cmcc
Centro Euro-Mediterraneo
sui Cambiamenti Climatici

ANNUAL REPORT 2012

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INDEX

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 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.

THE GLOBAL COMPACT

WE SUPPORT

Since February 2012, CMCC participates in Global Compact, the United Nations' initiative for the creation of a worldwide network of bodies, institutions and businesses companies ready to undertake commitments in the area of human rights, employment, environment and the fight against corruption.

CMCC

Science, climate and interactions with society and the ecosystems

CMCC (Centro Euro-Mediterraneo sui Cambiamenti Climatici: Euro-Mediterranean Center on Climate Change) is a research organization that conducts and promotes scientific and applied activities within the scope of international climate change research. CMCC aims to gain in-depth knowledge on climate variability, its causes and its consequences, through the development of high-resolution simulations using global models of the Earth System as well as regional models, focusing in particular on the Mediterranean area.
The specific objective of these research studies is to provide scientifically reliable, rigorous and updated results that will help to investigate, know and represent the interactions between the climate system, the marine and terrestrial ecosystems, and society.

The Center is organized in the form of a network distributed throughout the country with locations in Lecce, Bologna, Capua, Milan, Sassari, Venice, Viterbo and Benevento, which involves and connects public and private entities working together on multidisciplinary studies concerning issues of interest to the climate sciences.

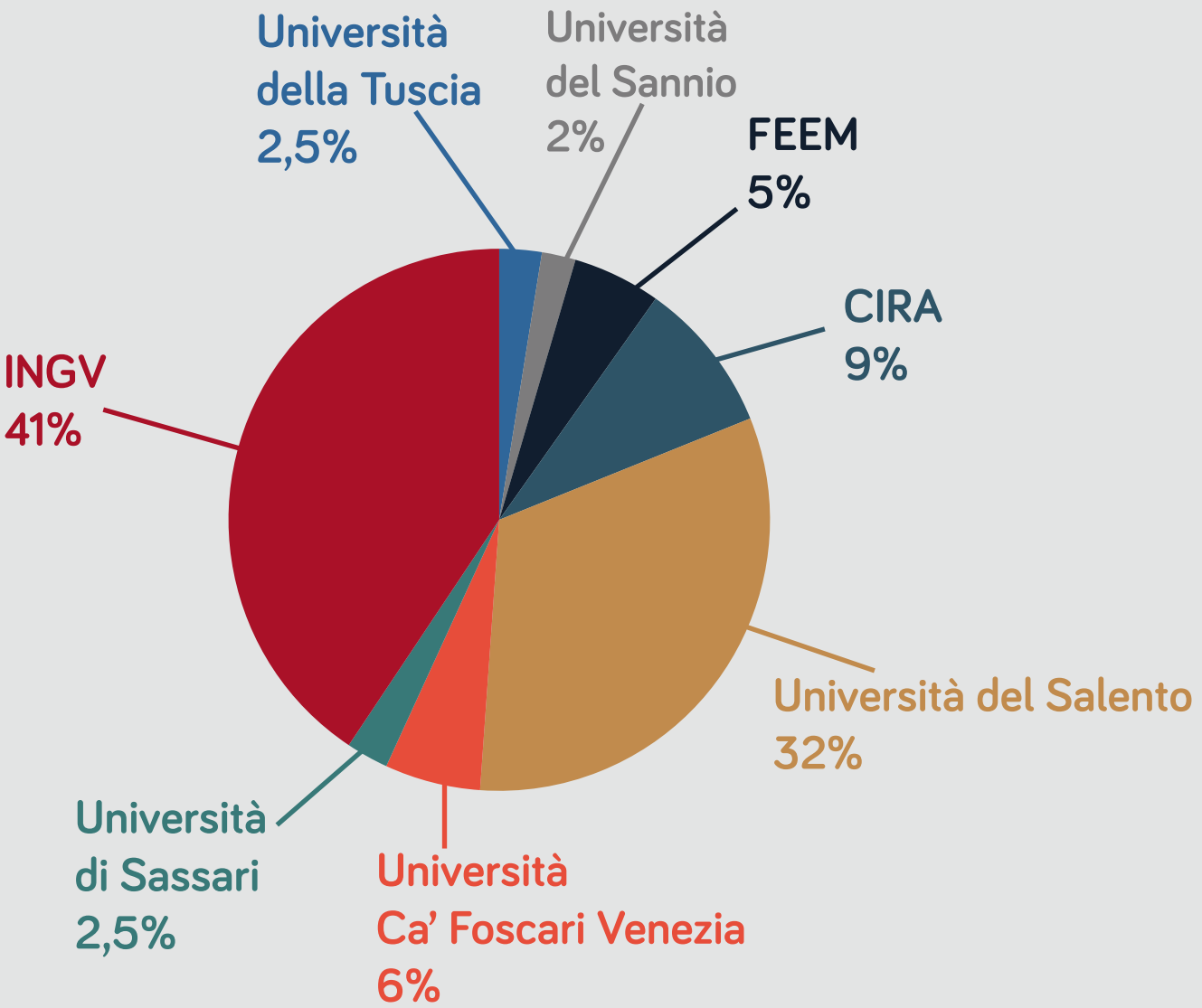
CMCC was created in 2005 with the financial support of the Ministry of Education, University and Research (Ministero dell'Istruzione, dell'Università e della Ricerca - MIUR), the Ministry of the Environment, Land and Sea (Ministero dell'Ambiente e della Tutela del Territorio e del Mare - MATTM), the Ministry for Agricultural and Forestry Policies (Ministero delle Politiche Agricole e Forestali - MIPAF) and the Ministry of Finance (Ministero delle Finanze - MEF). It is a non-profit research center that acts as an institutional reference point, both at national and at international level, for policy decision makers, public bodies as well as public and private entities, whenever they require technical-scientific support.

