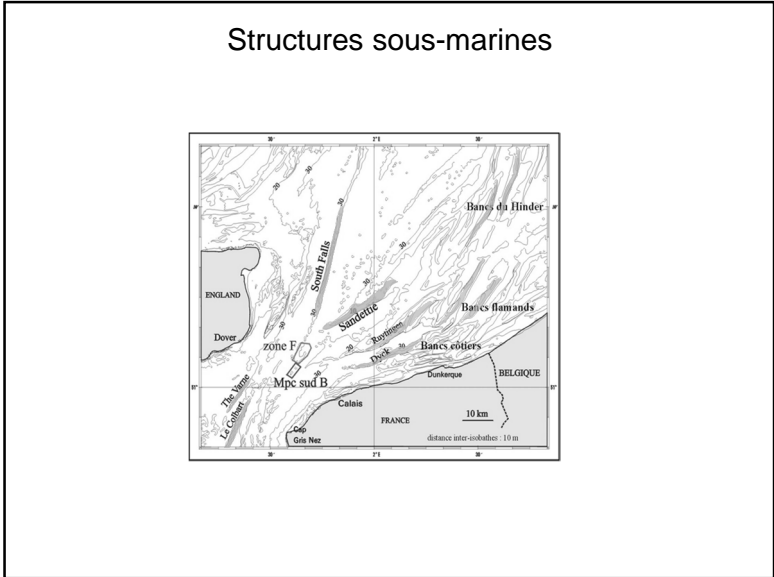
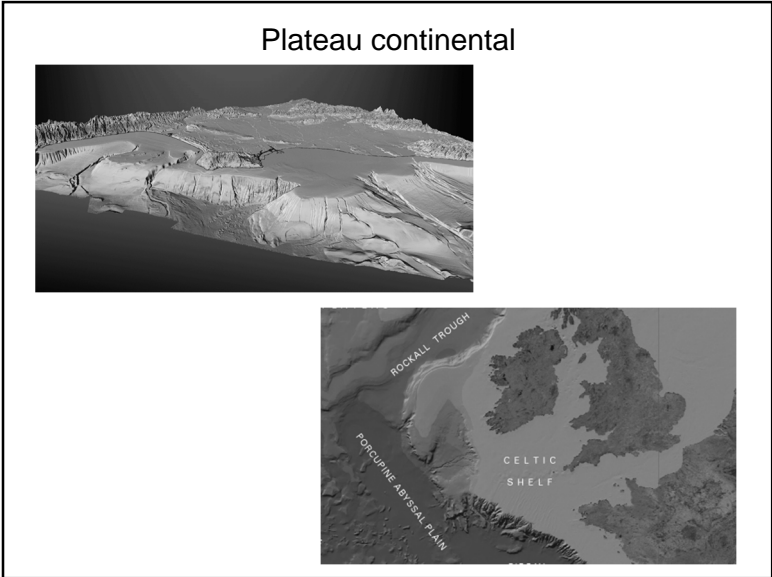
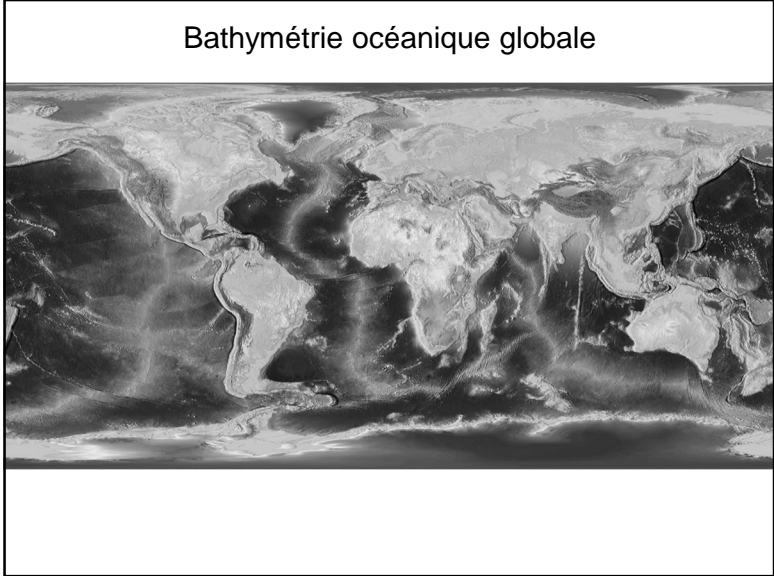
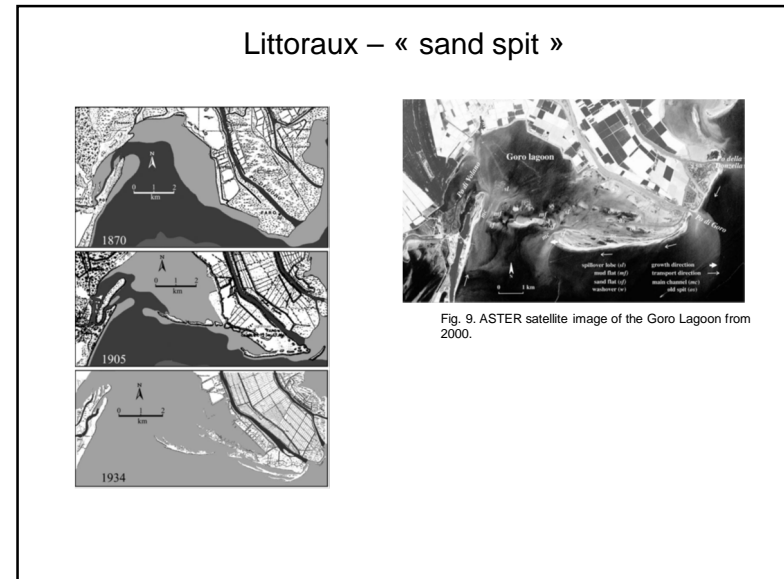
