cmcc

Centro Euro-Mediterraneo
sui Cambiamenti Climatici

Report

2010/2011

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Climate change and its consequences have become increasingly important in the public debate, since our socio-economic systems have expressed the need to design and build development models that respond to a widespread demand for sustainability.

We are aware that human activity contributes to changing some important factors we depend on, such as water, energy resources, and biodiversity. These changes are occurring at a pace and intensity, which exceeds our ability to control, limit, and adapt to them. The climate science is drawn into a geopolitical debate extended to natural, environmental, and social sciences.

The role of CMCC is to investigate, understand, and represent the scientific aspects of interdisciplinary implications. CMCC also aims to ensure that facts underlying public debate and public decisions are carefully surveyed and clearly conveyed.

The following pages provide an overview of how we decided to carry out these roles over the past two years. They also describe the intensity and importance of the challenge surrounding our work in the investigation of the Human Earth System. Scientific knowledge has helped us to understand the environment and human societies as interconnected systems. Investigation concerning these matters is key to finding a way out of the crisis.

CMCC plays an active role in the innovation of global processes by improving the scientific understanding of climate change in order to provide public and private decision makers with accurate, trustworthy, and timely information.

Antonio Navarra
President of the Euro-Mediterranean Centre on Climate Change

Mission

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.

Values

1. CMCC is committed to scientific integrity and independence, to foster scientific progress and innovation.

2. CMCC is committed to inform and facilitate the dialogue between scientists, decision makers, and the general public to support decisions and actions for the benefit of society and the environment.

3. CMCC is committed to encourage discipline convergence to spur new and creative ideas and to ensure that environmental observations, analyses, predictions and services most effectively meet the needs of society.

4. CMCC is an equal opportunity employer, actively promoting diversity in the workplace.

5. CMCC is a non-advocacy institution.

CMCC supports UN Global Compact

The Euro-Mediterranean Center on Climate Change (CMCC) joined the United Nations Global Compact, the world's largest corporate initiative that networks various entities engaged in human rights, labor, environment and anti-corruption areas. CMCC also contributes to the UN goals to achieve common objectives such as building a sustainable and inclusive global economy.

By joining the UN Global Compact, CMCC declared to embrace, support and enact the ten principles derived from the Universal Declaration of Human Rights, the International Labor Organization's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development, the United Nations Convention Against Corruption.
CMCC will take part in the activities of the UN Global Compact and, furthermore, commits to advance the ten principles within its sphere of influence, especially to its stakeholders and the general public.

Website: www.unglobalcompact.org

About Us

The Euro-Mediterranean Center on Climate Change is a non-profit research institution established in 2005, with the financial support of the Italian Ministry of Education, University and Research and the Ministry of the Environment, Land and Sea. CMCC manages and promotes scientific and applied activities in the field of international climate change research. The Center has been fully operative since 2006.

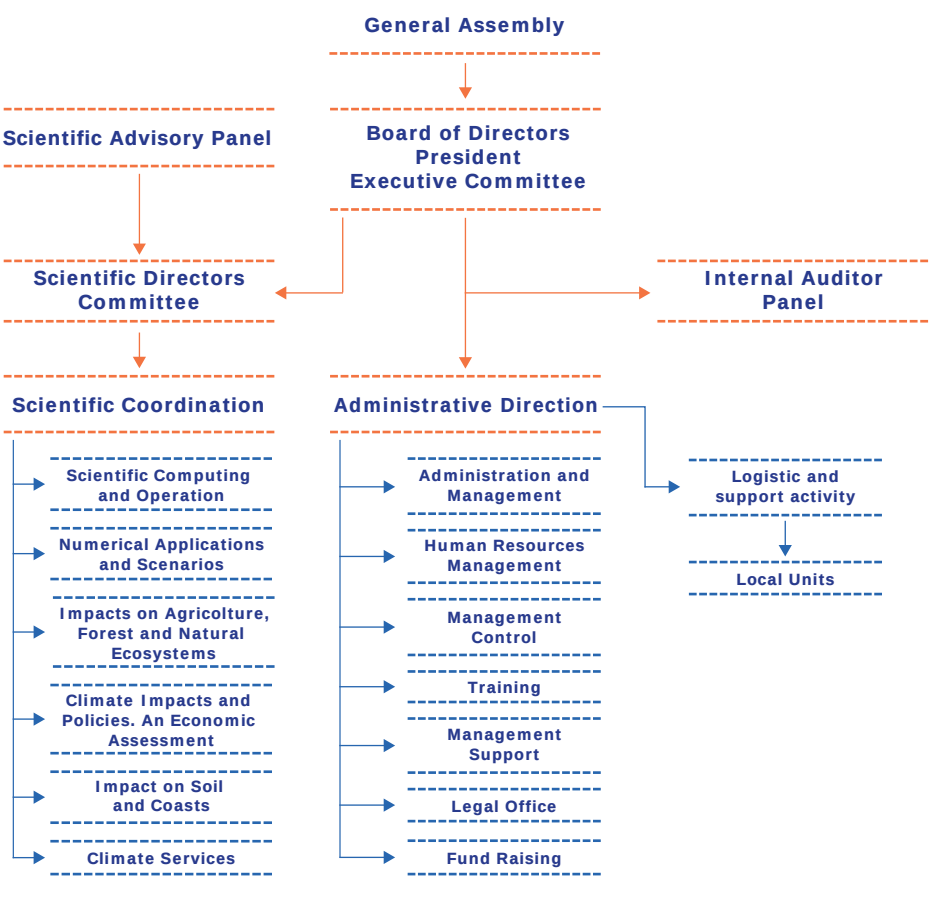
The CMCC network structure has offices in Lecce, Bologna, Capua, Milan, Sassari, Venice, Viterbo, and Benevento. It involves and links private and public institutions jointly investigating multidisciplinary topics related to climate science research.

CMCC has been founded with the main goal of establishing a Center of excellence focused on integrated study of climate change related topics in Italy. CMCC represents at the national and international scale, an institutional point of reference for decision makers, public institutions, as well as private and public companies seeking technical-scientific support.

CMCC's expertise and approach to climate science is strengthened by its capacity to develop research projects, which contribute to a national network of excellence. CMCC also collaborates with the best international centers specialized in advanced and applied research on climate change. Thanks to its networked structure, CMCC brings together highly qualified experts/professionals from different climate research areas in a single unique institution.

The workflow within the CMCC network fosters the integration of technological resources and skills needed to develop a global and extensive approach to climate research including: mathematics, physics, economics and computer science.

CMCC collaborates with experienced scientists, economists, and technicians, which work together in order to provide full analyses of climate impacts on various systems such as agriculture, ecosystems, coasts, water resources, health, and economics. CMCC also supports policymakers in setting and assessing costs, mitigation, and adaptation policies.



Governance

CMCC benefits from the extensive applied research experience of its six consortium members, which constitute the following General Meeting of Shareholders:

- Istituto Nazionale di Geofisica e Vulcanologia (INGV)
- Università del Salento
- Università degli Studi del Sannio
- Centro Italiano di Ricerche Aerospaziali (CIRA S.c.p.a.)
- Università Ca' Foscari Venezia
- Fondazione Eni Enrico Mattei (FEEM)

The General Meeting of Shareholders appoints:
- The Board of Directors (BoD) makes administrative executive decisions. Its term of office is three years and is composed of eleven members;
- The Executive Committee is responsible for following the BoD's guidelines and decisions regarding technical and financial matters (fund raising and supercomputer)

A Scientific Advisory Panel is appointed by the BoD and is composed of highly qualified experts selected from international scientific and academic communities. Its term of office is three years. The Panel provides advice on the research activity, strategic planning and organization of the CMCC. It also offers guidance on specific issues raised by the President of the Board of Directors.

Board of Directors

Dr. **Antonio Navarra**	INGV (Chair)
Prof. **Giovanni Aloisio**	Università del Salento
Prof. **Carlo Carraro**	Università Ca' Foscari Venezia, FEEM
Dr. **Arturo De Risi**	Università del Salento
Dr. **Pasquale De Santis**	INGV
Dr. **Fabio Florindo**	INGV
Prof. **Piero Lionello**	Università del Salento
Prof. **Antonio Marcomini**	Università Ca' Foscari Venezia
Dr. **Tullio Pepe**	INGV
Dr. **Pasquale Schiano**	CIRA
Prof. **Domenico Villacci**	Università del Sannio

Scientific Advisory Panel

Dr. **Paul Messina**	Argonne Leadership Computing Facility, Argonne
Dr. **Nadim Farrokh**	International Centre for Geohazards, Oslo
Dr. **Ghassem Asrar**	World Climate Research Programme, World Meteorological Organization, Geneva
Dr. **Ottmar Edenhofer**	Potsdam Institute for Climate Impact Research, Potsdam
Dr. **Giulio Boccaletti**	McKinsey & Company, London
Prof. **Robert Socolow**	Princeton University, Princeton
Prof. **Laurence Tubiana**	Institute of Sustainable Development and International Relations, Paris

Executive Committee

Prof. **Giovanni Aloisio**

Prof. **Carlo Carraro**

Dr. **Antonio Navarra**

Research Divisions

The research network is distributed among six research divisions that share different knowledge and skills in the field of climate science.

Simulating the climate system

Based in Bologna, the **Numerical Applications and Scenarios (ANS)** Division focuses on the study of climate variability, the physical-biogeochemical interactions in the climate system, and the implementation of a pre-operational system for short-term ocean forecasting, especially through numerical simulations. Numerical models of different complexity characterize the tools used by the ANS Division, from global and regional scale ocean models (Mediterranean and Adriatic in particular) to wide-ranging atmosphere, ocean, sea-ice, vegetation, and marine biogeochemistry coupled models.

Translating climate change in economic values

The **Climate Impacts and Policies - An Economic Assessment (CIP)** Division develops the social-economic research carried out at CMCC. This division translates the analysis of the scenario provided by ANS Division's climate dynamic models and the consequent quantification of climate change impacts delivered in economic values by the ISC and IAFENT Divisions. The economic assessment is fundamental to design appropriate emissions policies regarding mitigation and adaptation to climatic change. There are two CIP Division offices, which are based in Milan and Venice.

Focusing on agriculture and ecosystems

The activities of the **Impacts on Agriculture, Forest, and Natural Ecosystems (IAFENT)** Division focus on the diagnosis and forecast of climate change impacts on agriculture, as well as natural and semi-natural Earth ecosystems, mainly within a Mediterranean climate but also within the entire globe's climate. Based in Viterbo and in Sassari, IAFENT research produces climate risk scenarios for natural and agricultural ecosystems and provides models which present the dangers of climate change, fire, and desertification, pertaining to agricultural and forest areas.

Climate risks for soil and coasts

The **Impacts on Soil and Coast (ISC)** Division is based in Capua and in Venice. The Capua Unit focuses on the hydrogeological risks connected with climate change and integrates climate models at the regional scale with the analysis of risks related to extreme events and their impacts (such as landslides and floods).
A correct evaluation of the risks is a first and fundamental step to line up strategies for the adaptation and mitigation of hydrological risks due to climate change. The Venice Unit aims to develop and apply methodologies to analyze environmental impacts and risks correlated with climate change and natural hazards. The team also focuses on the impact of climate change regarding pollution at the regional and global scale in order to identify its potential effects in modifying the bioavailability to toxic chemicals.