GOVERNANCE

The Center's research lines and activities are implemented through the active involvement of the CMCC's consortium members and through the sharing of their internal resources.

CMCC relies on the extensive and established research experience of the eight consortium members.

CMCC Shareholders



The general meeting of Shareholders appoints:

- the **Board of Directors (Board)**, with ordinary and extraordinary management powers, which has a three-year term of office and is composed of 11 members;
- **the Executive Committee**, to which the Board delegates technical and financial matters

The **Scientific Advisory Panel (SAP)** is appointed by the Board and is made up of highly qualified experts selected among the international scientific and academic community. The SAP has a three-year term of office and provides advice on CMCC's research activities, strategic plan and organization, as well as support on specific matters raised by the Chairman of the Board.

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
Dr. 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

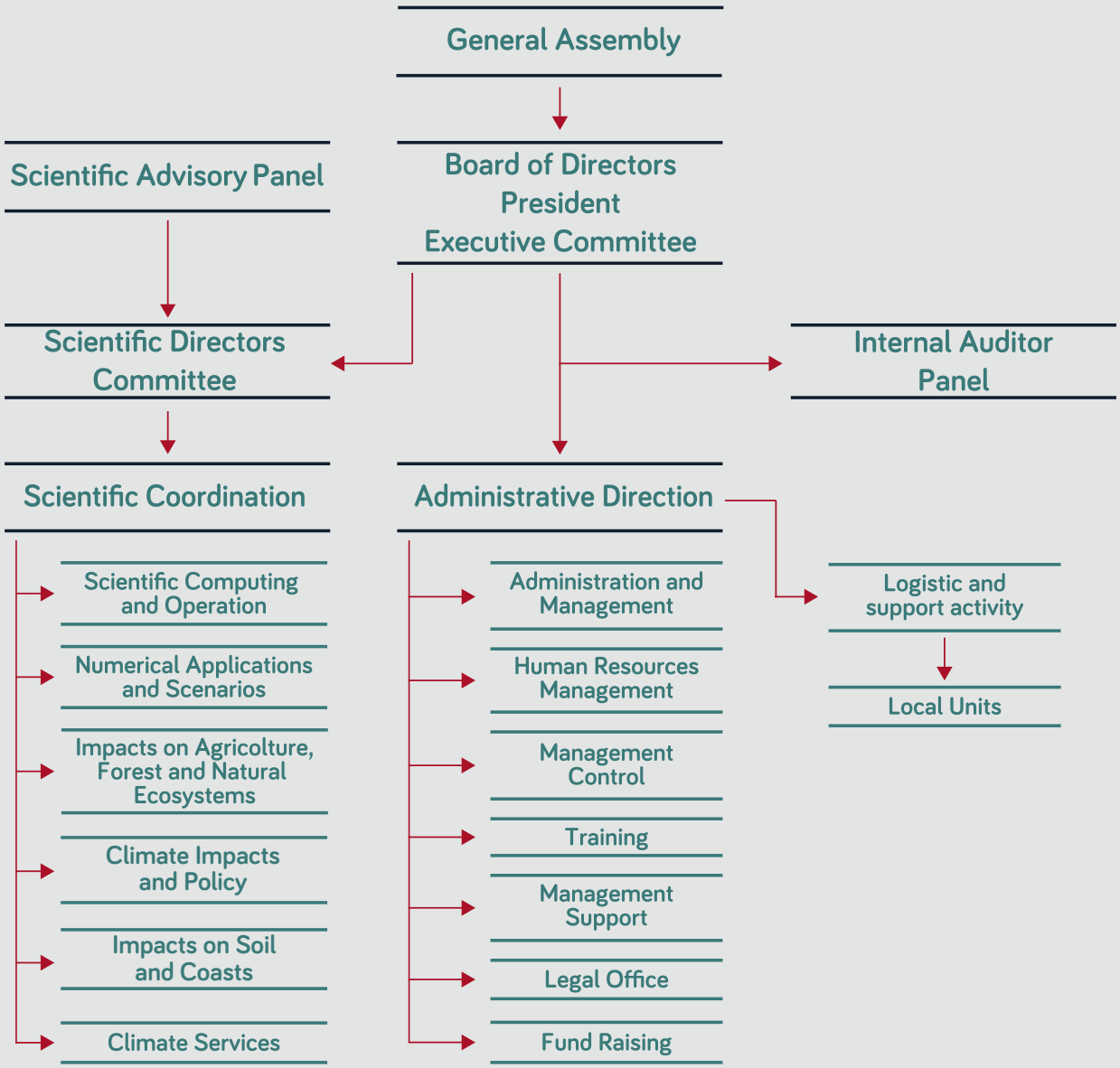
Dr. Paul Messina	Argonne Leadership Computing Facility, Argonne
Dr. Nadim Farrokh	International Centre for Geohazards, Oslo
Dr. Ghassem Asrar	World Climate Research Programme, World Meteorological Organization, Geneva
Dr. Ottmar Edenhofer	Potsdam Institute for Climate Impact Research, Potsdam
Dr. Giulio Boccaletti	The Nature Conservancy, 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

UNI EN ISO 13485:2004
CERTIQUALITY
SISTEMA DI GESTIONE QUALITÀ CERTIFICATO

CMCC has obtained the Certiquality and IQNet certifications, attesting that the Center meets the UNI EN ISO 9001:2008 Quality Management System standards.


