Por lo demás, todo lo que atañe el agua es poético y nunca deja de inquietarnos

from:
***La jonction*,**
in:
***Atlante*,**
J.L. Borges, 1984

COME ERAVAMO

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CHE COSA ABBIAMO IMPARATO?

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che cosa abbiamo imparato

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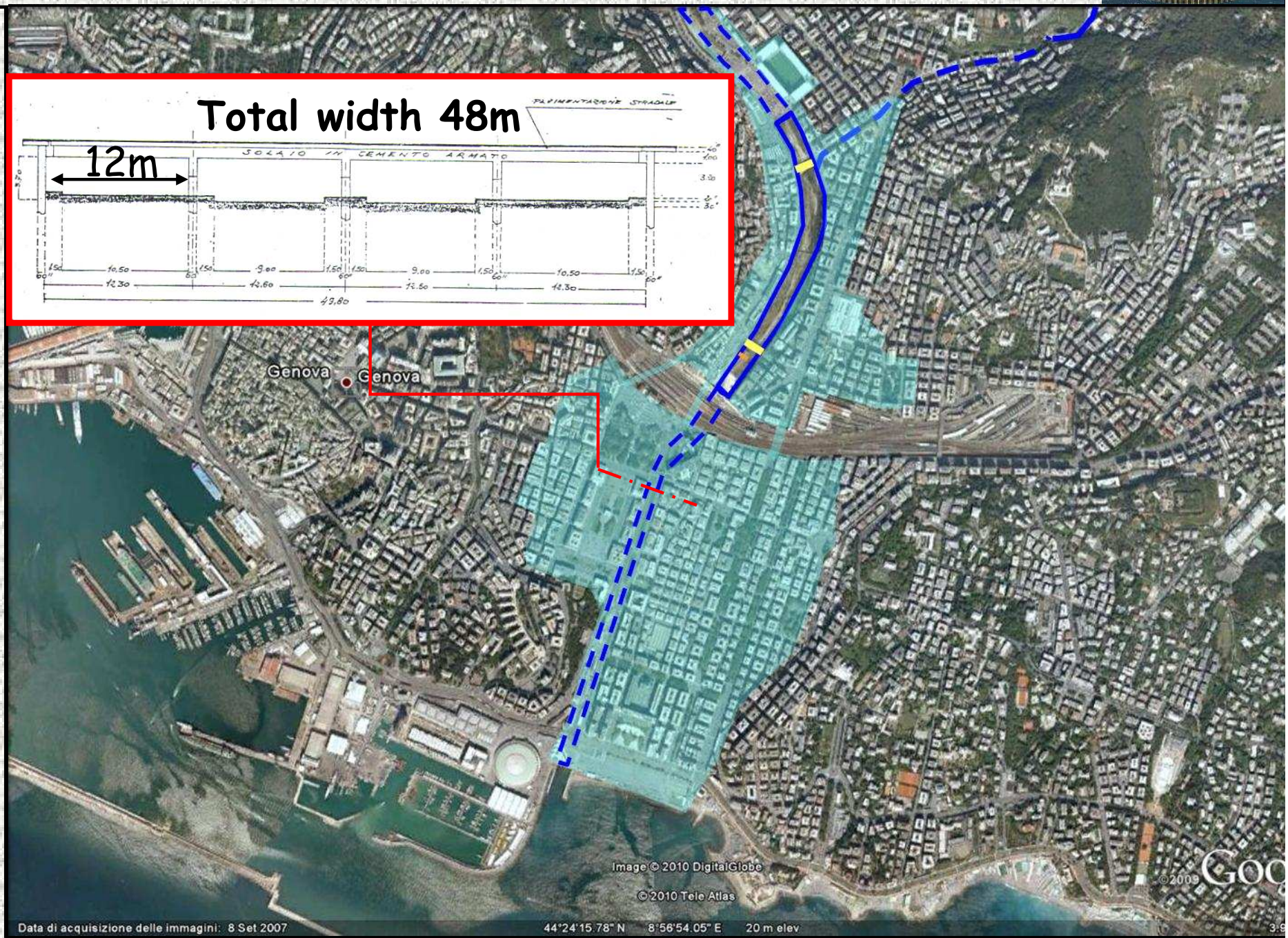
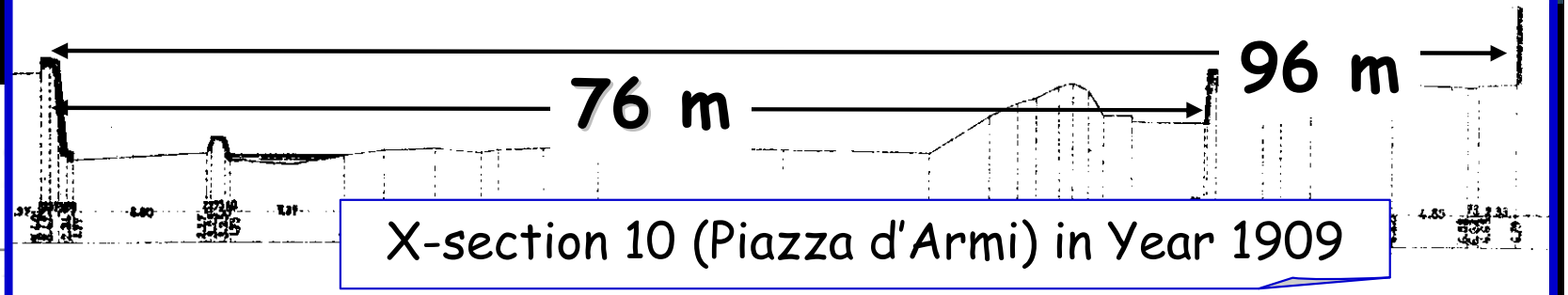
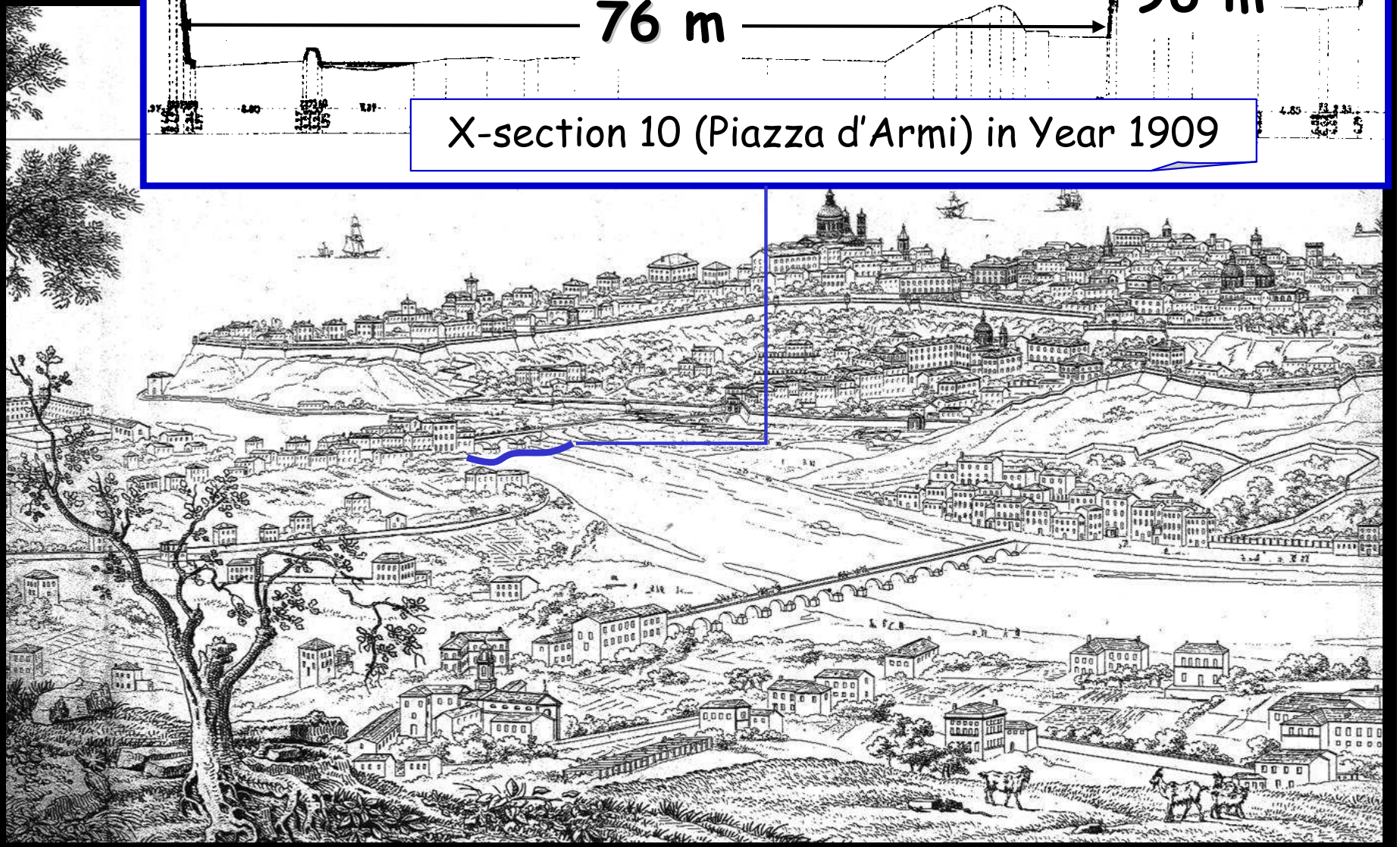


che cosa abbiamo imparato



X-section 10 (Piazza d'Armi) in Year 1909



Year 1802

che cosa abbiamo imparato

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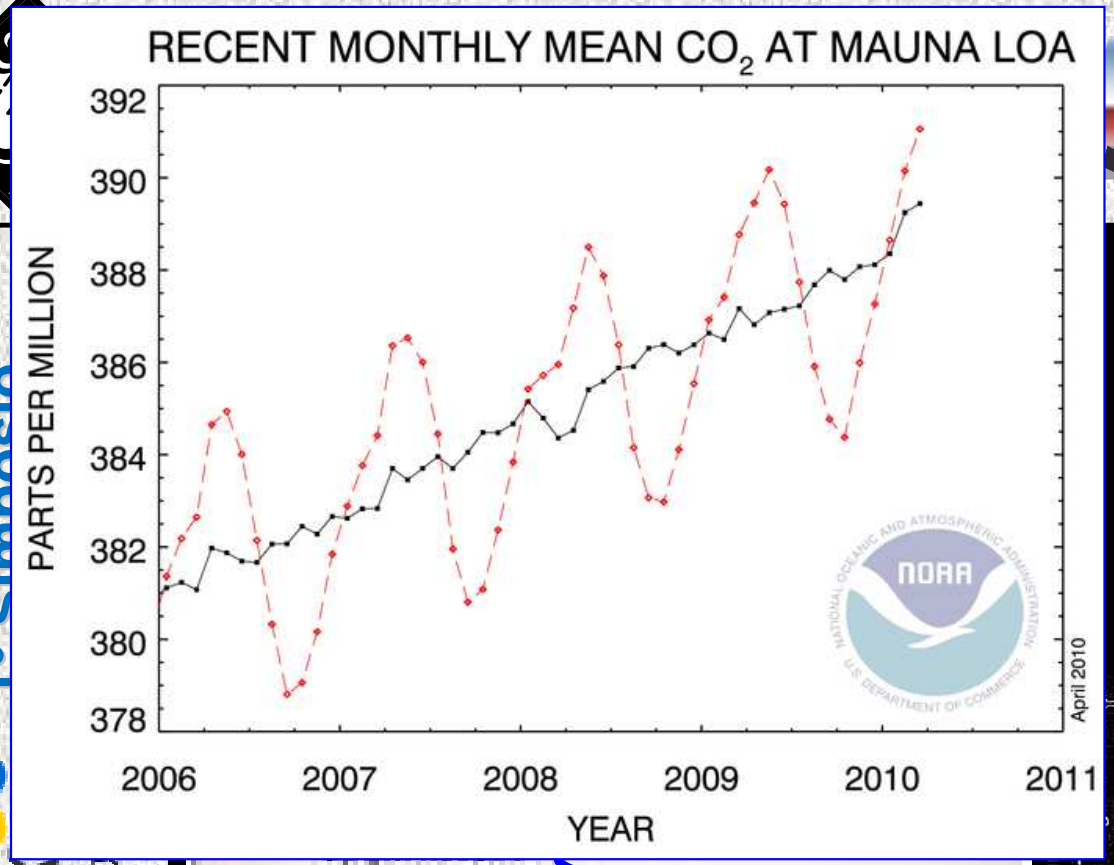
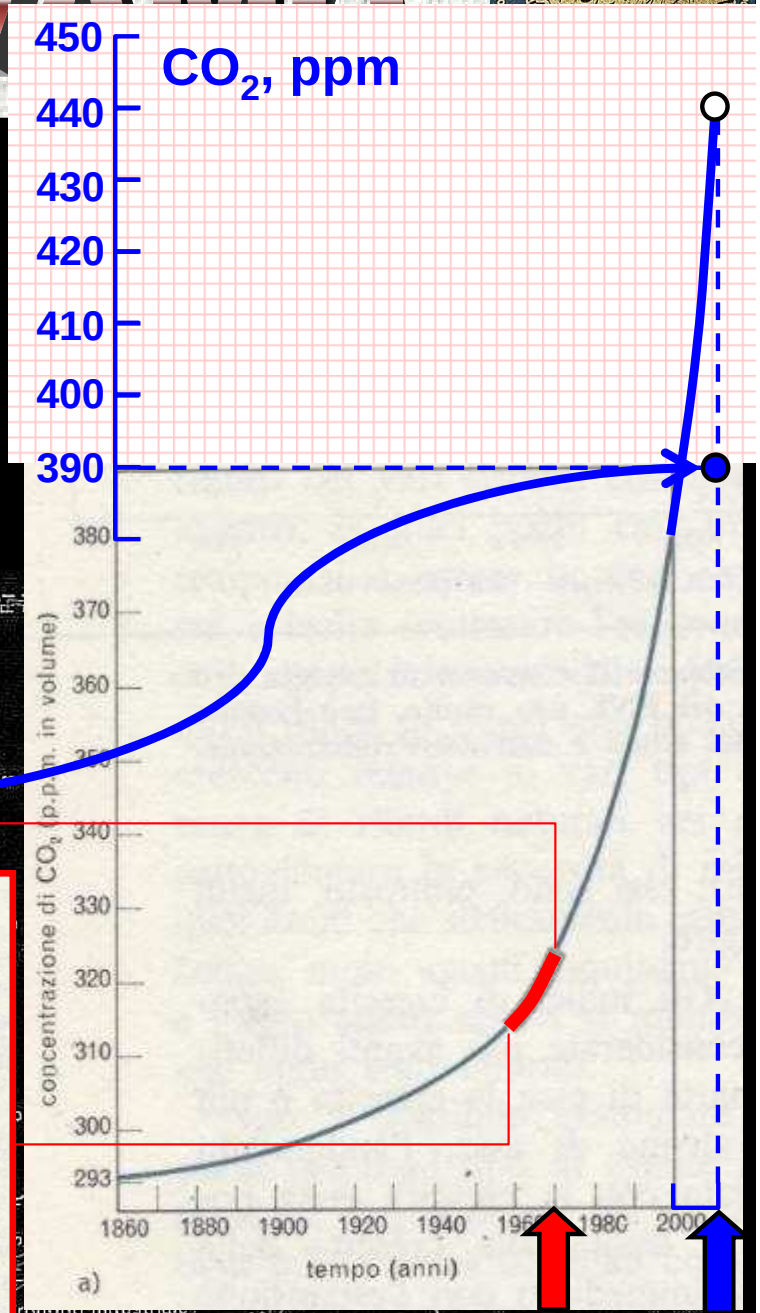
An understanding of how floosplains are formed should make it obvious that a channel river is not large enough to contain all the water produced by a drainage basin.