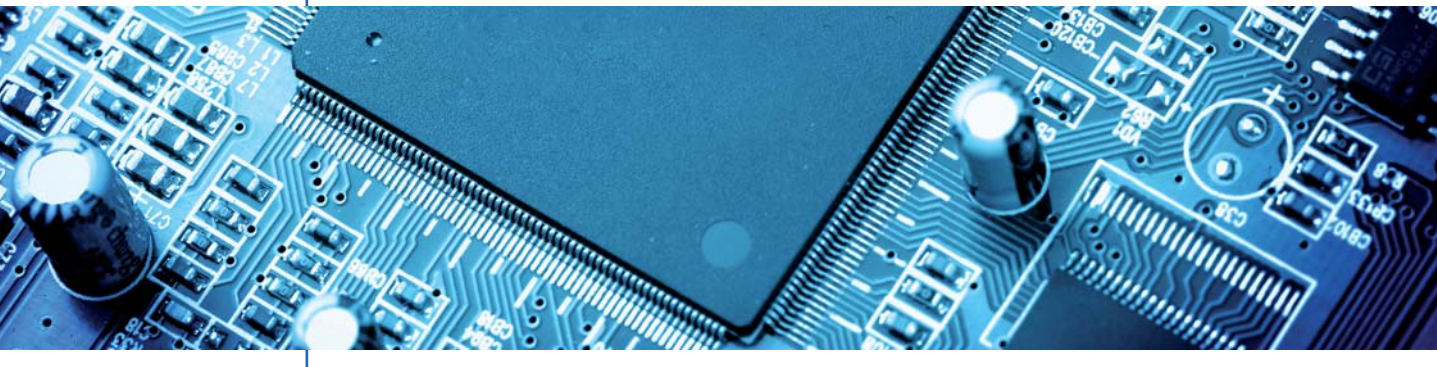
Supercomputing for climate change research

The **Scientific Computing and Operations (SCO)** Division carries out Research & Development activities on Computational Science applied to Climate Change. In particular, it focuses on the optimization of HPC architecture numerical models and the management of large volumes of scientific data regarding exascale scenarios. The team works on the optimization and the parallelization of numerical models for climate change simulations (both climate and impact models) as well as the design and implementation of open source solutions addressing efficient access, analysis, and mining of scientific data in climate change. Based in Lecce, the SCO Division also deals with the management system of the High Performance Computing facilities owned by CMCC Supercomputing Center and the research on Green Computing for an efficient (energy driven) use of computational resources.

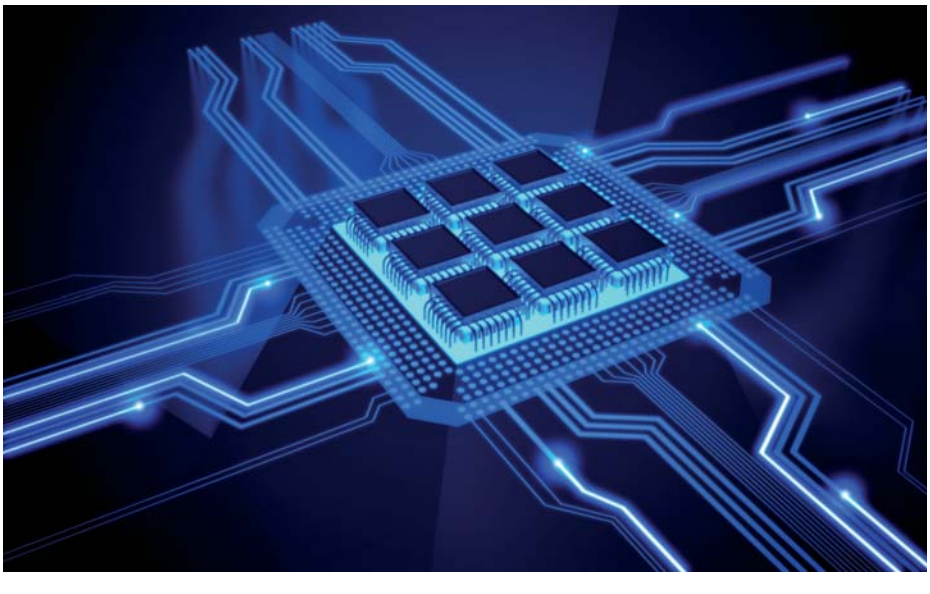
Delivering climate science outputs to stakeholders

Based in Bologna, the **Climate Services (SERC)** Division was established in 2011 and is responsible for the production of climate predictions, climate change projections, and the communication of obtained results and information to a broad range of users: decision makers, industry stakeholders, private companies, political bodies, public administration, scientists, and researchers. Climate predictions on seasonal and multi-annual scales and climate change projections on decadal and centennial scales are based on CMCC high-resolution global and regional models. In addition, the SERC Division coordinates research on adaptation policies to climate change and provides technical and scientific support to institutions involved in climate change multilateral negotiations (EU, IPCC, UNFCCC).

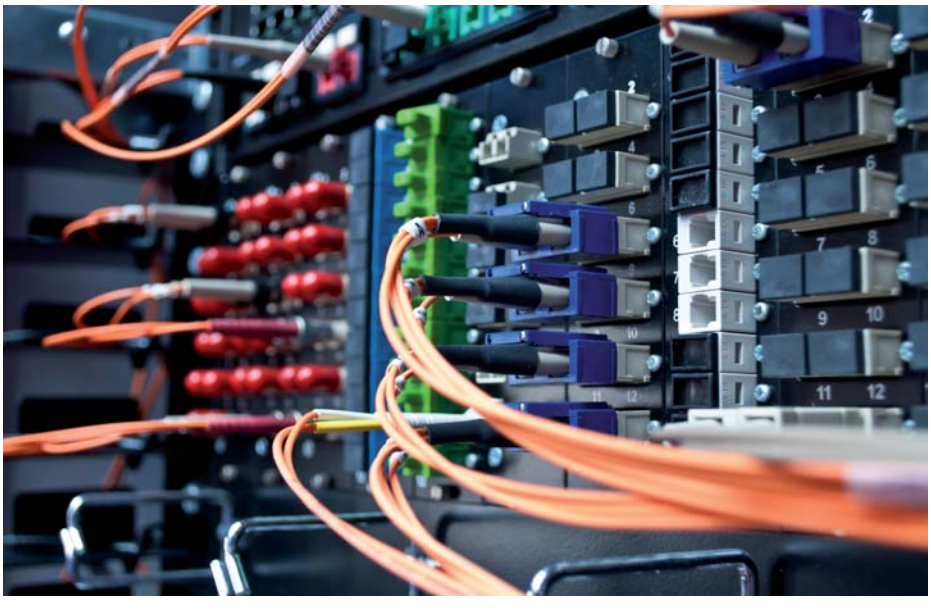
Supercomputing **C**enter



Supercomputing is at the core of CMCC activities that are focused on numerical modeling solutions and methods. Scientific computing is becoming increasingly data intensive and climate science will exert a significant demand of computational capabilities. CMCC plays a leading role and actively participates in the cooperative effort towards exascale computation. The objective is to uphold computational intensity, for instance the computational power per researcher. CMCC easily reaches a high computing intensity per researcher by using dedicated and significant computing resources. Providing raw computational capacity is not enough to sustain scientific leadership and cutting edge research. Innovative software and applications are developed together with visualization tools and applications.



In order to meet the increasing needs of computational power and storage capacity in line with the "Green Computing" challenge, CMCC is upgrading the Supercomputing Center located in the "Ecotekne" Campus in Lecce. The new supercomputing infrastructure will be deployed in the second half of 2012. It is composed of a high performance computing system based on the last generation of Intel Sandy Bridge processors. In particular, the new cluster will be equipped with 482 bi-processor computing nodes IBM DX 360M4 interconnected through a FDR InfiniBand network (56Gb/sec). The theoretical peak performance of the new system (approximately 8000 cores in total) will be 160Tflops (there were approximately 30Tflops in the old system). The new supercomputing infrastructure will be capable of responding to the growing need of computation and storage for CMCC in the coming years.



IPCC National **F**ocal **P**oint for **I**taly

Since August 2006, the Euro-Mediterranean Center on Climate Change has been hosting the IPCC National Focal Point in Italy.

The National Focal Point disseminates relevant IPCC activities, facilitating mutual information exchange between the national scientific community and the public.

The main activities of the IPCC National Focal Point include:

- Collecting information and documenting national techno-scientific activities with relevance to IPCC themes: climate science and climate change (observations, modeling, vulnerability assessments, impacts assessments, adaptation, and mitigation measures);

- Disseminating IPCC activity and findings at all the levels within the national territory through websites, meetings, conferences, and dedicated workshops;

- Identifying and designating the national experts or representatives to the IPCC and related Working Group meetings, workshops and plenary sessions;

- Providing IPCC with feedback on the main activities carried out at the national level.

IPCC was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) with the aim to provide policymakers with a scientific assessment of the available techno-scientific and socio-economic literature on climate change, climate change impacts, adaptation, and mitigation.

IPCC is an Intergovernmental Panel open to all members of the UNEP and WMO. Each government can have a National Focal Point coordinating IPCC relevant activities at the national level. Relevant International Governmental and Non-Governmental Organizations share the mission of IPCC.

In December 2007, the IPCC and Al Gore were awarded the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change".

Website: www.ipcc.ch

Contributing to the 5th IPCC Assessment Report

The 5th IPCC Assessment Report is one of CMCC's most relevant contributions to the international community of climate research and policy. A selection of CMCC's leading researchers and scientists who have a range of views on climate change are included among the authors. The report is scheduled to be published in the period 2013-2014.

In Working Group III (Mitigation of Climate Change), Carlo Carraro, the Director of the Climate Impacts and Policy Division at CMCC, is the Review Editor for chapter 16, "Cross-cutting Investment and Finance Issues". Emanuele Massetti was selected to be Lead Author in the same chapter. Others Lead Authors in WGIII include Valentina Bosetti "Integrated Risk and Uncertainty Assessment of Climate Change Response Policies" in chapter 2, Massimo Tavoni "Assessing Transformation Pathways" in chapter 6, and Alessandro Lanza "Industry" in chapter 10. Riccardo Valentini (Director of IAFENT Division at CMCC), is Coordinating Lead Author in chapter 2 - "Europe" - (WGII, "Impacts, Adaptation and Vulnerability").

International Research Network

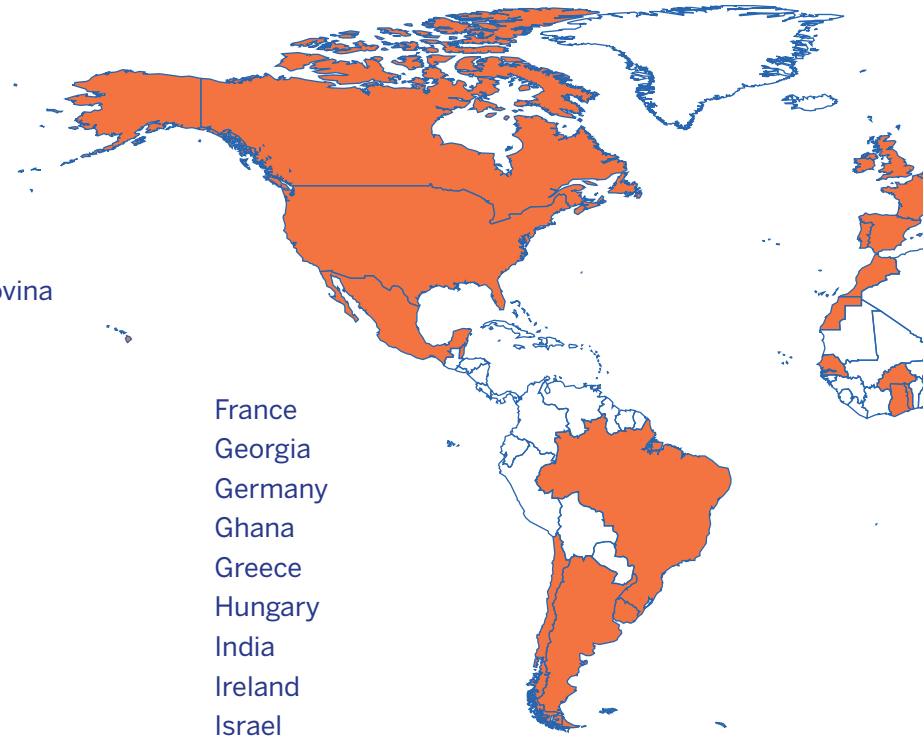
Since its foundation, CMCC has been involved in international research and support activities for policy makers and international institutions. In the past few years the Center took part in international research projects in partnership with excellent centers dealing with climate science by signing specific partnership agreements with prominent research institutions.