General Assembly
Scientific Advisory Panel
Board of Directors
President
Executive Committee
Scientific Directors Committee
Internal Auditor Panel
Scientific Coordination
Administrative Direction
Scientific Computing and Operation
Numerical Applications and Scenarios
Impacts on Agricolture, Forest and Natural Ecosystems
Climate Impacts and Policy
Impacts on Soil and Coasts
Climate Services
Administration and Management
Human Resources Management
Management Control
Training
Management Support
Legal Office
Fund Raising
Logistic and support activity
Local Units

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.

Ocean Lab

The Ocean Lab (Operational Coastal Oceanography Laboratory) was created in 2012 in Lecce. The Laboratory is part of the activities of the ANS Division, and houses a team of scientists who use advanced technologies applied to the study of coastal seas and the development of tools for supporting the activities performed at sea. Inaugurated concomitantly with the launch of the projects IONIO (IONian Integrated marine Observatory) and Tessa (TEchnologies for Situational Sea Awareness), the Ocean Lab performs activities that combine applied technological, engineering and scientific components to areas of intervention including, among others, prevention and control of pollution, sustainable fishing, and transport safety. The work carried out at the Ocean Lab generates products and services such as, for example, the development and production of short term ocean forecasts, models and applications in the field of maritime safety (i.e. oil spill modelling and decision support system development), coastal modelling (i.e. sediment transport) and climate impacts assessment in the coastal area.

Climate risks for soil and coasts

The **Impacts on Soil and Coasts (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.

Translating climate change in policy and in economic values

The **Climate Impacts and Policy (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.

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).

IPCC Focal Point

Since August 2006, the Euro-Mediterranean Center on Climate Change hosts the IPCC Focal Point for Italy.
The National IPCC Focal Point participates in the plenary sessions and meetings of IPCC, represents the IPCC in Italy, and carries out communication and education activities concerning IPCC activities.

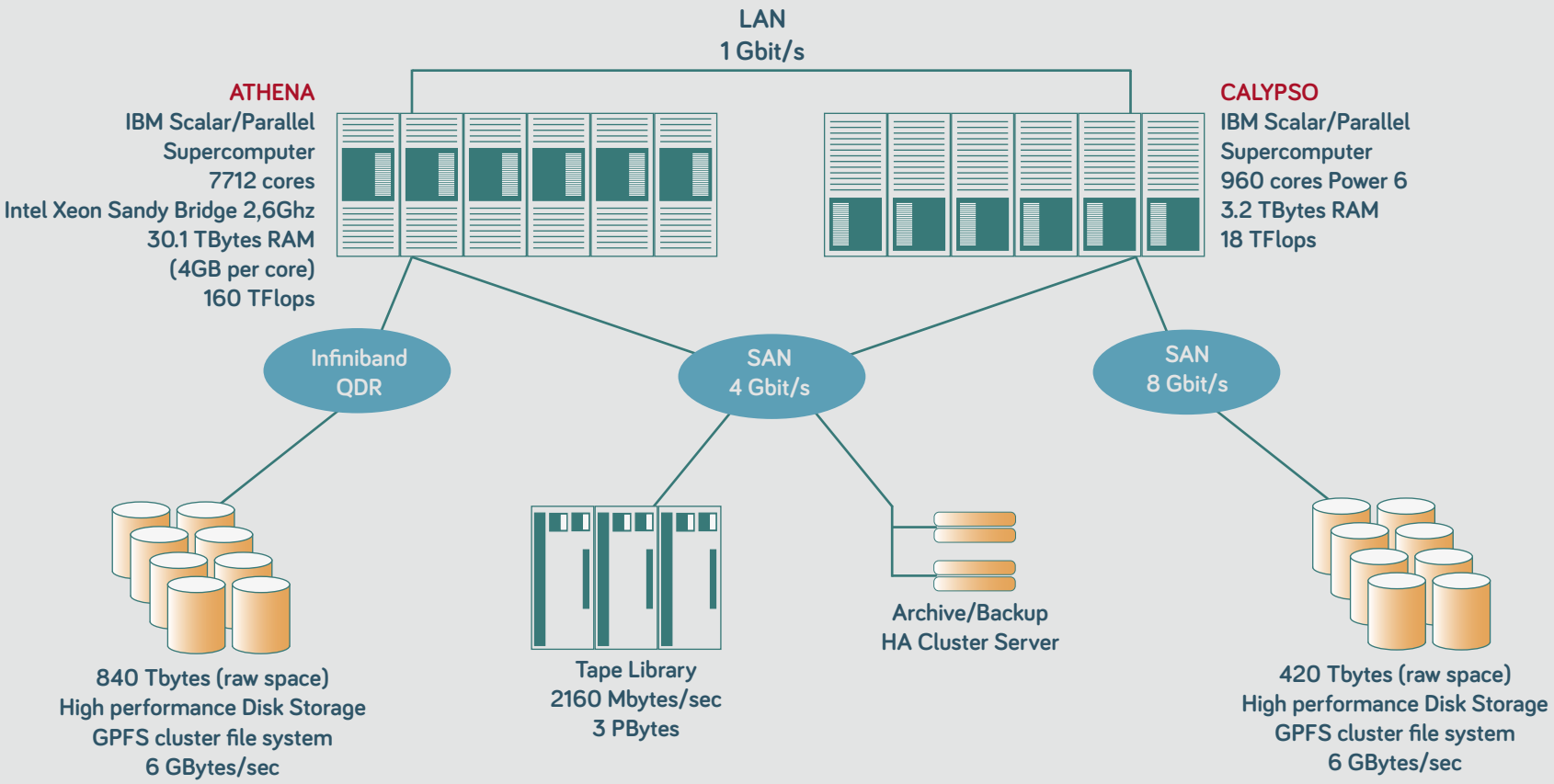
The activities of the IPCC FOCAL POINT for Italy include:

- collection of information and documentation on national technical and scientific activities related to the issues dealt with by the IPCC: climate science and climate changes (observations, models, vulnerability studies, impact estimates, adaptation and mitigation measures);
- nationwide dissemination of the IPCC's activities and results through the website, meetings, conferences and dedicated workshops;
- identification and designation of experts or national representatives at meetings, workshops and plenary sessions of IPCC and the related work groups;
- reporting to IPCC on the major activities carried out throughout the country.

CMCC's Supercomputing Center: the technological heart in the global Top 500

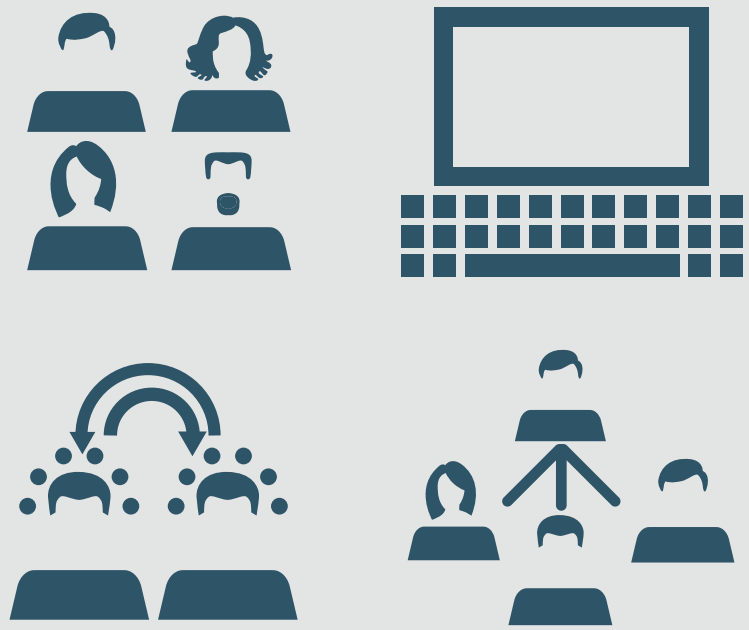
The core of the technological infrastructure that allows CMCC to design and develop scenarios and models on the future of the climate is located in Lecce. Specifically, the Ecotekne complex houses the Supercomputing Center, whose next-generation computers are used by one of the main structures in Europe, as documented by the ranking of the 500 most powerful supercomputers in the world.
Scientific computing is a very important part of climate research, requiring increasingly complex computational capabilities and powerful machines to develop simulations and models able to provide more accurate, detailed and better defined results. This is why the CMCC's Supercomputing Center has recently renovated its infrastructure, strengthening its computing and data storage capabilities.
A new next-generation IBM iDataplex supercomputer based on Intel E5-2670 multicore architecture and InfiniBand interconnection has been added along with the scalar system composed of IBM nodes based on Power6 processors.
Currently, thanks to the use of highly advanced technologies, the CMCC's Supercomputing Center has a computing capability of over 160 TFlops (160,000 billion operations per second).
The new system is integrated with two DDN sfa10000 storage subsystems in cluster architectures with an IBM GPFS file system to allow efficient and reliable access to data. The design of the computing architecture, comprised of the IBM dx360M4 server cluster, the InfiniBand interconnection network and the storage subsystem, accelerates research activities and improves the quality of research activities for the development of future climate change scenarios and impacts: from the economy to agriculture, from coastline profiling to marine and terrestrial ecosystems, from the hydrogeological cycle to health.

The CMCC's supercomputing infrastructure



PEOPLE

At CMCC, people are an essential resource that provides and ensures the quality of scientific research, the effective performance of administrative and organizational activities, and the maintenance and development of technological structures and equipment. Therefore, CMCC's main goal is to make the most of the potential and talents of those who work for the Center; the latter is committed to developing and increasing the skills and knowledge of its employees in their respective areas, in order to achieve research objectives as well as to enrich the global community.
Because of the Center's structure and the type of activities it carries out, individual abilities must promote cooperation within work groups, where the skills of each member contribute to team work and integration. A proactive and flexible spirit is encouraged by initiatives that include advanced training, brainstorming and group activities.
The interdisciplinary approach that characterizes the CMCC's work requires, and at the same time contributes to, the creation of specializations that are not easily available in the external market, and their growing value induces the Center to make increasing investments in the quality of the processes related to the management of human resources.