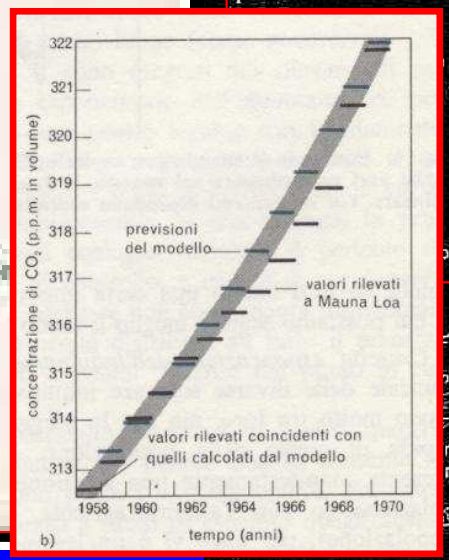
LUNA B. LEOPOLD

La documentazione sugli eventi negativi deve essere perfettamente conosciuta da chi intende operare sul territorio ed in primo luogo, oltre che dai funzionari delle pubbliche amministrazioni, dai professionisti laureati e diplomati, dai docenti e dagli allievi delle scuole corrispondenti a tali professioni. Soprattutto nelle scuole di ingegneria non dovrebbero essere tollerati il silenzio o le spiegazioni monche, distorte o evasive, sulle difficoltà e sugli insuccessi delle opere di ingegneria.

GIULIO DE MARCHI


RECENT MONTHLY MEAN CO_2 AT MAUNA LOA
PARTS PER MILLION
392
390
388
386
384
382
380
378
2006
2007
2008
2009
2010
2011
YEAR
NOAA
April 2010


CO_2, ppm
450
440
430
420
410
400
390
380
370
360
340
330
320
310
300
293
concentrazione di CO_2 (p.p.m. in volume)
1860
1880
1900
1920
1940
1980
2000
tempo (anni)
a)


concentrazione di CO_2 (p.p.m. in volume)
322
321
320
319
318
317
316
315
314
313
previsioni del modello
valori rilevati a Mauna Loa
valori rilevati coincidenti con quelli calcolati dal modello
1958
1960
1962
1964
1966
1968
1970
tempo (anni)
b)

William W. Behrens III
A PÖTOMAC ASSOCIATES BOOK

1972

CHE COSA ABBIAMO IMPARATO?

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It doesn't matter who the physicist is, or how smart he/she is, or how he/she came up with the new law.
If it disagrees with experiment, then it is wrong.
RICHARD P. FEYNMAN

Nobody accepts the model as true, except its modeler. Everyone accepts the data as true, except its catcher.
GAYLON S. CAMPBELL

Expansion of process variables

Extension of the spatial and temporal scales of analysis

Understanding of process interactions over a wide range of space-time scales

perchè il futuro riflette il passato?

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Hydrology has developed slowly because it has been considered an appendage of hydraulic engineering rather than a natural science.

VUJICA YEVIEVICH
1968

In practice, hydrology is regarded mostly as a technological discipline rather than a science; this attitude is responsible for much bad science in hydrology which, in turn, has led to much bad technology in applied disciplines.

VITO KLEMES
1988

Some one is going to…end up with an understanding of the relation of the physical basis for statistical variability in time and space.

DAVID R. DAWDY
2008

expansion of process variables

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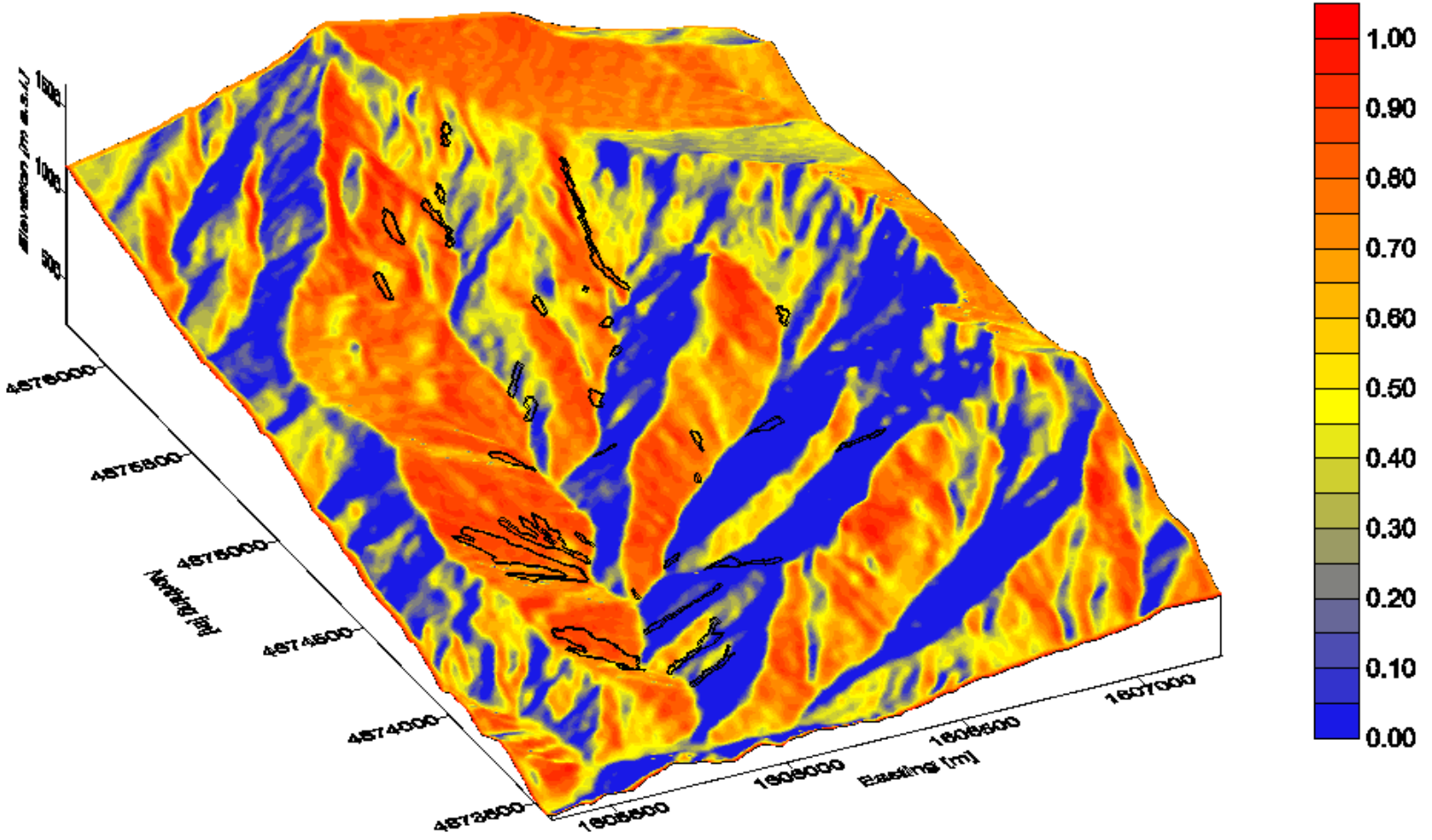

Normalized anomalies of cumulated point precipitation for the June 19, 1996 storm in the Capriola catchment (Italy) after processing rainfall intensity records using a fine resolution meteorological model of **wind field**

extension of space-time scales

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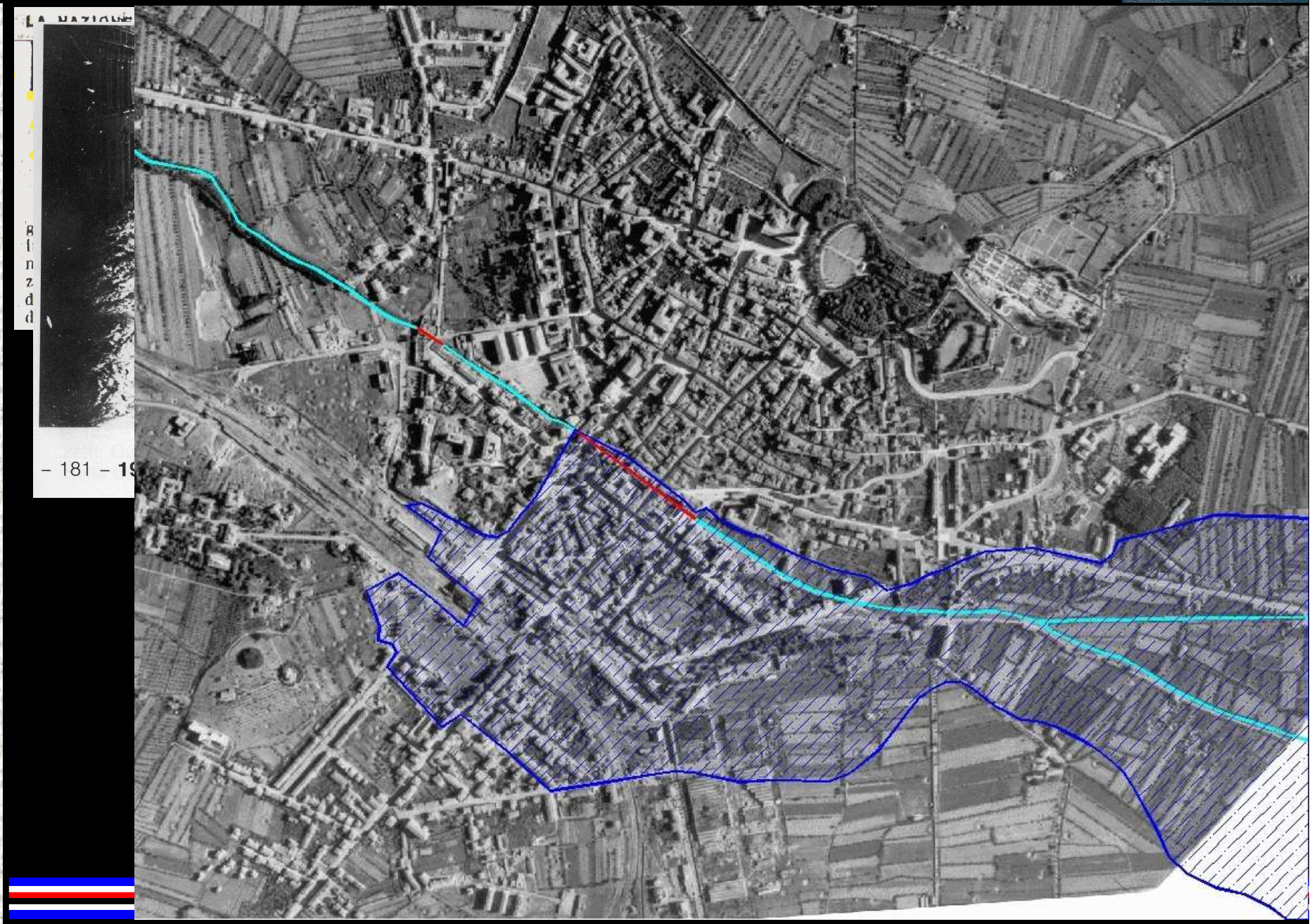
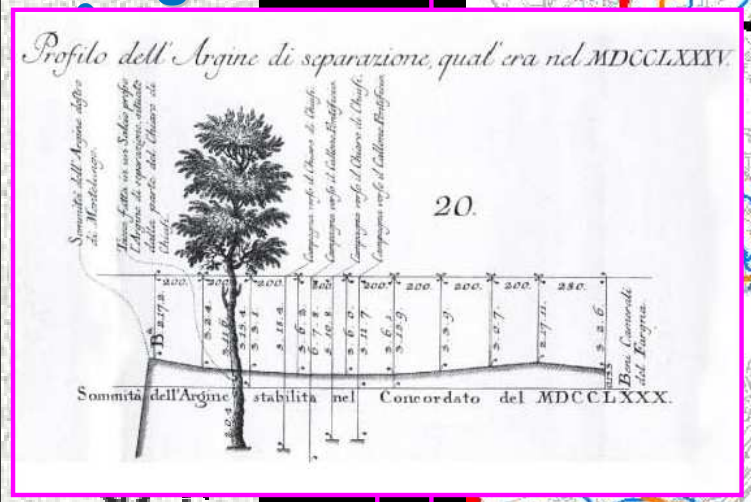


extension of space-time scales

Canale Maestro della Chiana
XVIII-XIX Century
Tevere – Arno Diversion



extension of space-time scales

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process interactions

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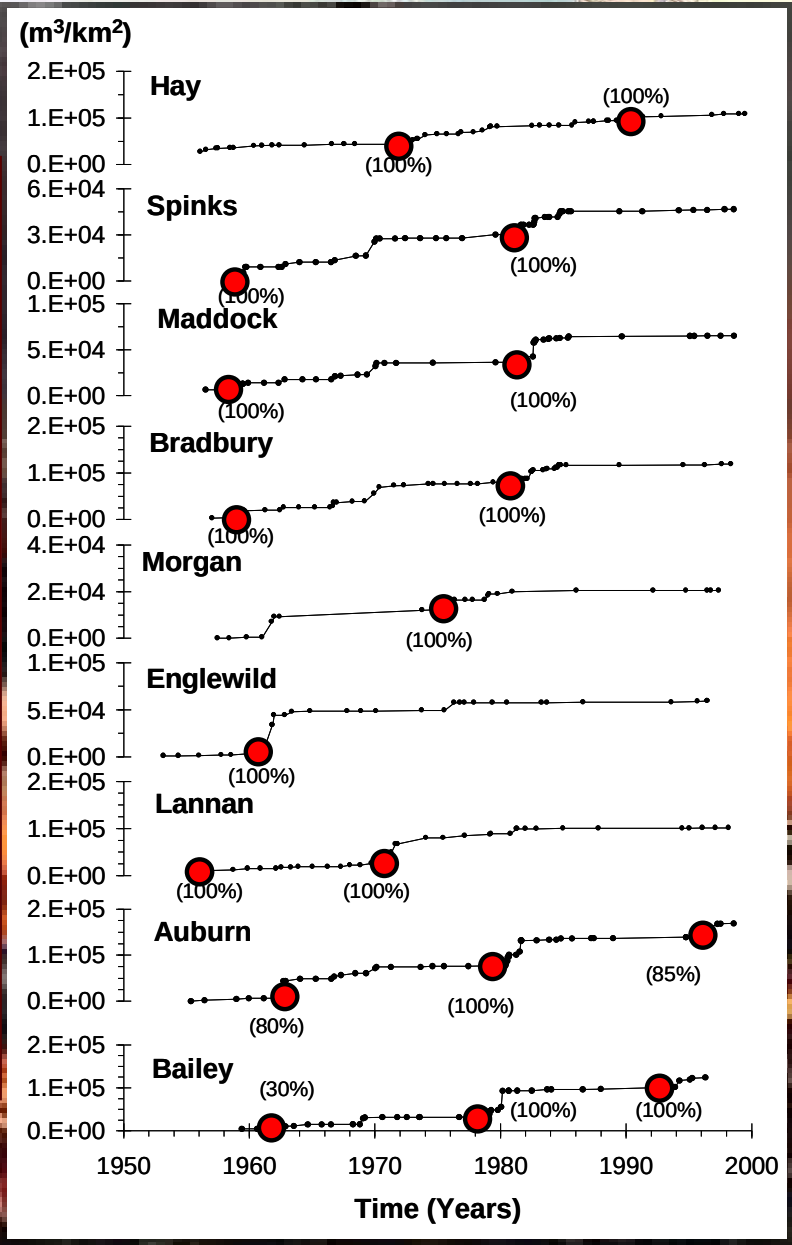

Cumulative sediment yield per unit catchment area from nine catchments in St. Gabriel mountains, California, USA.