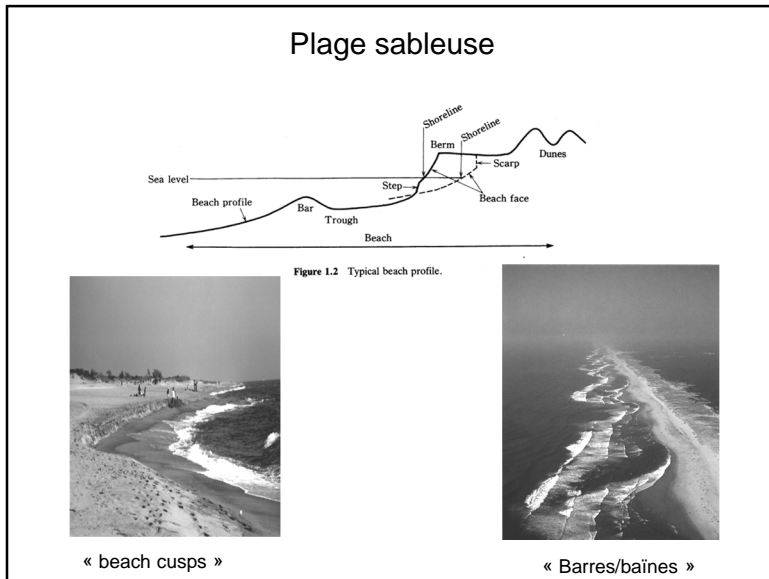
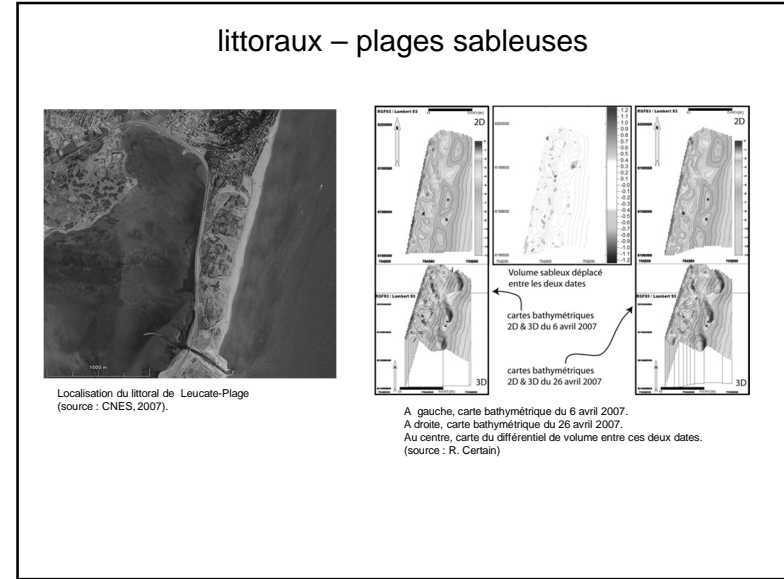
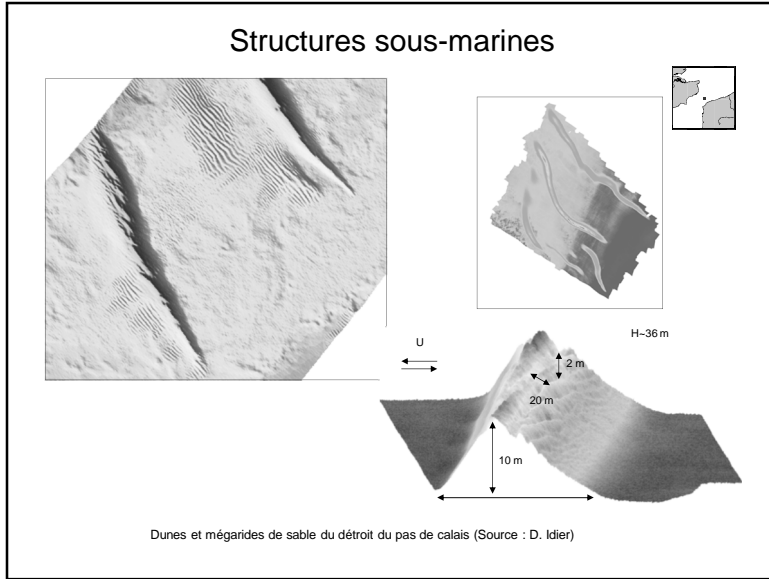