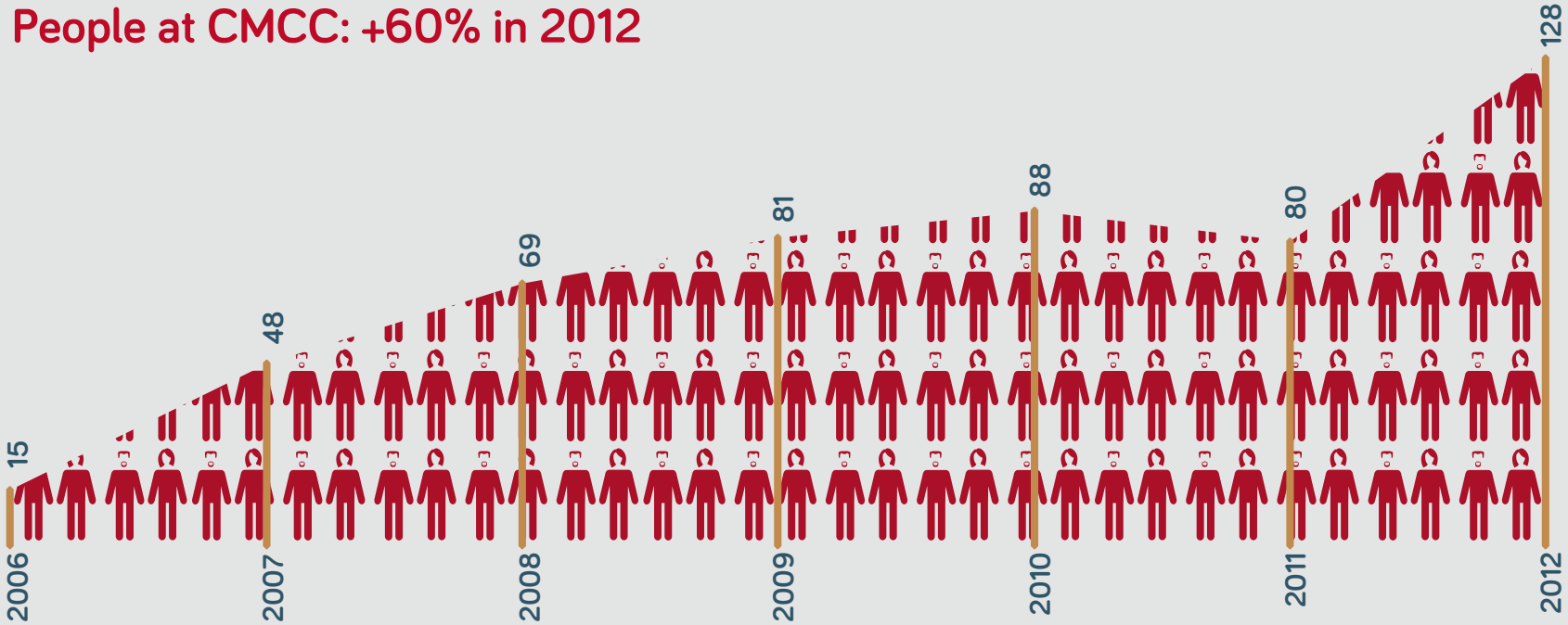


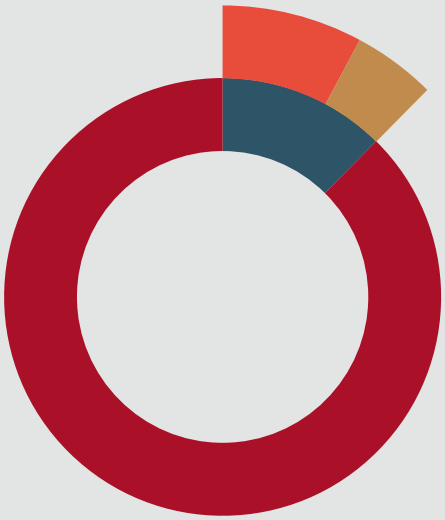
In 2012, new practices were introduced (also thanks to the UNI EN ISO 9001:2008 certification) to document personnel training and education, with an increasing focus on the need to ensure that the skills of personnel, including administrative personnel, meet the required service standards.
The Recruitment and Selection Process has also undergone a thorough revision as a result of the Center's increasing requirements. The growth of CMCC's image in the external market is confirmed by the increasing number and high quality of the applications received from all over the world. The approval and development of the JAM - Job Application Manager, an online tool that allows applicants to submit their CV through the Center's website, will allow for a more efficient management of the numerous CVs received and the processing of the relevant data so as to make them available to the entire organization.
As with most research centers, the proportion of non-permanent staff is higher than that of employees. However, the level of specialization achieved by our researchers has led the CMCC's young organization to put in place its first retention policies. In 2012, the Center signed the first permanent employment contracts of scientific personnel. These contracts concerned researchers involved in the coordination of work teams engaged in specific research lines, and respond to the need to retain skills that have become crucially important to the Center.

