



Science and policy in Venice

Dr Pierpaolo Campostrini

Consortium for Managing Research Activities in the Venice Lagoon

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Brest, 16 October 2008**

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, was born in 1998, active in 2000
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



Location: $45^{\circ}10' N$ $12^{\circ}40' E$,
Length: ab. **51km**. Width: ab.
12km. Perimeter: 157km.

Total surface: **540km²**, 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): 66km².

Shallows (depth between 150 e
40 cm): **243km²**.

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): **11km²**.

Embanked fish farms: 92km².

Islands: 29km².

Index: to make short a long story

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- 1492
- 1530
- 1592-1610
- 1819
- 1920 and 1950 (1963)
- 1966
- 1973
- 1991
- 2001
- 2006 to present

1202

- The Pope launched the Fourth Crusade: who is able to build ships to carry 4.500 horses, 9.000 knights, 20.000 foot, and provisions for one year to save Jerusalem?
- In those years, 20.000 workers populated the Arsenale of Venice, the first example of a workshop-fortress in modern era, able to protect any strategic secret.
- The best naval engineers and carpenters developed an “industrial” technology of bending the wood, of preparing separately the different parts of a ship, ropes and weapons included, allowing a real series-production of ships ready-to-go, 7 centuries before Mr. Henry Ford birth
- This technology was continuously updated along the centuries

(In the 4^o Crusade, Venice gave the ships to the Pope, for some (al lot of) money and 50% of the revenue of the operation. However, after the start of the fleet toward Jerusalem, diverted it to Costantinopoli, taking home the remaining treasures of the Easter Roman Empire, both in terms of treasures and of political influence. The Doge become "*Dominus quartae partis et dimidiaie totius Imperii Romaniae*")

1492

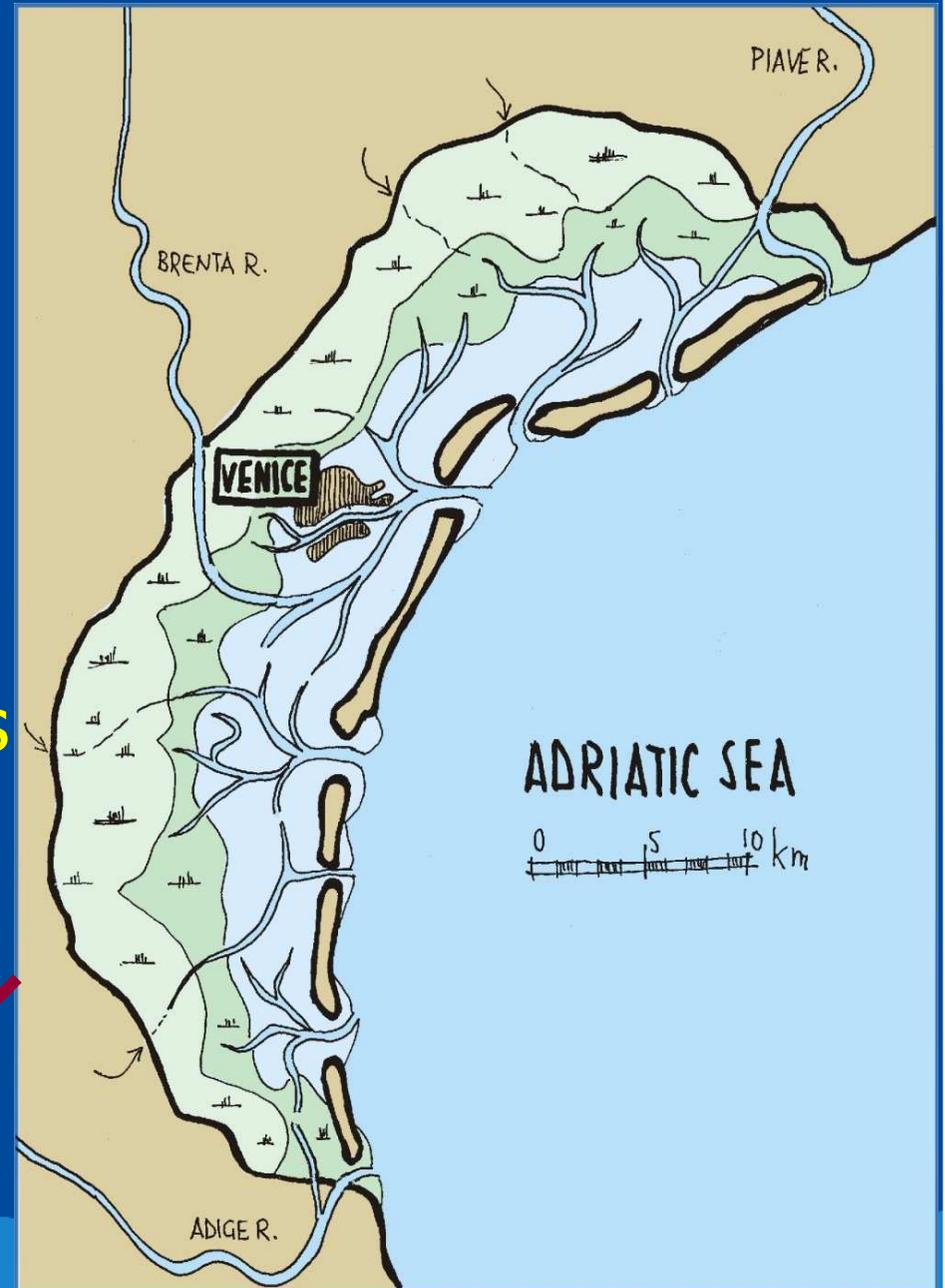
- Considered a symbol milestone for Venice's history. After Columbus, the Mediterranean Sea has not the same value
- The ships for the Oceanic routes are made in a completely different way
- Agriculture is changing, too
- The “city-state” model of the middle age proved its weakness, while “new” empires are stronger



In the XV century, the lagoon of Venice was different from today:

- large rivers flowing into the lagoon
- 5 - 8 unstable inlets
- large extension of marshes
- tendency of tidal flats to become silted

risk of infilling of the lagoon

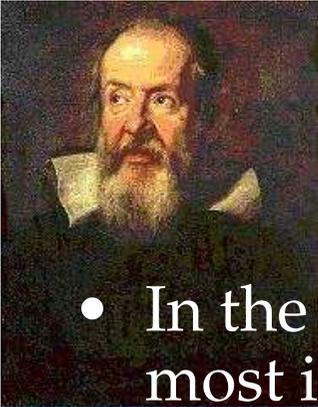


1530: Land or Water?

