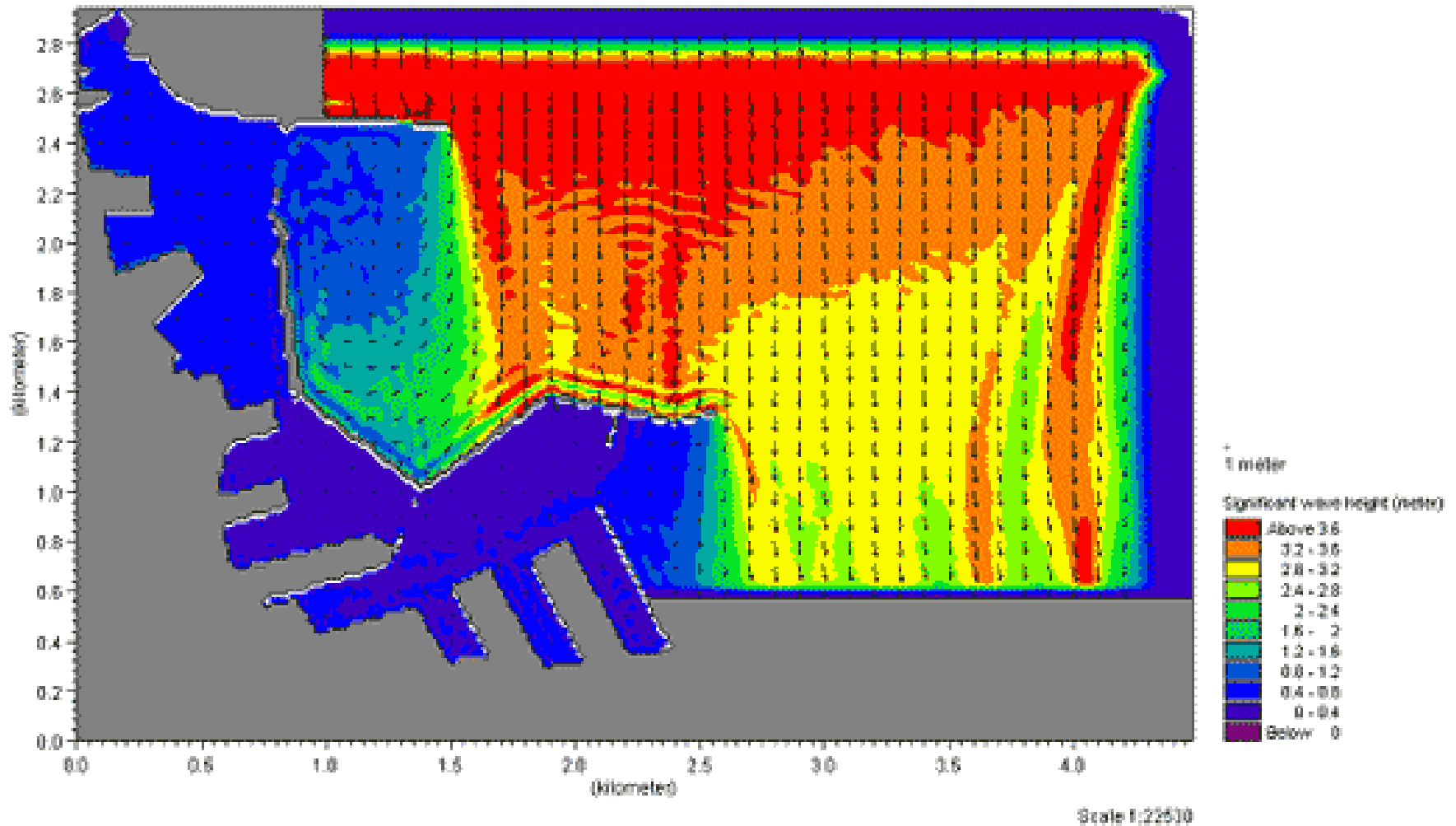


Port Havre 2000

Infrastructures – Diques talus



Infrastructures - ports

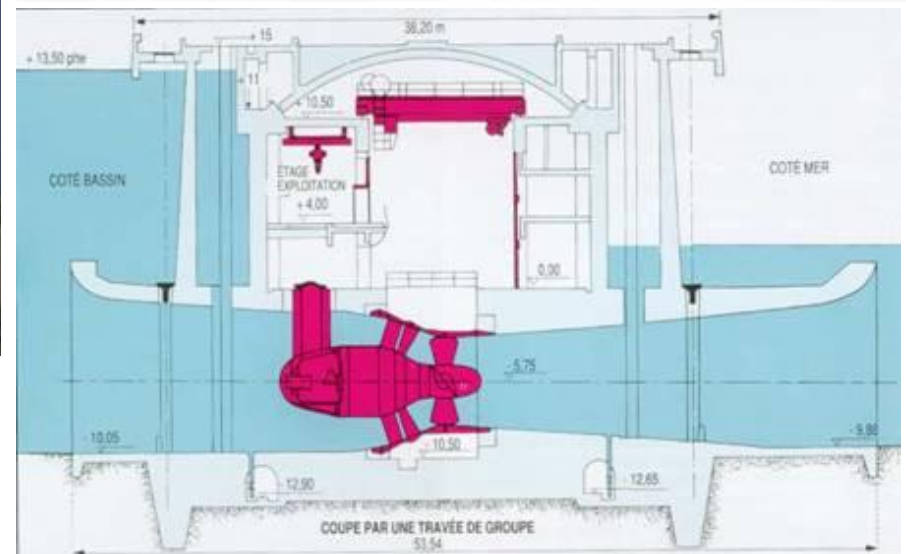