	2012			2011		
	Total	Male	Female	Total	Male	Female
	128	68	60	80	38	42
CMCC staff						
CMCC permanent staff	10	3	7	8	3	5
Permanent staff from partner institutions	6	3	3	6	3	3
Other	112	62	50	62	32	34
Area						
Administration, management and communication	31	10	21	22	8	14
Scientific / technical	97	58	39	58	30	28
Age						
Under 30	25	9	16	13	3	10
31 - 40	68	38	30	43	22	21
41 - 50	22	12	10	17	9	8
Over 50	13	9	4	7	4	3
Nationality						
Italian	112	58	54	69	31	38
UE – non Italian	8	5	3	6	3	3
Extra - UE	8	5	3	5	4	1
Position						
Senior	32	20	12	22	14	8
Junior	96	48	48	58	24	34

In order to perform an analysis of human resources and the breakdown of CMCC's personnel, it is necessary to take into consideration many different types of contracts. Therefore, for a consistent reporting of the number of people employed in the CMCC's activities, human resources data are provided in full-time equivalent (FTE).

People at CMCC: +60% in 2012





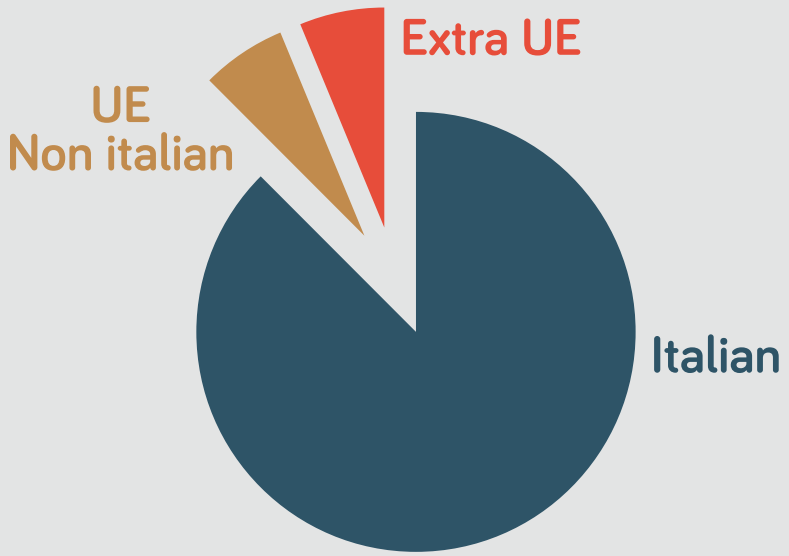
Permanent Staff

7,8%
CMCC

4,6%
From partner institutions

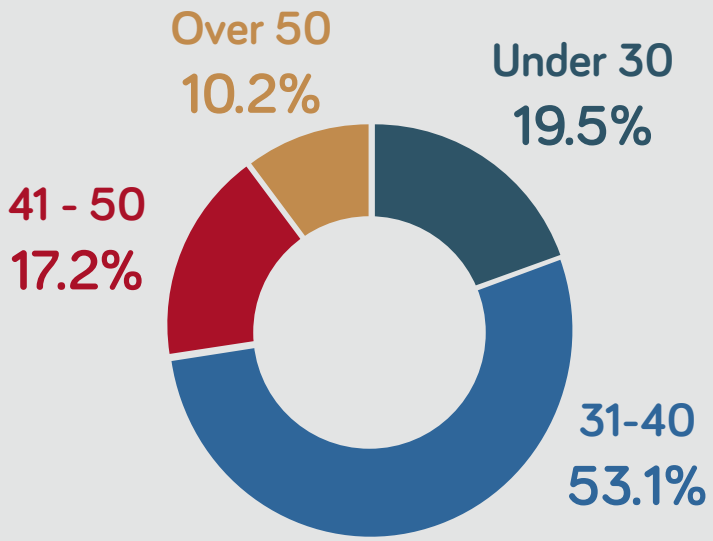
87,6%
Non permanent

Geografical Distribution



The number of people who worked for CMCC in 2012 was equal to 128 man-year.
The figures confirm a growth in personnel, which has characterized CMCC from 2009 to the present, showing an increase in its workforce in parallel with its project portfolio.
The presence of people from foreign countries, including non-EU States, expands the Center's international footprint. CMCC pursues the aim to create an inclusive work environment, open to diversity of all types, which promotes a positive exchange of ideas, perspectives and input for the entire workforce.
Data confirm that CMCC is a research institution highly focused on the development of the young generations, with nearly 75% of its personnel under the age of 40 (vs 70% in 2011).
An analysis of all the people who worked for CMCC in 2012 shows that the largest proportion consists of researchers, and almost half (46,6%) has earned a PhD.

