International Workshop

Governance of climate-related risks in Europe: the need for policy oriented research

Brussels, 8-9 September 2011

Using knowledge for integrated climate risk management at the local level

Dr. Pierpaolo Campostrini

Focal point for the city of Venice in the UNISDR campaign "Making Cities Resilient"

Director, Consortium for Managing Research Activities in the Venice Lagoon

National representative in the Program Committee of the FP7 Theme "Environment, including climate change"

Venice: UN Role Model for Cultural Heritage Protection

Third Global Platform for Disaster Risk Reduction, Geneva 9-13 May 2011

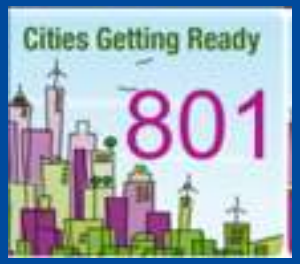
Mayors' meeting

"I urge local authorities to accelerate all efforts to make cities safer to prevent the loss of lives and assets"

UN Secretary-General Ban Ki-moon

UN-ISDR : United Nation International Strategy for Disaster Reduction

The International Strategy for Disaster Reduction (ISDR) is a strategic framework, aiming to guide and coordinate the efforts of a wide range of partners to achieve substantive reduction in disaster losses and build resilient nations and communities as an essential condition for sustainable development.



World Disaster Reduction Campaign 2010-2011
MAKING CITIES RESILIENT

The campaign aims at getting Mayors, local government and national authorities to take actions towards making cities resilient, on the basis of a ten-point action plan of "Ten Essential for City Resilience"

Venice was the first Italian city to have joined the campaign

United Nations
International Strategy for Disaster Reduction

Making Cities Resilient **My City is Getting Ready**

City to City collaboration

Venice & Byblos: an example of self-initiated city-to-city learning event

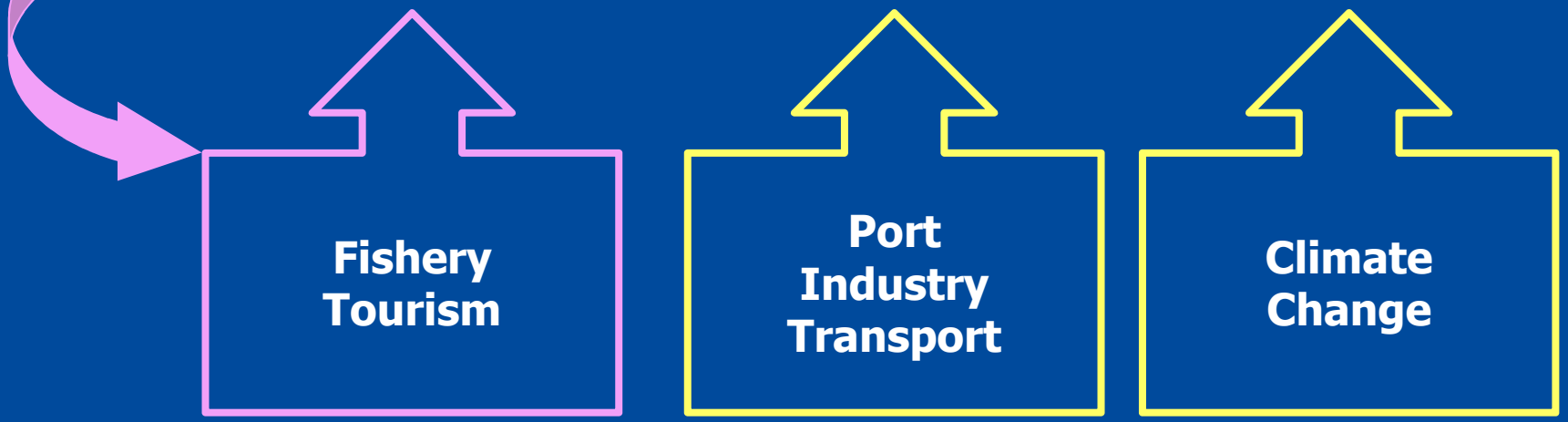
- Protection of the port and mitigation of tsunami risk
- Archeological site
- Tourism development
- Holistic approach

Safeguard Byblos from maritime dangers by following the example of its Role Model City, Venice.
Byblos, 28-29 June 2011

Venice as paradigmatic case

target

Nature, landscape and cultural heritage conservation



Pressures affected by the status of the target

"Pure" pressures, interrelated

constraint

social dimension ("city status" for Venice)

Location: 45°10′ N 12°40′ E, Length: ab. **51**km. Width: ab. **12**km. Perimeter: **157**km.

