



POLITECNICO DI MILANO



**Politecnico di Milano**

# **Global Climate Change Activities at POLIMI**



# The pioneers and the followers



1994

## PROGETTO STRATEGICO CAMBIAMENTI CLIMATICI GLOBALI

Politecnico di Milano

A cura di Luca Bonaventura (DMAT), Stefano Cernuschi (DICA), Stefano Consonni (DENG), Enrico De Angelis (DABC), Paola Garrone (DIG), Marino Gatto (DEIB), Renzo Rosso (DICA), Gianni Scudo (DASTU)

### 1. Introduzione

Le sfide che l'umanità deve attualmente affrontare non hanno precedenti nella storia. Lo sviluppo economico e l'incremento della popolazione umana continuano ad esercitare la loro pressione sulle risorse della nostra Terra. La popolazione mondiale è più che raddoppiata negli ultimi 50 anni e probabilmente raggiungerà i 9 miliardi nel 2040 (Fig.1A). Gli indicatori economici di benessere (ad es. il reddito pro capite) sono continuati ad aumentare, ma non omogeneamente in tutto il mondo (Fig. 1B-C).

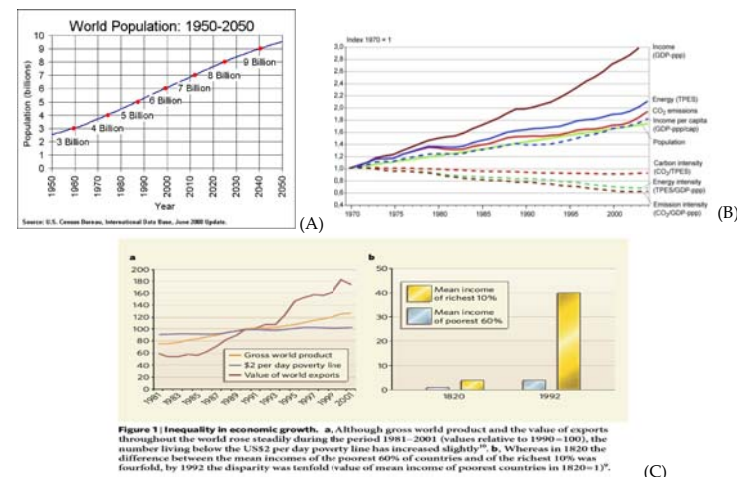


Fig. 1 - (A) Crescita della popolazione mondiale: dati e proiezione media fino al 2050. (B) Andamento del PIL globale e di vari indicatori energetici legati alla produzione, al consumo e all'emissione di reflui. (C) Andamento temporale di indicatori di povertà e di disuguaglianza.

2014



# The EXPO event



## Impacts of Climate Change on Ecosystem Services

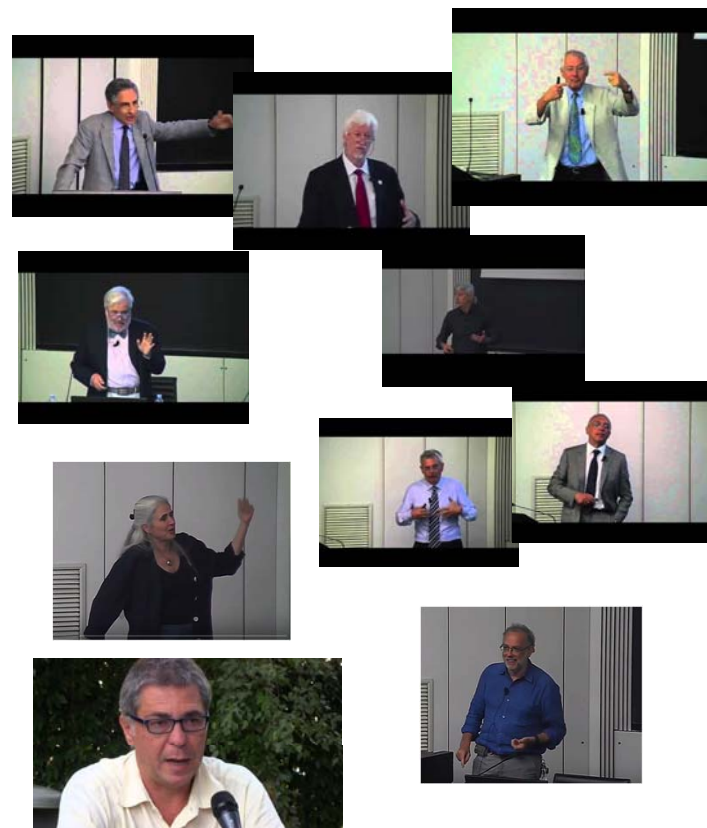
June 23, 2015

Venue: Politecnico di Milano, Aula De Donato, Piazza Leonardo da Vinci 32, Milano

Organisers: **Marino Gatto**, Politecnico di Milano, **Frank Raes**, Joint Research Centre, Ispra, and **Roberto Zoboli**, Università Cattolica, Milano, in collaboration with the **European Commission**.