Age distribution



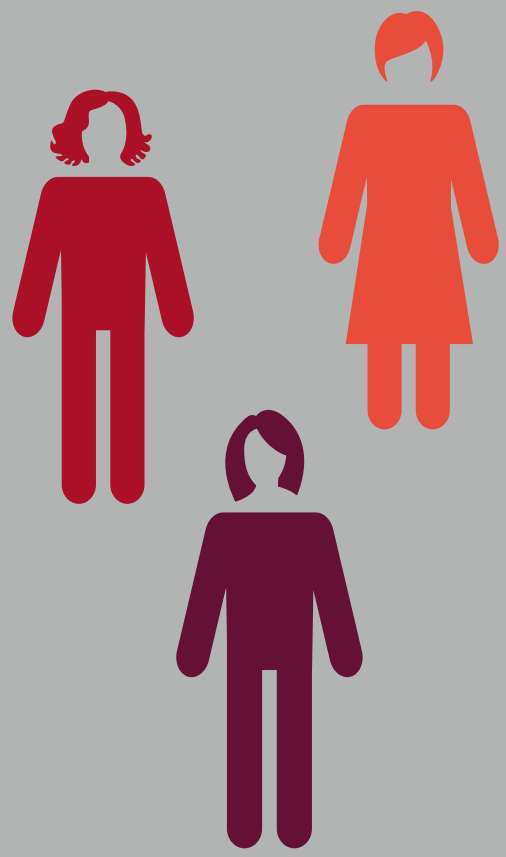
Women at CMCC

The percentage of women declined slightly (46.9% vs. 52.5% in 2011), but the gender ratio remains substantially balanced compared to the previous year. An in-depth analysis of the gender balance shows that the presence of women has increased slightly among senior scientists (37.5% vs. 36.4%) and decreased across the higher education levels (36.3% vs. 43.3%). For all other categories examined by the human resources analysis, the gender ratios have remained substantially unchanged.

46.9% of people working at CMCC

37.5% of senior scientists

36.3% of people with PhD



RESEARCH PROJECTS

Research and the development of scientific projects have been the CMCC's core activities since it was established.

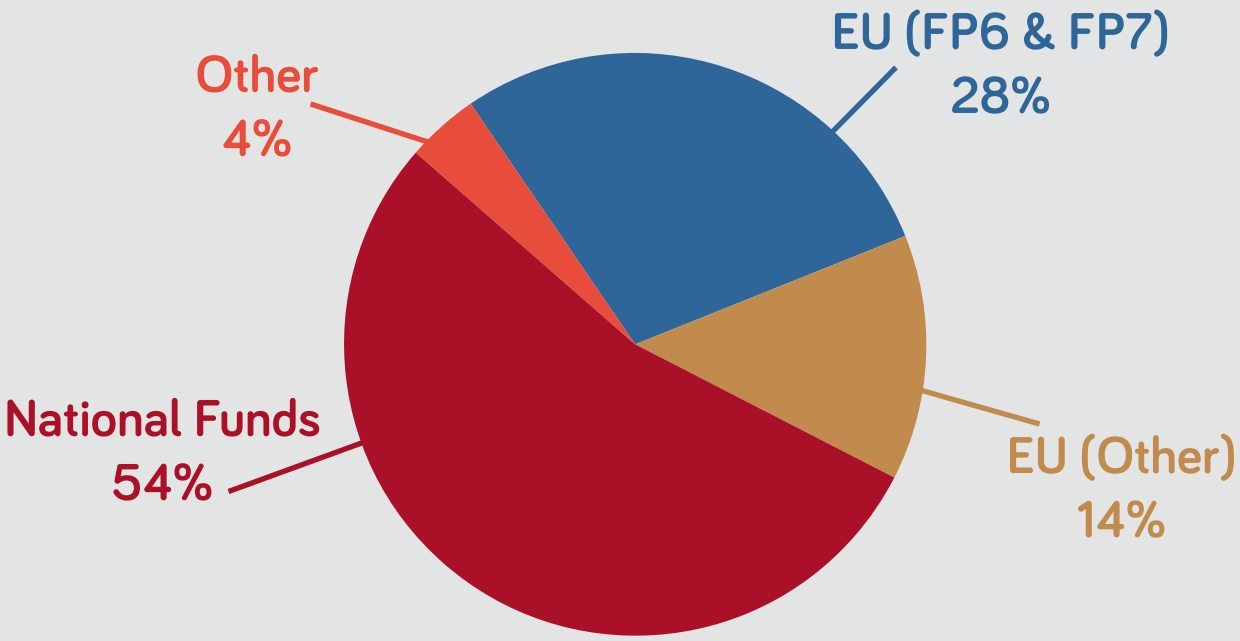
At 31 December 2012, CMCC's project portfolio consists of 82 projects, 41 of which are coordinated by CMCC, with a total turnover amounting to € 36,900,428.

These funds are over and above the initial financing granted by: the Italian Ministry of the Environment, Land and Sea, the Ministry of Education, University and Research, the Ministry for Agricultural and Forestry Policies and the Ministry of Finance.

ORIGIN OF FUNDING	TOTAL	COORDINATED	ONGOING	CLOSED
EU FP6 & FP7	26	4	21	5
Other European funds	19	10	7	12
National funds	19	13	6	13
Other	18	14	4	14

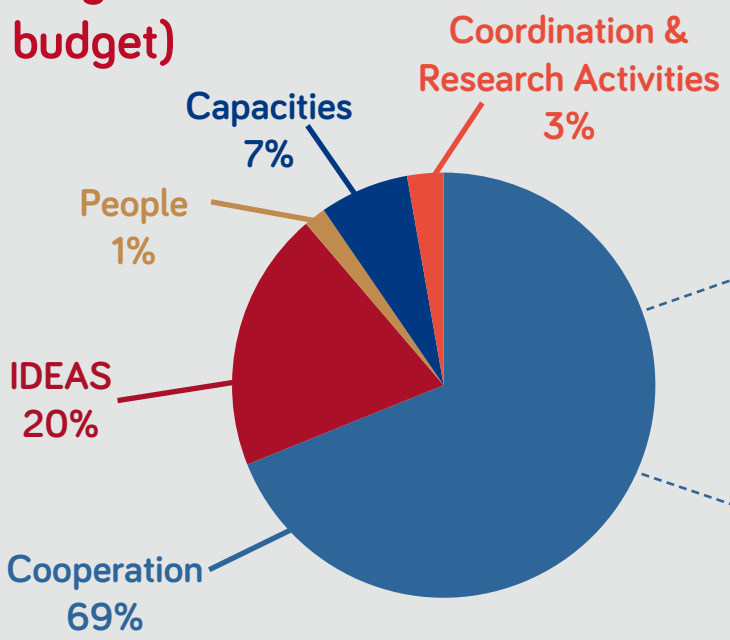
A national leader in scientific research on climate change, today CMCC is a top player in Europe, with a virtually equal proportion of domestic and international financers. In particular, 42% of acquired projects is due to CMCC's ability to compete successfully at European level.