Small dots show measurements and large red dots denote the occurrence of wild fires with the percentage of burned area in parenthesis.

Renzo Rosso, 2011

process interactions

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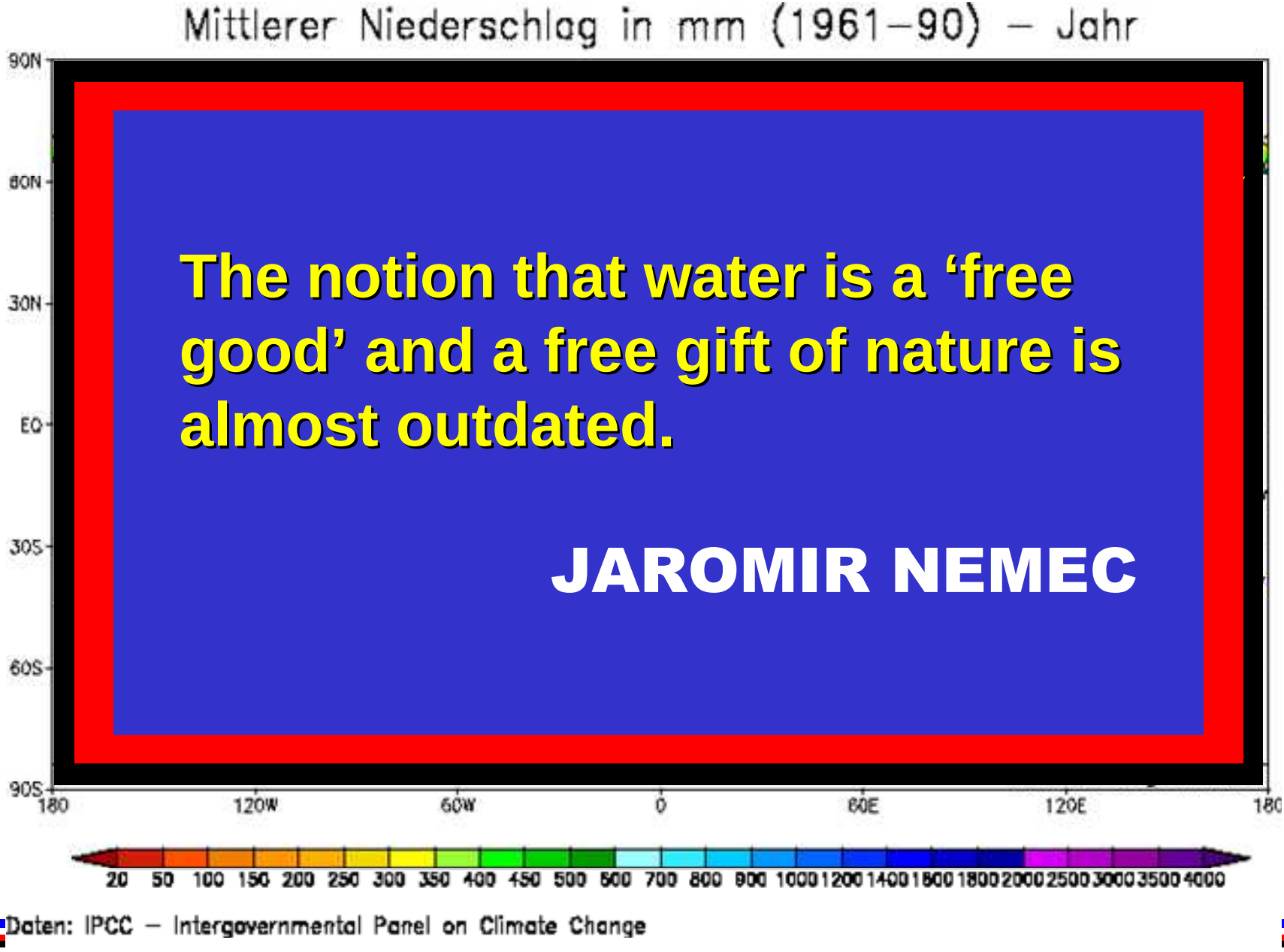

The notion that water is a 'free good' and a free gift of nature is almost outdated.

JAROMIR NEMEC

BACINI INDISTURBATI

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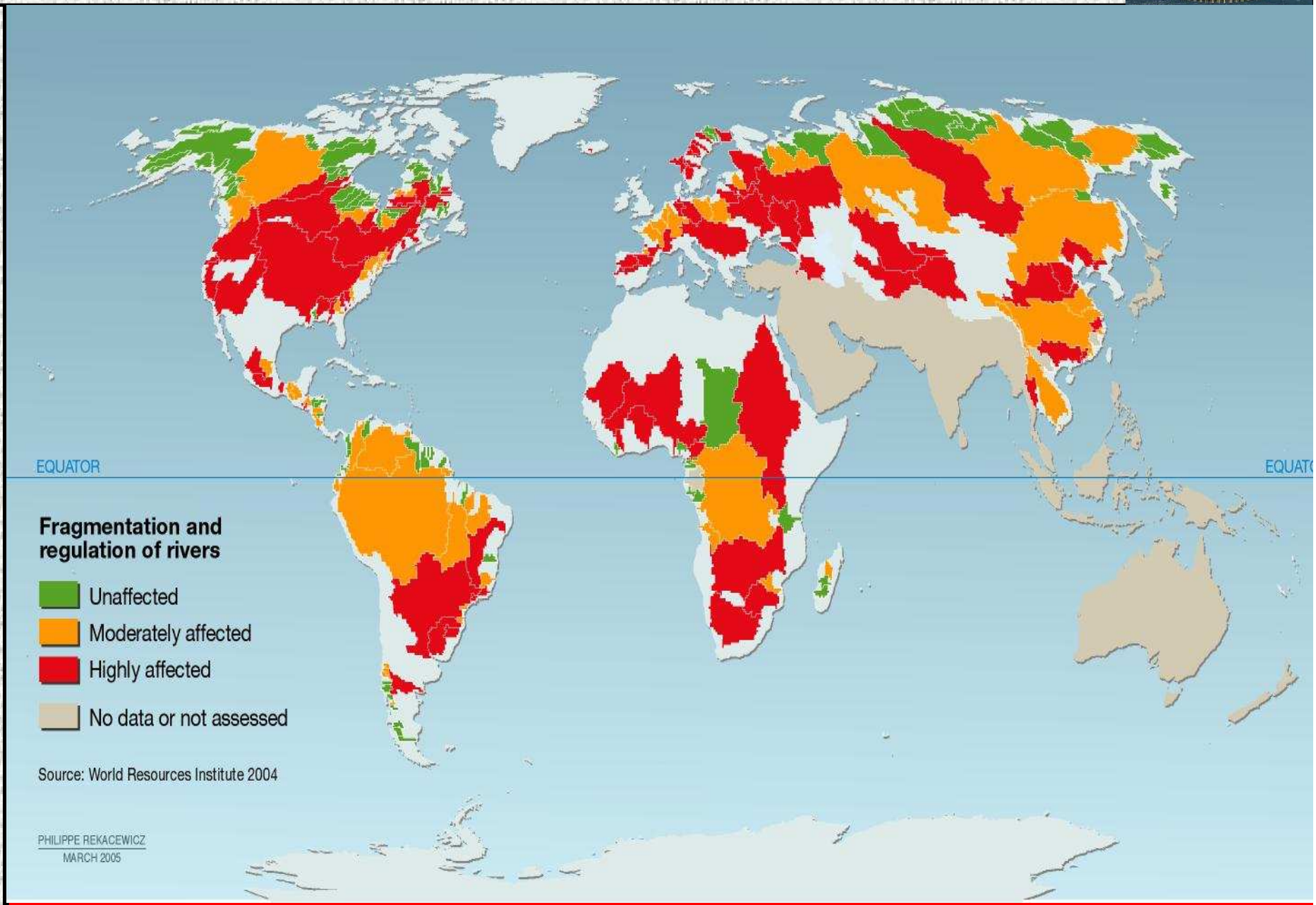

disponibilità idrica

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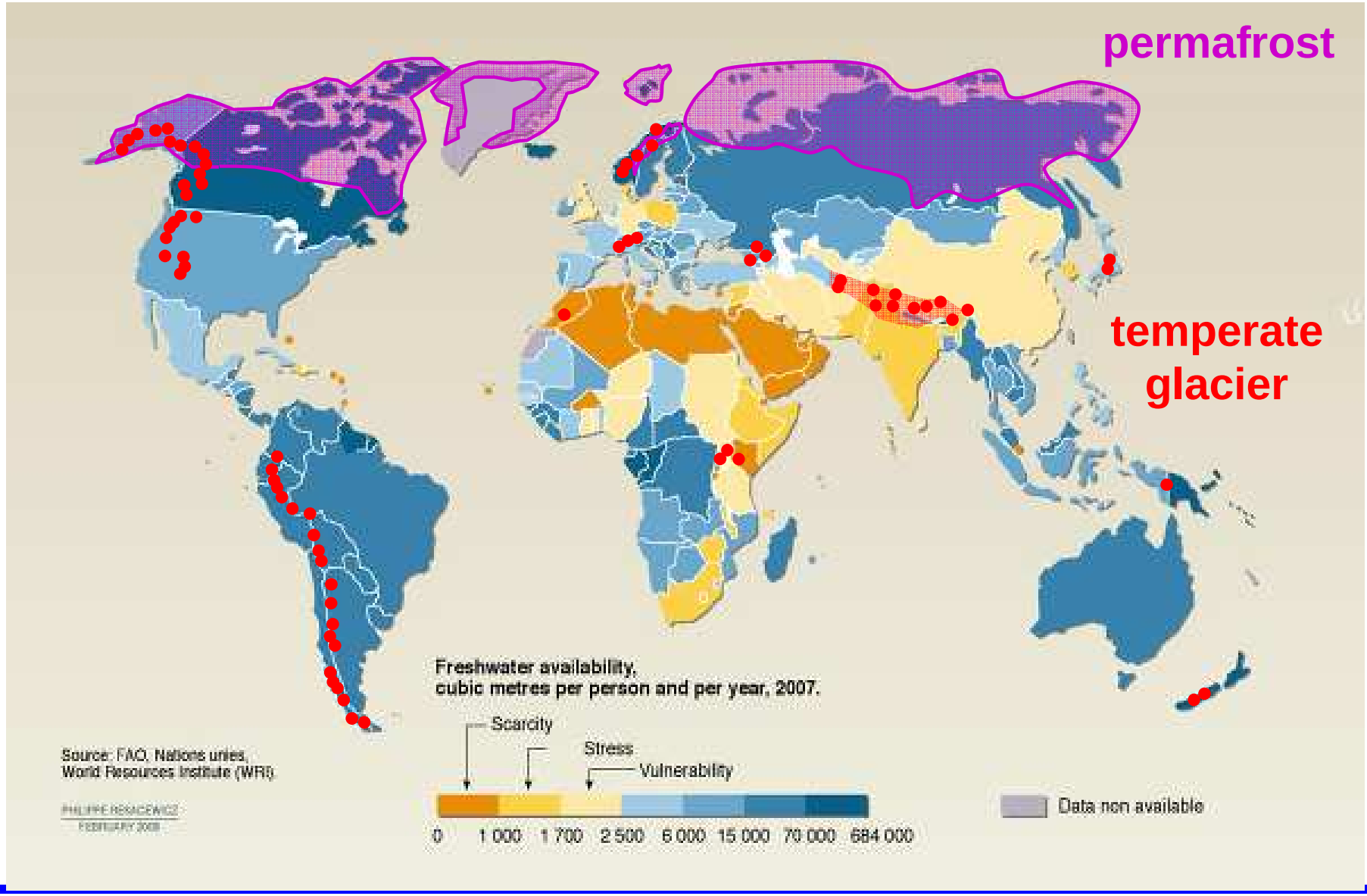
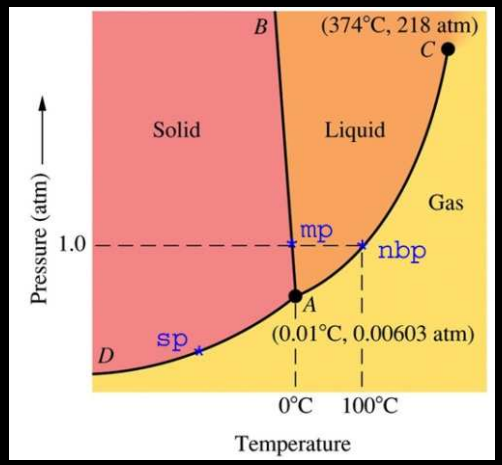
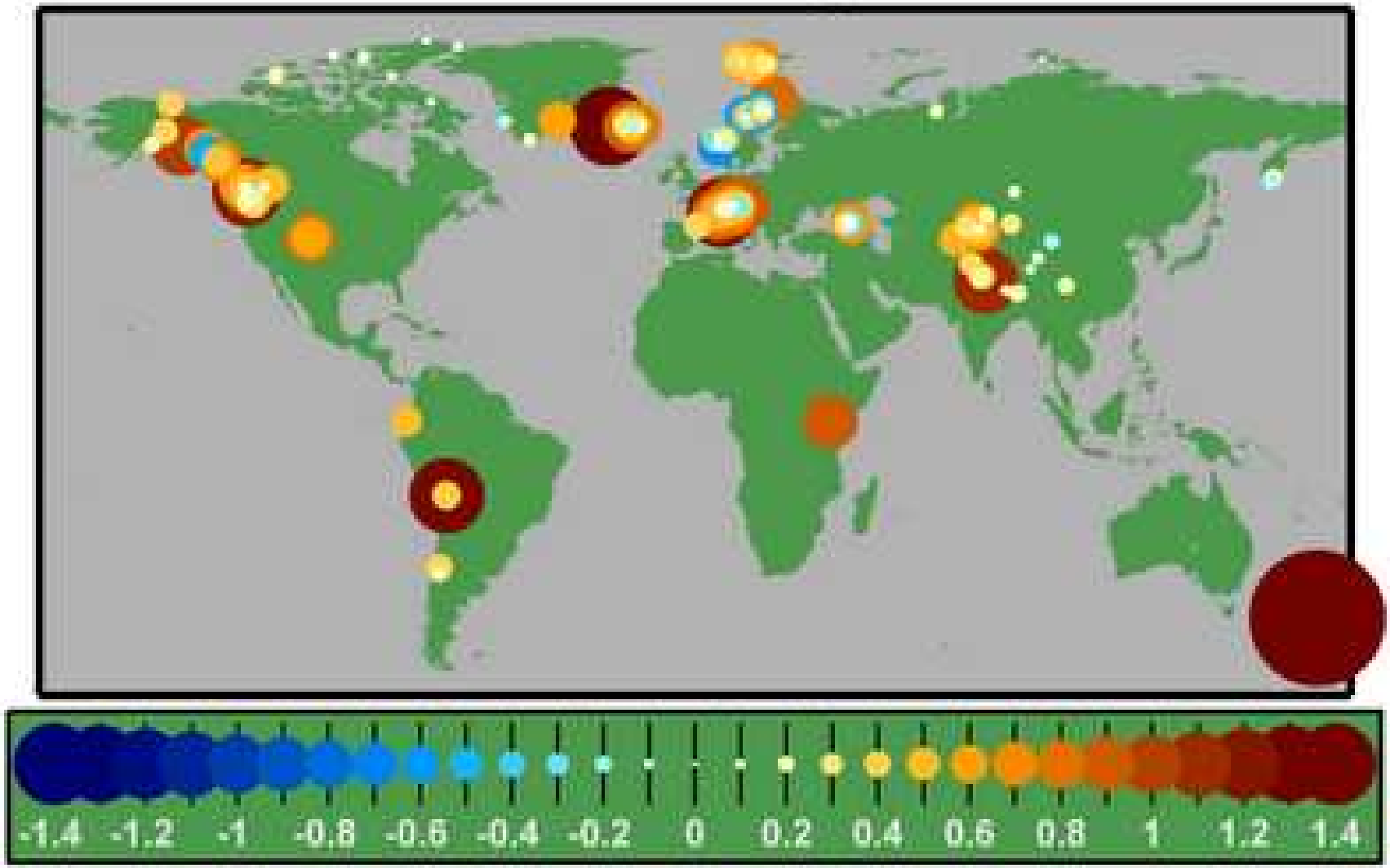