CMCC has signed a Memorandum of Understanding with:

- National Centre for Atmospheric Research (Boulder, Colorado, USA)
- Princeton Environmental Institute (Princeton University, New Jersey, USA)
- Yale University (New Haven, Connecticut, USA)
- Climate and Global Modelling Division of the Indian Institute of Tropical Meteorology (Pashan, India)
- National Marine Environment Forecasting Center, State Oceanic Administration of China (Beijing, China)
- University of Adelaide (Australia)
- Tel Aviv University (Israel)

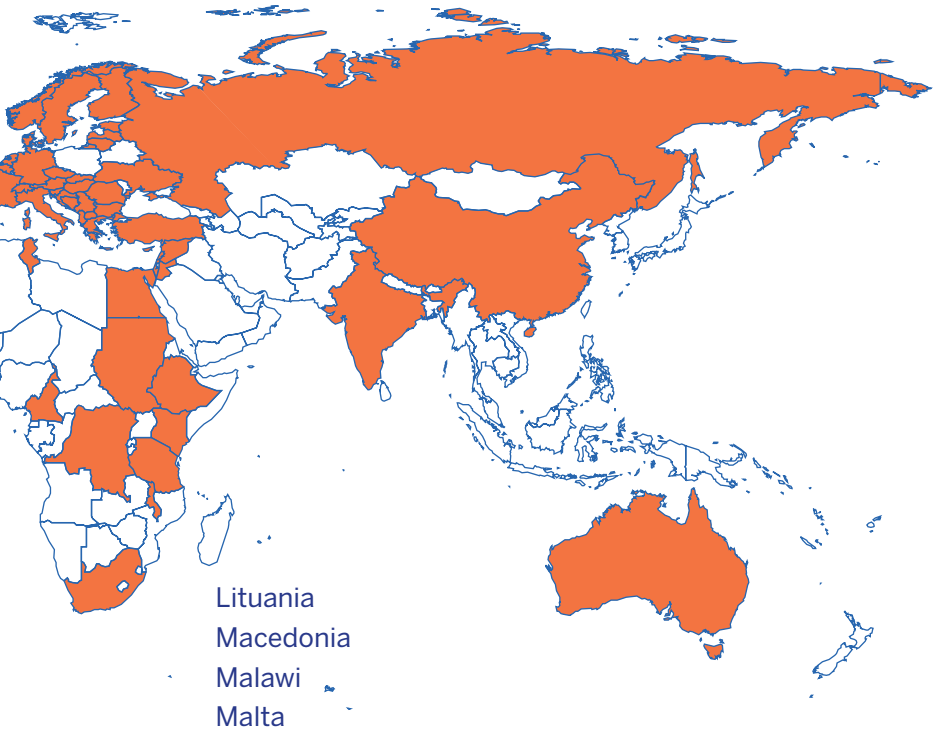
CMCC has partners from more than 70 countries

Albania
Algeria
Argentina
Australia
Austria
Belgium
Belize
Bosnia Herzegovina
Brazil
Bulgaria
Burkina Faso
Cameroon
Canada
Chile
China
Congo
Croatia
Cyprus
Czech Republic
Denmark
Egypt
Estonia
Ethiopia
Finland
France
Georgia
Germany
Ghana
Greece
Hungary
India
Ireland
Israel
Italy
Jordan
Kenya
Lebanon
Lettonia



The extensive experience in multidisciplinary climate research allows CMCC to play a significant role in decision-making processes that involve climate related issues. The Center has started several projects with national and international institutions and policymakers, both public and private:

- Asian Development Bank
- Environment Energy Agency - EEA - European Union
- European Investment Bank
- Food and Agriculture Organization of the United Nations - FAO
- Global Climate Foundation
- Republic of Mauritius
- The World Bank



Lituania
Macedonia
Malawi
Malta
Mauritius
Mexico
Monaco
Montenegro
Morocco
Netherlands
Norway
Poland
Portugal
Romania
Russia
Senegal
Serbia
Slovenia
South Africa
Spain
Sudan
Sweden
Switzerland
Syria
Tanzania
Togo
Trinidad and Tobago
Tunisia
Turkey
Ukraine
United Kingdom
Uruguay
USA

People

Human capital is a fundamental asset at CMCC, where human resource policies are based on respect for individuals as well as the recognition of an individual's capability skills and merit. Internal cohesion and cross-disciplinary are encouraged by advanced educational learning, brainstorming sessions, and teamwork.

Individual and team behaviors are prompted by proactivity and flexibility in order to gather complementary competences and to consolidate the sense of membership.

CMCC Human Resources
man-year equivalent, 2011

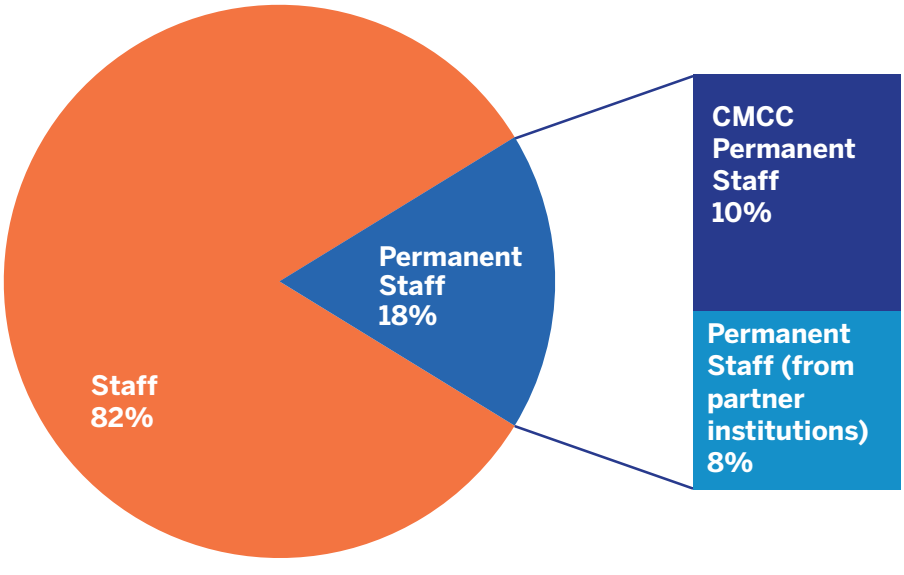
	Total	Male	Female
	80	**38**	**42**
CMCC staff			
CMCC permanent staff	8	3	5
Permanent staff from partner institutions	6	3	3
Other	66	32	34
Area			
Administration, management and communication	22	8	14
Scientific / technical	58	30	28
Education			
PhD	34	18	16
Degree	41	17	24
Other	5	4	1
Age			
Under 30	13	3	10
31-40	43	22	21
41-50	17	9	8
Over 50	7	4	3
Nationality			
Italian	69	31	38
UE – non Italian	6	3	3
Extra - UE	5	4	1

Employees and collaborators

CMCC research, administrative, and managing activities include more contractors than employees. This kind of human resources organization is typical for non-profit research institutions, since it allows flexibility and the high turnover of young researchers.

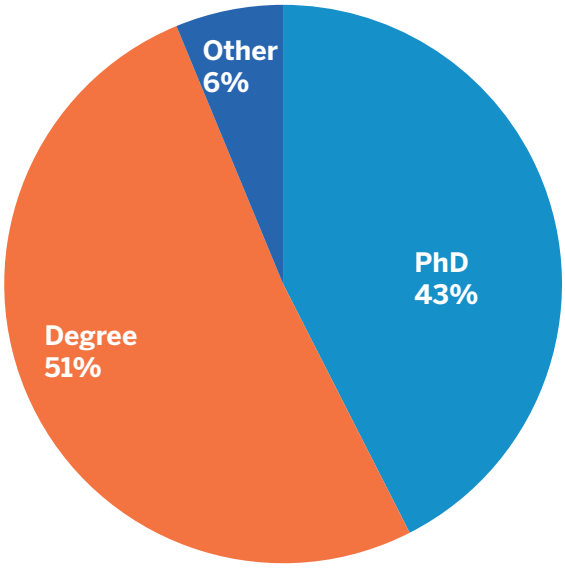
The analysis of human resources at CMCC must take into account a great variety of contract types. Data on human resources are thus reported using a man/year equivalent (e.g. a two-months contract plus a ten months contract are equivalent to one man/year), in order to present homogeneous data and information deriving from such heterogeneous source.

The number of people who worked at CMCC in 2011 was 80 man/year equivalent.



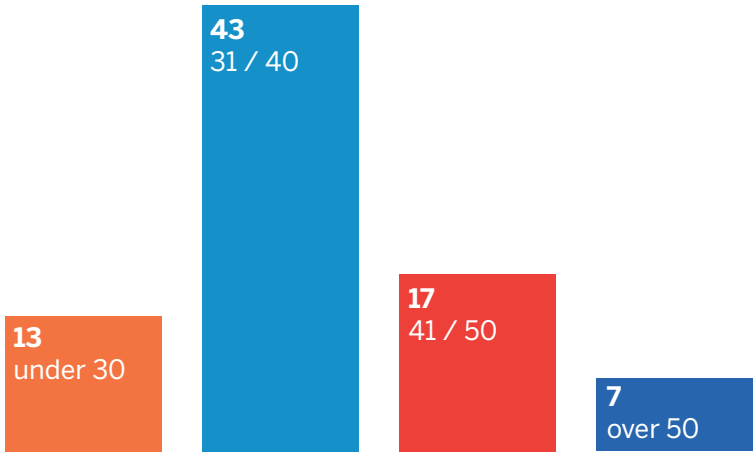
Most of the people who work at CMCC are scientists. Approximately 43% of CMCC's employees have a PhD. Nevertheless, as the Center activities have increased in recent years, more administration and management positions were required in 2011.

People at CMCC
PhD and Degree



A young institution
More than two-thirds of CMCC's employees are under the age of 40 while only 9% is over the age of 50. The Center is a young institution in the area of scientific research.
Since CMCC is part of an international network, it has started collaborations with some of the most prominent climate research institutes and often hosts visiting scientists and foreign researchers. Most of the people working at the Center are Italian.

People at CMCC
age distribution in man-year equivalent



Gender balance
As for gender, there is a balanced mix in the overall number of people working at CMCC. Gender seems to be balanced in most categories.

Research Projects

Research and the development of scientific projects are the core of CMCC activities.

CMCC is well connected in the national and international research network and context. Thanks to its international outreach, CMCC plays an active role within the European and International scientific community.

Over the years CMCC has thus been able to attract resources aimed at funding high quality scientific research.

Financed Projects

CMCC has considerable experience in the management and implementation of scientific research projects funded by the EU and other international organizations.

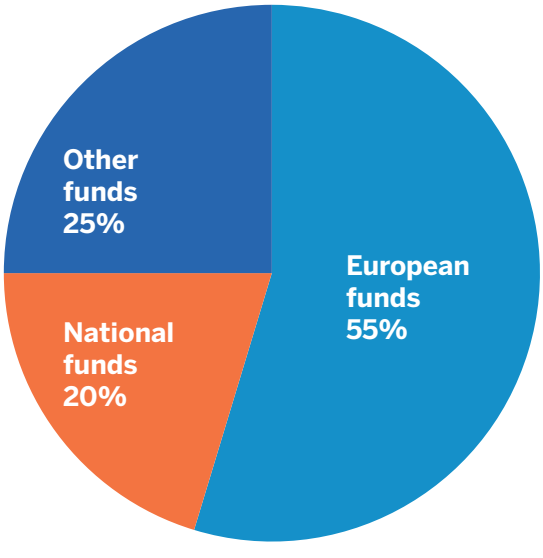
CMCC's research projects portfolio on 31 December 2011 included 64 projects, 34 of which coordinated by CMCC, for a total turnover of 22.069.461 euros. 32 projects were completed while the remaining 32 will continue in 2012. These funds come on top of the initial funding provided by the Italian Ministry of the Environment, Land and Sea and the Ministry of Education, University and Research.