- A vivid debate “scientific” debate occurred around 1530 AD
- **Alvise Cornaro** (1475-1566) vs **Cristoforo Sabbadino** (1487-1560), the first was for extending the reclaimed land on the lagoon border, the latter for maintaining the water
- Behind the science dispute, two clear interests: **land developer vs sea merchants**
- Sabbadino won and rivers were diverted
- A lot of public money was spent and Venice remained the **Queen of the Sea** for almost two centuries more: its fleet played a substantial role in counteracting the Turkey expansion in the Mediterranean (Lepanto battle, 1571)

From the XIV to the XVIII century great care was taken by the *Serenissima Repubblica* to defend its lagoon "against sea, rivers and man"





Galileo Galilei (1564 – 1642)

- In the year 1592 Galileo moved from Pisa to Padova, the most important “land city” of the Republic of Venice. Thanks to its genius and **to the Venice glass factory technology**, his telescope was of outstanding optical quality for the period. Most important, in Padova (until **1610**, the year of publication of *Siderius Nuncius*) **Galileo was free and protected**, while this was not the case when moved to Florence and Rome
- The Serenissima Repubblica developed from the year **1405** the University in Padova (actually born in 1222), which became the cultural engine of Venice and the main scientific centre in Europe (*Universa Universis Patavina Libertas*)
- It must be noted that Padova is **35 km away from Venice**, seat of the political and military power of the Republic

The post-Republic crisis (XIX century) under foreign rule

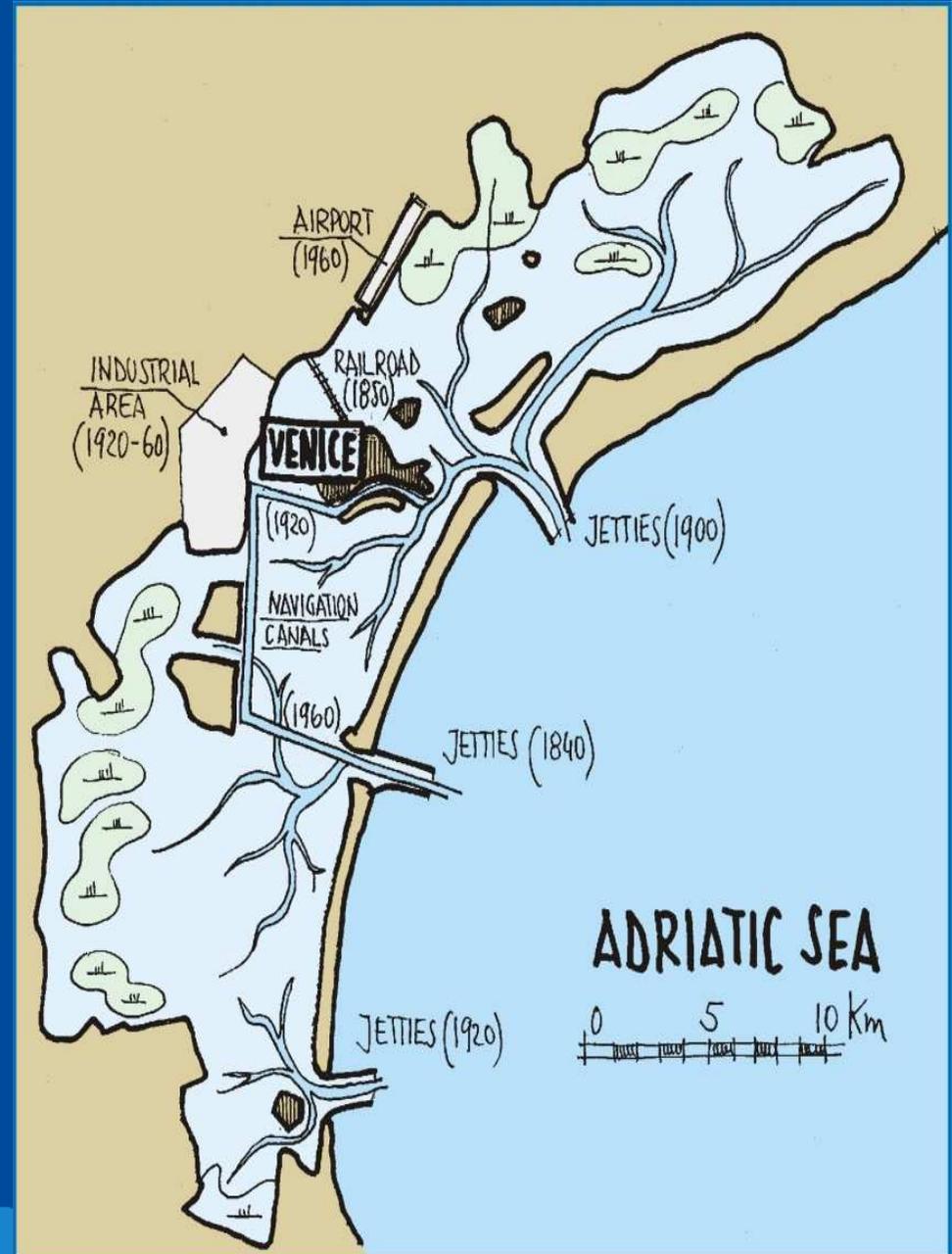
Ode to Venice (1819) Byron George Gordon