Total surface: **540**km^2, of which 8% land above sea level (littorals, reclaimed areas, islands, embankments) and 92% "water system": channels (11,9%), shallows, mud flats and salt marshes (80,1%).

Channels and open waters (depth >150cm): 66km^2.

Shallows (depth between 150 e 40 cm): 243km^2.

Mud flats (inertial areas between –0.40 and +0.24 on the m.s.l.): 98km2.

Salt marshes (areas higher than +0.24m, but flooded by high tide): 11km^2.

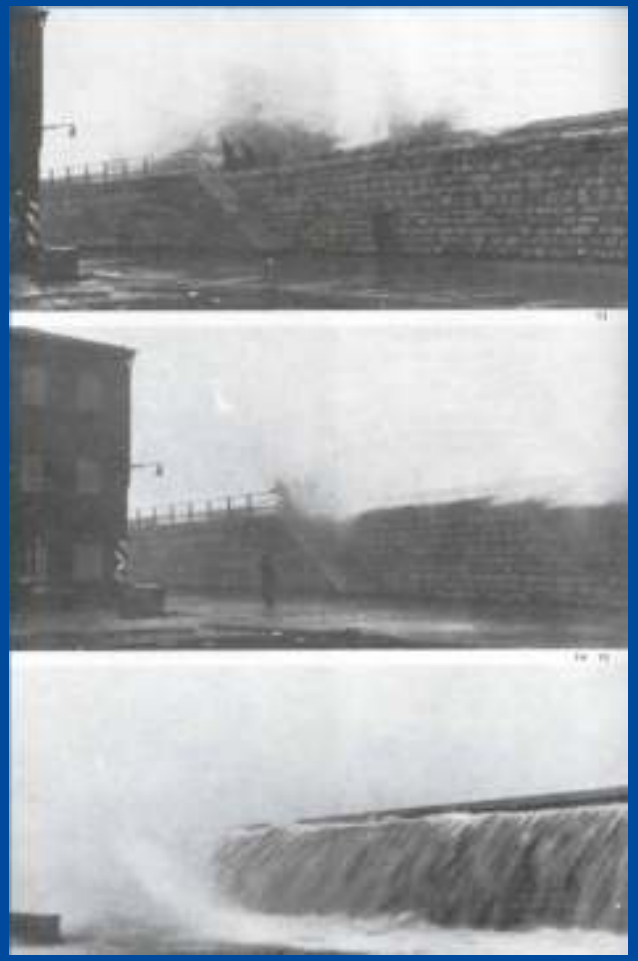
Embanked fish farms: 92km^2.

Islands: 29km^2.

The environmental weaknesses

- Flooding
- Pollution (past and present)
- Loss of lagoon status (erosion)
- Loss of precious habitats and biodiversity
- Monument and building degradation
- Only-tourism-economy culture
- City population ageing and decrease: loss of "city status"

