

CHAIRE DÉVELOPPEMENT DURABLE - ENVIRONNEMENT, ENERGIE ET SOCIÉTÉ
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COLLÈGE DE FRANCE
1530

Climate change and sea level rise; Coastal vulnerability and societal impacts

Sediment dynamics and coastal zone management

Patrice Walker, Creocan

Paris, 11 juin 2013

OCEAN

Equilibrium of coastal zone is related to:

- the stock and availability of unconsolidated sediments,
- the grain size distribution of sediments,
- the shore position and orientation with regard to oceanographic and climatic conditions and forcing

Exposed shoreface

Wave and wind dominated

High energy shoreface (Wave dominated)

How to build the beach?

If unconsolidated sediments with wide grain size distribution are available

∇H_s , wave

E_{sed} sediment

To induce onshore transport

The waves nourish the beach!

Onshore sediment transport

Nearshore

fine sand

sand

gravels

pebbles

Shoreface

Foreshore

Backshore

Gentle wave and weather conditions

fine sand

sand

gravels

pebbles

Wind

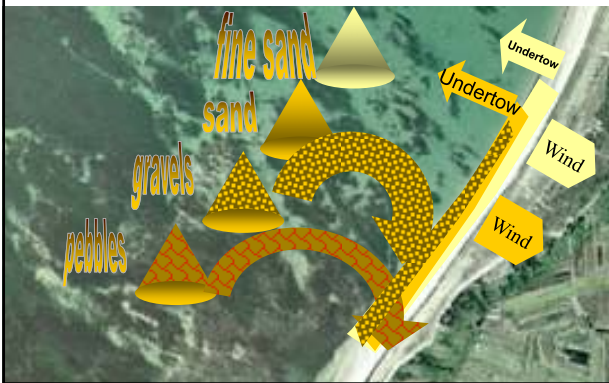
Gentle to moderate conditions



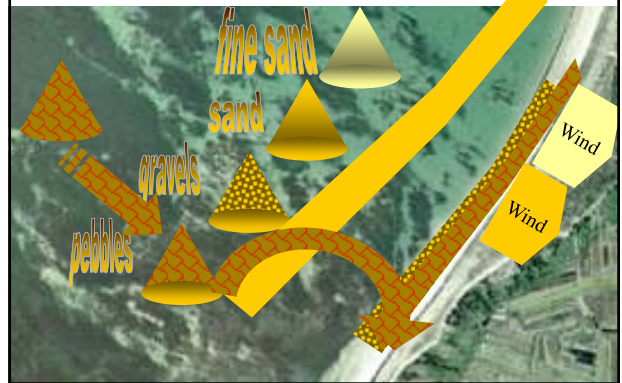
Gentle to moderate conditions 2



Moderate to severe conditions



Severe conditions



Decreasing conditions



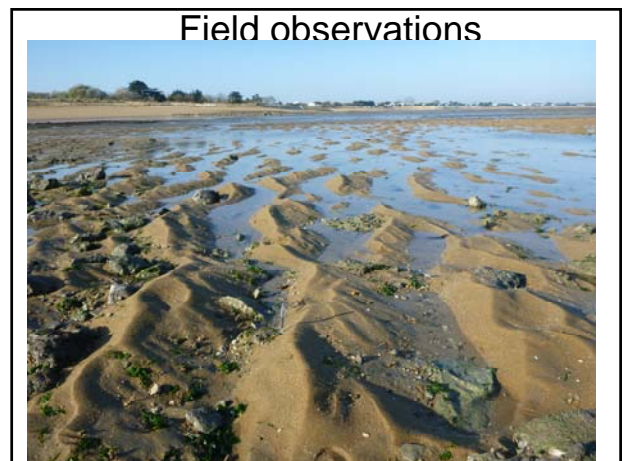
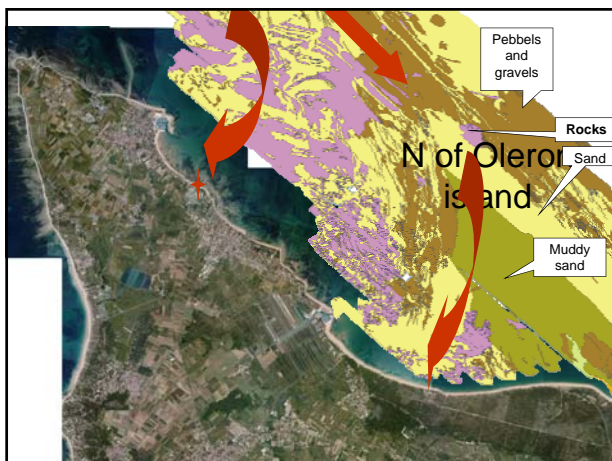
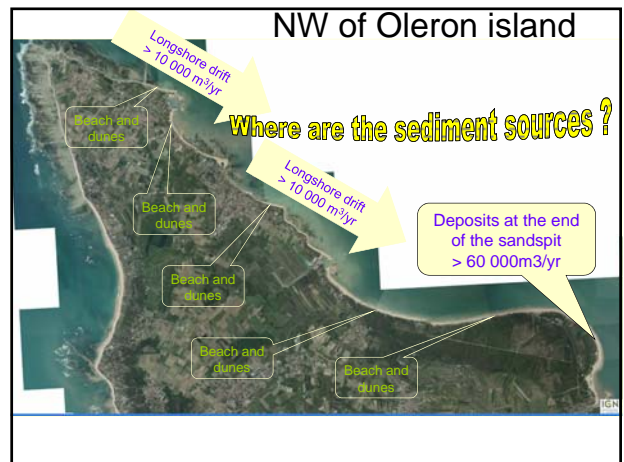
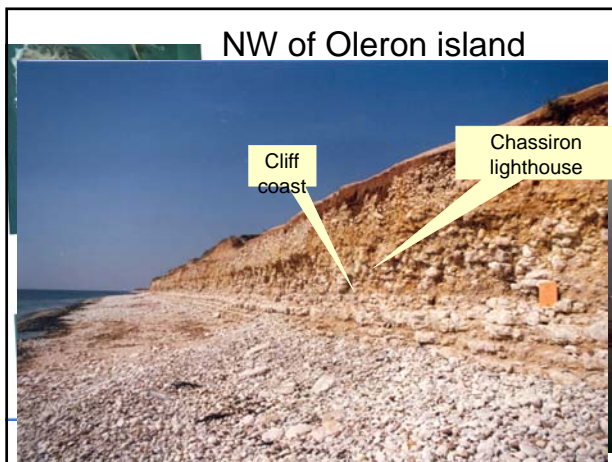
.....the coarsest deposits stay on the backshore