CAMBIAMENTI DI FASE



the RONGBOK GLACIER (Everest, HIMALAYA)
LOST 106m (in depth) from 1921 to 2008

Mountain Glacier Changes Since 1970



Effective Glacier Thinning (m / yr)

NON-STAZIONARIETA'

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POPOLAZIONE TOTALE

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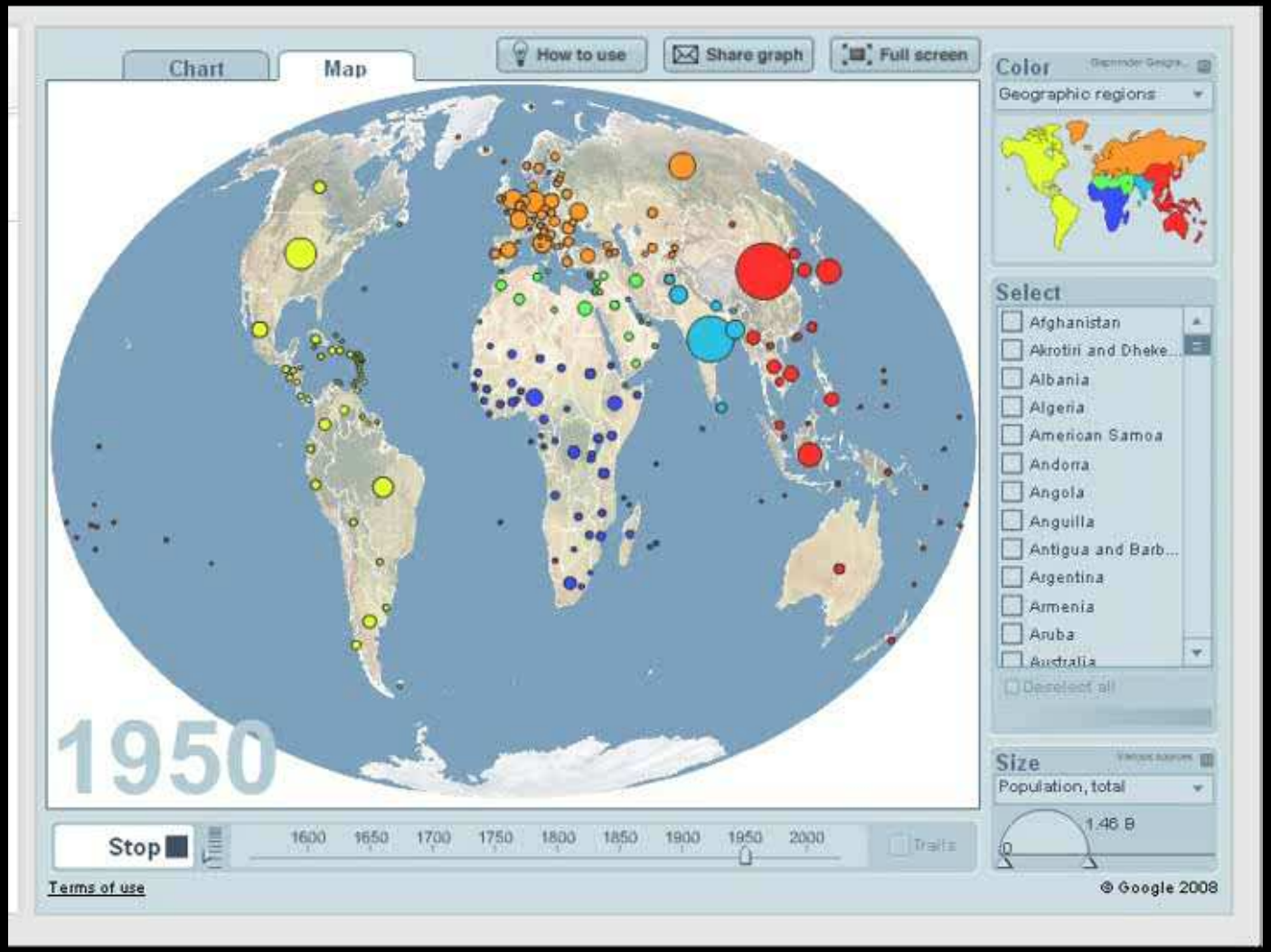

PRELIEVO IDRICO TOTALE

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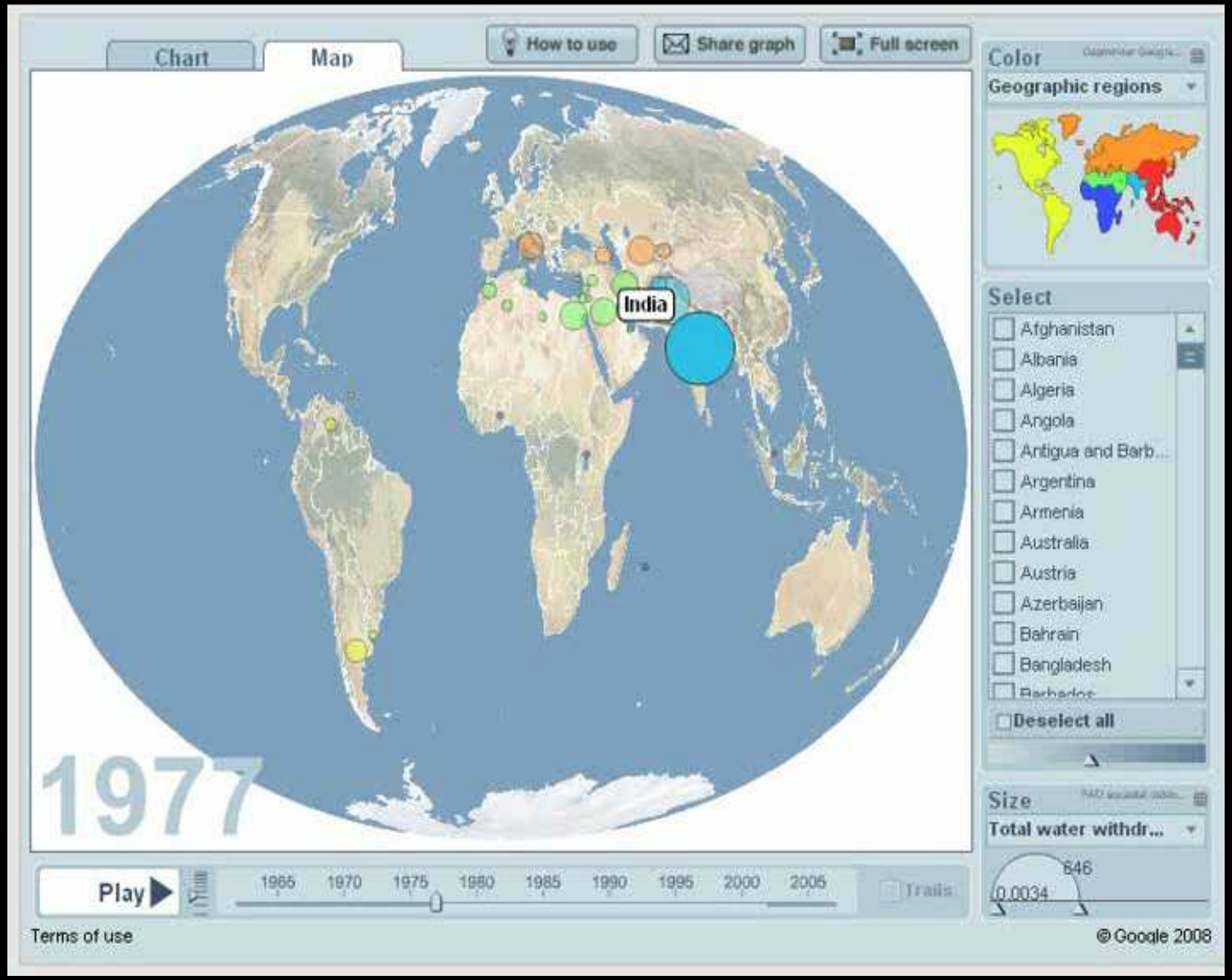

RISORSA IDRICA RINNOVABILE
(mc pro capite)