4th November 1966

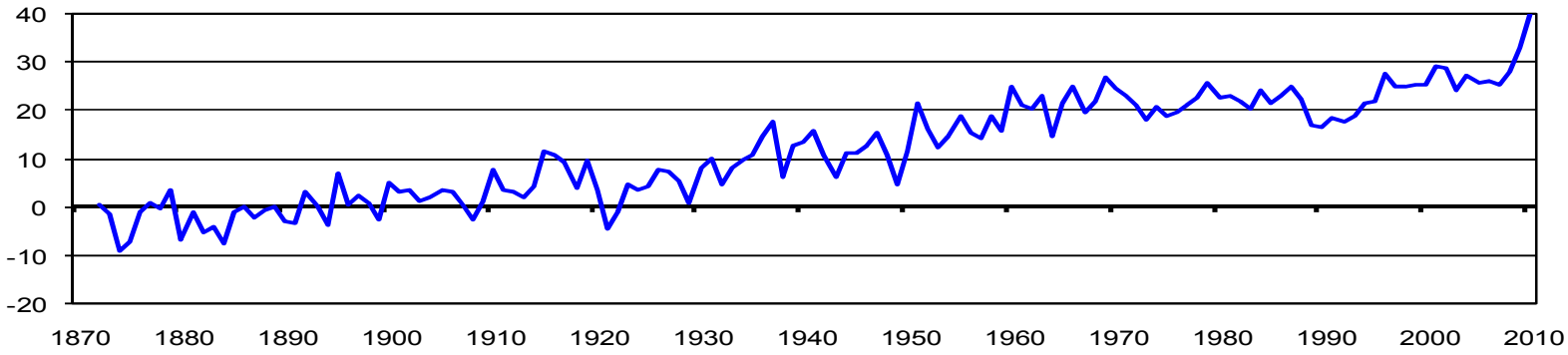


Floods

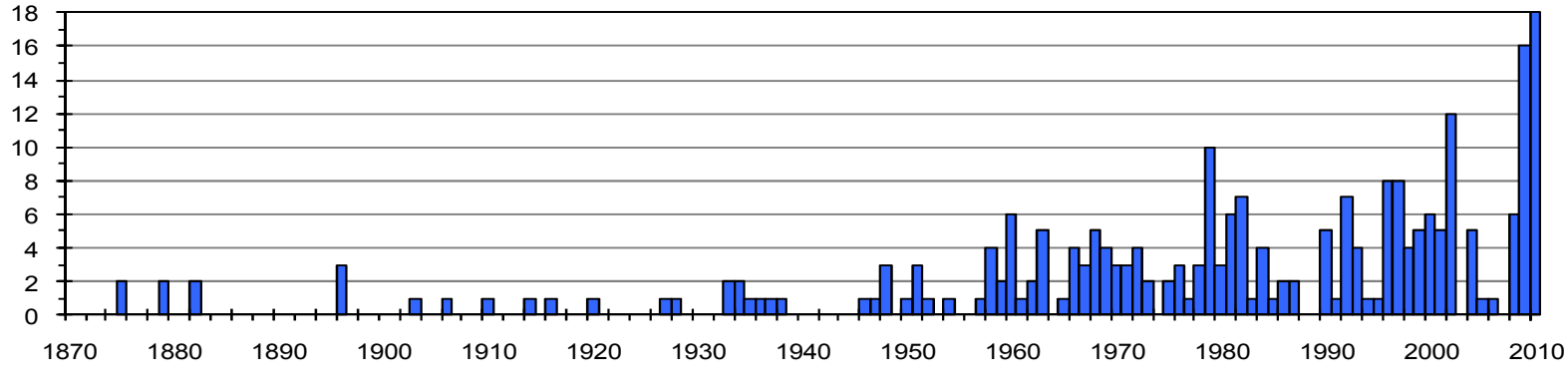
- Frequent high water events represent a thread for the buildings and for the city economy.
- Major events like in 1966 are still possible, too.

"Acqua Alta": TREND

mean sea level in Venice 1872-2010 : + 40 cm [source: ICPSM]



annual number of high water events 1872-2010 (≥ 110 cm) [source: ICPSM]



During the XX century the frequency of flooding tides has increased about 13 times, up to 18 events registered in 2010.
During the period 2000-2010 a number of 6 exceptional events occurred (the same number of events happened from 1960 to 1999).

The solution: a General Plan of Structural Interventions based on Science and Technology

- Coastal reinforcement
- Morphological restoration
- Reclamation of polluted sites
- Mobile sea barrier
- City pavement rising