In detail:

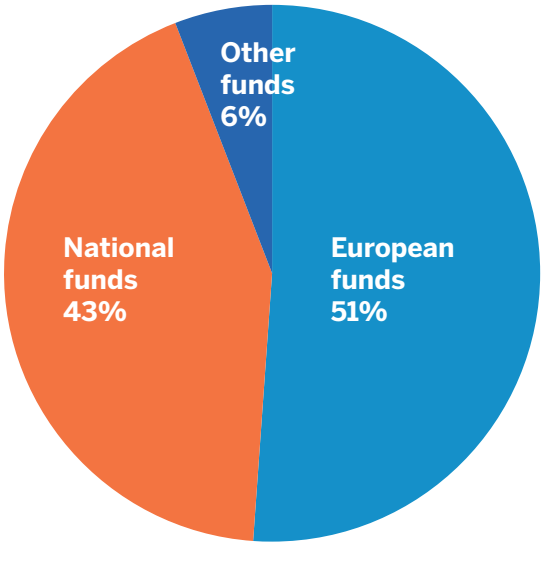
- 35 projects were funded by European funds – including 11 as coordinator (25 ongoing, 10 closed) – 20 of which are funded by FP6 & FP7, including 3 as coordinator (17 ongoing, 3 closed)
- 13 projects were funded by national funds, including 11 as coordinator (1 ongoing, 12 closed)
- 16 projects were funded by other funds, including 12 as coordinator (6 ongoing, 10 closed)

Research Projects Portfolio
on 31th December 2011

Funding sources
per project



Funding sources
per budget



Climate Risk Analysis in Nigeria

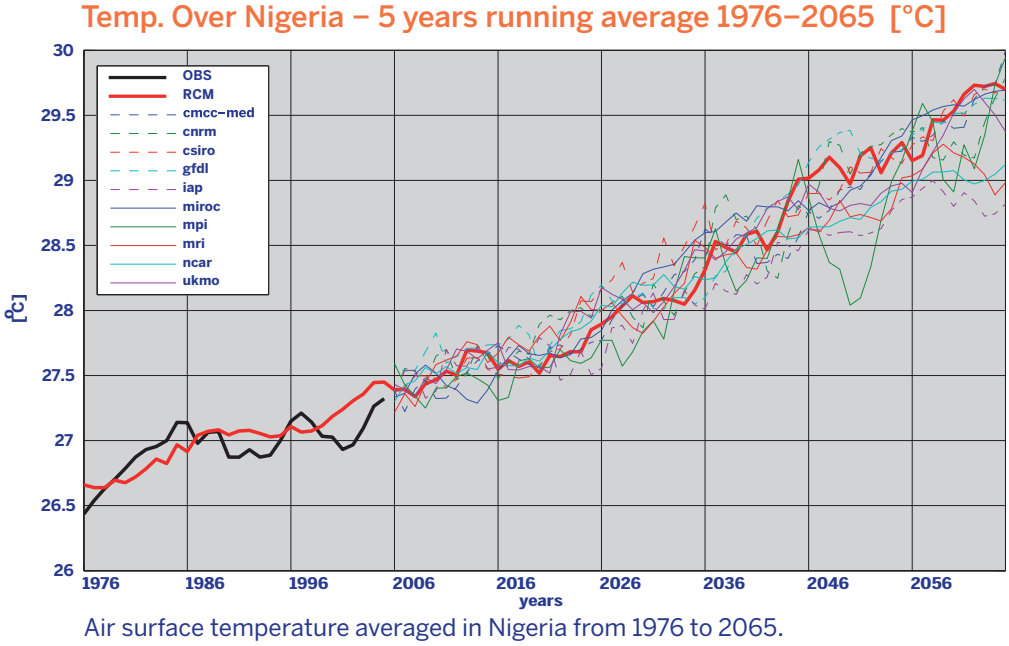
The Federal Government of Nigeria, the United Nation Development Programme, and the World Bank in 2010 have agreed to carry out a strategic Climate Change Assessment, as stated in the Bank's Country Partnership Strategy for Nigeria (2010-2013).

After an open international bidding process, the World Bank recruited CMCC to carry out the Climate Risk Analysis in both the agriculture sector (for food provisioning by crops and livestock) and the water sector (related to irrigation and hydropower).

CMCC has evaluated short-medium term risks (up to 2065) Nigeria's development objectives through climate and impact models, as defined in Vision 20:2020 in the selected sectors above.

Subject to comments to be received by the Federal Government of Nigeria, key messages emerging from the analysis are as follows:

- Climate change is likely to make it more challenging to achieve food, water, and energy security in Nigeria.
- Rain-fed yields are projected to decline with important implications on GDP and trade, and added challenges to food security. Increased temperatures will also affect livestock and rural livelihoods.
- Combined options for sustainable land management can offset much of the climate impacts on agriculture.
- Irrigation could play an important complementary role, but planning and design should be based on climate projections, as water availability will be different from the past.
- Although hydropower will continue to be an important pillar of Nigeria's energy system, climate change and variability must be considered when planning new schemes.



Air surface temperature averaged in Nigeria from 1976 to 2065.

Nigeria Climate risk assessment in agriculture and coastal development

Funded by: The World Bank

Duration: 18 months (January 19, 2011 - June 29, 2012)

General objectives

- To implement a comprehensive assessment of climate related risks to Nigeria's long term development prospects, based on available datasets and existing models, focusing on strategic sectors (agriculture, livestock, irrigation, hydropower).
- To analyze a set of representative and plausible scenarios alerting policymakers and stakeholders regarding emerging problems related to climate change impacts (e.g. sector development, food security, water scarcity, energy supply).
- To identify and evaluate potential adaptation measures to reduce the climate related risks mentioned above.
- To quantitatively measure the effectiveness of adaptation measures to climate change.

Multi-model context to investigate climate variability

At the end of 2008, the WCRP's Working Group on Coupled Modeling (WGCM) launched an initiative to promote a new set of coordinated climate model experiments, involving major climate modeling groups from around the world. These experiments comprise the fifth phase of the Coupled Model Intercomparison Project (CMIP5, http://cmip-pcmdi.llnl.gov/cmip5).

CMIP5 provides a multi-model context to investigate the mechanisms that are responsible for climate variability and change. It also assesses the model differences in poorly understood feedbacks, such as those associated with the carbon cycle and clouds. It additionally tests the model's ability to predict climate on decadal time scales, and, more generally, it provides coordinated multi-model climate projections investigating the climate change signal and its impacts for a relatively near-term (few decades) and the distant (next century) future.

Model Configuration	Period	Experiment	Model Resolution
CMCC-CM physical core High horizontal resolution	300 years	piControl (pre-industrial)	T159L31 (~80 km)
	1850-2005	Historical	T159L31 (~80 km)
	2006-2100	RCP4.5 (scenario)	T159L31 (~80 km)
	2006-2100	RCP8.5 (scenario)	T159L31 (~80 km)
	140 years	1pctoCO2 (scenario)	T159L31 (~80 km)
	480 years	Decadal predictions (short term projections)	T159L31 (~80 km)
	1979-2008	AMIP (prescribed SST)	T159L31 (~80 km)
CMCC-CESM Low horizontal resolution; carbon cycle	277 years	piControl (pre-industrial)	T31L39 (~400 km)
	1850:2005	Historical	T31L39 (~400 km)
	2006-2100	RCP8.5 (scenario)	T65L39 (~400 km)
CMCC-CMS physical core Medium horizontal resolution high vertical resolution Stratosphere resolving	300 years	piControl (pre-industrial)	T65L95 (~200 km)
	300 years	Historical	T65L95 (~200 km)
	2006-2100	RCP4.5 (scenario)	T65L95 (~200 km)
	2006-2100	RCP8.5 (scenario)	T65L95 (~200 km)

Table 1: summary of CMCC contribution to CMIP5 set of experiments.

CMCC supported the set of simulations required by CMIP5 with a series of experiments performed through its specific climate model, implemented in several configurations. Specifically, CMCC has performed the simulations described in Table 1– among which the pre-industrial and 20th century ones– applying the climate model at different horizontal and vertical resolutions. Besides these long-term climate scenario simulations, CMCC has also performed the short-term projections (decadal prediction experiments), with the high-resolution version of the CMCC climate model (CMCC-CM).

Furthermore, CMCC has supported the experiments aimed at assessing the carbon cycle feedbacks with a set of integrations performed with its Earth system model (CMCC-CESM).

Figure 1 shows the evolution of the 2-meter temperature (T2m, global average), the NCEP re-analyses (red-dashed line), the "historical" simulation of the climate over the past century (black solid thick line), and two CMIP5 scenarios (RCP4.5 and RCP8.5) for the next century (2005-2100) performed with the high-resolution CMCC-CM model.

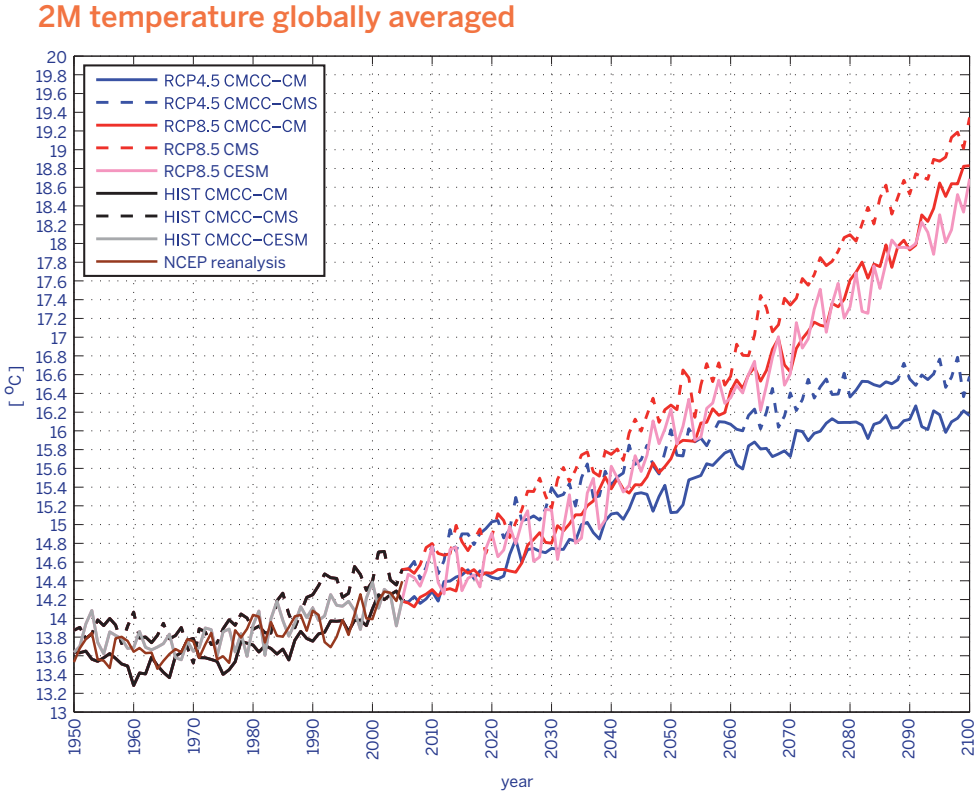


Figure 1: 2-meter Temperature (T2m) registered around the globe through NCEP-reanalyses considering the 1965-2005 period (brown line); last segment of the 20th century simulation drawn from the "historical" climate simulations performed with CMCC models (solid and dashed black lines); projections for the 2005-2100 period according to RCP4.5 (solid and dashed blue lines) and RCP8.5 scenarios (solid and dashed red and pink lines) performed with CMCC models described in Table 1.