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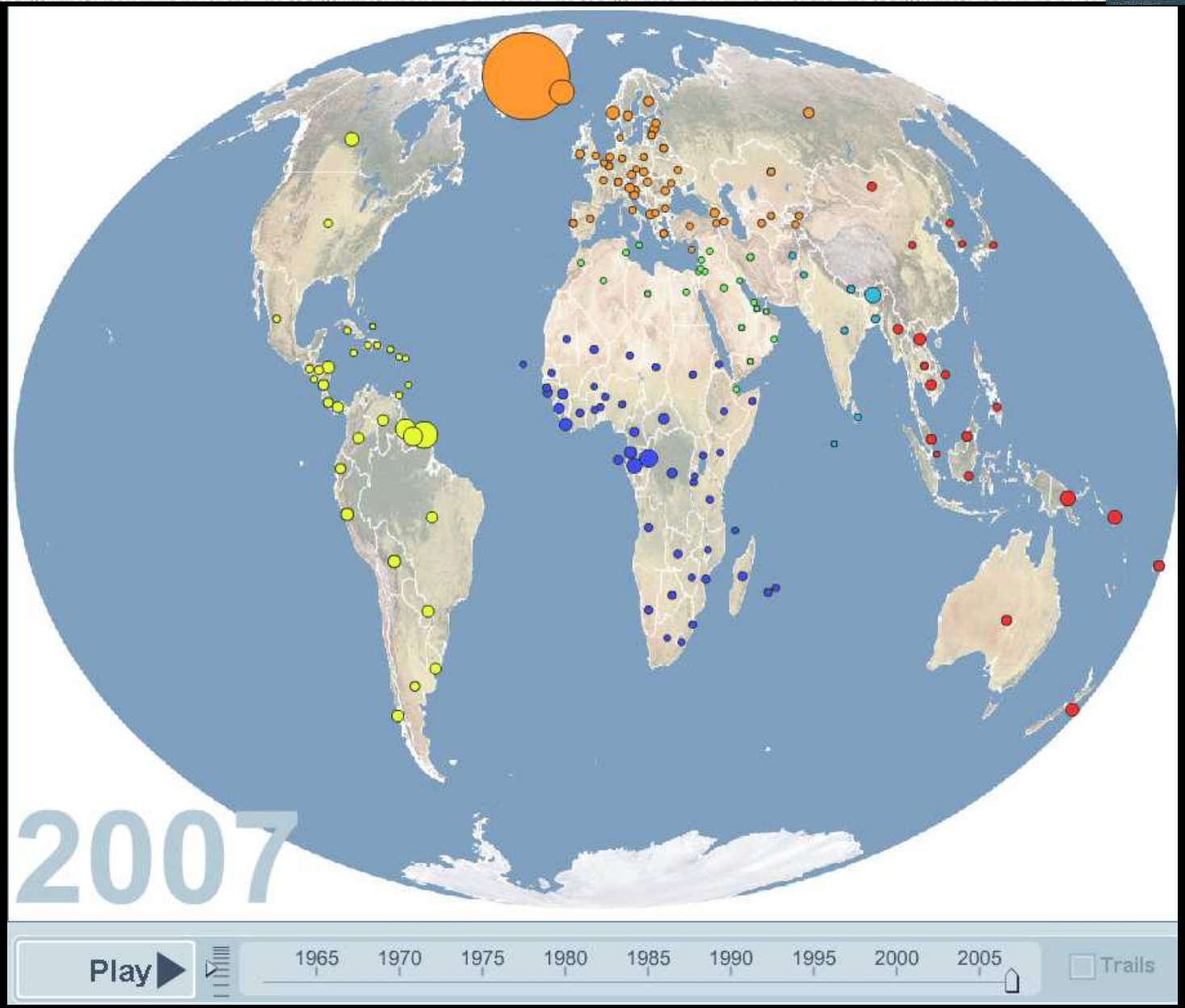
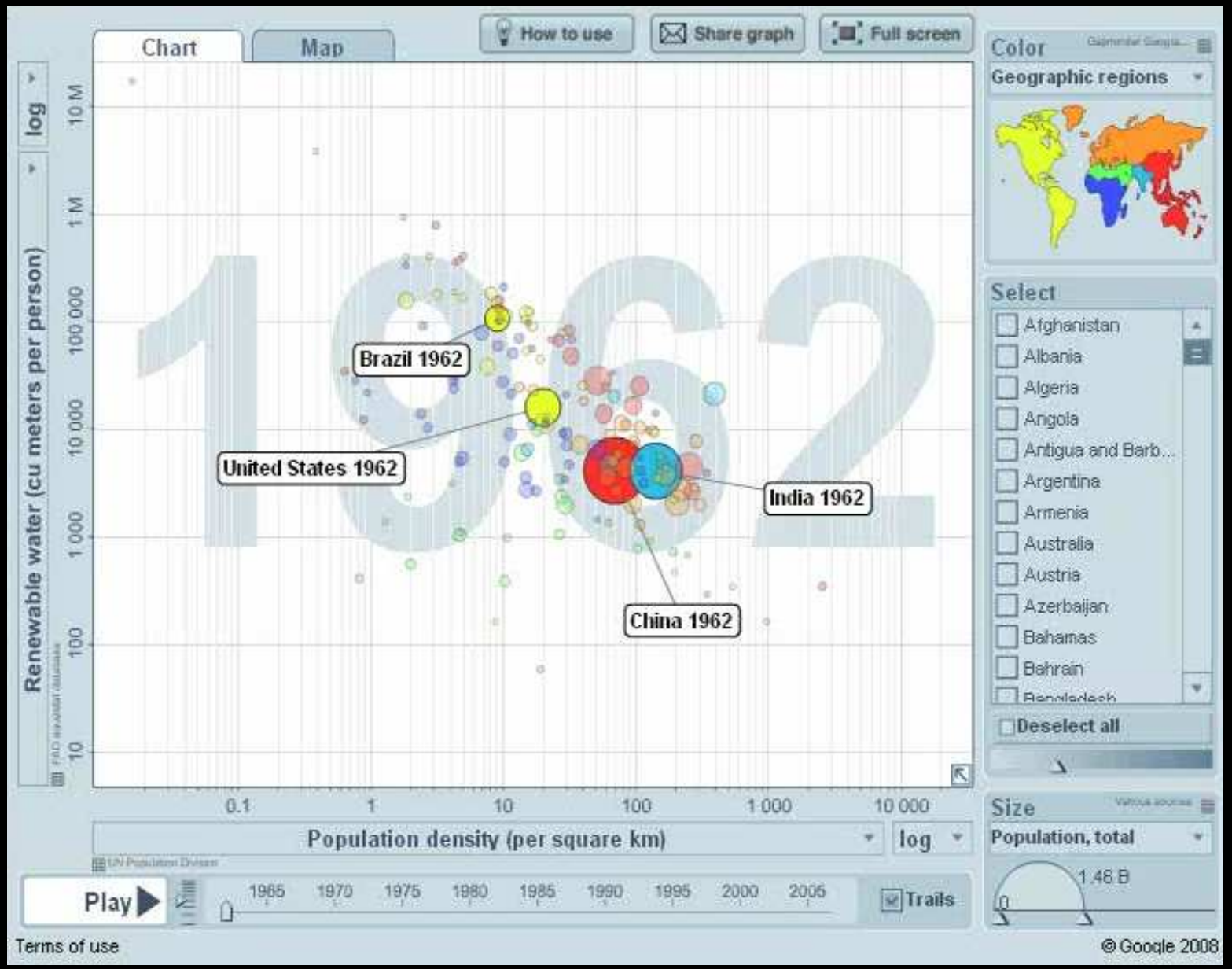


http://www.gapminder.org

http://www.gapminder.org

POPOLAZIONE (totale)

ACQUA RINNOVABILE (mc pro capite)

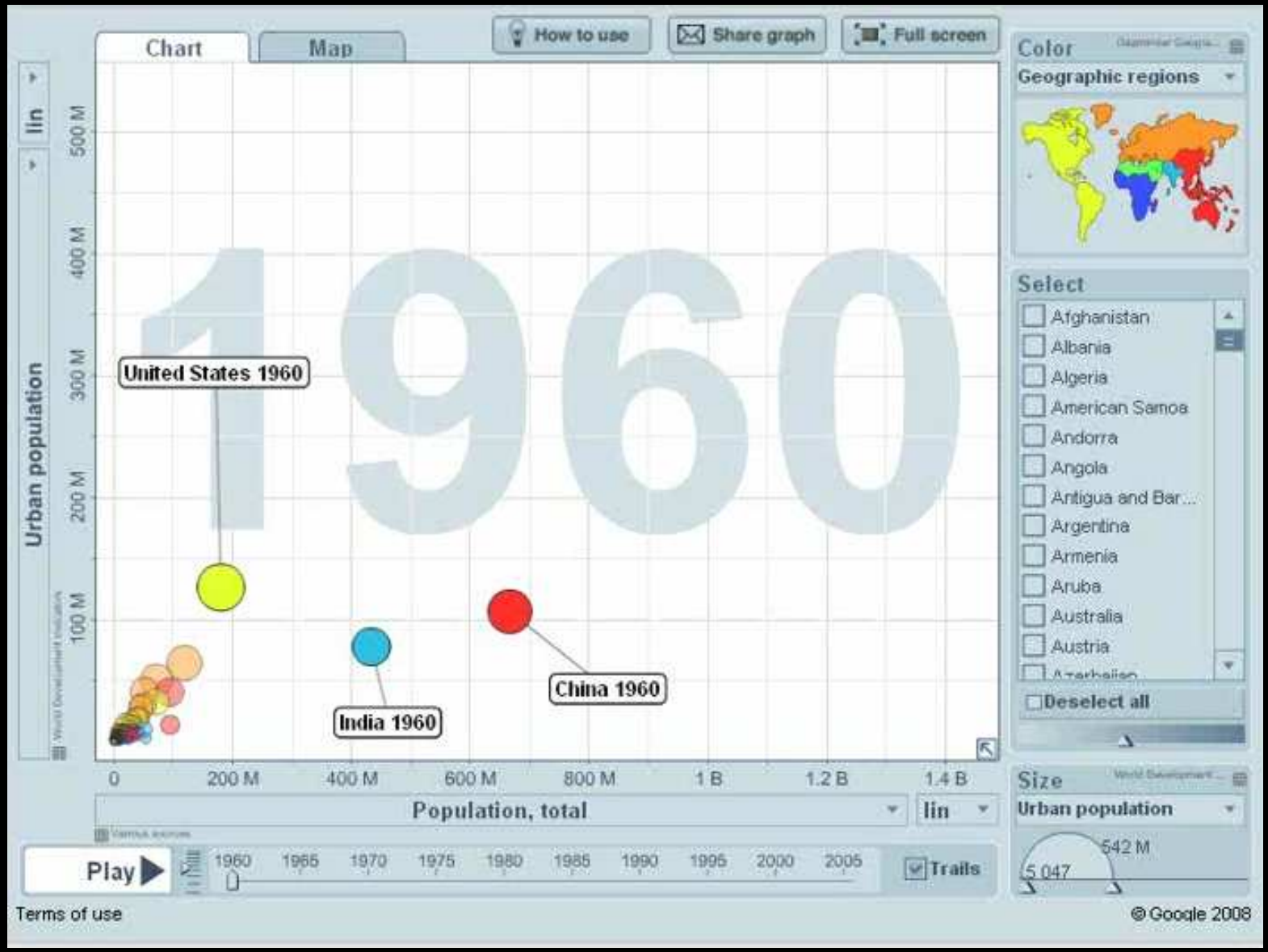


DENSITA' DI POPOLAZIONE (per kmq)

POPOLAZIONE (totale)

http://www.gapminder.org

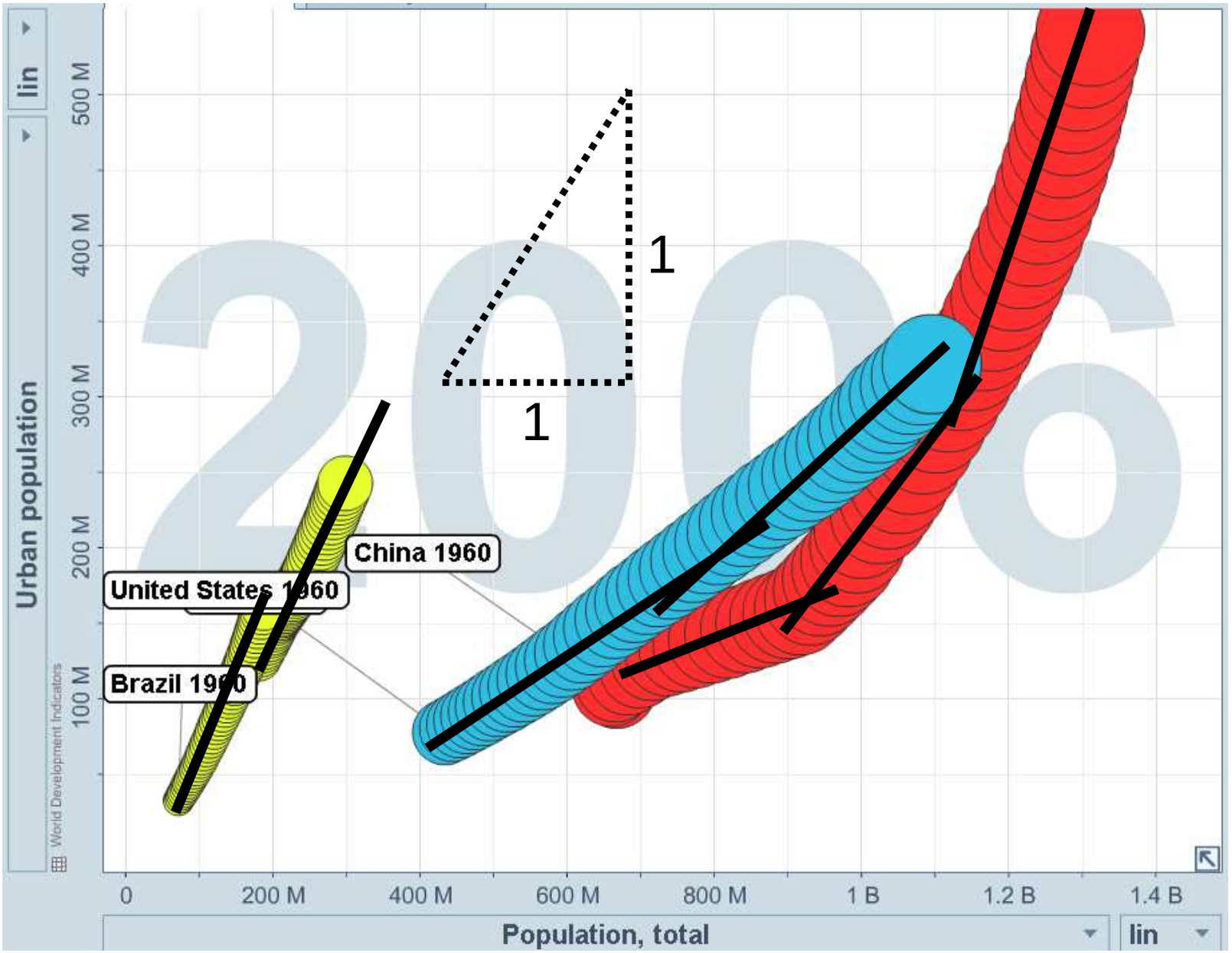
POPOLAZIONE URBANA (totale)



POPULAZIONE (totale)

http://www.gapminder.org

POPOLAZIONE (totale)



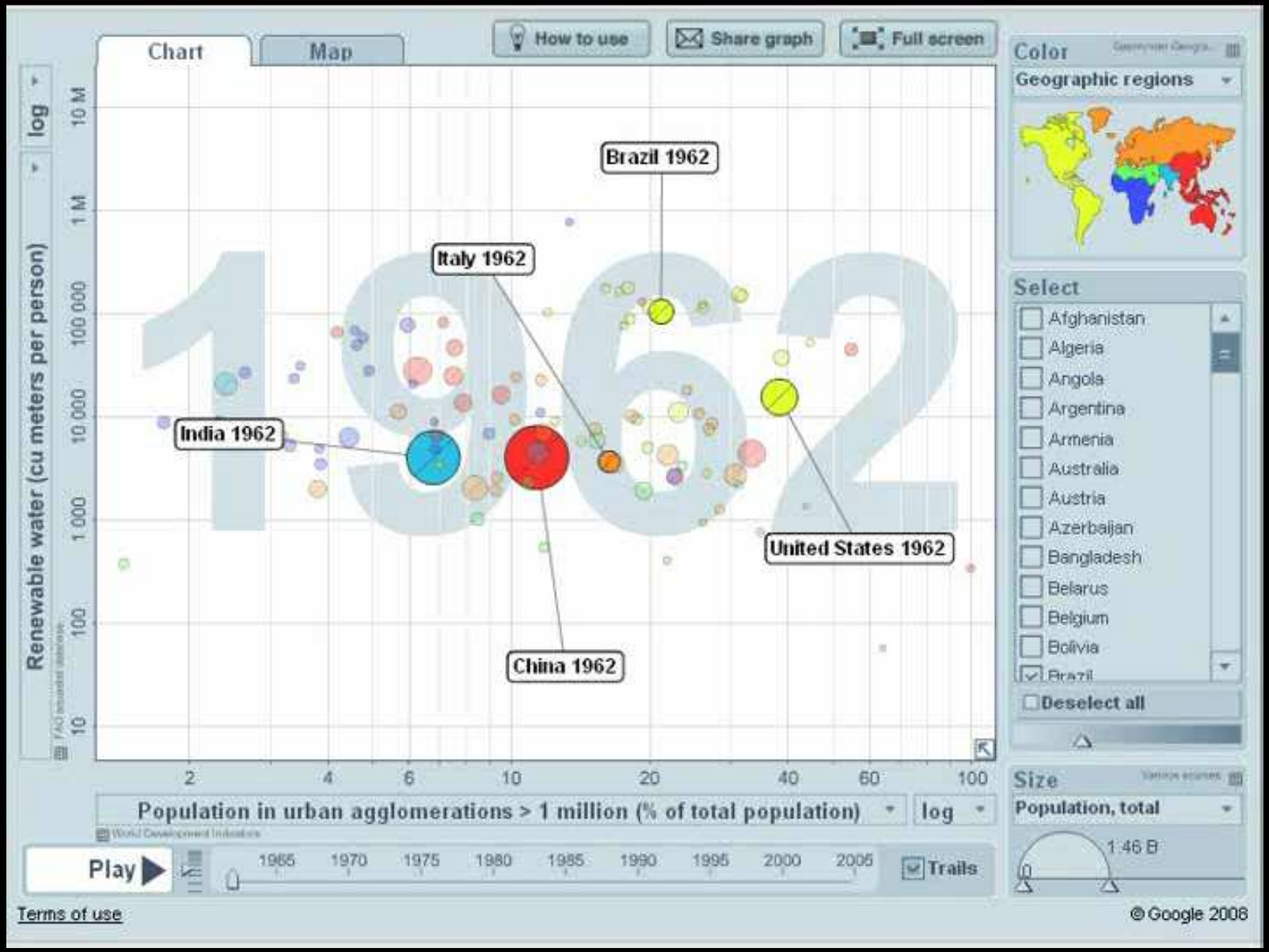
POPOLAZIIONE URBANA (totale)