Cavallino

Pellestrina

Sea walls and beach nourishment

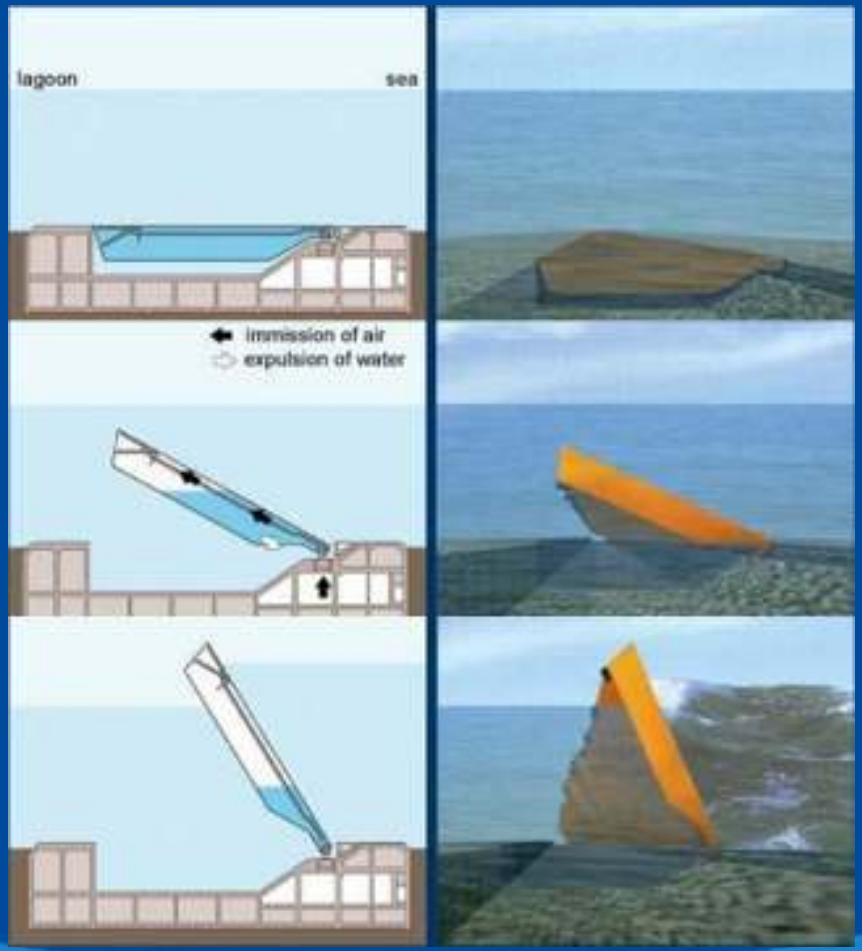
before

after

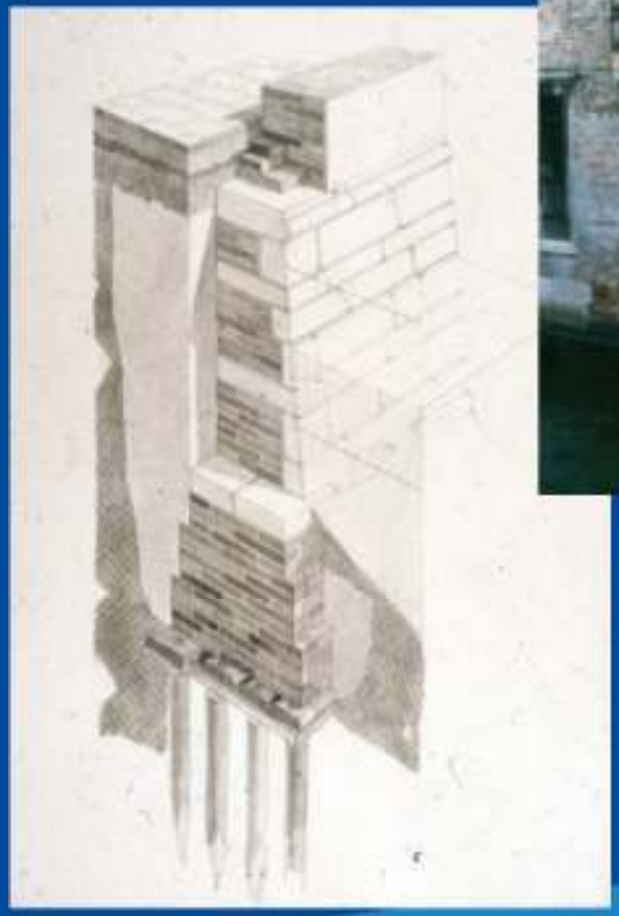
11 km of beach, 2,000,000 m^3 of sand taken from the sea, 20 km from the coastline

A new beach 9 km - 5,000,000 m^3 of sand. 18 containment groynes, connected by a submerged breakwater parallel to the coast, 300 m from the shore along the full lenght of coastline.