European Topic Centre on Climate Change impacts, vulnerability and adaptation

Vulnerability of natural and human systems is increasing across Europe due to climate change combined with many other factors such as intensified land use, urban expansion, and infrastructure development.

The European Topic Centre on Climate Change impacts, vulnerability and Adaptation (ETC/CCA) is addressing information needs in this area. Its task started in January 2011 under contract with the European Environment Agency (EEA). The ETC/CCA ensures high quality and science-based support to the EEA and its European Environment Information and Observation Network (EIONET) in the area of climate change impacts, vulnerability and adaptation. The EEA aims to help achieve significant and measurable improvement in Europe's environment by providing timely, targeted, relevant, and reliable information to policymakers and the public.

The "Call for Proposal" for this European Topic Centre was published in the spring of 2010 and in the summer of 2010. The contract was awarded to the ETC/CCA consortium, which is headed by the Euro-Mediterranean Center on Climate Change.

The main aim of ETC/CCA is to improve information among European countries on the following three topics:
1) Data and indicators on climate change and its impacts across sectors and regions
2) The assessment of climate change vulnerabilities and natural hazard risks to society and ecosystems
3) Current or planned adaptation strategies and actions.
The ETC/CCA uses GMES services and also supports the development of user requirements. The ETC/CCA also contributes to the EU Shared Environmental Information System in the area of climate change impacts, vulnerability and adaptation by making relevant information more accessible to European policymakers and citizens. Moreover, the work program of the ETC/CCA also includes contributions to the EEA's thematic assessment reports on freshwater and coastal systems and to the next pan-European state of the environment report. The ETC/CCA, in cooperation with the European Commission and EEA member countries, contributes to the new Climate Adaptation Platform (Climate-Adapt), which was put into action in March 2012.

ETC-CCA - European Topic Centre on Climate Change impacts, vulnerability and adaptation

Funded by: EEA (European Environment Agency)

Duration: 36 months (January 2011 - December 2013)

General objectives
Support the EEA in specific tasks identified in the EEA strategy and specified in the EEA Annual Management Plans (AMPs) in the area of climate change impacts, vulnerability and adaptation across Europe, including improving information among European countries on:

- Data and indicators on climate change and its impacts across sectors and regions;
- The assessment of climate change vulnerabilities and natural hazard risks to society and ecosystems;
- Current or planned adaptation strategies and actions.

Website: http://etc-cca.eionet.europa.eu

Models for GHG mitigation actions in developing countries

GHG mitigation policies are at the forefront of national policies both in developed and developing countries. The EU already has an Emission Trading System (ETS) in place and the USA, Australia, and New Zealand are also implementing one. Similarly, several developing countries have started to develop their own energy and climate plans, which foresee the use of global carbon markets to reduce GHG emissions to some extent, either via the Clean Development Mechanism or via more elaborated market mechanisms. These national policy initiatives are often based on economic models that conduct counterfactual studies in terms of climate policies, GHG emission trajectories, abatement costs, etc. to considerable extent. Given that many of these policy initiatives have an impact on the costs to mitigate in other countries via the global carbon market, sound economic modeling tools that inform policymaking need to take into account international considerations.

Within this framework, CMCC coordinates the Climate Policy Outreach (CPO) Project funded by the European Commission via the EuropeAid Programme. CPO partners include:

- Potsdam Institute for Climate Impact Research – PIK
- Renmin University of China
- Indian Institute of Management Ahmedabad – IIM
- Indian Statistical Institute – ISI
- University of Tsinghua.

The Joint Program on the Science and Policy of Global Change at the Massachusetts Institute of Technology also contributes to modeling deep dives.
The main task of the CPO project is to improve the modeling capacity of climate change policies in developing countries and to help policymakers understand how to use these results. The dialogue between policymakers and modelers has been advanced through the project, which is structured in three basic work streams that are strictly intertwined: improve existing modeling capacity, improve interactions between modelers and improve policy preparation.

In 2010-2011, three workshops were organized in the framework of the CPO project in Seoul, Xi'an, and Potsdam. The Xi'an workshop took place between the 28th and the 31st of March 2011, back-to-back with the Asian Modeling Exercise (AME) project, which provided policy scenarios for the deep-dive analysis. The Potsdam workshop, on November 11th 2011, focused on the internal discussion among modeling groups related to deep-dive topics including energy policy and emission targets in China, induced innovation, the transport sector and corresponding fuel energy consumption, gas and shale gas in China, and so forth. To provide more information on policy analysis, apart from the modeling approach, the project also included the theoretic and econometric works contributed by ISI on regional green energy deployment and the electricity demand in India.

CPO - Climate Policy Outreach

Funded by: European Commission, EuropeAid

Duration: 3 years (January 1, 2010 - December 31, 2012)

General objectives

The project focuses on the interaction between countries when addressing greenhouse gas (GHG) mitigation commitments (developed countries) and GHG mitigation actions (developing countries). The overall objective is to improve policymaking concerning GHG mitigation, also through better understanding of the potential impact of a global carbon market development. This will be achieved by:

- Increasing the capacity to develop, maintain, and use economics modeling tools to assess mitigation potential, including the use of offset mechanisms in developing countries;
- Improving the interactions between modelers from key developed countries and developing countries, leading to an improvement in their respective modeling tools as well as in the understanding of a gradual developing global carbon market and the way it needs to be assessed;
- Increasing the capacity to use the results of economic modeling tools by policymakers in developing countries.

Water and climate induced changes

The WASSERMed project (Water Availability and Security in Southern Europe and the Mediterranean) is analyzing ongoing and future climate induced changes in available water for different sectors in southern Europe, North Africa, and the Middle East according to potential threats to national and human security. This includes the assessment of changes in mean flows, surface run-off, ground water balance, as well as social and economic factors.

Climate change scenarios for the Mediterranean and Southern Europe, with a special emphasis on precipitation, are produced by synthesizing existing model simulations and climate re-analyses to generate high resolution ensemble scenarios of climate change in the Mediterranean, focusing on five case studies: Syros Island (Cyclades Complex, Greece), Sardinia Island (Italy), Merguellil watershed (Tunisia), Jordan river basin, and the Rosetta area (Egypt). These case studies represent situations that deserve special attention due to their relevance to national and human security. Additionally, they refer to varying problems and conditions within the Mediterranean region, in terms of scale, complexity, water use and impacts as far as security threats are concerned, ranging from small touristic (Syros), to medium sized regional (Sardinia, Tunisia) water systems. These complex water systems are analyzed through holistic integrated models, coupling climate change and water use scenarios, so as to study the impacts of water related shortages quantatively with the introduction of specific technical indicators referring to water related security threats.

WASSERMed is also addressing the impacts on key strategic sectors such as agriculture and tourism and the macroeconomic implications of water availability in terms of regional income, consumption, investment, trade flows, industrial structure and competitiveness using disaggregated general equilibrium models. The model is also used to assess virtual water trade, which is associated with the implicit water content of imports and exports. Changes in virtual water trade can be considered a major adaptation option.

WASSERMed - Water Availability and Security in Southern EuRope and the Mediterranean

Funded by: European Commission, 7th Framework Programme

Duration: 36 months (January 2010- March 2013)

General objectives
The overall objective is to analyze and to assess the impacts of climate change on sensitive strategic sectors in the Mediterranean (agriculture and tourism) and to propose adaptation strategies, technological solutions and management practices to attenuate these impacts. A second objective is to improve modeling capabilities to better quantify climate-induced changes in the water system by coupling a climate model and an eco-hydrological model assessing changes in competitiveness, economic structure, trade flows and implicit water trade (virtual water), due to specific changes in water availability, through economic macro-models.

Website: www.wassermed.eu

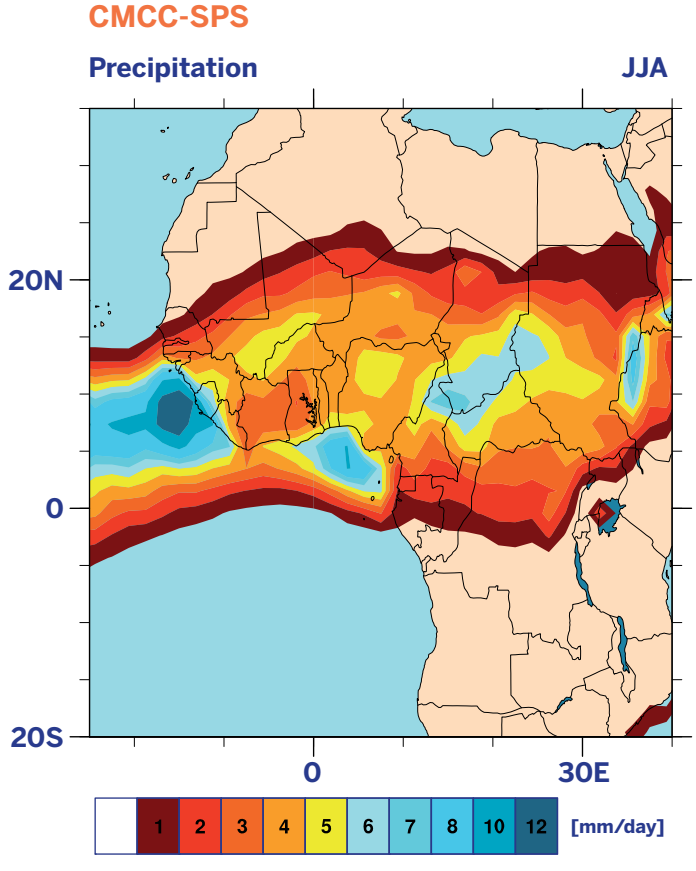
Climate change predictions in Sub-Saharan Africa

Considering its low adaptive capacity and its particular eco-climatic and socio-economic conditions, Africa is probably the most vulnerable continent to climate change and variability. Nevertheless, it remains one of the regions less covered by climate change studies and most of the predictive models are developed outside the African context. The African population mostly depends on the rural sector, which relies in turn on rainfall patterns: any negative climate effect on the water cycle and agriculture production will significantly threaten its livelihood and economy.

In order to address the issues above, ClimAfrica aims at developing improved tools to better understand and predict climate change in Sub-Saharan Africa (SSA) over the next 10-20 years, analyzing the expected impacts on water and agriculture and proposing adaptation strategies tailored to the context.

Co-funded by the European Union under the 7th Framework Programme, and coordinated by the Euro-Mediterranean Center on Climate Change, Climafrica comprises 18 institutions: 9 from Europe, 8 from Africa, and the UN-FAO. African partners belong to: Burkina Faso, Congo, Ghana, Kenya, Malawi, South Africa, Sudan and Togo.

The first version of decadal predictions of climate change at the continental scale and the first simulations of crop yields have been developed as result of the first 18 months of project activities.



An example of a climatic model developed by CMCC and used in ClimAfrica

CLIMAFRICA - Climate change predictions in Sub-Saharan Africa: impacts and adaptations

Funded by: European Commission, 7th Framework Programme

Duration: 4 years (October 2010 – September 2014)

General objectives

The project aims at providing the stakeholder with appropriate and the most up-to-date tools to better understand and predict climate change, assess its impact on African ecosystems and population, and evaluate and carry out accurate adaptation strategies. In this respect there is an urgent need to:

- Develop improved climate predictions for SSA on seasonal to decadal time scale
- Assess climate impacts in key sectors of SSA's livelihood and economy, such as water resources and agriculture
- Evaluate the vulnerability of ecosystems and civil population to inter-annual variations and decadal trends in climate
- Suggest and analyze new adaptation strategies suited to SSA
- Develop a new concept of medium term monitoring and forecasting warning system for food security, risk management, and civil protection
- Analyze the economic impact of climate change on agriculture and water resources in SSA and the cost-effectiveness of potential adaptation measures.