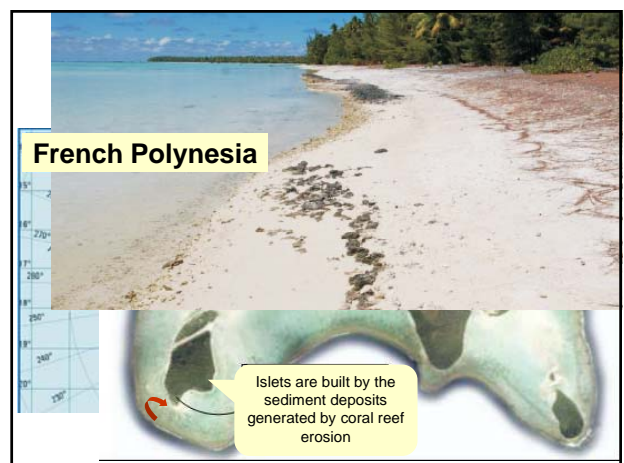
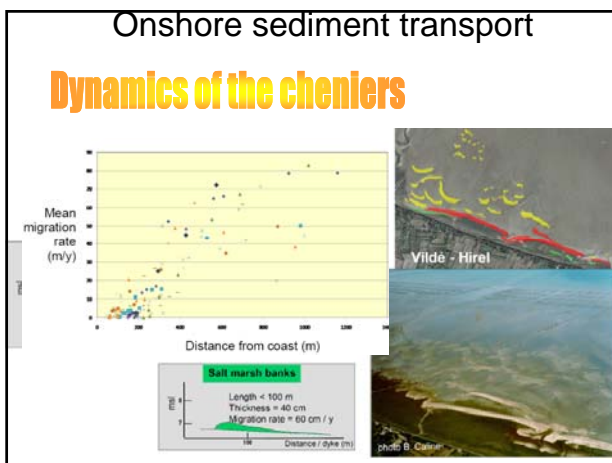
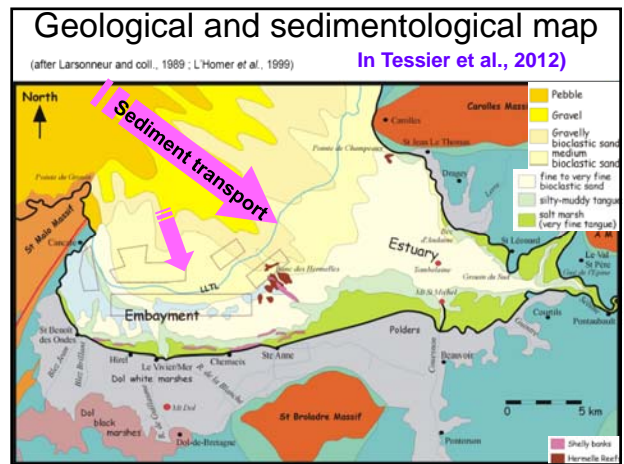
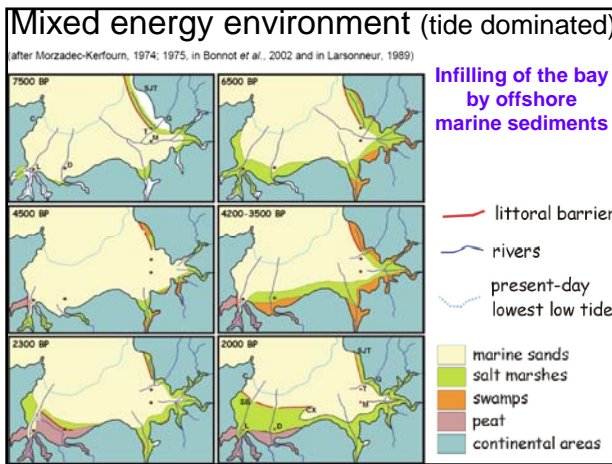
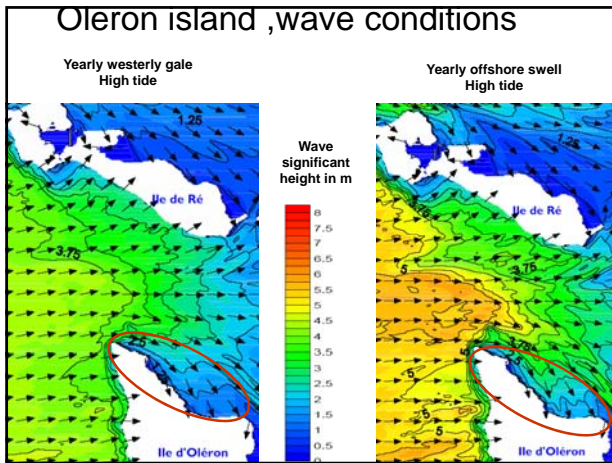


Field observations

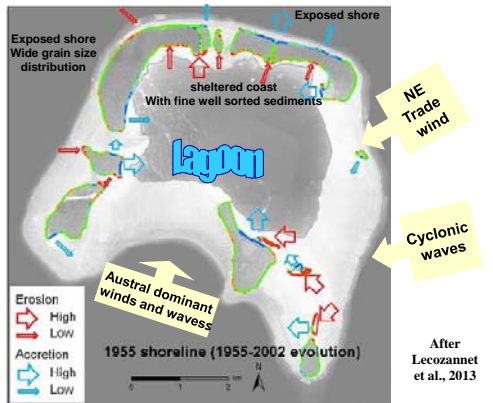
A Ré island nice beach in summer

The pebble layer reduces erosion in winter





A paradox



Climate change, sea level rise and coastal zone management



Severe conditions