Hydrodynamique littorale et côtière

Ch. 1 : Introduction





Littoraux - Falaises

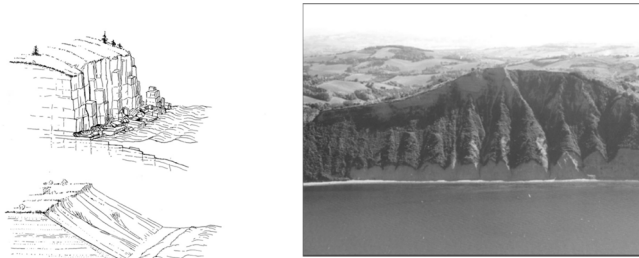


FIGURE 20.6 The nearly vertical cliff (above) is typical of the granite coast of Maine, while the gentler marine scarp of sand and gravel (below) is found on Cape Cod and other localities where glacial sediments are being eroded. (Drawn by A. N. Strahler.)

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

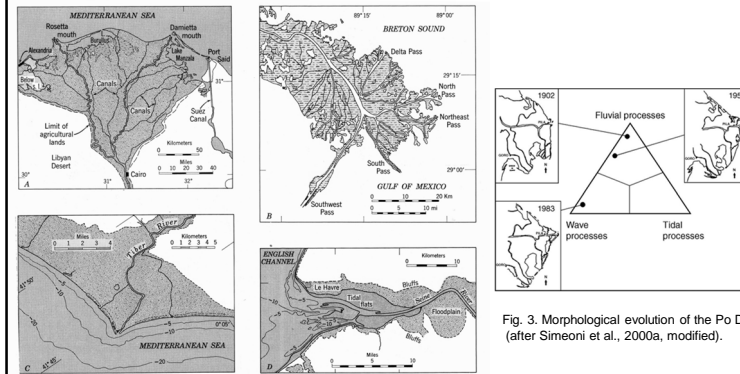
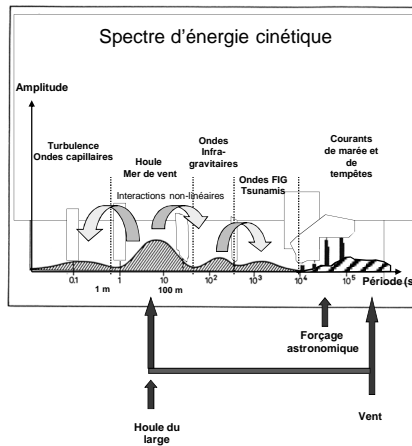


FIGURE 20.41 Deltas. (A) The Nile delta has an arcuate shoreline and is triangular in plan. (B) The Mississippi delta is of the branching, bird-foot type with long passes. (C) The Tiber delta on the Italian coast is pointed, or cusped, because of strong wave and current action. (D) The Seine delta is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

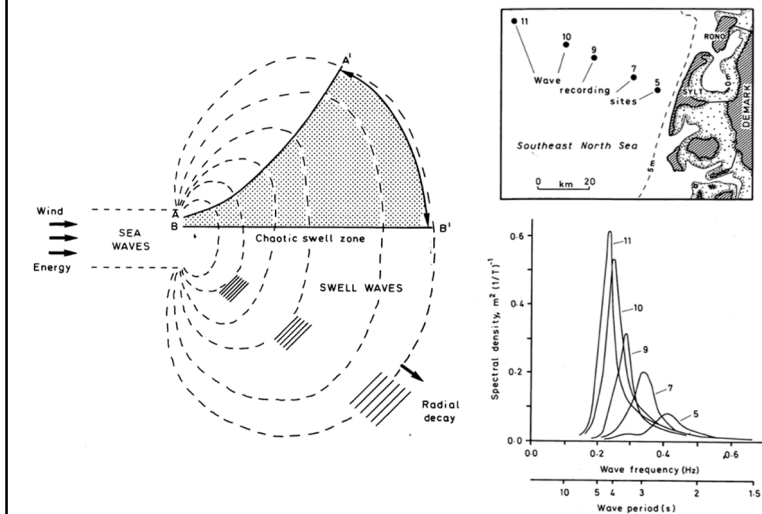
Fig. 3. Morphological evolution of the Po Delta (after Simeoni et al., 2000a, modified).

Processus hydrodynamiques en zones littorales et côtières



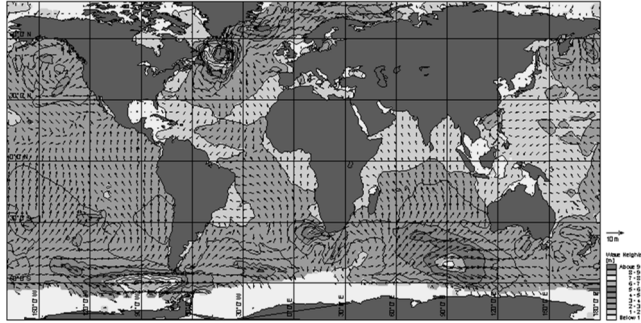
- Grande gamme d'échelles
- Apports d'énergie sur certaines gammes de fréquence
 - Houle
 - Tempêtes (vents + pression)
 - Marées