Website: www.climafrica.net

Designing a Global Carbon Observation and Analysis System

Nowadays there are many networks monitoring the Carbon cycle, but there is a lack of continuity and sustainability, and there are still many under-represented regions and ecosystems types. We also have many different methods to measure the Carbon cycle but the interoperability of the systems and inter comparison of the results are difficult. At the same time we use several Carbon budget estimates at different temporal and spatial scales. However, there is still high uncertainty despite the impressive amount of scientific information, as the translation of science into policy relevant information is very challenging. Now more than ever, decision makers need timely, systematic, consistent and transparent data, information, and tools as well as an independent and reliable verification system for greenhouse gas emissions and sequestration.

In this sense, GEOCARBON aims at designing a coordinated Global Carbon Observation and Analysis System, addressing the climate targets of the Group on Earth Observations (GEO) towards a Global Earth Observation System of Systems (GEOSS) for carbon. CO_2 and CH_4 data from in situ and remote sensing observations encompassing atmosphere, land and oceans will be collected, integrated and analyzed.

Funded by the European Commission under the Seventh Framework Programme (FP7) and coordinated by the Euro-Mediterranean Center on Climate Change, the GEOCARBON consortium includes 25 partners from 12 countries, of which, 9 are European, 1 is international (FAO), 1 is from Brazil, and 1 is from Cameroon.
An operational international office has been recently launched by GEOCARBON to run the project and to work on a global coordination level. The office has already started to serve the international community to improve the coordination and effectiveness of the global "carbon" contributions of the GEO Work Plan. The office will also enhance the communication flow among the single communities, promote their involvement in the GEO process, and disseminate the project results turning them into policy relevant information.

GEOCARBON – Toward an Operational Global Carbon Observing System

Funded by: European Commission, FP7, Cooperation

Duration: 36 months (October 2011 - September 2014)

General objectives
The main objective of this project is to coordinate the contribution of European and international leading research institutes toward the development of an Operational Global Integrated Carbon Observation and Analysis System.

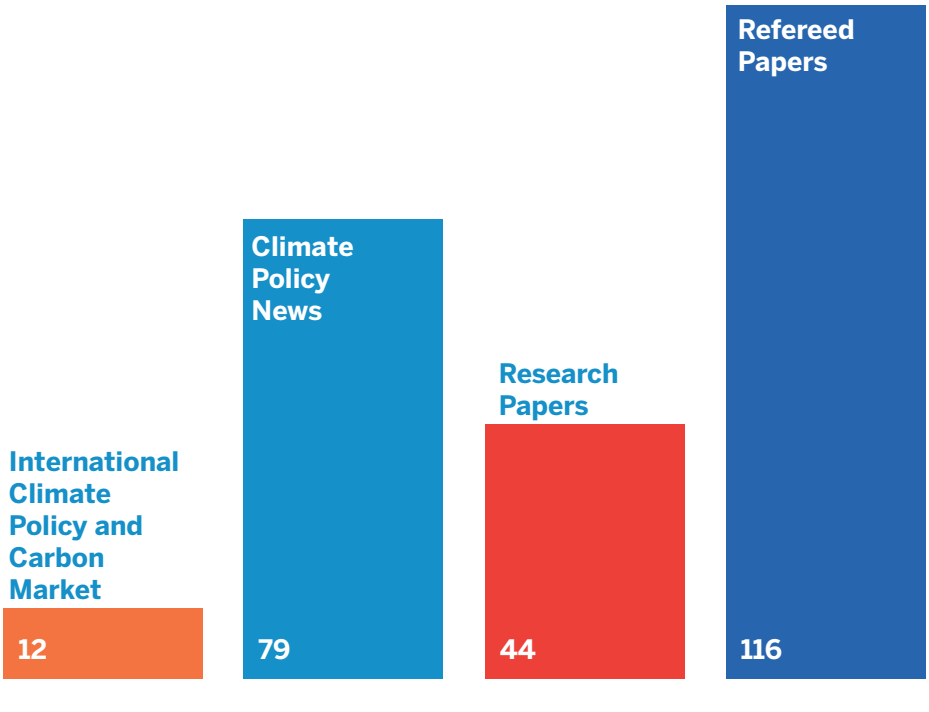
Specific objectives
- Provide an aggregated set of harmonized global carbon data information (integrating land, ocean, atmosphere and human dimensions);
- Develop improved Carbon Cycle Data Assimilation Systems (CCDAS);
- Define the specifications for an operational Global Carbon Observing System;
- Provide improved regional carbon budgets of Amazon and Central Africa;
- Provide comprehensive and synthetic information on the annual sources and sinks of CO_2 for the globe and for large ocean and land regions;
- Improve the assessment of global CH_4 sources and sinks and develop the CH_4 observing system component;
- Provide an economic assessment of the value of an enhanced Global Carbon Observing System Strengthen the effectiveness of the European (and global) Carbon Community participation in the GEO system.

Scientific Publications

Publications are the principal way to disseminate CMCC research outputs.

Published in English and in Italian, CMCC publications are addressed to the scientific community, policymakers, and the general public. They represent the outcome of the synergy among CMCC research divisions and the proactive collaboration with other outstanding institutions.

CMCC Scientific Publications 2010/2011



CMCC publications are categorized as follows:

Scientific papers in refereed journals

Papers are directed to a scientific and expert audience and submitted for peer review; most of the journals included in this list are collected in the Journal Citation Report (JCR). In the last three years CMCC's scientific production of refereed papers has increased (51 in 2010 and 65 in 2011).

Research Papers

Papers produced by CMCC research divisions are directed to the scientific community. CMCC Research Papers are available on the website for free and can also be downloaded from the SSRN (Social Science Research Network) platform. Files from the series were downloaded almost three thousand times in 2010/2011.

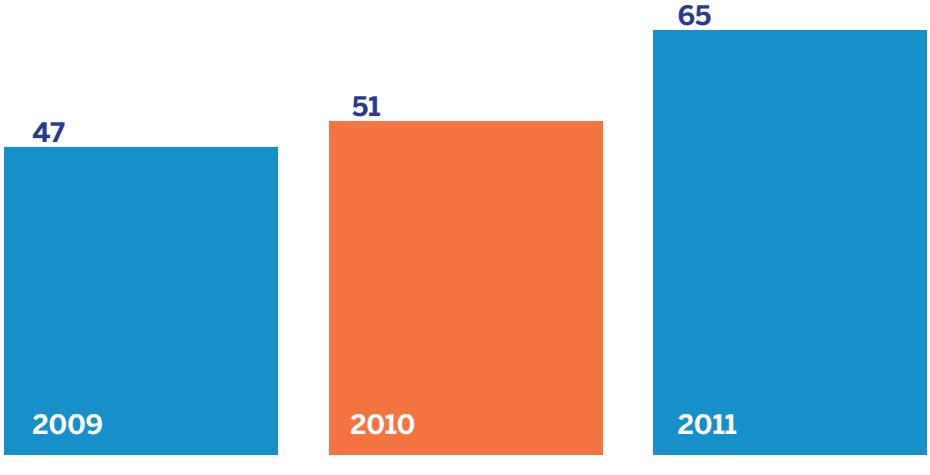
Climate Policy News

CPN is a weekly column with updates on international climate policy and reports news on energy market, and technology laws. It also provides regular updates on the Carbon Market in Europe.

International Climate Policy updates on the Carbon Market

There is a bimonthly report with news and comments on international climate negotiation, domestic climate policy measures around the world, and recent research on the economics of climate policy.

CMCC papers in refereed journals



Events

CMCC organizes events, seminars, workshops and conferences to disseminate its research activities to the public and to strengthen relationships with other research centers and institutions at the national and international level.

Seminars are primarily addressed to a specialized audience and to the scientific community in order to encourage discussions on frontier issues in research and policy.

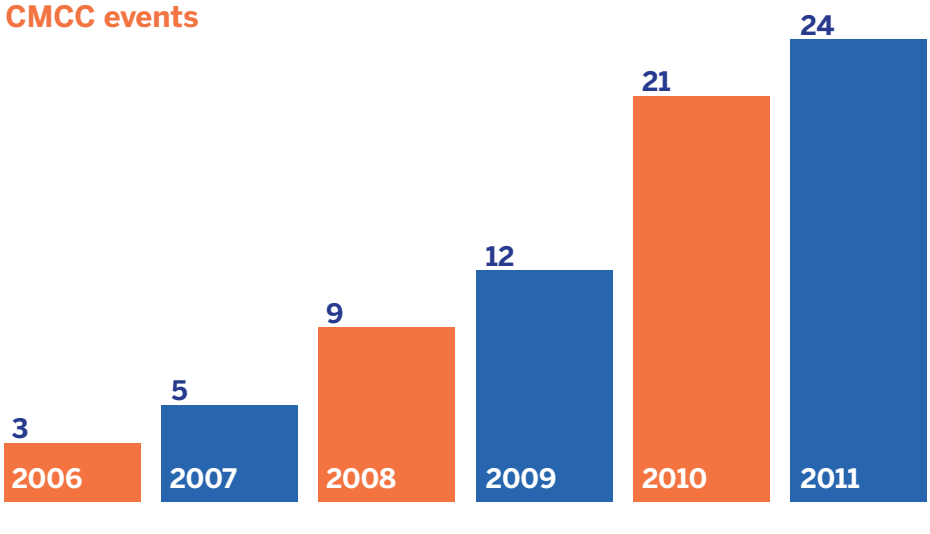
Conferences are large-scale institutional events with the participation of important international speakers.

Meetings usually run parallel to research projects and scientific collaborations and are held to start a new project, to define technical topics, or to deliver research outcomes.

Workshops are dedicated to CMCC researchers and are used for brainstorming and updates about ongoing activities.

As shown in the chart, the organization of scientific events is a growing part of CMCC activities, from 12 in 2009 to 24 in 2011.

CMCC events



CMCC at UNFCCC COP16 in Cancún

CMCC attended the Conference of the Parties (COP) at the United Nations Framework Convention on Climate Change (UNFCCC) in Cancùn (29 November – 2 December 2010) and in Durban (28 November - 9 December 2011). Some CMCC representatives took part in the Italian delegation for the official negotiation process while side events were organized in collaboration with international institutions. The side event that took place in Cancùn on Thursday December 9th 2010, titled, **International cooperation and local commitment: a success story in the Small Pacific Islands States** was organized by the Italian Ministry for the Environment, Land and Sea with the participation of CMCC. On May 10th 2007, the Italian Government and the Pacific Small Island States launched a cooperation program in New York to address the key global challenges of climate change; in less than 3 years about $11 Mln have been committed to projects and activities (18 projects in all). The event at COP 16 introduced and promoted the programs as cooperation models.

Focus on Africa at UNFCCC COP17 in Durban

Organized by CMCC in collaboration with Cape Town University, the Regional information for climate services in Africa event took place on Saturday December 3rd 2011. It focused on improved climate services, including the careful assessment of uncertainties that are needed to support decision-makers for developing adaptation strategies as well as promote sustainable development in Africa.

Africa and its cooperation with the European Union is the focus of the side event, **Africa-EU scientific and technological cooperation in the field of climate change: the best practices, challenges and opportunities for addressing capacity development needs for research in Africa**. This side event presented examples of successful EU-Africa scientific cooperation in the field of climate change. In particular, capacity needs in areas such as climate predictions and scenarios, climate change impacts on health, agriculture and ecosystems, and adaptation options were the focus of the side event. The panel of participants involved representatives of the EC, EU Member states, European and African researchers, UN agencies and other stakeholders. CMCC participated with a presentation on the dynamics of climate change in Africa, based on the ClimAfrica project.