OH, Venice! Venice! When thy marble walls
Are level with the waters, there shall be
A cry of nations o'er thy sunken halls,
A loud lament along the sweeping sea!
If I, a northern wanderer, weep for thee,
**What should thy sons do? -anything but weep;
And yet they only murmur in their sleep.**

Around the XIX century the political decadence of Venice brought to a halt the interventions in the lagoon

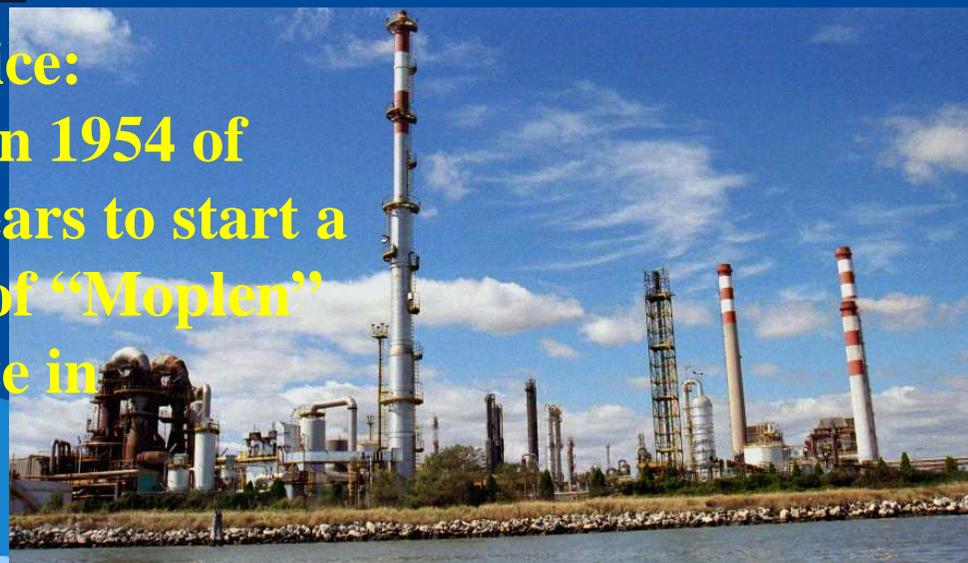
Over the past 150 years, by contrast, the lagoon was subject again to large modifications



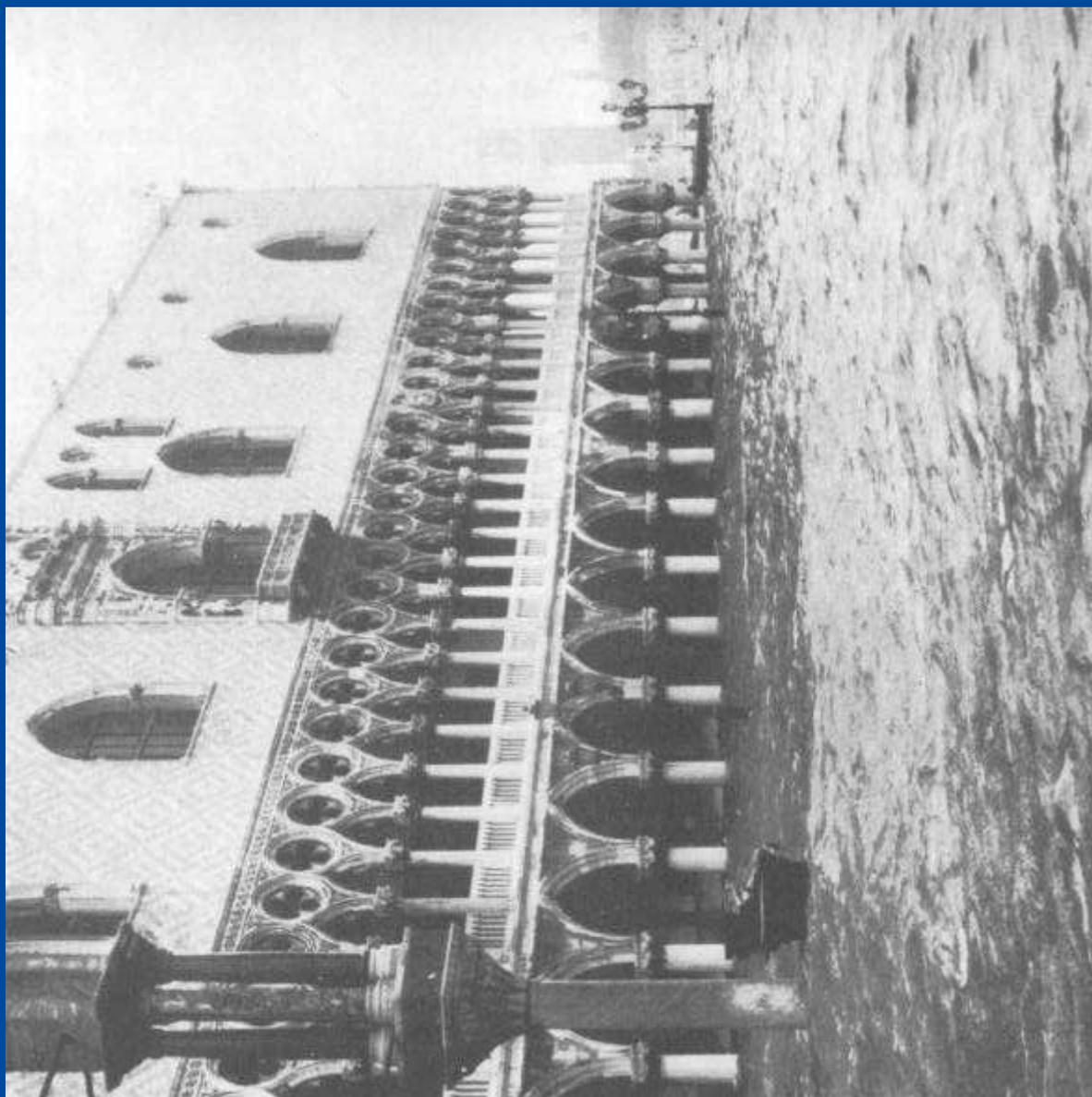
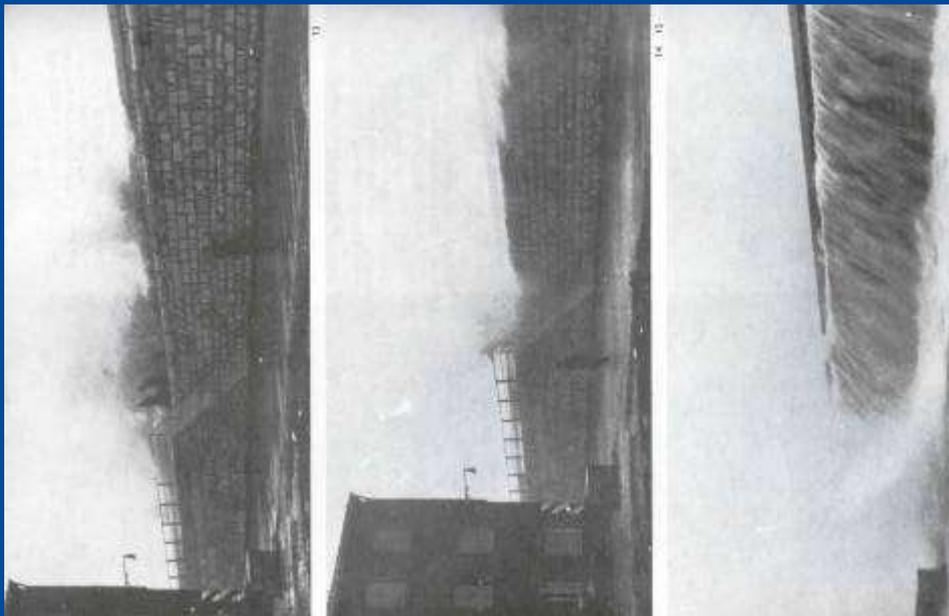