Génération et propagation de la houle



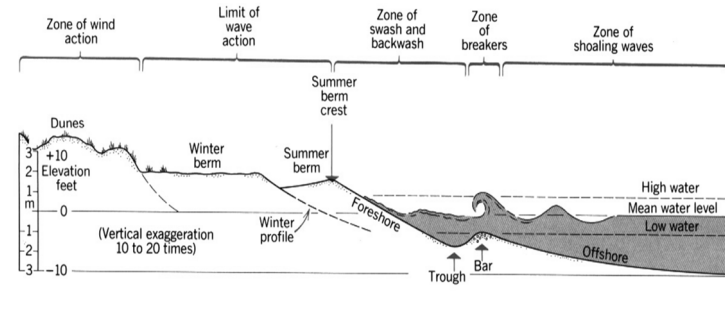
Modélisation du champ de houle planétaire

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\GP26x29a24c
 Showing: 15/10/2009 10:00 UTC



10/15/2009 10:00:00

Transformation de la houle en milieu peu-profond

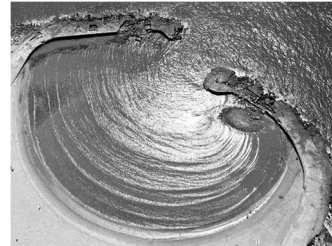


(d'après Strahler et Strahler 1992)

