

## Aménagement de l'Espace Maritime-Côtier pour la gouvernance intégrée des zone côtières



Med-Cluster  
**facecoast**

Regione Toscana

Settore Protezione e Valorizzazione della Fascia Costiera e dell'Ambiente Marino

**1er Comité de Pilotage**

**Hotel Tiber, Fiumicino (Rome) 28 Avril 2014**

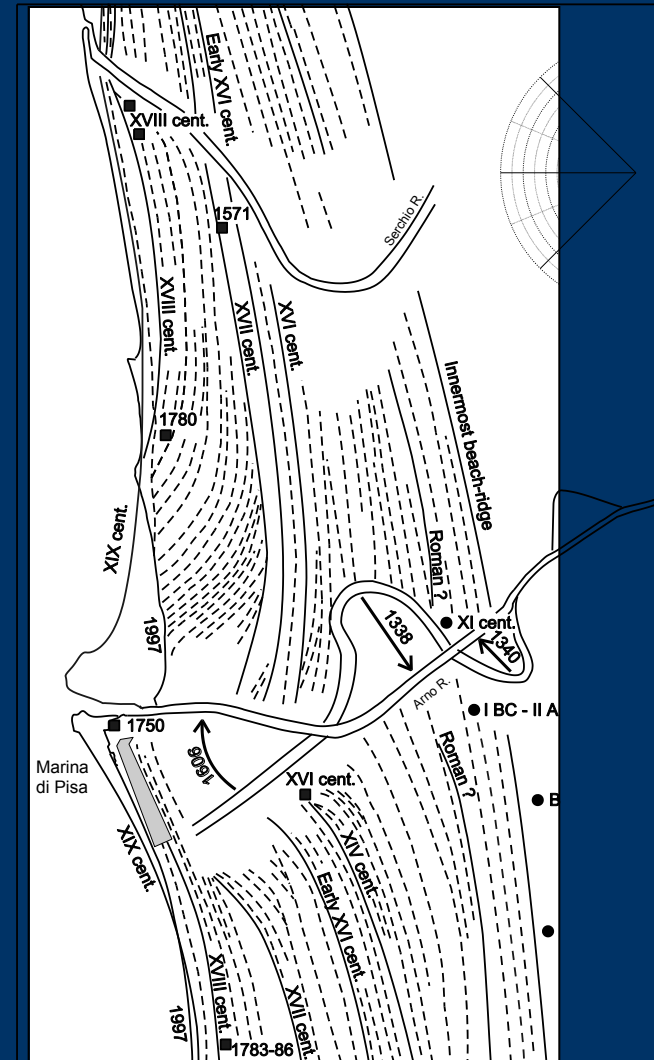
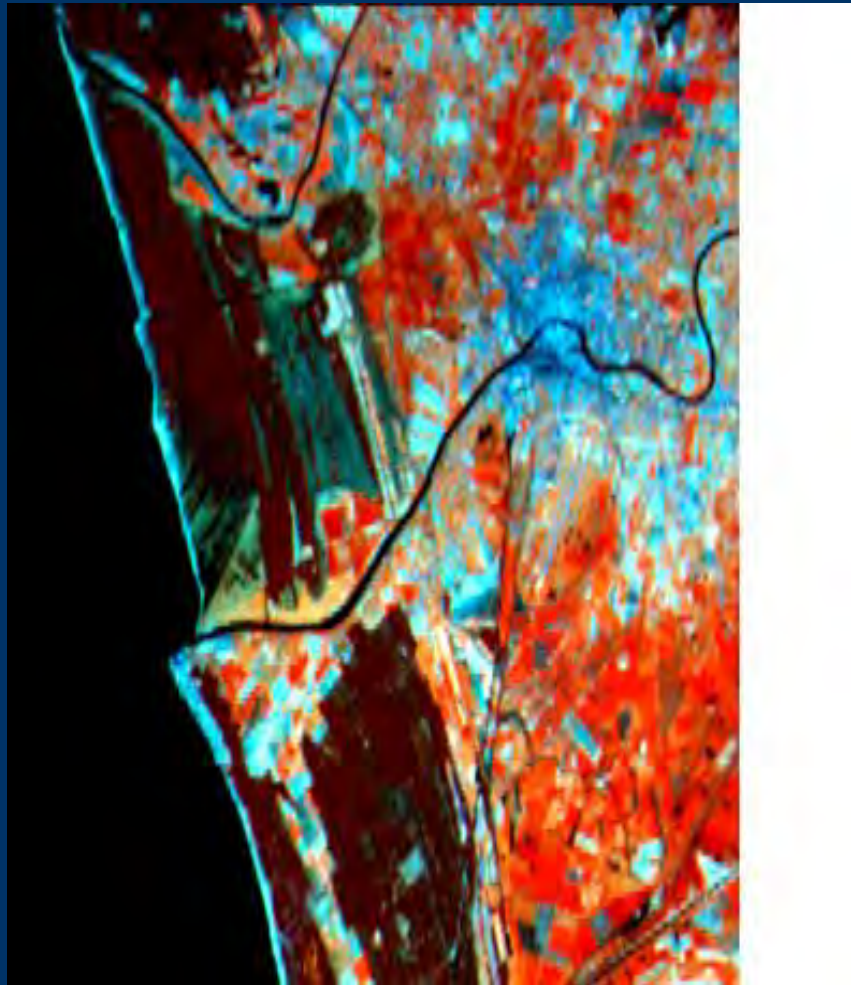
In historical times all the Italian coastal plains and beaches have experienced deposition and accretion as a consequence of the increased river sediment transport due to extensive deforestation and related soil erosion and land slides (as shown in these XVIII century paintings).





Beach erosion began in the mid-XIX century concentrating just at the river deltas, which, in previous periods, had acquired a very prominent shape. River deltas recorded these processes and they presently show the past accretion and erosion phases.

Arno river delta



In the meantime, internal migration moved people and activities from the inland towards the coast, where they found better economic, social and recreational opportunities.



Coastal road



Coastal town



Industry





Follonica (Tuscany)

...and summer tourism



Capalbio (Tuscany)



Prato Ranieri (Tuscany)





A day in the summer life  
of Marina di Massa (Tuscany)

N.B. The beach is given in concession  
to private entrepreneurs

However, new coastal infrastructures had to face traditional environmental risks such as river and sea flooding, land subsidence, salt water intrusion, sea level rise, and the incoming beach erosion.

As a consequence, at the beginning of the XX Century Italian coastlines experienced the coastal defense era.





Coastal defense at Marina di Pisa (Tuscany)





Beach erosion gradually shifted from river deltas to neighboring beaches, inducing shoreline retreat along stretches of coast further away from the river mouth.



San Rossore  
Regional Park







Marina di Carrara harbor (Tuscany)



# The Netherlands



- About 400 km of Rhine river
- International catchment
- About 350 km coastline
- About 9 million inhabitants below flood level

• Invested value 1800 109 euro, 65% of GNP

- Safety level: 1:10.000 – 1:1250
- Qdesign: 16.000 m<sup>3</sup>/s Netherlands
- 3500 km of flood defences, hundreds of locks, sluices, pumping stations





## 2) Policy implementation



- ▶ Coastline maintenance
- ▶ € 60 million / year
- ▶ 12 million m<sup>3</sup> sand



# Pilot Sand Engine

- Surplus of sand, distributed by tide/waves/wind
- Total budget 70 Meuro
- Realization 2011