MOSE - Mobile flood barriers



Urban maintenance



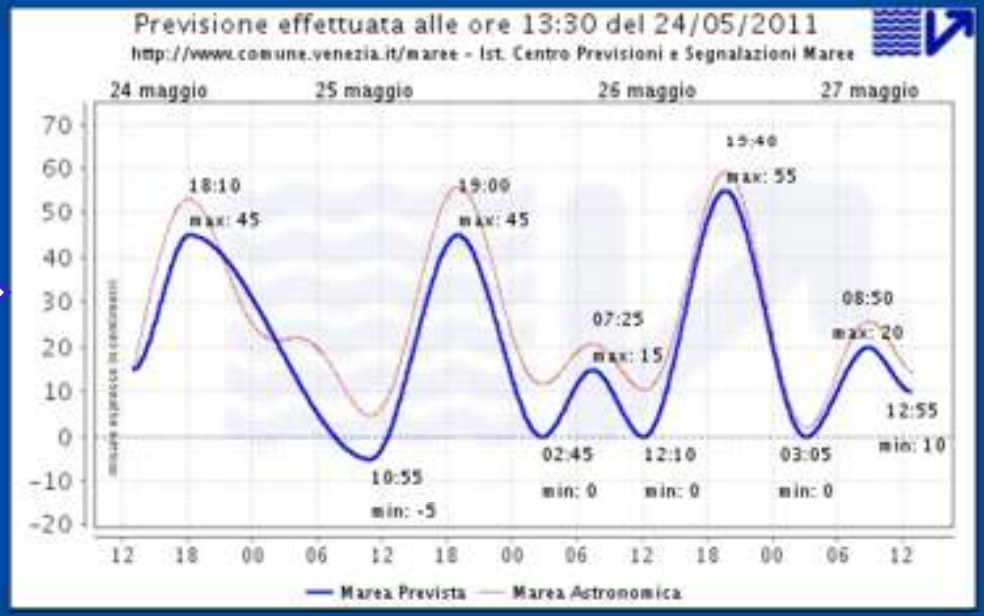
Non-structural measures

- Monitoring and Forecast
- Mapping
- Early Warning Systems
- Public Awareness

Monitoring and Forecast

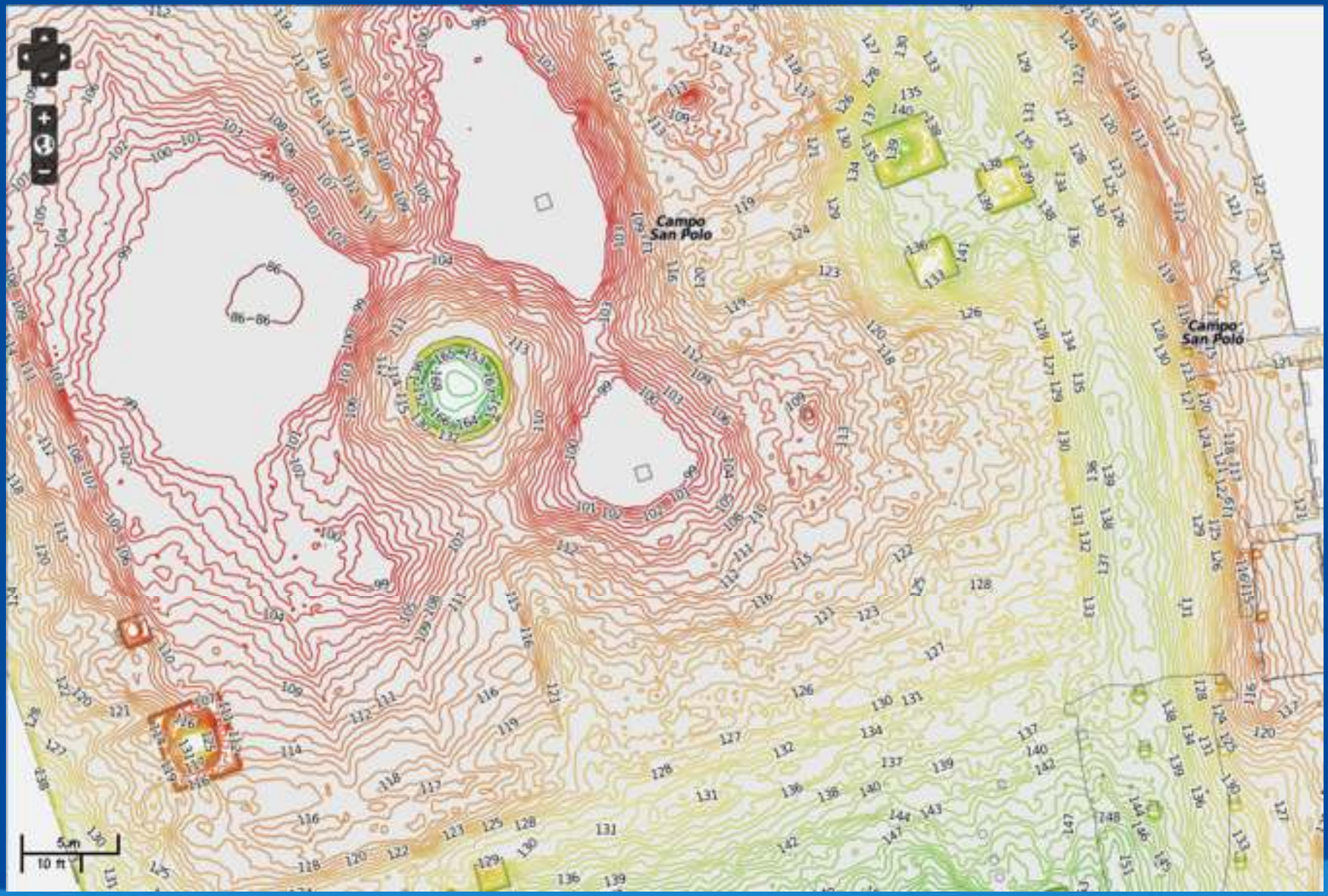
The ICPSM (Tidal Forecasting and Early Warning Centre) is an office of the Municipality of Venice, founded in 1980 to inform and alert the citizens in case of flooding tides