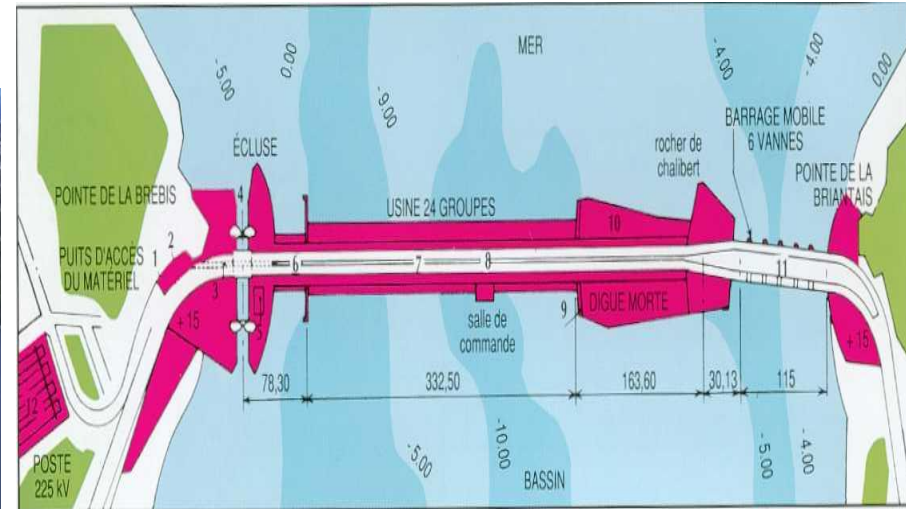


Modélisation de l'agitation portuaire (Mike 21 – DHI)

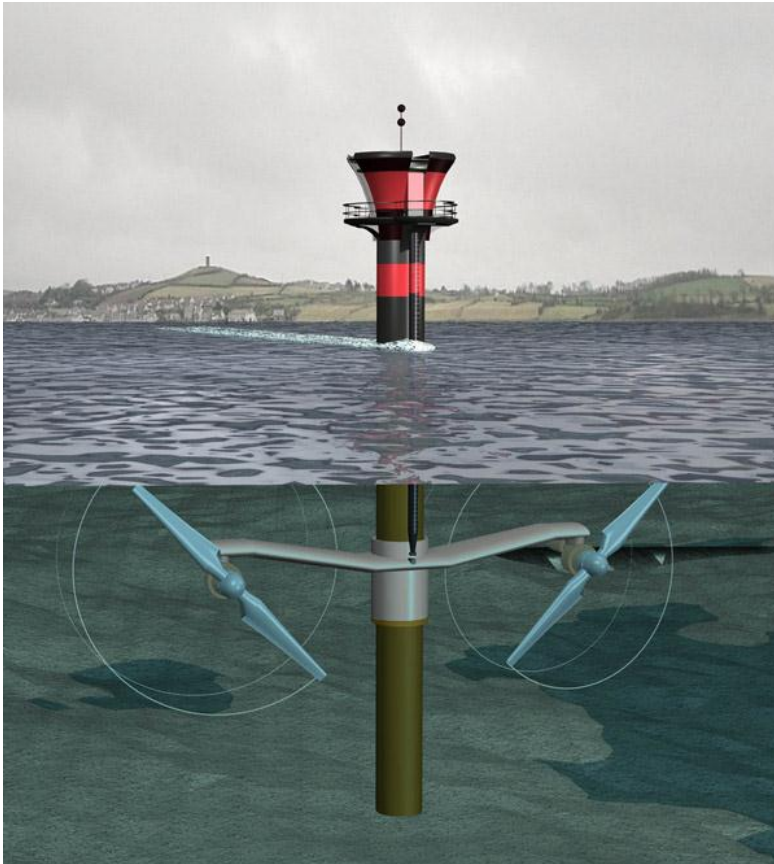
Infrastructures – Production d'énergie Marée