Réfraction-diffraction



Réfraction de la houle



Diffraction et réfraction de la houle

Courants de houle – longitudinaux

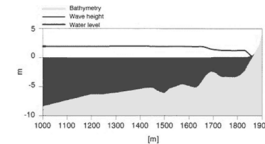
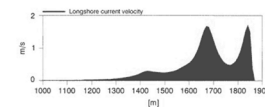
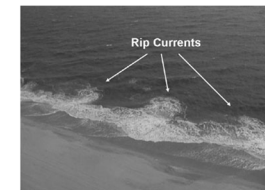
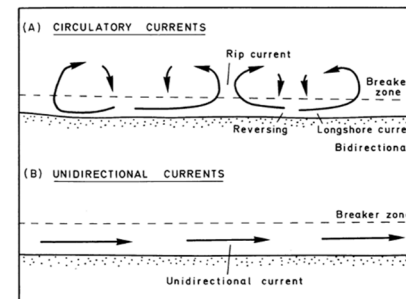
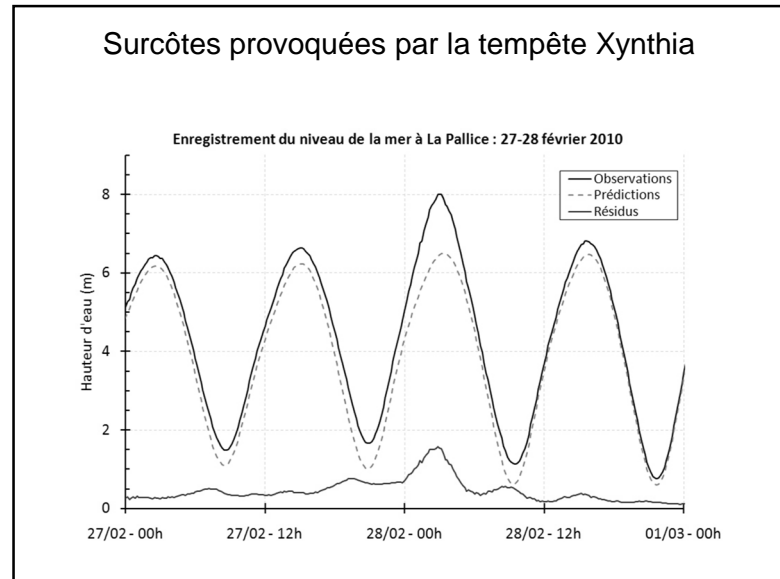
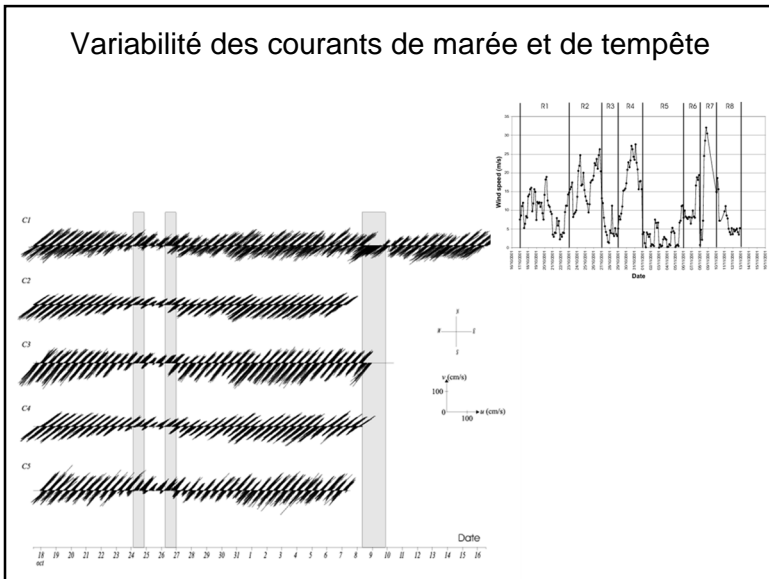
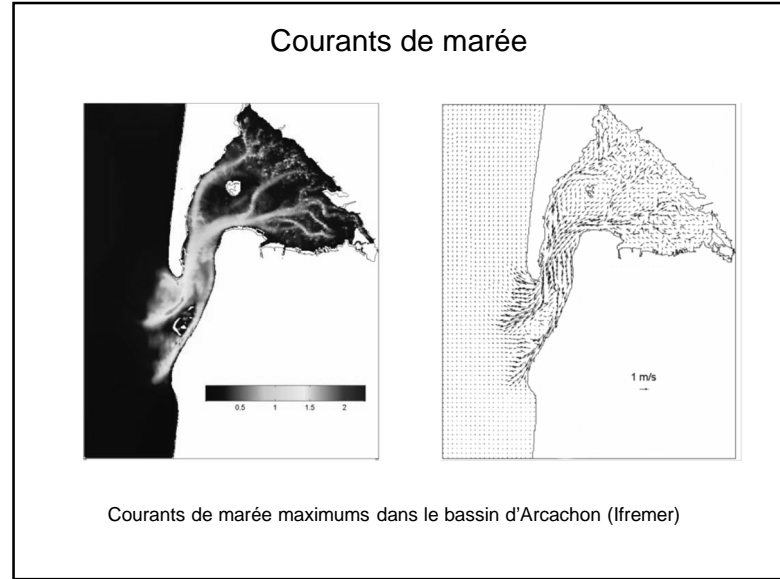