Monitoring Networks



Sea Level Forecast

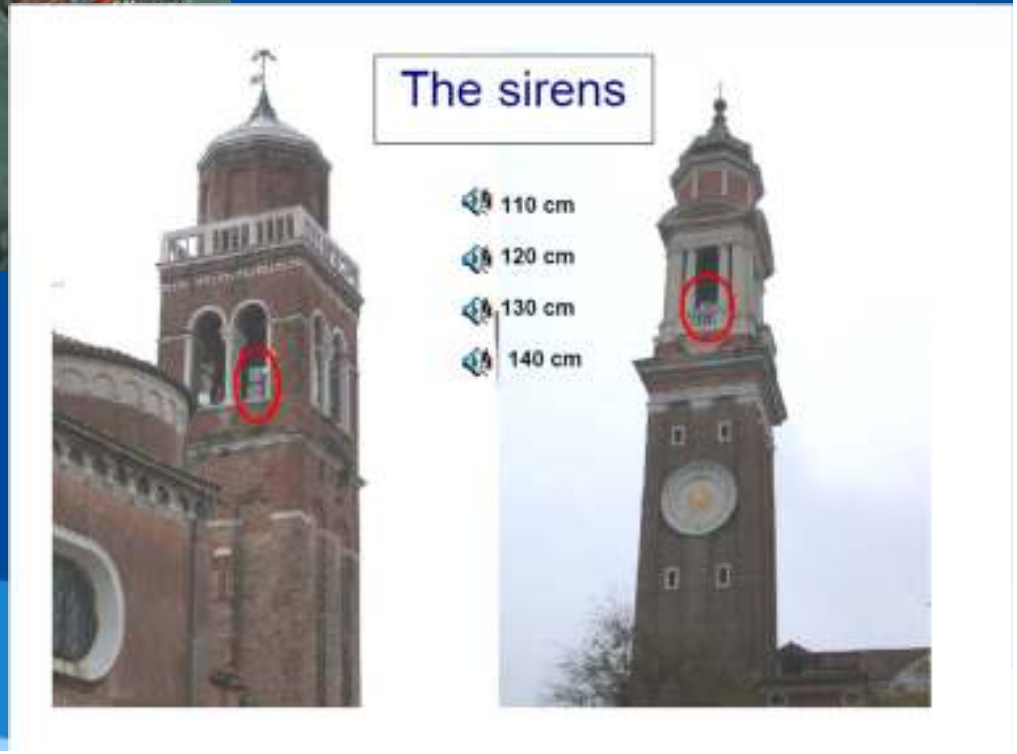
Flooding maps. Precision 1 cm



ACUSTIC alarm

A net of 23 sirens, placed on the principal Venice islands, alarms the population 3 or 4 hours before a predicted tide of 110 cm or higher