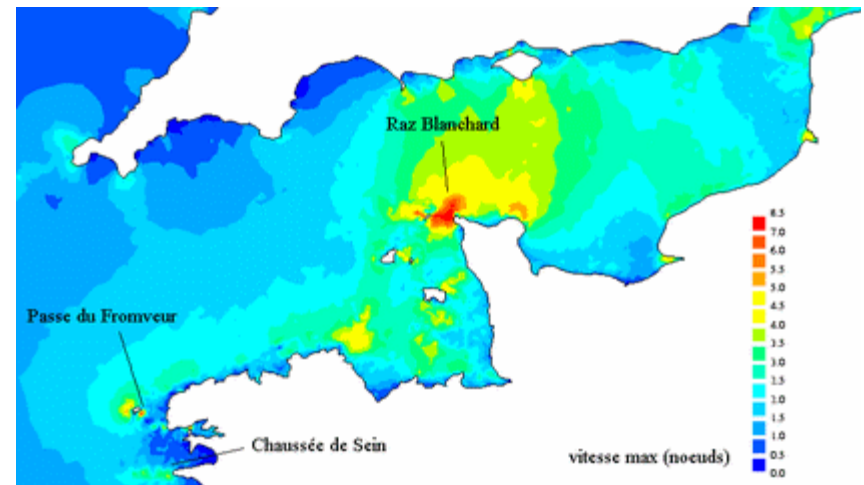
Usine marémotrice de la Rance



Infrastructures – Production d'énergie Marée



Hydrolienne « SeaGen »
(Marine Turbines Ltd)

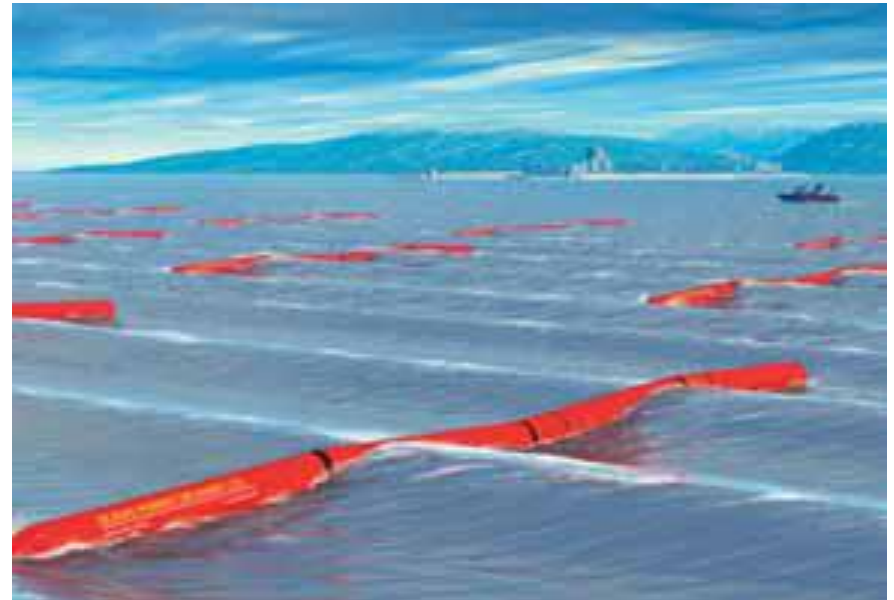
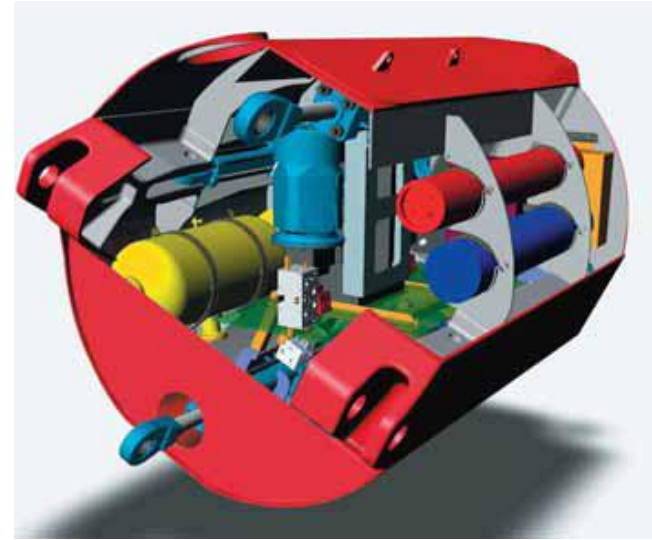