### Agenda:

9.15	<b>Registration</b>
9:30 – 9:45	<b>Welcome</b> The Rector, Giovanni Azzone, Politecnico di Milano Marino Gatto, Politecnico di Milano Giancarlo Caratti di Lanzacco, European committee for EXPO <b>Morning session</b> - Chairperson: Alessandro Cescatti (JRC, Ispra, EU)
9:45 – 10:30	Andreas Fischlin (ETH, Zurich, Switzerland): Climate change and ecosystem services in a changing climate
10:30 – 11:15	Christian Körner (University of Basel, Basel, Switzerland): Is the biosphere carbon limited?
11:15 – 11:30	Coffee break
11:30 -12:15	Renzo Rosso (Politecnico di Milano): Climate change and the water cycle
12:15 – 13:00	Stephen Palumbi (Stanford University, Stanford, USA): The human footprint on the oceans
13:00 – 14:15	Lunch
	<b>Afternoon session</b> - Chairperson: Roberto Zoboli (Università Cattolica, Milano)
14:15 – 15:00	Mercedes Pascual (University of Chicago, USA): Infectious diseases and climate change
15:00 – 15:45	Carlo Carraro (CMCC, FEEM, Venezia): The international climate governance
15:45 – 16:00	Coffee break
16:00 – 16:45	Stefano Consonni (Politecnico di Milano): The mitigation of greenhouse gas emissions
16:45 – 17:30	Franco Miglietta (IBIMET-CNR, Firenze): Agricultural systems and climate change
17:30 – 17:45	Alessandro Cescatti (JRC, Ispra, EU): Final wrapup
17:45 – 18:30	<b>Open discussion</b> coordinated by S. Caserini (Politecnico di Milano)



<http://www.iat.polimi.it/eventi/climate-change-2015/>





## Politecnico's departments participating in the project on GCC



- **DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**
- **DEPARTMENT OF ENERGY (DENG)**
- **DEPARTMENT OF ELECTRONICS, INFORMATION AND BIOENGINEERING (DEIB)**
- **DEPARTMENT OF MANAGEMENT, ECONOMICS AND INDUSTRIAL ENGINEERING (DIG)**
- **DEPARTMENT OF ARCHITECTURE AND URBAN STUDIES (DASTU)**
- **DEPARTMENT OF MATHEMATICS FRANCESCO BRIOSCHI (DMAT)**
- **DEPARTMENT OF ARCHITECTURE, BUILT ENVIRONMENT AND CONSTRUCTION ENGINEERING (DABC)**





# Climate-lab: an interdepartmental laboratory



- Multidisciplinary laboratory supporting the analysis and modeling of climate.
- Mission: building a knowledge base on the present and potential future climate worldwide under global warming

Dipartimento di Ingegneria Civile e Ambientale, DICA

Dipartimento di Elettronica, Informazione e Bioingegneria, DEIB (+IEIT-CNR)

Dipartimento di Architettura, Ingegneria delle Costruzioni e Ambiente Costruito, ABC

Dipartimento Architettura e Studi Urbani, DASTU



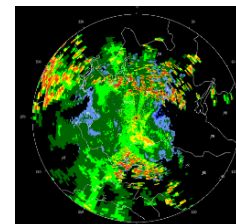
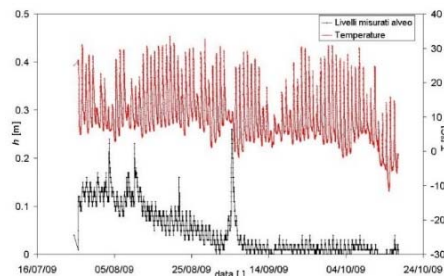


- **Focus**

- description of the state of atmosphere, hydrosphere and ecosphere
- impacts on natural resources, and natural, weather driven hazards
- definition of boundary conditions for adaptation strategies in
  - energy planning,
  - planning, design, and management of buildings and the urban environment

- Specific **aims** cover interdisciplinary research in topics such as

- Gathering large arrays of climate change projections
- Creating a common climate data base for multidisciplinary use
- Coordinated measurement of climate variables subject to change, and impacting on human and natural environment
- Networking the observational tools available at Politecnico
- Developing survey methodologies for urban scale meteorological analysis.
- Characterization of emission regimes of innovative technologies and processes





# Fondazione Centro euro-Mediterraneo sui Cambiamenti Climatici (CMCC)

<http://www.cmcc.it/>

- non-profit research institution established in 2005
- Shareholders
  - Istituto Nazionale di Geofisica e Vulcanologia (INGV)
  - Università del Salento
  - Centro Italiano di Ricerche Aerospaziali (CIRA S.c.p.a.)
  - Università Ca' Foscari Venezia
  - Università di Sassari
  - Università della Tuscia
  - Politecnico di Milano
  - Resources for the Future

## Mission

CMCC's mission is to investigate and model our climate system and its interactions with society to provide reliable, rigorous, and timely scientific results to stimulate sustainable growth, protect the environment, and to develop science driven adaptation and mitigation policies in a changing climate.

## POLIMI's Participating Departments

- DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
- DEPARTMENT OF ENERGY (DENG)
- DEPARTMENT OF ELECTRONICS, INFORMATION AND BIOENGINEERING (DEIB)
- DEPARTMENT OF MANAGEMENT, ECONOMICS AND INDUSTRIAL ENGINEERING (DIG)
- DEPARTMENT OF ARCHITECTURE AND URBAN STUDIES (DASTU)
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## Politecnico bringing its contribution in the following Topics

- *Impacts of global ad climate changes on water resources and natural hazards*
- *Greenhouse gases inventory (sources and processes)*
- *Assessment of GHG emissions and carbon footprint in buildings*
- *Energy efficiency, low CO<sub>2</sub> technologies, CCS and renewables*
- *Environmental planning at different scales with the aim of reducing emissions*
- *Assessing market penetration of low carbon technologies and processes*
- *Energy sector modeling (both technical and economic)*
- *Big data and climate*