1920 and 1950 The new life: the industry and the new port

Qualified people moved to Venice:
Prof. Natta after the discovery in 1954 of
polypropylene isotactic, in 4 years to start a
massive industrial production of “Moplen”
and in 1963 won the Nobel prize in
Chemistry



**4th November
1966**



The shock and the struggle

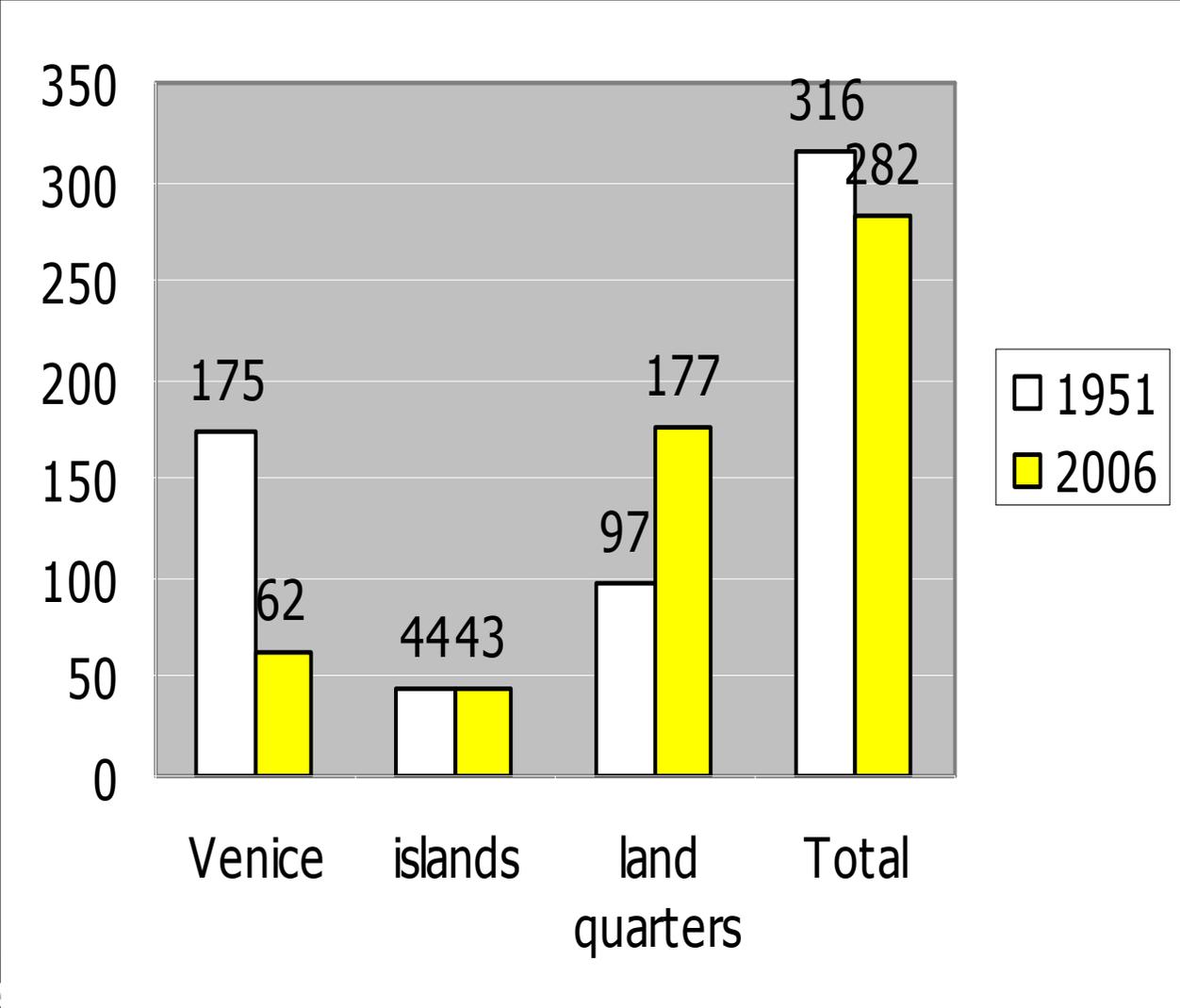
- Large emotion world wide after the 1966, when the risk of the physical lost of Venice was run
- In addition to the extreme events, the increased number of flooding (10 times more than the beginning of the century) is blocking the city economy and expelling the inhabitants, making impossible the residential use of the houses' first floor