POPULAZIONE (totale)

http://www.gapminder.org

POPOLAZIONE (totale)

RENEWABLE WATER (cum per person)

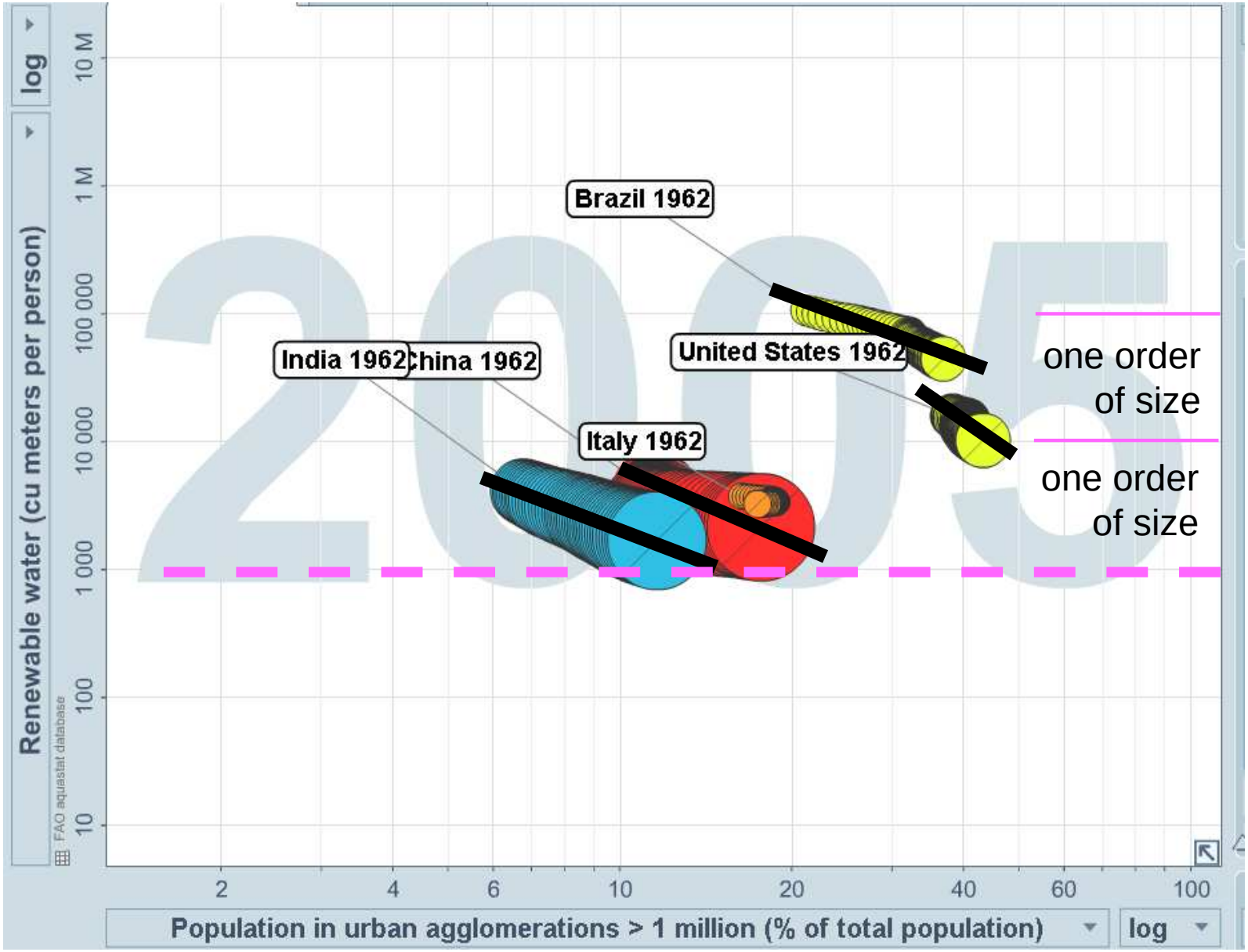


POPULAZIONE URBANA (totale)

http://www.gapminder.org

POPOLAZIONE (totale)

RENEWABLE WATER
(cum per person)



POPOLAZIONE URBANA (totale)

CITTA' E SOBBORGHI

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Rio de Janeiro, Brazil, April 2010

Rio de Janeiro, Brazil, April 2010

RICCHI E POVERI

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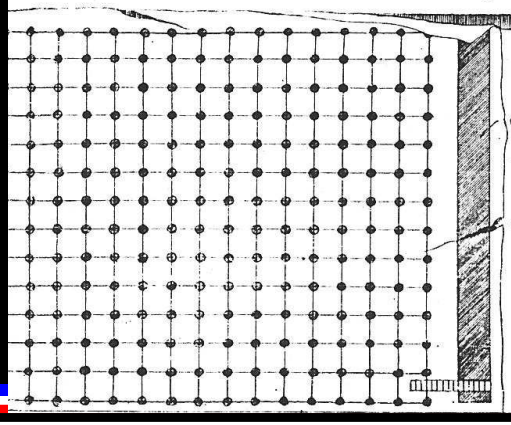
Rio de Janeiro, Brazil, April 2010


Rio de Janeiro, Brazil, April 2010


Rio de Janeiro, Brazil, April 2010

the Constantinople Basilica cistern



Die grosse Cisterne zu Constantinopel an dem Marckte Atmeidan sonst Hippodromus genañt.

Wessen steinerne Säulen grösten Theils mit Wasser angefüllet unter der Erden nicht weiter von einander stehen als daß man mit Kahnen zwischen durchfahren kan. Ihrer werden in allen 224 gezehlet. Gegenwertige eigentliche Abzeichnung ist samt dem Grundrisse und anderen Türckischen Gebäuden aus Orient verschrieben worden, um solche der sonderbahren Beschaffenheit halber denen Liebhabern mit zu theilen.

La grande Cisterne de Constantinople à la place dite Atmeidan autrefois l'Hippodrome

Les 224. Colonnes de pierre de taille dont elle est soûtenüe Soûs terre sont presque couvertes d'eau à une distance qui ne Souffre que le passage de petits bateaux. On en a fait venir de l'Orient cette Elevation avec le plan et avec quelques autres bâtimens Turcs pour les communiquer aux curieux à cause de leur Singularité.

La crescita di Costantinopoli

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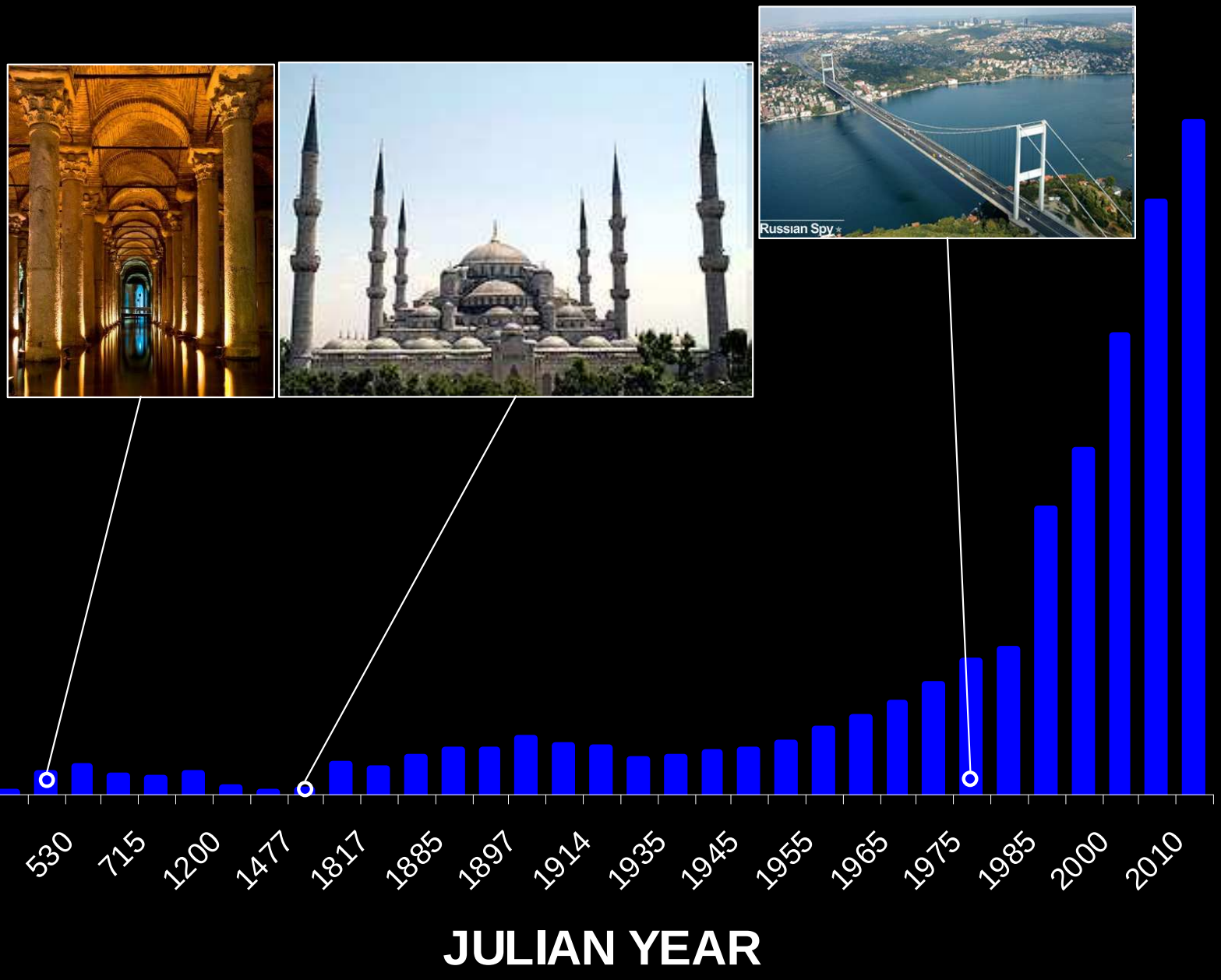
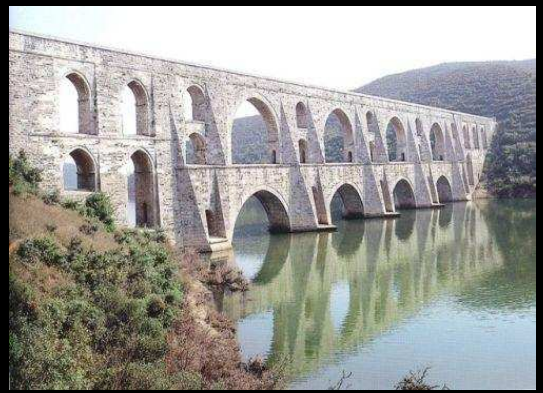
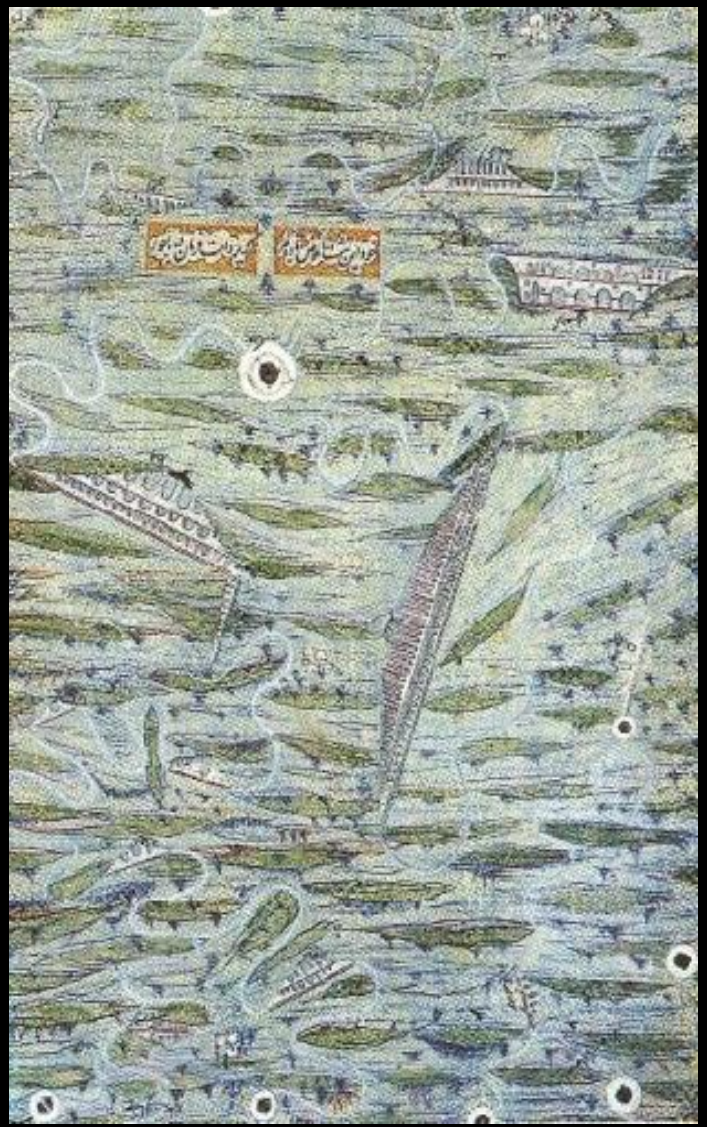


Kirkcesme water supply systems (1555)

Uzunkemer Aqueduct

Maglova Aqueduct





Egrikemer Aqueduct

Kovuk Aqueduct

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FLOOD DISASTER

WREAKS HAVOC AT THE HEART OF İSTANBUL

>100 M Euros

>30 victims

SEPTEMBER 2009

Flash floods caused by heavy rainfall in the Marmara region have resulted in disaster, particularly in the İkitelli, Gaziosmanpaşa, Arnavutköy, Sultangazi, Bağcılar, Eyüp, Esenler, Bahçelievler, Başakşehir and Büyükçekmece districts [illegible] Ayamama stream flooded. About 60 semi-trailers in the parking lots were dragged by the rushing water and obstructed culverts underneath the TEM highway. [illegible] completely submerged, turning the basin [illegible] Ayamama Stream, which flows into the Sea of Marmara, suffered serious material damage due to the deluge. While İkitelli sees an average of 45 kilograms of rainfall per square meter in the month of September, some 90 kilograms of rain fell per square meter in just one hour on Wednesday morning.