- First alert
- 110 cm
- 120 cm
- 130 cm
- 140 cm



"Acqua Alta": non structural measures

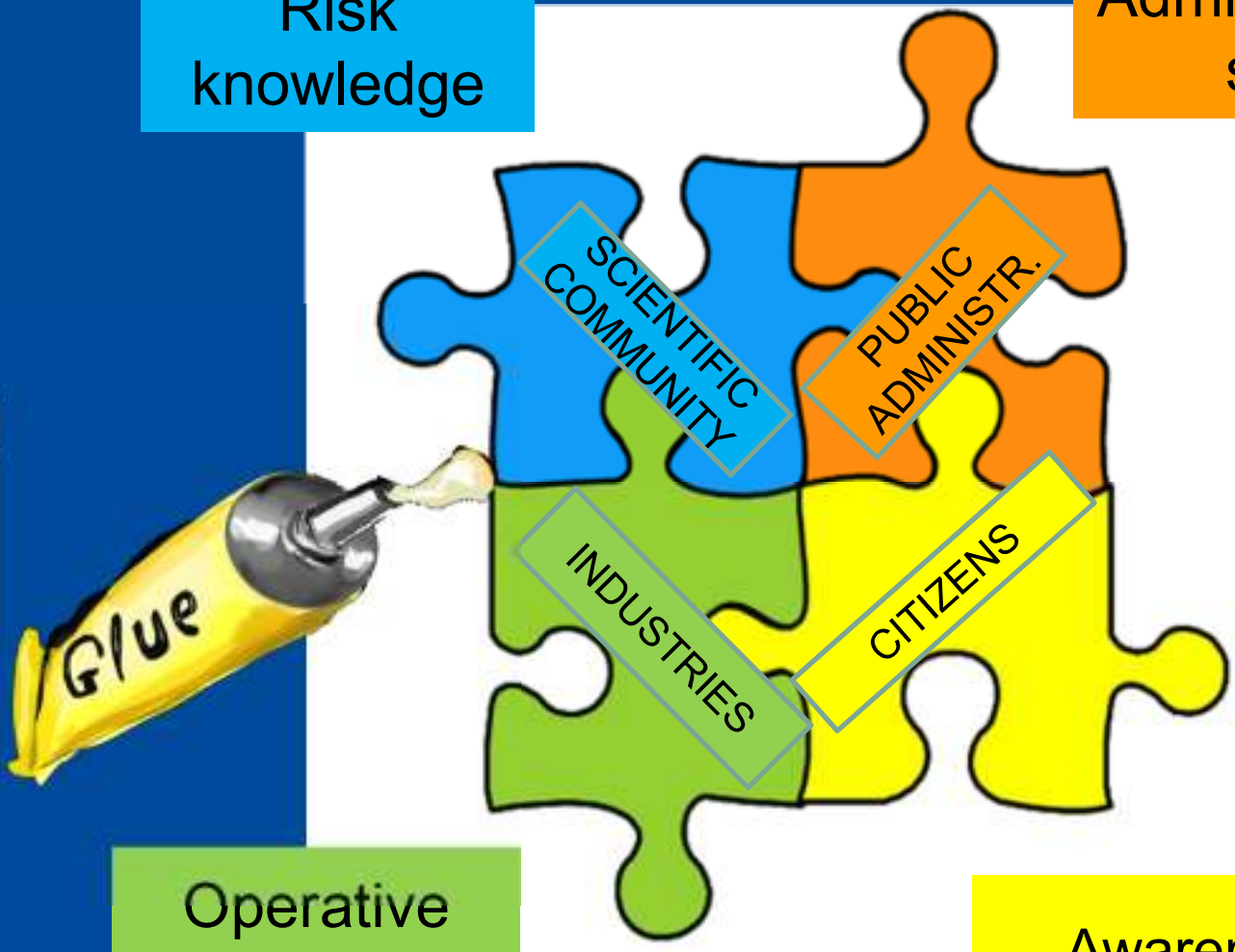
"Adaptation"

- During "acqua alta" event**s,** Venice can rely on the strong awareness of its citizens and their capacity to adopt adaptation measures in order to protect their assets.

Venice: a new sustainable paradigm

Risk knowledge

Administration skills



COMUNE DI VENEZIA

Operative skills

Awareness

Scientific research in Venice requires a strong coordination effort

CORILA - Consortium for Coordination of Research Activities concerning the Venice Lagoon System

overseen by the Ministry of Research of Italy, is composed by the public research entities more involved in lagoon studies

IUAV

University of Padua

University Ca' Foscari

National Institute of Oceanography and Experimental Geophysics

National Research Council

CORILA is also the seat of National/European organisations/projects

CORILA