Social dimension



Residents in the Venice Municipality



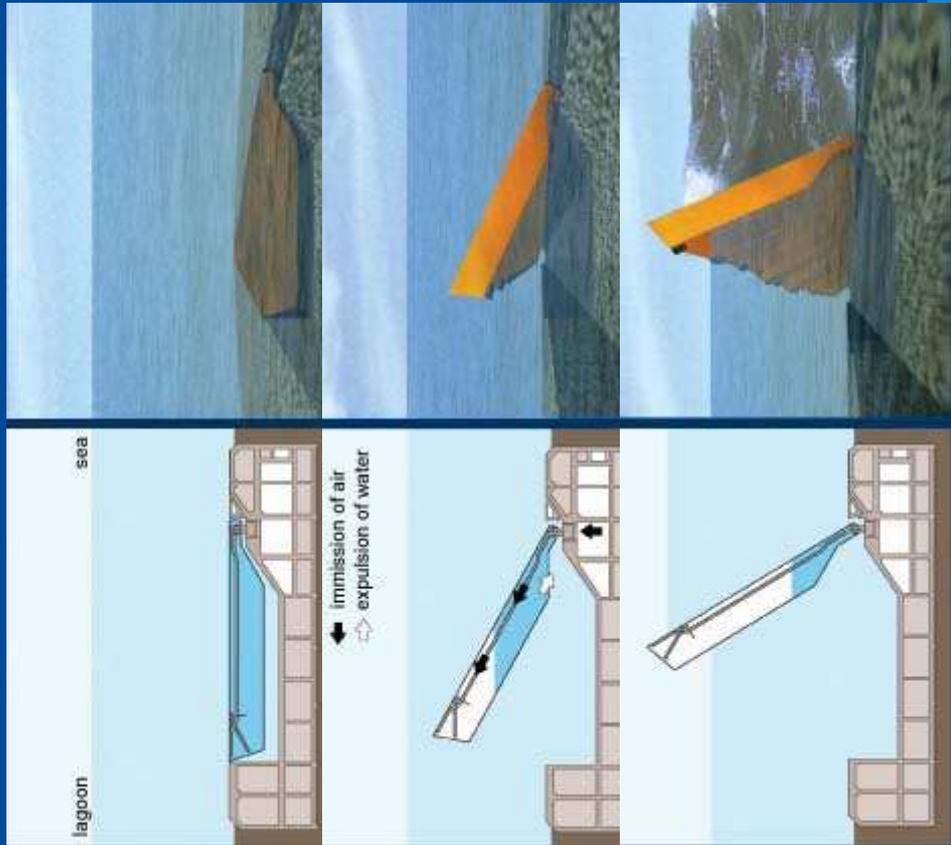
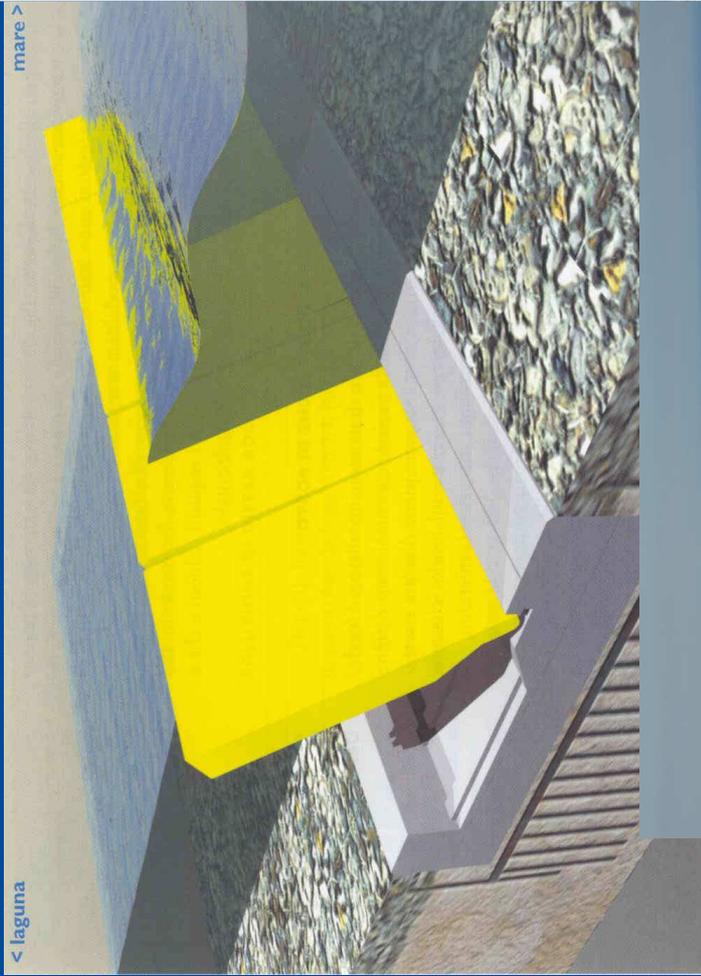
First dispute: what are the causes?