Infographic by Yunus Emre Hatunoğlu, Abdulkerim Keskin
Photos by Mustafa Kirazlı, Mehmet Ali Poyraz, Fatih Uğur

İSTANBUL
Disaster zone
MARMARA SEA

FLASH FLOODS STRIKE INFRASTRUCTURE IN BAŞAKŞEHIR
Engineering and improvement work conducted on a mass housing project in a valley in Başakşehir proved unable to withstand the rushing water. Sewage pipes broke and parts of roads collapsed, creating huge potholes.

SEMI-TRAILERS ACT AS BARRIERS IN İKITELLI
About 60 semi-trailers dragged by rushing water from two parking lots located near the Ayamama Stream obstructed culverts beneath the TEM highway. Ten people in İkitelli died including several truck drivers.

HELICOPTERS SAVE DOZENS OF PEOPLE
Military helicopters rescued dozens of people who waited for aid on top of buildings and vehicles.

BLOCKED CULVERTS EXACERBATE DISASTER
Goods from the semi-trailers dragged by the water were carried away by the rushing water. Together the trailers and the goods blocked culverts and the path of the channelized Ayamama Stream, adding to the magnitude of the disaster.

GIANT SEMI-TRAILERS PUSHED LIKE TOY CARS
When heavy rainfall triggered flash floods, asphalt roads were twisted like pieces of paper and giant semi-trailer trucks carrying several tons of freight were dragged by the water like toy cars.

BASIN EKSPRES ROAD COVERED WITH WATER
Dozens of vehicles were dragged and submerged by flash floods on the Basın Ekspres road, which was hit hardest by the deluge. Since the heavy rainfall came early in the morning, the flood mainly affected vans, buses, minibuses and some private cars.

PASSENGERS RESCUED BY BOAT
Passengers trapped inside mass transport vehicles climbed onto the vehicles and waited for aid. Fifty such passengers were rescued using 32 boats, and about 862 people and 228 vehicles participated in the rescue work.

TEXTILE WORKERS DIE IN VAN
A van carrying workers to the Pameks textile factory in Halkalı was submerged in water. The driver and two people sitting in the front seats of the van escaped, while seven women trapped inside the van drowned.

LOOTERS AT WORK
People took advantage of the floods to collect goods carried out of semi-trailers and storehouses by the rushing water. Looters stole clothes, kitchen utensils, weapons and electronic appliances.

TRAFFIC JAM ON THE TEM AND E-5 HIGHWAYS
There were traffic jams on the TEM junction connecting to İkitelli Organized Industrial Zone, Başakşehir and Bahçeşehir until the evening.

AYAMAMA STREAM INFAMOUS IN FLOOD DISASTERS
The Ayamama Stream is located on the European part of Istanbul, originates in Başakşehir and passes through İkitelli, Mahmutbey and Güneşli. It then goes through Yenibosna and Ataköy before joining the Sea of Marmara. It is partially channelized. Nevertheless, it still gives off bad odors and occasionally plays a role in calamities.

Atatürk Olympiad Stadium
TEM HIGHWAY
Toll booth
İstoc
İkitelli
Halkalı
Hürriyet daily
Güneşli
BASIN EKSPRES ROAD
AYAMAMA STREAM
Sancaktepe
Military zone
Ziyagökalp
Esenler
Başakşehir
Central Yenibosna
Cobancesme
Yenibosna
Sirinevler
Cennet
Atatürk Airport
BAKIRKÖY
KÜÇÜKÇEKMECE LAKE
D100
E-5 Highway
MARMARA SEA

ANTICHE CITTA' VERDI

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The Hanging Gardens of Babylon (590 BC)

CITTA' VERDI CONTEMPORANEE

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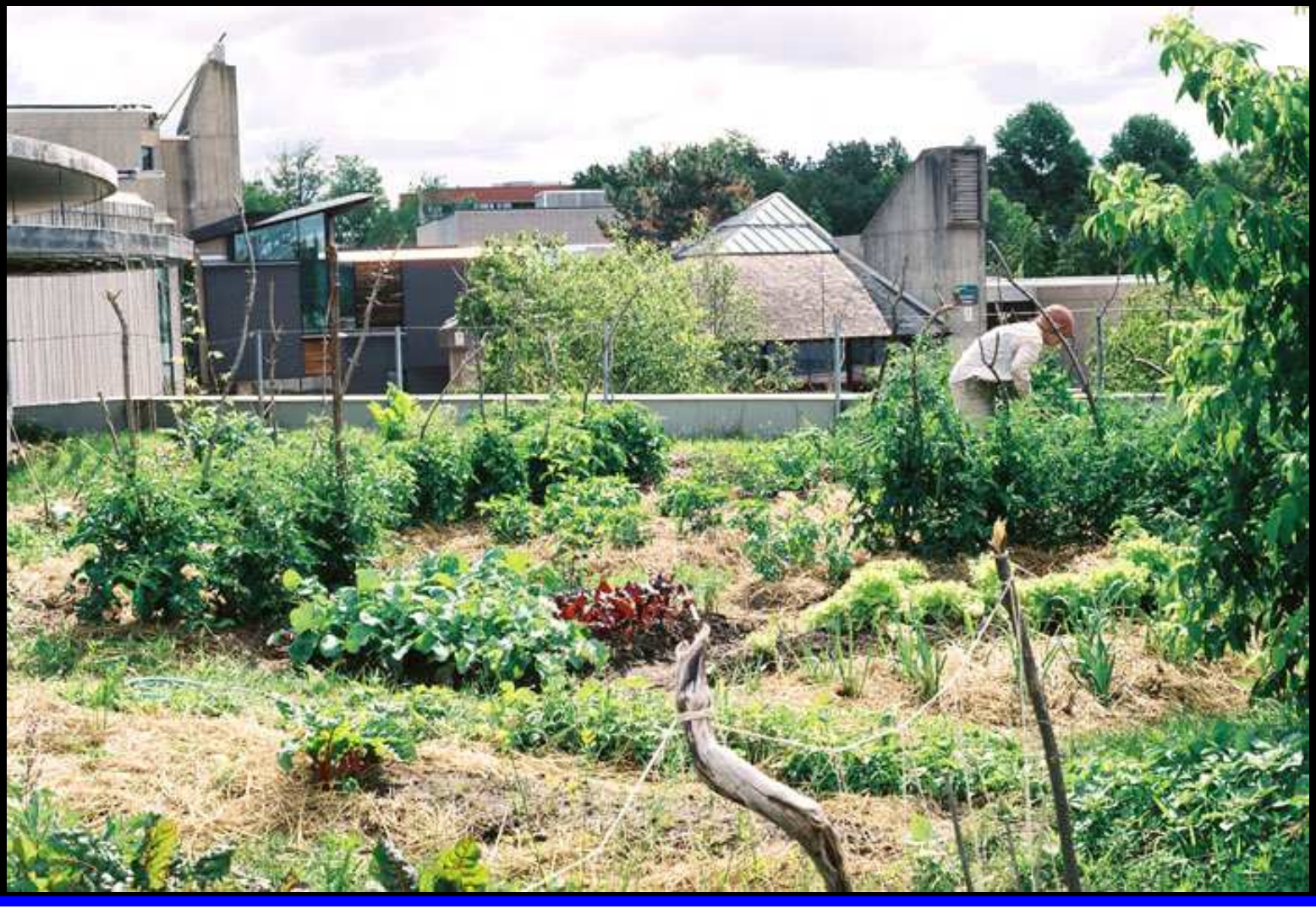
Peterborough,Ontario,Canada
Cafè Fed By Roof Top Garden



PASTORIZIA PENSILE

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IDRAULICA DEL VERDE PENSILE

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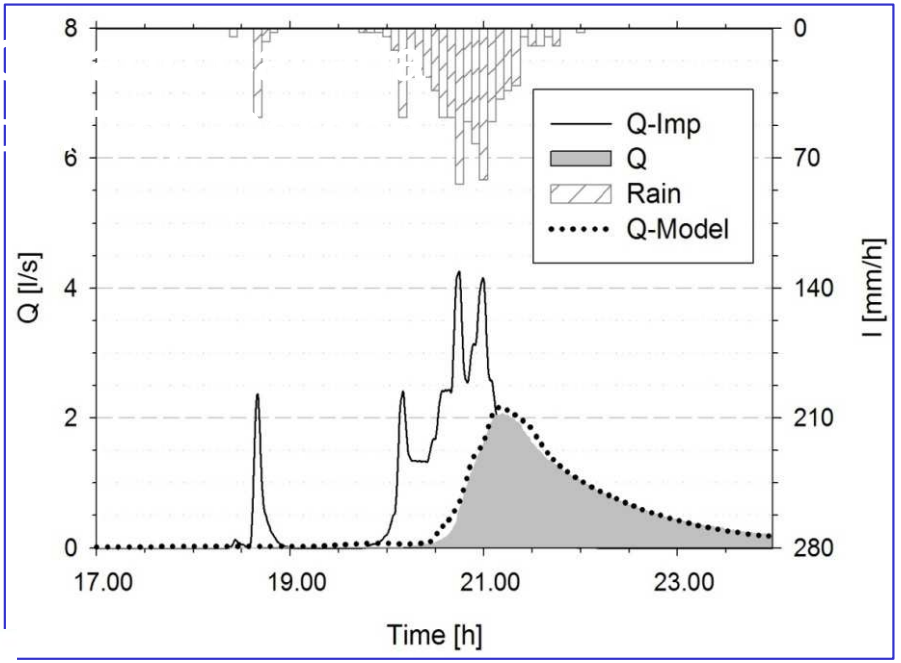
per cortesia di Luca Lanza



Simulazione dell'evento (28 ottobre 2008)

** Intensità Massima 5 minuti: 84 mm/h*

** Picco: 2.05 l/s*

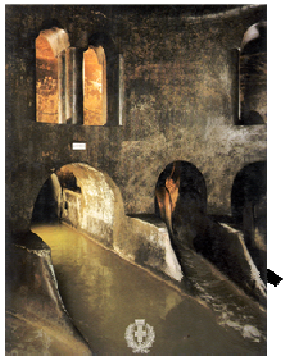
** Altezza di Precipitazione: 59 mm*

** Tempo secco antecedente: 48 h*

Riduzione del volume: 18%

Ritardo nella risposta: 92 min

Abbattimento dell'altezza del picco: 52%



Controllo e Gestione delle Acque Meteoriche in Ambiente Urbano

< 1980

Approccio tradizionale (conveyance):

Raccolta, rapido allontanamento e smaltimento

Cunette → Caditoie → Tubazioni → Scarichi

> 1980

Approccio conservativo (storage)

Convogliamento e temporaneo immagazzinamento

Vasche di laminazione e di prima pioggia

Quantità

Qualità

> 1990

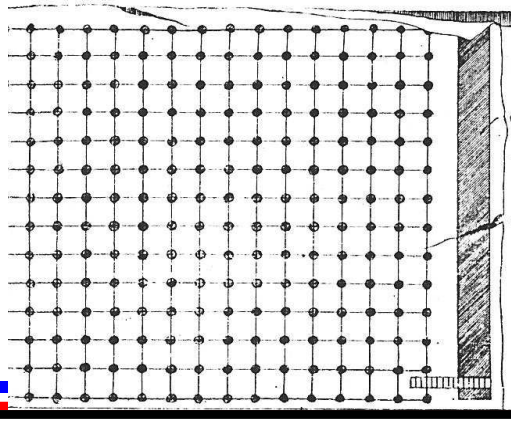
Approccio sostenibile (local management)

Controllo della formazione del deflusso superficiale

Sistemi di infiltrazione e sub-dispersione – Aree verdi

51

the Constantinople Basilica cistern



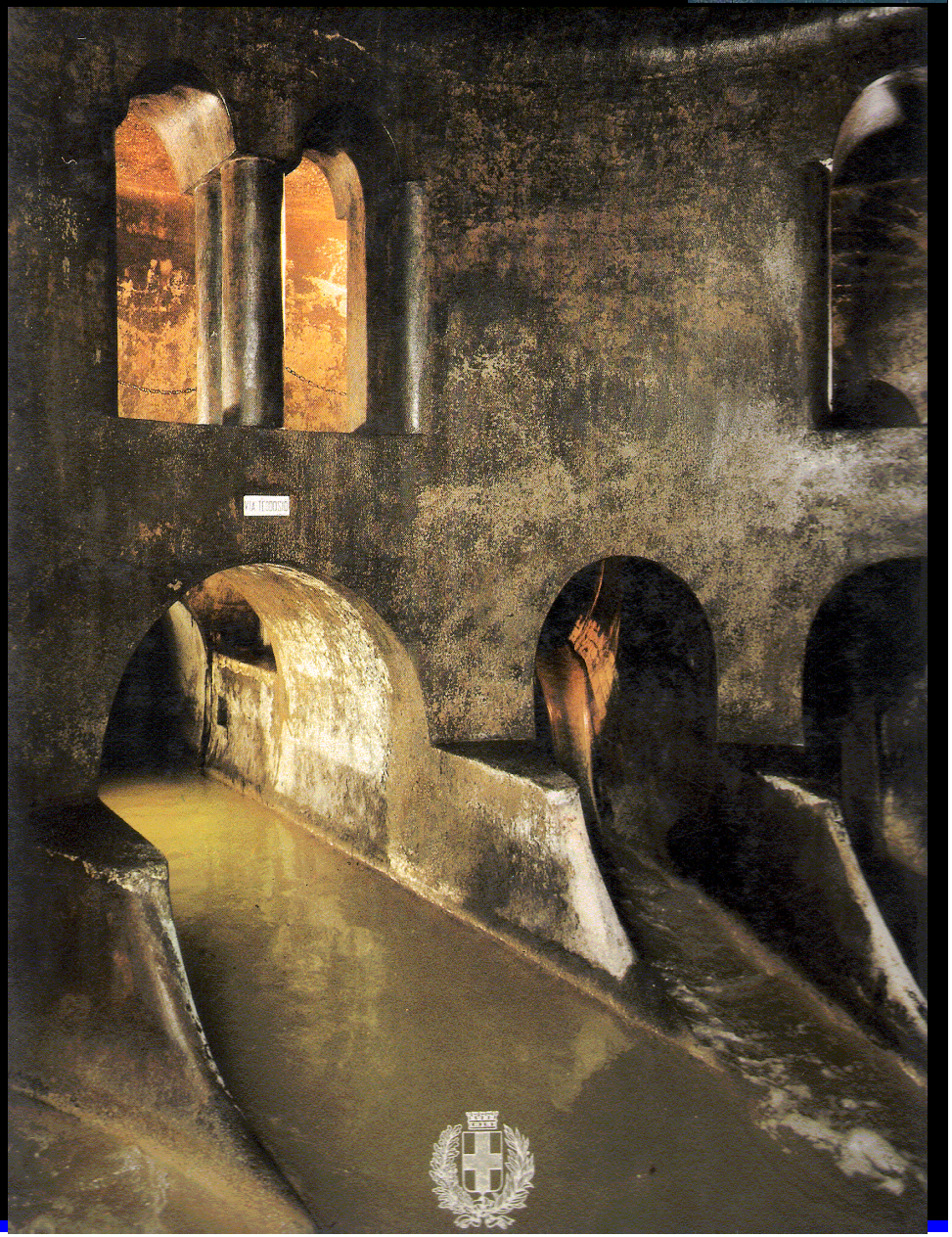
Die grosse Cisterne zu Constantinopel an dem Marckte Atmeidan sonst Hippodromus genañt.