Courants de marée dans la manche

Infrastructures – Production d'énergie Houle



Système Pelamis P750
Wave energy converter (750 kW)



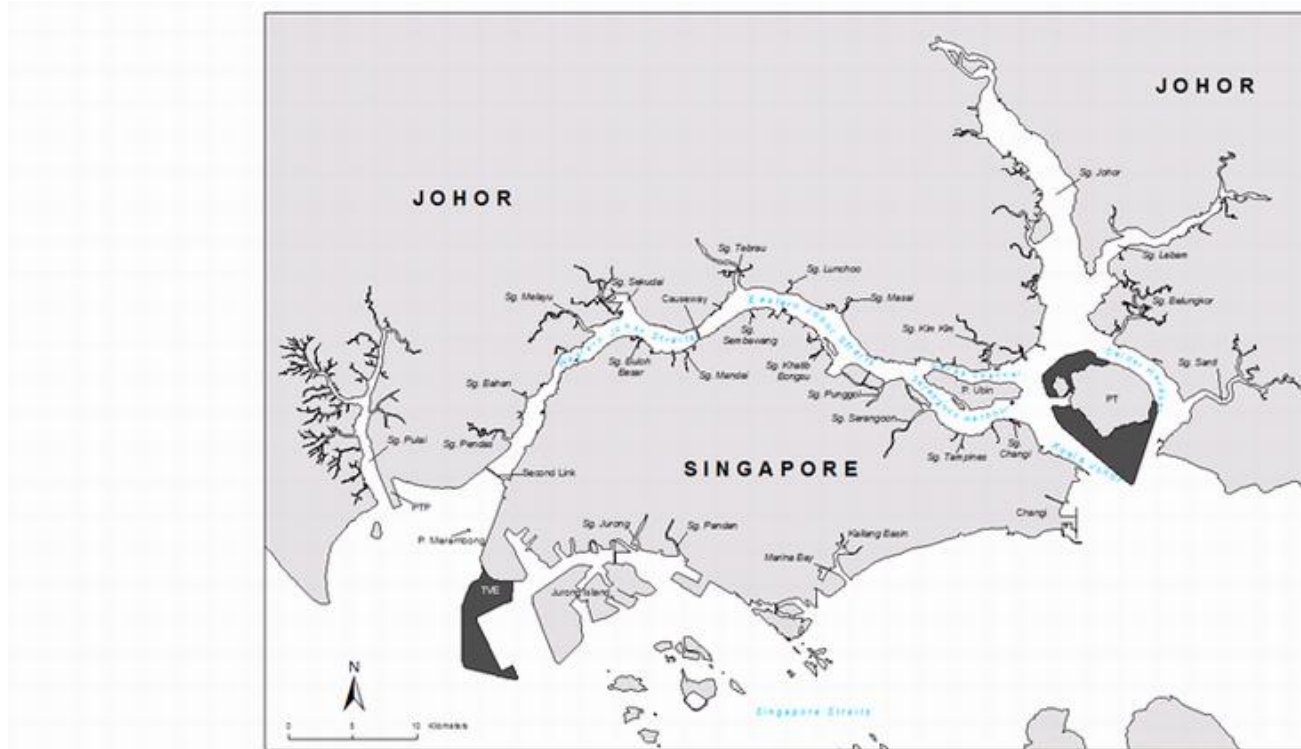
Infrastructures – Production d'énergie

Autres energies



Centrale Nucléaire de Flamanville (EPR en construction)