- Under accuse the **development model of the XX century**. The industry, the new channels, the new aquaculture zones on the lagoon borders.
- The so-called “environmentalism” in Venice has his roots in the negation of the positive role of the “new economy” based on the industry, realised by workers. **It is aristocratic, not popular**. Politically, it comes from centre-right wing, not from the left wing.
- It took almost 20 years to demonstrate definitively that:
 - A) there is no practical influence of the navigation channels and of the fish farms on the water level in the city
 - B) the subsidence and eustatism of one century (24 cm of relative sea level rise) give enough reasons for the repeated flooding
- **Even today, the question of the influence of navigation channels on the flooding is often posed by the general public**

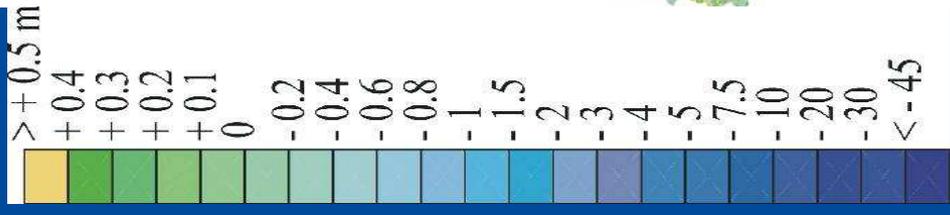
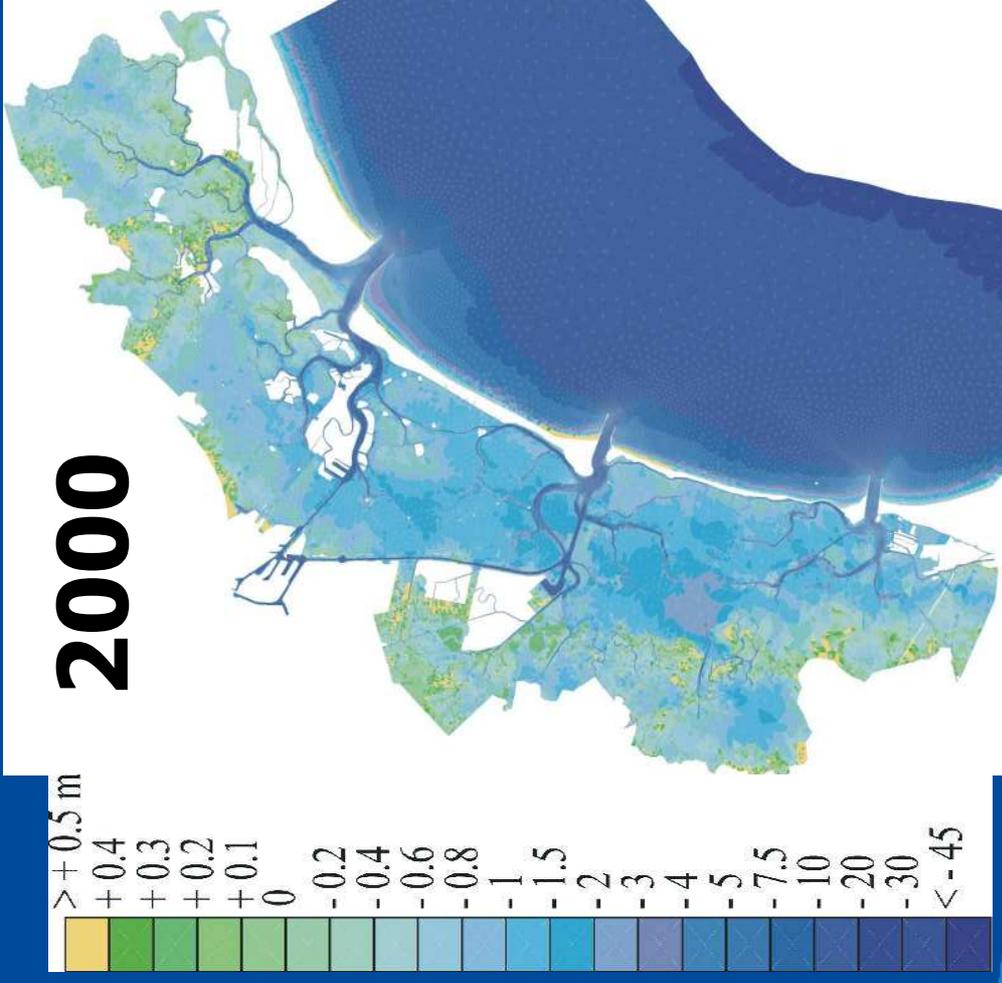
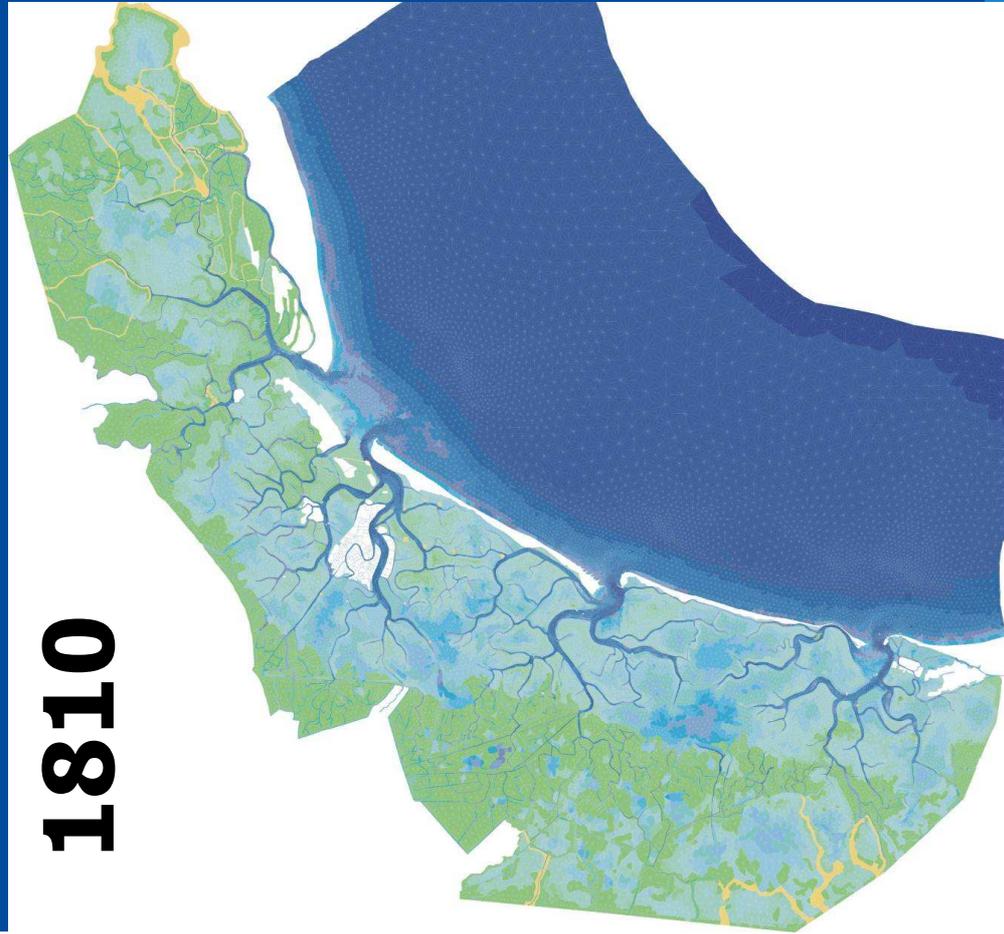
Second and longer dispute: the solution