Wessen steinerne Säulen grösten Theils mit Wasser angefüllet unter der Erden nicht weiter von einander stehen als daß man mit Kahnen zwischen durchfahren kan. Ihrer werden in allen 224 gezehlet. Gegenwertige eigentliche Abzeichnung ist samt dem Grundrisse und anderen Türckischen Gebäuden aus Orient verschrieben worden, um solche der sonderbahren Beschaffenheit halber denen Liebhabern mit zu theilen.

La grande Cisterne de Constantinople à la place dite Atmeidan autrefois l'Hippodrome

Les 224. Colonnes de pierre de taille dont elle est soûtenüe Soûs terre sont presque couvertes d'eau à une distance qui ne souffre que le passage de petits bateaux. On en a fait venir de l'Orient cette Elevation avec le plan et avec quelques autres bâtimens Turcs pour les communiquer aux curieux à cause de leur Singularité.

Junction chamber of the sewerage system in Milano, next to Pacini Rd



ARCHITETTURA VIRTUALE

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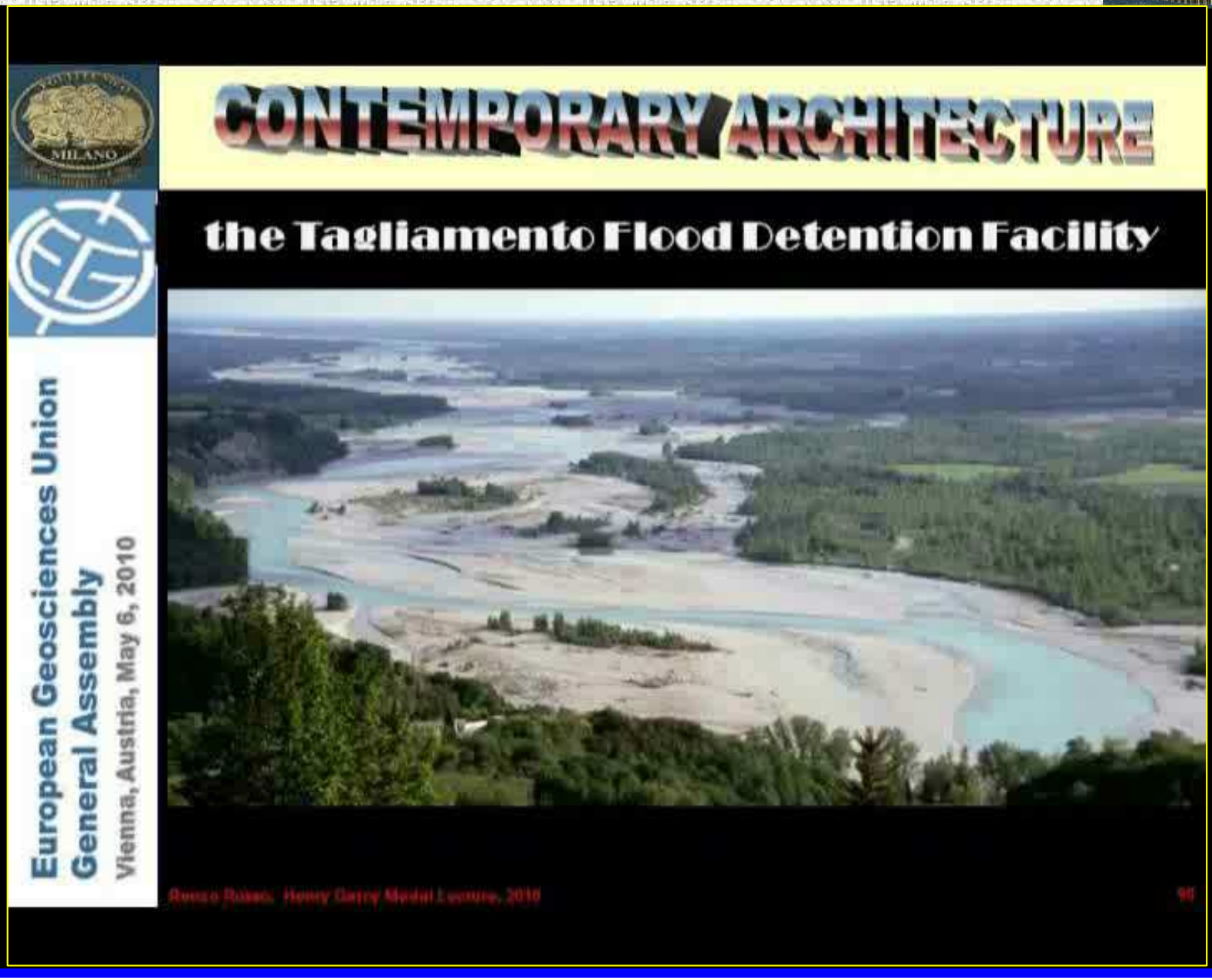
That wall next to the Como Lake...*

*modifed from Alessandro Manzoni (1841)

the Tagliamento Flood Detention Facility


CONTEMPORARY ARCHITECTURE
the Tagliamento Flood Detention Facility
European Geosciences Union
General Assembly
Vienna, Austria, May 6, 2010

Braided Tagliamento river, one of the last unfragmented rivers in Europe

Biosphere reserve candidate under the UNESCO "Man and Biosphere" (MAB) Programme

the Tagliamento Flood Detention Facility

la relazione con la storia

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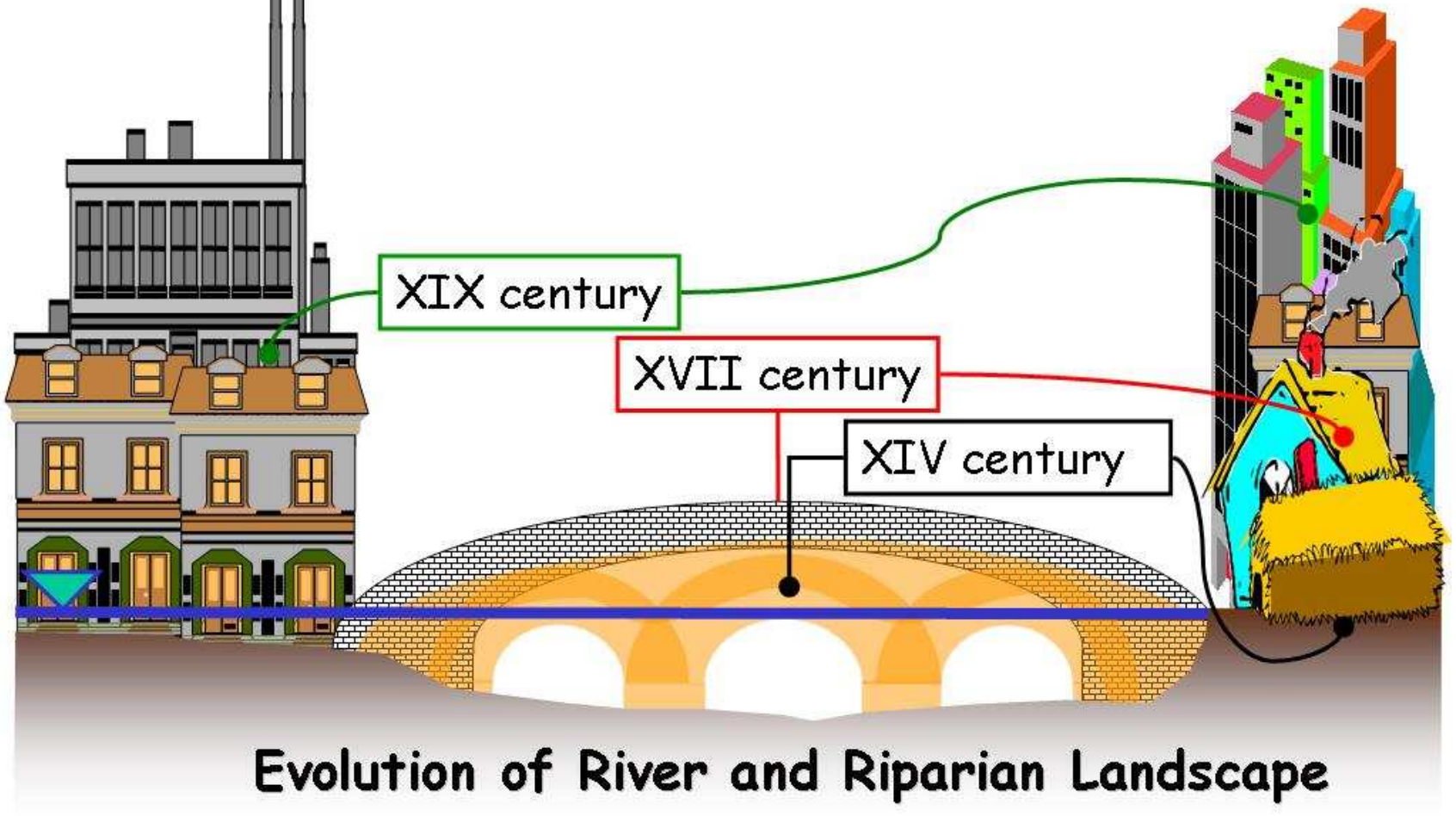
Renzo Rosso - 11
Renzo Rosso - 12
Renzo Rosso - 13

perchè de nostru da a cianûa a u meü
nu peua ciû cresce ni ærbu ni spica ni figgeü
da ***Sidun*** di Fabrizio De Andrè, in "Creuza de mä"



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Marittime e Idrologia

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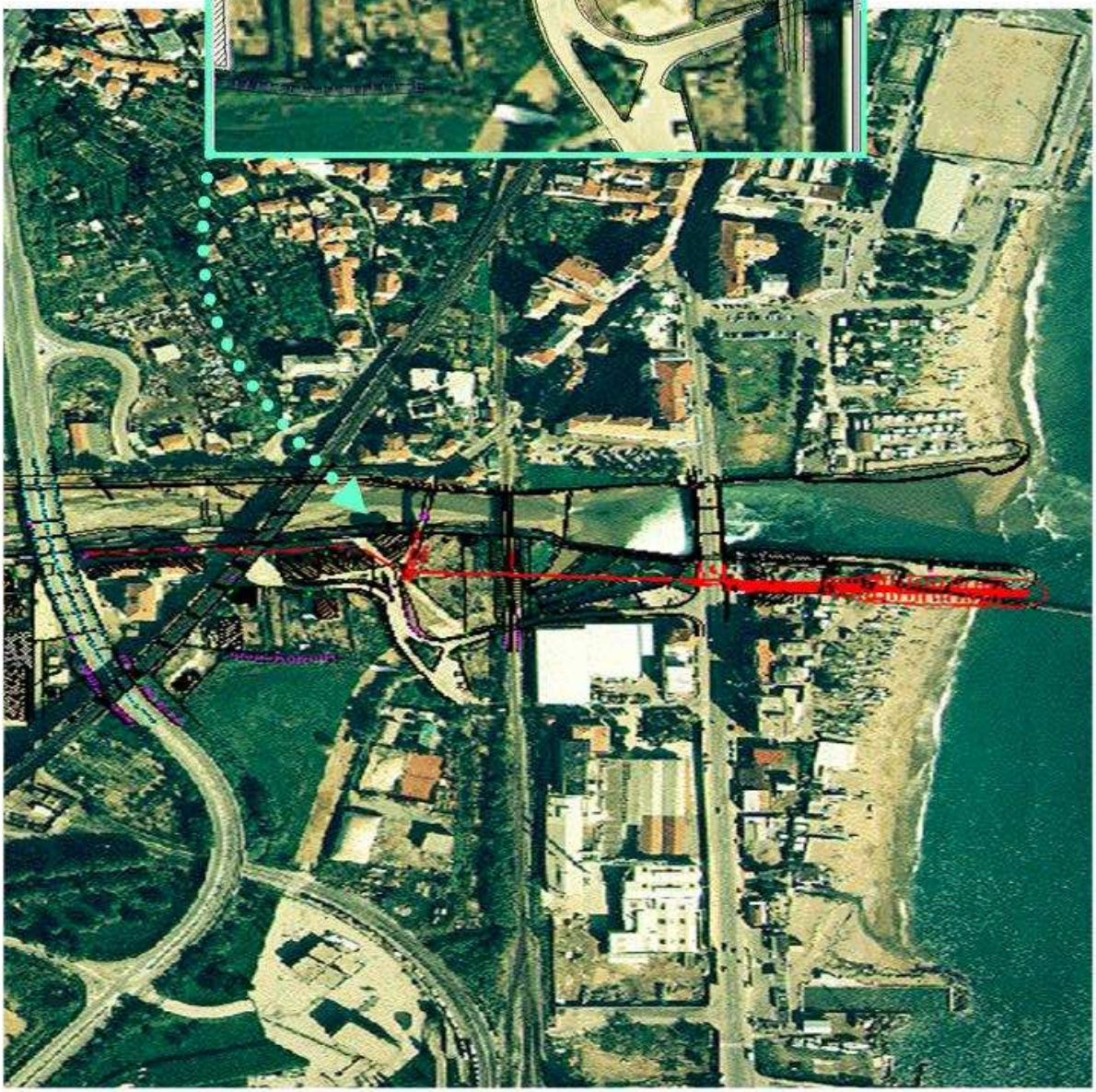
Renzo Rosso - 15
Renzo Rosso - 16



la relazione con la storia

la relazione con la storia

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CHE COSA ABBIAMO IMPARATO?

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Personalmente serbo una convinzione che ha una semplicità direi lapalissiana: penso che, prima di tutto, l'attenzione vada posta nel non aggravare la situazione esistente.

ENRICO MARCHI

The discussion of future water reosurces problems and the needs for advanced statistical methods for their solution shows that professionals need to upgrade, improve or develop new and more reliable statistical methods to applied hydrology and water resurces management.

VUJICA YEVJEVICH

conclusion

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In the XX century Hydrology developed slowly as an appendage of hydraulic engineering rather than a natural science, leading to much bad technology in application.

In last 20 years hydrology has emerged as a science, with outstanding scientific results, but it has gradually lost its capability of driving innovation in application, so losing the fundamental role played in the XVII and XIX century.

It is time for scientists and engineers to join in order to approach the water challenge arising from 9 billion people in Earth 2050, two thirds living in urban areas, with no reasonable prediction available about how many people will live in slums.