Evolution du trait de côte – gains sur la mer



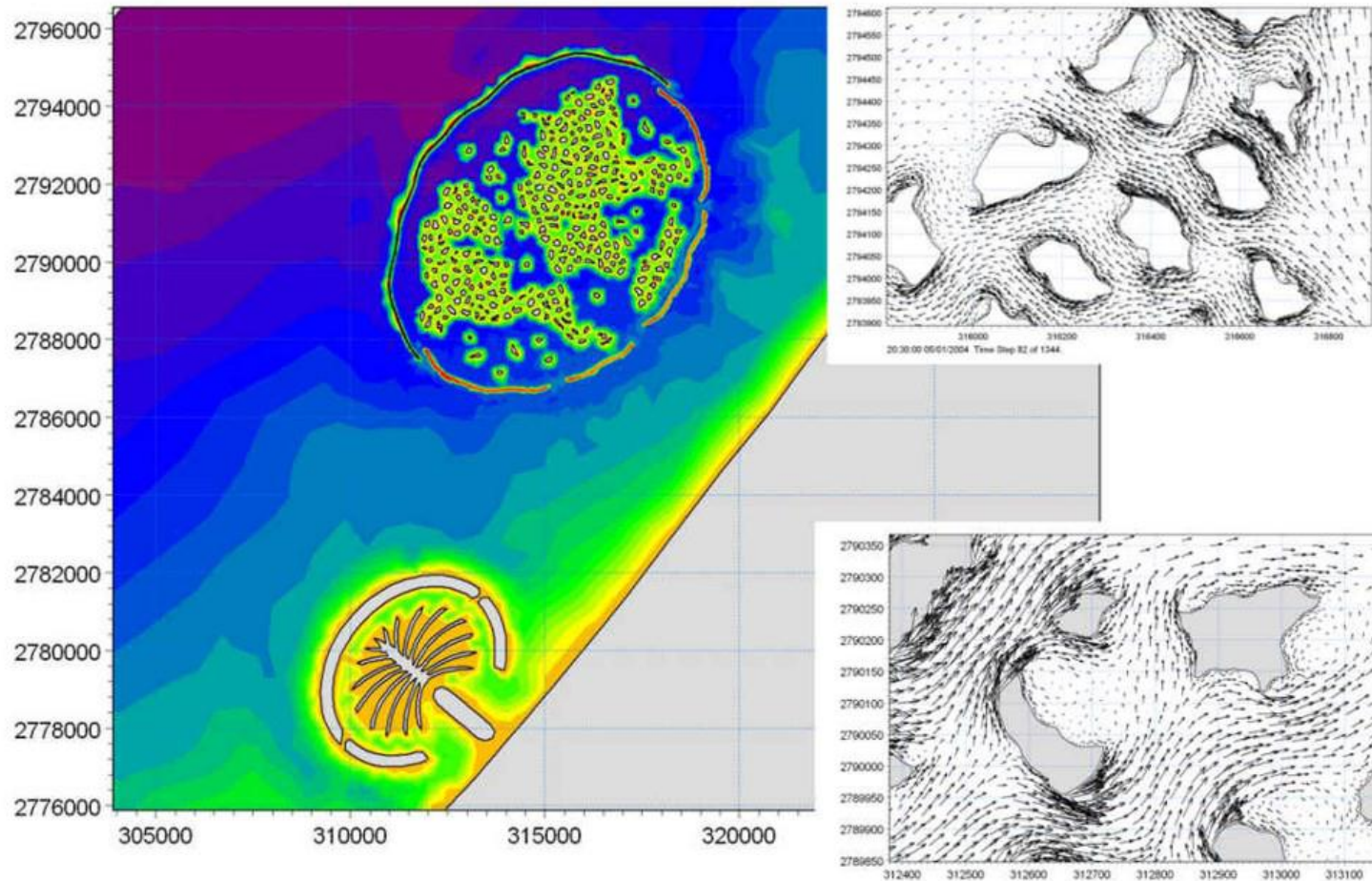
Projet de gains de terrains sur la mer à Singapour

Evolution du trait de côte – gains sur la mer



Iles artificielles « The World » (Dubai)

Evolution du trait de côte – gains sur la mer



Modélisation des courants autour des îles de « the World » (DHI)

Evolution de trait de côte - Erosion



Tempête (Quelques heures)
Canet en Roussillon



Long terme (dizaines d'années)
Cap Ferret

Evolution de trait de côte - Erosion



Evolution de trait de côte – lutte contre l’ensablement



Barrage sur le Couesnon (Mont St Michel)