- *Save Venice OR Save the lagoon ?*
- Two parties with scientists in both
- The first arrived fast to the conclusion that to avoid flooding is necessary to temporarily separate the lagoon from the sea in some meteorological conditions (the TAP Party)
- The second insisted that the safeguarding of Venice cannot be separated from the restabilising of a correct lagoon equilibrium, defeating erosion and pollution (the MUD Party)
- Behind them, as four centuries ago, some different economic interests, with borders more confused than four centuries ago, and the perspective of a lot of public money to be spent in huge public works

The TAP: Mobile flood barriers



The MUD: lagoon morphology



MAIN CAUSES AND EFFECTS OF MORPHOLOGICAL DEGRADATION

C
A
U
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E
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- Relative sea level rise (subsidence and eustatism)
- River mouth diversion (occurred in 1500-1700)
- Modification of inlets (occurred around 1900)
- Navigation artificial channels dredging (1920-1960)

E
F
F
E
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- Unbalance of sediment input-export: 0,2-2 million m³ per year
- Need to dredge internal channels for navigation
- Loss of intertidal habitats/biodiversity
(A more flat and uniform lagoon > a marine bay)

Some wrong impressions

It is NOT true that:

The TAP solution is less “ecological” than the MUD solution

The MUD solution can solve the problem of any flooding

A lot of money have been spent to look to the TAP, nothing for the MUD

The TAP solution is sustained by dirty economical interests, while the MUD solution is “pure”

In fact:

The MUD solution to be effective for flooding will jeopardize the water fluxes

The MUD solution is effective only for high speed of tide currents

8,2 billion Euro of State money have been spent for Venice, 2-3 for the TAP

See above

The science point of view: an ill-posed debate

- It is possible to save Venice AND the lagoon
- The timescale of phenomena are different
- To restore the lagoon morphology 30 years is a correct target timescale
- The rising up of a tide barrier for avoiding flooding is 30 minutes
- The two interventions (tide barriers and morphology recovery) are different and mainly independent

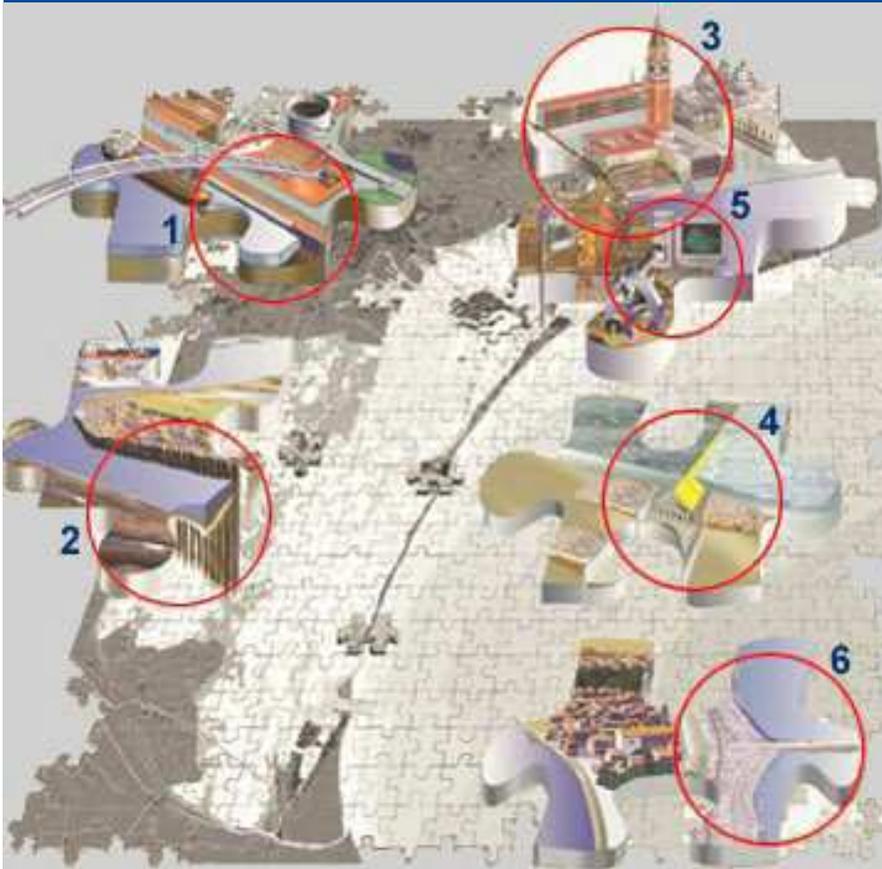
From : Seminara, Academia dei Lincei 2008

1973 Italy's Special Law for Venice

- Venice: Italy's national interest
- To reach hydraulic equilibrium
- To preserve environment from pollution
- To reinforce socio-economic vitality
- To safeguard the architectural patrimony
- Different levels of administration involved (State, Region, Municipality), a Big Committee for co-ordination



1991 - The General Plan of Interventions



The Plan has been approved by the Technical Committee of the Water Authority, by the Inter-ministry Committee ("Comitatone") in 1991 and by Parliament who referred to it in Special Law 139/92 as a basis for the development and funding of the measures planned, completed and still underway.