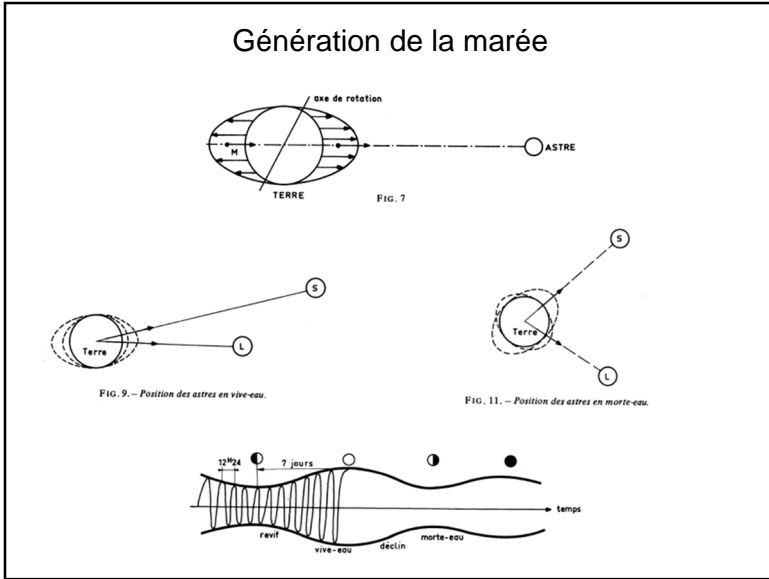
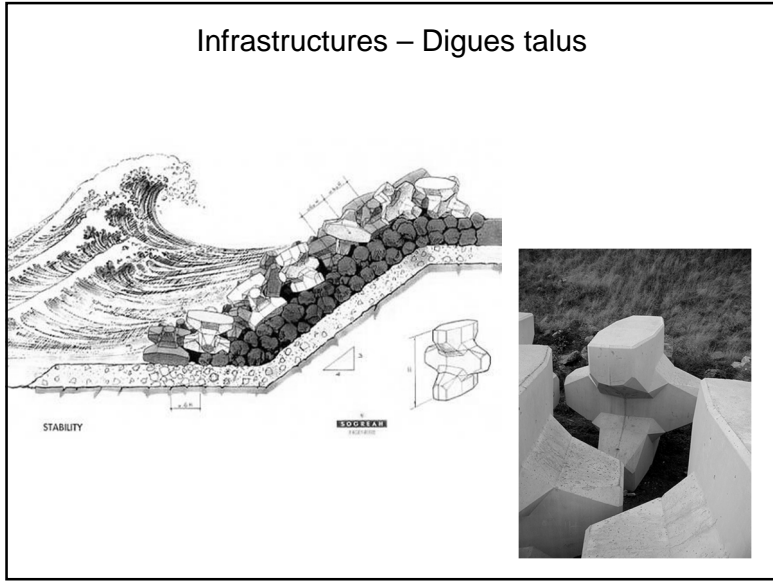
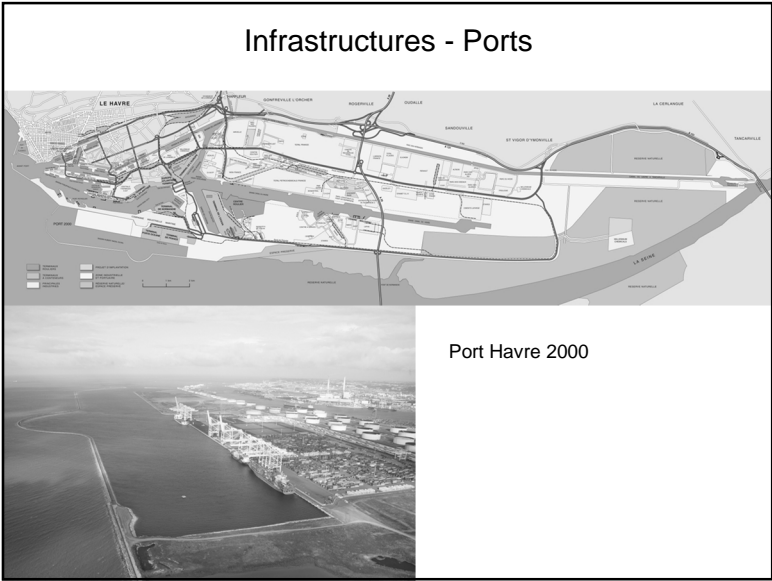
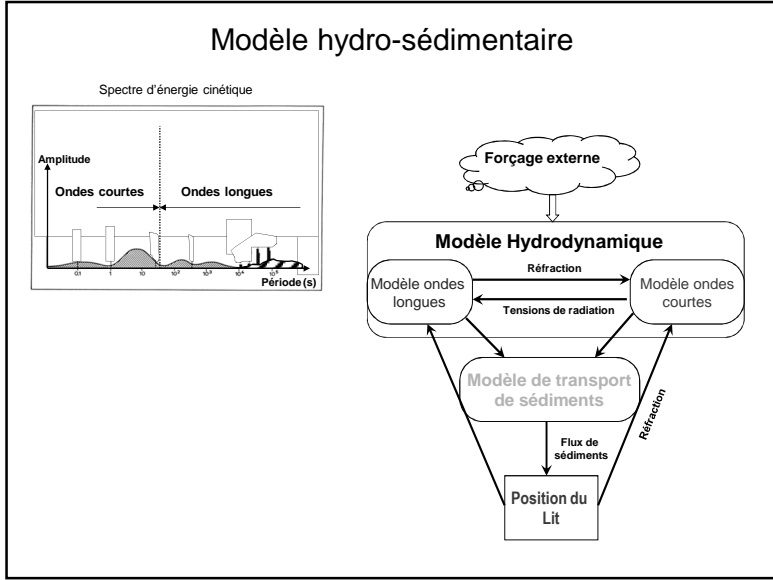
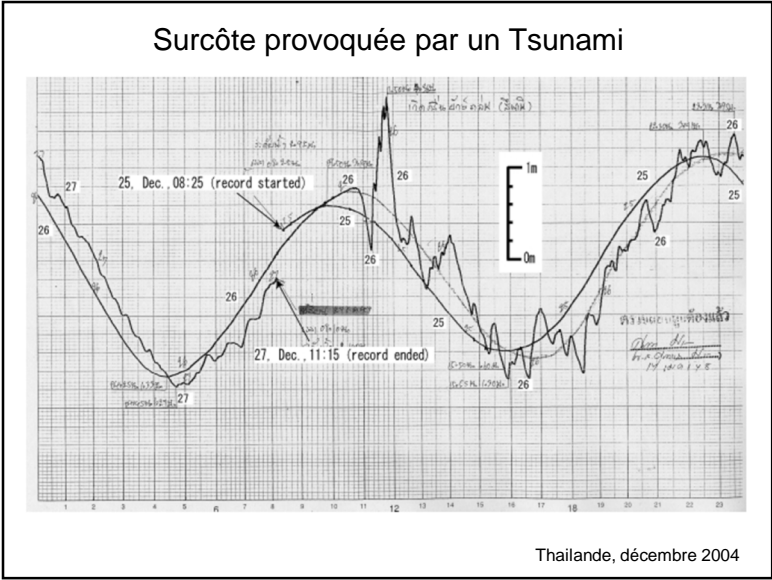