Discussing the institutional context of international climate change policy

Institutions for Climate Governance was the topic discussed at the International Workshop organized in Venice (May 20-21, 2010) by the International Center for Climate Governance (ICCG), Fondazione Eni Enrico Mattei (FEEM), CMCC, and the Harvard Project on International Climate Agreements. During the research workshop, leaders from the academic world were able to engage in a discussion within the institutional context of international climate change policy. The discussion dealt with the following topics:

- The appropriate and most effective roles for existing or new organizations in negotiating and implementing a new climate agreement or set of agreements
- The contribution research could bring in the context of public policy, considering economics, political science, international relations and legal scholarship
- Institutional shaping and how to overcome institutional path-dependence

Challenging topics for Computational Science

Held in conjunction with "The Ascent of Computational Excellence in the Land of the Rising Sun", the **International Conference on Computational Science 2011, the International workshop on "Climate Change Data Challenges - C2DC"** (Singapore, June 1-3, 2011) provided a contribution to the Computational Science field and dealt with challenging topics.
Researchers and practitioners worked together to identify and explore open issues and challenges as well as to discuss and propose innovative data management solutions. The workshop provided a forum to freely exchange ideas, address challenging data management issues and topics, including exabytes systems. Novel, interesting and emerging scientific data-oriented initiatives in climate change were also reported at the workshop.

Economics of Climate: Governing Global Challenges

The **14th Annual Conference on Global Economic Analysis "Governing Global Challenges: Climate Change, Trade, Finance and Development"** (June 16-18, 2011) took place at the School of Economics and Business– Ca' Foscari University of Venice. The Conference was organized by Fondazione Eni Enrico Mattei (FEEM), Ca' Foscari University of Venice and the Center for Global Trade Analysis of Purdue University, in cooperation with the Euro-Mediterranean Center on Climate Change, the International Center for Climate Governance (ICCG), and the Center for Thematic Environmental Networks (TEN Center). The goal of the Conference was to encourage brainstorming among economists conducting quantitative analysis on global economic issues. Particular emphasis was placed on applied general equilibrium methods, data, and applications. The conference featured a plenary session to outline the broad themes of the conference (Environment and Climate, Trade, Distributional and Equity Issues, Dynamics and Growth, Energy Supply and Security, International Health Issues, Poverty, Employment and Development, Conflicts, Natural Resources Supply and Security, Methodology, Software and Data). Designed to introduce participants to new topics as well as to provide fresh insights, presentations were given by distinguished, intellectual leaders in their respective fields.

Modeling Regional Climate in Detail

CMCC hosted the **6th Assembly of the CLM-Community (Climate Limited-area Modelling- Community)** in Cava de' Tirreni between August 30 and September 2, 2011. The assembly was held for an open international network of scientists who accepted the CLM Community agreement and who also use the COSMO model in their research. The COSMO model in Climate Mode (COSMO-CLM or CCLM) is a non-hydrostatic regional climate model that has been applied to simulations on time scales up to centuries and spatial resolutions between 1 and 50 km. The model represents the dynamical downscaling of global circulation models that cannot realistically simulate regional climate details. This is particularly true for the Mediterranean area, which is characterized by a complex geography and has a strong impact on the pattern of the atmospheric variables. It is also important to emphasize that regional climate models have the physical and numerical features to provide a more detailed description of extreme climate events. The international community of scientists gathered in Cava de' Tirreni to discuss and exchange information on model developments, achieved applications, and ongoing projects.

A European Coordination for Climate Knowledge

About 70 national representatives and experts were hosted at CMCC offices during the **JPI CLIMATE 2nd Governing Board Meeting, and the Working Groups Workshop "Towards the Implementation Plan"** between November 7th and 8th, 2011 in Bologna. JPI CLIMATE is a Joint Programming Initiative on the coordination of research efforts on climate change, characterized by a new process based on a strategic framework and voluntary high-level commitments to a European Member States partnership. The overall aim of Joint Programming is to gather national research efforts in order to enhance the use of Europe's valuable public R&D resources and to tackle common European challenges more effectively in a few key areas, such as climate change. JPI CLIMATE aims at aligning national research priorities according to a jointly agreed Strategic Research Agenda (SRA) with the aim of complementing and supporting initiatives at the European level. As explained on the JPI CLIMATE's website, it is a "fundamental European initiative concerning the coordination of climate research funding" where Program Members "understand 'climate knowledge' in a rather broad sense, including all kinds of scientific knowledge on causes and consequences, on cost, risks and benefits of climate change as well as possible responses".

A European Infrastructure for the Earth System Modelling

The **IS-ENES 2nd General Assembly** was hosted by CMCC in Lecce (December 12-14, 2011). The event involved all IS-ENES partners to discuss the current status of the project, in order to accelerate progress in climate/Earth system modeling and understanding. A proposal for extending the goals of the project (IS-ENES2) was discussed and approved during the meeting. Moreover, invited speakers discussed European Earth System Modeling (ESM) initiatives, the IS-ENES project, and international activities. Within Europe, the European Network for Earth System Modeling (ENES) brings together the European climate/Earth system modeling community, currently working on the understanding and prediction of future climate change. Through IS- ENES, ENES promotes the development of a common distributed modeling research infrastructure in Europe to facilitate the development and exploitation of climate models and better fulfill societal needs regarding climate change issues. IS-ENES gathers 18 partners from 10 European countries and includes the 6 main European Global Climate Models. IS-ENES combines expertise in climate Earth system modeling (ESM), computational science and studies of climate change impacts.

Training **P**rograms

Among its wide range of activities, CMCC runs several training programs to improve students and researchers' scientific performances, to provide professional growth opportunities and to capitalize the motivation, energy and mindset of younger generations, which are a valuable resource for an advanced research institution.
CMCC schools are recognized for their international scope and high quality of training thanks to the collaboration with European institutions and universities and world-class experts in climate change. As a center of expertise, CMCC attracts young researchers from all over the world and provides high profile training for its students.

In 2008 CMCC started the Doctorate School in Global Change Science and Policy (ChangeS), in partnership with three Italian Universities (Ca' Foscari, Salento and Sassari), with the aim of promoting and coordinating advanced studies on climate change impacts and policy. Based at the Department of Economics of Ca' Foscari University in Venice, the School supports and organizes advanced training and research activities with emphasis on the development of innovative management strategies for both physical and socio-economic climate related phenomena.
The three universities joined the School through PhD Programs gathering 51 students in the 2009/2010 academic year, 68 students in 2010/2011, and 64 students in 2011/2012.

Summer and Winter Schools

CMCC Training Programs also include summer and winter programs for "ChangeS" PhD students as well as students enrolled in other international PhD programs on climate change.

Advanced school on Data Assimilation

June 7-11, 2010 - Bologna (Italy)

In the fields of oceanography, meteorology and climatology, Data Assimilation (DA) combines observations and models in an optimal way. Data Assimilation is mature and well developed in atmosphere studies while in the past few years it has become central in operational oceanographic systems and climatological studies of the oceans. The School described the fundamental methods and techniques used in Data Assimilation and state of the art applications. With theoretical lectures followed by practical exercises, the school covered Bayesian, variation and ensemble methods, and presented applications with operational Data Assimilation systems and climatological data analysis.

Ocean observation with remote sensing satellites

June 18-23, 2010 - Benevento (Italy)

The Summer School consisted of lectures and practicals that covered a number of different techniques for ocean remote sensing. Starting from basic theoretical considerations, students were introduced to application contexts and eventually to some quantitative considerations. The school was expected to give participants full awareness on advanced satellite techniques and their impact on the understanding and modeling of climate change. Major topics covered by the School were: Satellite oceanography, Open-ocean and coastal altimetry, Ocean microwave scattering and simulation, Ocean salinity measurements, Microwave ocean monitoring, Satellite data assimilation in ocean models.

WAVACS-COST Winter School

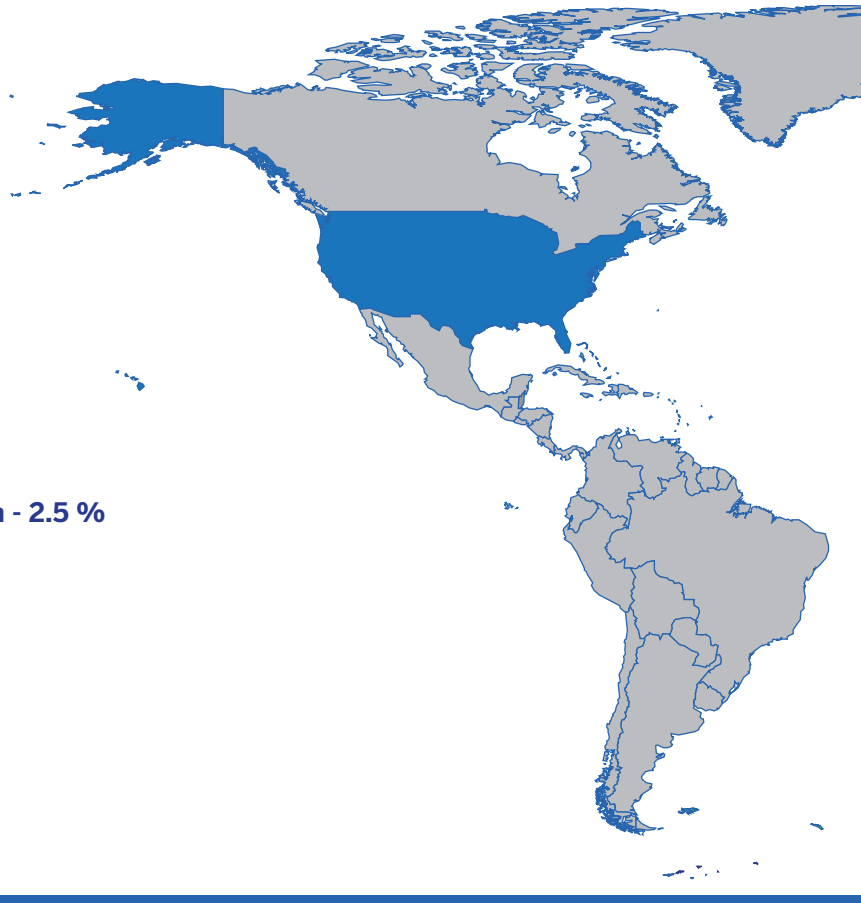
February 6-12, 2011 - Venice

The Water Vapor in the Climate System (WAVACS) COST Winter School provided a detailed view of atmospheric water vapor and its role in the climate system. The course has a practical component focusing on observations models and methods. This one-week class was addressed primarily to PhD students, postdocs, and other young scientists with the desire to broaden and deepen their knowledge or to identify new research opportunities. The winter school was a follow-up of the Cargese International School. The course included lectures, practical sessions and group activities on pedagogical exercises addressing open issues in current research. Poster sessions animated by students and two Science Cafes were held to promote a discussion among the participants.

Communication and Public Opinion

During the past few years, the issue of climate change has become a hot topic in the assessment of decision-makers and among the public. While the connections between climate change and environmental and socio-economic systems become increasingly obvious, scientists are called upon to improve communication skills to present the research to those outside of the scientific community.