The different geographical layers of the battle for State money

- The ecological-physical problem is in the “water city”
- The pollution problem is in the “land city” and in the drainage basin
- The economic-social problem is in a wider territory, with some “hot-spots” in the lagoon, like tourism and fishing
- The local political power depends on the consensus of the local community.
- It is just the fascination of the “water city” which attracted, justified and sustained the rather exceptional flux of Italian taxpayers money

2001 The division of the pie changes

- Until 2001, one third of the State money was given to the State Public Works (flood and morphology), one third to the Region (de-pollution of the drainage basin) on third to the Municipality (urban maintenance and social re-vitalisation)
- After 2001, the huge direct cost of MOSE construction (4,7 billion) was directly funded, while the difficulties in public finance reduced the funds of the Special law for Venice
- A number of activities (e.g. restoring of public buildings and private houses) are in deep trouble without the public money (they were addicted, too..)
- The MOSE was (is) considered responsible of this lack of money, even if the physical defence of Venice was (is) the actual justification of the overall State intervention

Policy and Science Complexity

- To solve the **complex political problem** a short path was looked for in the science
- Unfortunately, lagoons are very complex and the **ecology complexity** is at least of the same order of policy complexity
- However, **science has been used** in the political debate like a hammer to defeat the political enemy (“...my expert says...”)
- In the '80-'90 the decline of resources given to science institutions weaken their independence. **Local research institutions were fragmented**. Some Italian resources were driven to science abroad just to skip the “local” problem.
- The result: **bad policy** (battle of ideas, decided by consensus) and **bad science** (battle of proves, decided by peer reviews)

2006 The “alternatives” drama (1/2)

- In July 2006, the Major of Venice asked to the National Govern to consider schemes for flood protection “alternative” to the MOSE project, claiming they were “technically based”
- The Govern decided to send the proposal from the Major to the different Ministries involved for evaluation
- CORILA was asked from the Ministry of the University and Research to perform a “technical and scientific evaluation”: CORILA did it, involving people from Italian Academy and the Ecology scientific society. The Ministry staff approved it
- The evaluation results were discussed around a “technical table” convened in the Rome on 2nd and 8th November 2006
- Around the table, experts from the Ministries and the Major with its “technical team”
- Before the meeting, strong pressures occurred from the Major on the Ministry of Research to block the participation of CORILA, which was defended by the Prime Ministry

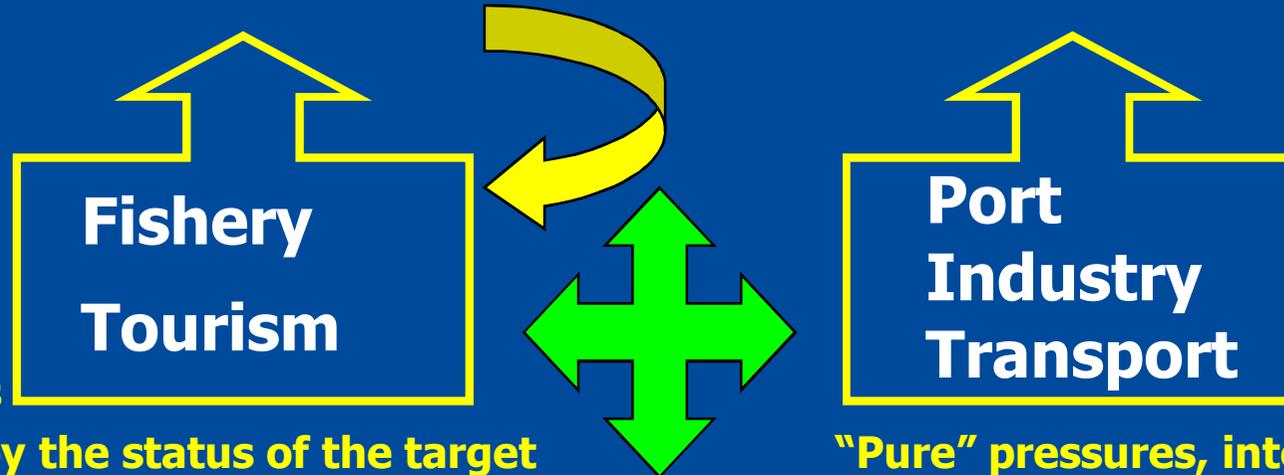
The “alternatives” drama (2/2)

- During the technical discussion, the CORILA team demonstrated how the alternatives, from the ecological point of view, were **worse than the MOSE** solution; in addition they were less flexible and/or less effective for flood protection. The “technical outcome” of the “technical table” was more than clear.
- The following meeting of the Govern, two days later, decided by large majority **to continue with the original MOSE design**; the Ministry of the Environment and the Ministry of Research votes were contrary.
- CORILA made **public thanks** to the Ministry of Research who, notwithstanding its political opinion, allowed the expression of the science community.
- In the funding division of Special Law for Venice, occurred few months later, **the research obtained no funding** (CORILA was born to use for research 12 million Euro from this Law)

Paradigmatic case

Nature, landscape and cultural heritage conservation

target



pressures

affected by the status of the target

"Pure" pressures, interrelated

social dimension ("city status" for Venice)

constraint

Impossible any self-regulation of the system (zero-option policy), due to:

- Natural processes already compromised
- Presence of no-market goods of large importance
- Complex cause-effect relationships at subsystem level

Conclusions

- The SPICOSA approach, linking **but not confusing** Science and Policy issues, could have been the only way to approach Venice's safeguarding and **CORILA actually used this approach ante-litteram**
- You may understand now why in SPICOSA experiment in Venice we choose **not** to consider the tide regulation system