Figure 35. Two types of longshore current pattern.

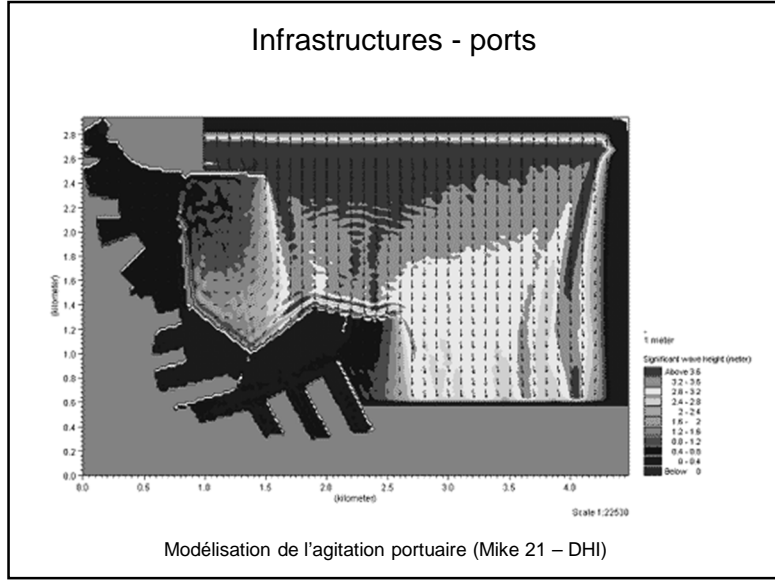




Infrastructures - Ports

Port de tanger (2005)

Digue à caissons



Infrastructures – Production d'énergie Marée

Usine marémotrice de la Rance

Infrastructures – Production d'énergie Marée

Hydrolienne « SeaGen »
(Marine Turbines ltd)

Parc hydrolien Paimpol-Bréat (EDF)
Hydrolienne OpenHydro (DCNS)

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

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




Soulac sur mer (Aquitaine)

Submersion marine



La faute sur mer (Tempête Xynthia)



Commune de Carnac - Risque de submersion marine - Carte de l'allée centennial • 20 centimètres