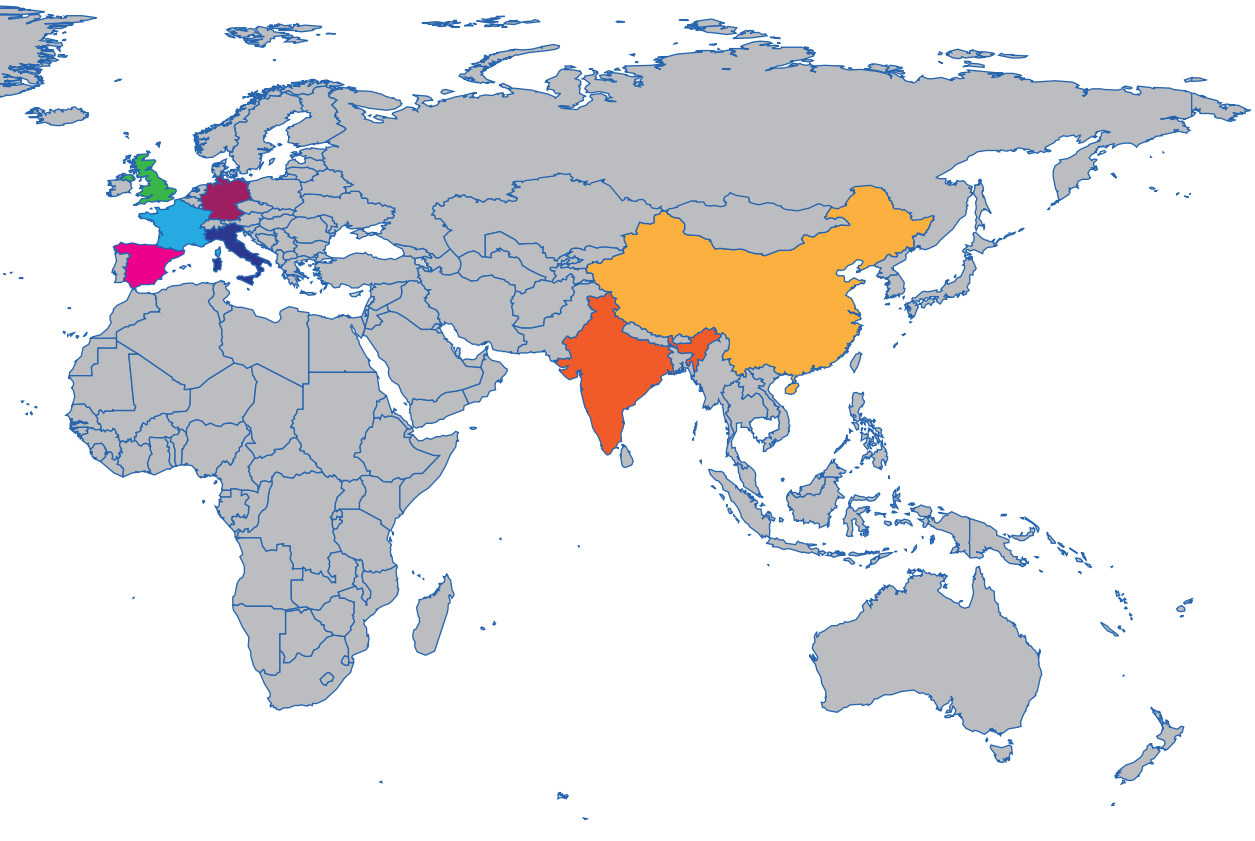
www.cmcc.it
visitors by country



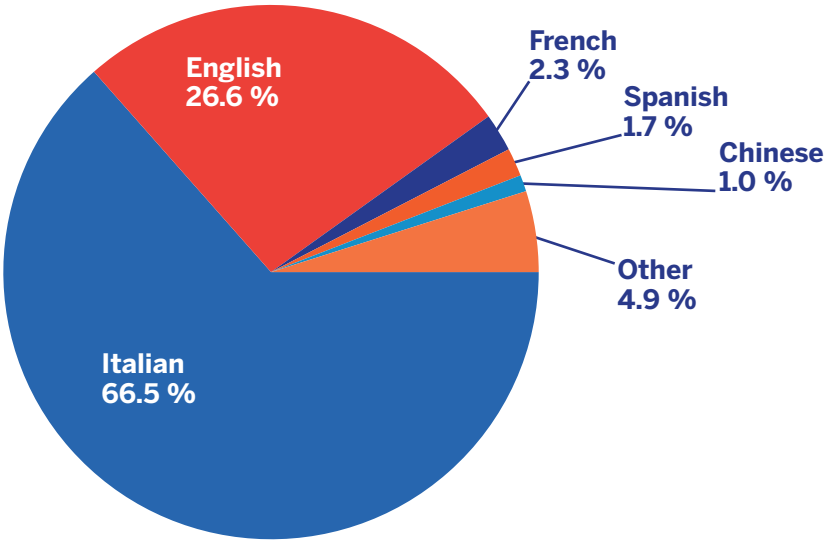
- **Italy - 73 %**
- **USA - 3.5 %**
- **France - 3 %**
- **United Kingdom - 2.5 %**
- **Germany - 2 %**
- **Spain - 1.5 %**
- **India - 1 %**
- **China - 1 %**
- **Others - 12.5 %**

www.cmcc.it

The CMCC website is designed to disseminate and draw attention to the scientific activities of the Center and attract a varied audience including scientists, scholars, and climate experts as well as the general public. The Center's webpages provide the public with a reliable source of content on climate research and cover popular topics in the international debate on climate science and policy.



www.cmcc.it
visitors by language



CMCC on the media

In the last three years CMCC gained relevant press coverage in traditional media. When climate issues become a part of the public agenda, journalists and the media contact CMCC for their professional opinion. The press review is available on the website (www.cmcc.it/area-stampa/rassegna-stampa). In 2010/2011, CMCC was quoted more than four hundreds times in articles, interviews, or op-eds.

TEC A blog on the changing climate

The TEC blog constitutes the most interactive session of the website, where CMCC editors post climate research news and focus on the topics that are currently shaping the international debate on the communication of climate change. The blog is updated almost daily with contents providing information on recent publications, events and debates.

facebook

www.facebook.com/pages/CMCC-Climate/339966276040228

twitter

@cmccclimate

ClimateScience&Policy

Climate Science & Policy is a digital magazine published by CMCC with contributions from international experts on climate science, politics and economics. The magazine offers trustworthy opinions and updated information, providing the readers with an in-depth and multidisciplinary perspective through articles, editorials, and interviews. The articles are intended to reach non-expert readers.
www.climatescienceandpolicy.eu

The future is now
These are the big global imbalances: excess of consumption on the one hand, excess of saving on the other hand, and a financial market connecting the two. Thanks to these global imbalances, financial deregulations and monetary policies, a strong interdependence developed not only among regions of the world, but also among generations because we were postponing problems to the future. And that future is now. (...) I believe that if you go into the deepest theoretical structure of the problem you will discover plenty of parallels between the financial crisis and the environmental crisis. Now it is up to environmental economists to speak up and explain to the policy-maker and to the general public that sustainability is really a serious matter.

From **Environment and Finance: Lessons to be Learnt** by Domenico Siniscalco, Morgan Stanley International - January 19, 2010

Politics and Science: their roles and functions are completely different
Science in its post-normal stage relies on its consistence with cultural constructs. Knowledge claims are not only raised by recognized scientists, but also by other experts serving specific interests. Climate research is presently in a post-normal state. (...) It is imperative that sustainability be restored; the most important element in this process is to restore the different functions of "politics" and "science". It is the task of politics to arrive at decisions which have comprehensible and normatively acceptable consequences; science, however, must explain interconnections, independent of normative systems. Politics must not hide behind would-be scientific necessities (...). Science must not be guided by the political usefulness of its statements. Politics and science may co-operate well as a team, but their roles and functions are completely different.

From **Knowledge Claims in A Post-Normal Stage: Thoughts on Climate Science and Policy** by Hans von Storch, Institute for Coastal Research - GKSS Research Centre, and Nico Stehr, Zeppelin University - July 6, 2010

Have you ever thought of global warming as an opportunity?
What is the appropriate balance between our responsibilities towards future generations, and our obligations towards those suffering today? To Africans, this is the central dilemma of global warming, one on which the rich and the poor have different perspectives. The wealthy emphasize imminent environmental disasters, and "adaptation and mitigation" policies. From an African perspective, this approach sends our children (...) the unfortunate message that their inheritance will be environmental disasters, and advice on how to cope. We owe our children, not messages of gloom and doom, but promises of a better and brighter future. Africans are therefore obliged to regard global warming, not as a threat, but as an opportunity to address a host of urgent problems.

From **An African Perspective on Global Warming** by S. George Philander, African Center for Climate and Earth System Science - April 29, 2010

The Great Warming. Lessons from the ancient climate change
The lessons from the past give us clues to what we should look to for the future. Archaeology is the study of ancient societies over long periods of time, not only hundreds or thousands of years, but even millions of years, and we can give a long-term perspective to the study of humanity. Anthropology studies modern and living societies. If you combine the long-term view with the view of today, you get a unique picture of how humans have adapted to ancient Climate Change.

From **Discovering the Great Warming: lessons from the ancient Earth**, video interview to Brian Fagan, Archeologist - March 2, 2010

Coal and CCS, two big issues in the low carbon energy portfolio
Fukushima has a strong impact on the European policy and I am quite convinced that in the end it will have a strong impact on the global energy policy. (...) From my point of view, in the global scale, the big issue in the future will be coal because it is relatively cheap, it is abundant and many countries will then substitute their nuclear power capacities with coal. Therefore, it is absolutely crucial for an ambitious climate policy, that we have Carbon Capture and Storage technologies available. I know that CCS is not available now at the commercial level and we have only a few pilot plans. People, particularly in Europe, think that CCS is not an important part of the mitigation portfolio. I think it is an almost inevitable part because coal remains the most important issue.

From **Nuclear Decline, Coal Renaissance**, interview to Ottmar Edenhofer - IPCC Working Group III, Potsdam Institute for Climate Impact Research (PIK) - May 19, 2011

Financial Report

BALANCE SHEET: ASSETS	2011	2010
A) Receivables from shareholders for contributions due	-	-
B) Fixed assets	**4,050,770**	**6,248,217**
I. Intangible fixed assets	27,388	179
II. Tangible fixed assets	4,007,815	6,235,971
III. Financial assets	15,567	12,067
C) Current Assets	**29,750,587**	**23,783,553**
I. Inventories (Work In Progress - WIP)	25,693,622	20,506,650
II. Receivables	464,129	598,200
III. Current financial assets	2,000,000	2,000,000
IV. Cash at hand	1,592,836	678,703
D) Prepayments and accrued income	**486,314**	**35,336**
TOTAL ASSETS	**34,287,671**	**30,067,106**

BALANCE SHEET: LIABILITIES	2011	2010
A) Net Liabilities	**117.770**	**111.034**
Capital	100,000	100,000
Reserve Funds	11,035	9,769
Profit for the year	6,735	1,265
B) Provisions for risks and charges	-	-
C) Employee Severance indemnities	**53,450**	**39,966**
D) Payments from Clients	**32,572,438**	**29,120,808**
E) Accruals and deferred charges	**1,544,013**	**795,298**
TOTAL LIABILITIES	**34,287,671**	**30,067,106**

PROFIT AND LOSS	2011	2010
A) Revenues	**9,072,825**	**8,049,120**
Revenues from sales and services	39,500	55,777
Variations in stocks (WIP)	5,186,972	6,549,608
Other revenues	3,846,353	1,443,735
B) Expenses	**9,009,506**	**7,990,922**
Consumable	70,598	15,474
Services	5,706,925	4,742,590
Leases	215,585	176,442
Personnel	342,104	287,083
Depreciation	2,561,214	2,721,927
Other Operating Expenses	113,080	47,406
Difference between revenues and expenses (A-B)	**63,319**	**58,198**
C) Financial income and charges	**3,275**	**-3,193**
D) Impairment on financial assets	**-**	**-**
E) Extraordinary income and charges	**1,002**	**351**
Results before taxes (A-B±C±D±E)	**67,596**	**55,356**
Income tax expenses- current and deferred		
a) Current taxes	60,861	54,091
Profit (loss) for the year	**6,735**	**1,265**

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