Origin of projects funding (per budget)

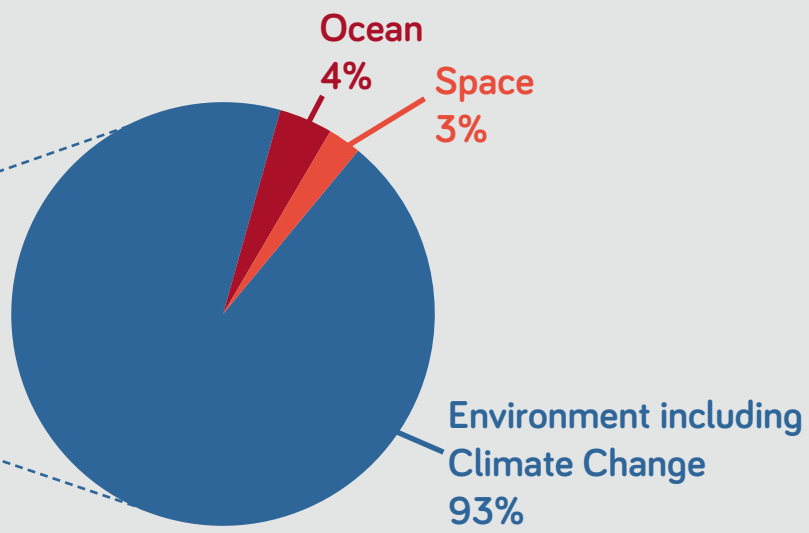


Specifically, the CMCC's portfolio includes projects financed by the 7th Framework Programme for Research and Technological Development 2007-2013, which will be completed in 2013 with consolidated results as part of the 'Environment including climate change' theme of the "Cooperation" Programme.

FP7 Programs (per budget)

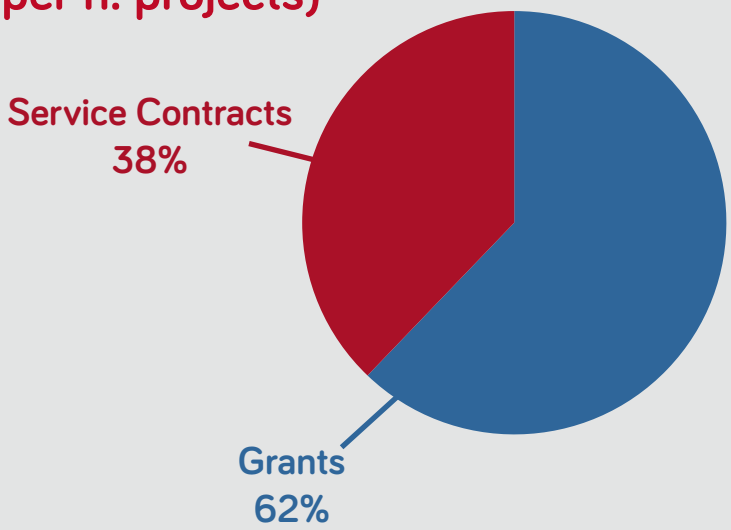


FP7 COOPERATION Program (per budget)

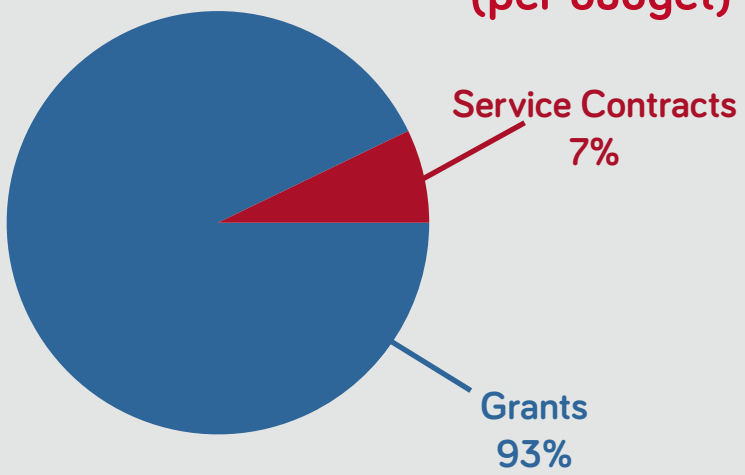


Although most of the CMCC's project portfolio (more than 90% of the budget) comes from research project grants, CMCC also provides studies and analyses in the environmental area in support of the community, stakeholders and policy decision makers; these activities, funded through service contracts, testify a growing ability to acquire such resources over time.

Type of funding (per n. projects)



Type of funding (per budget)

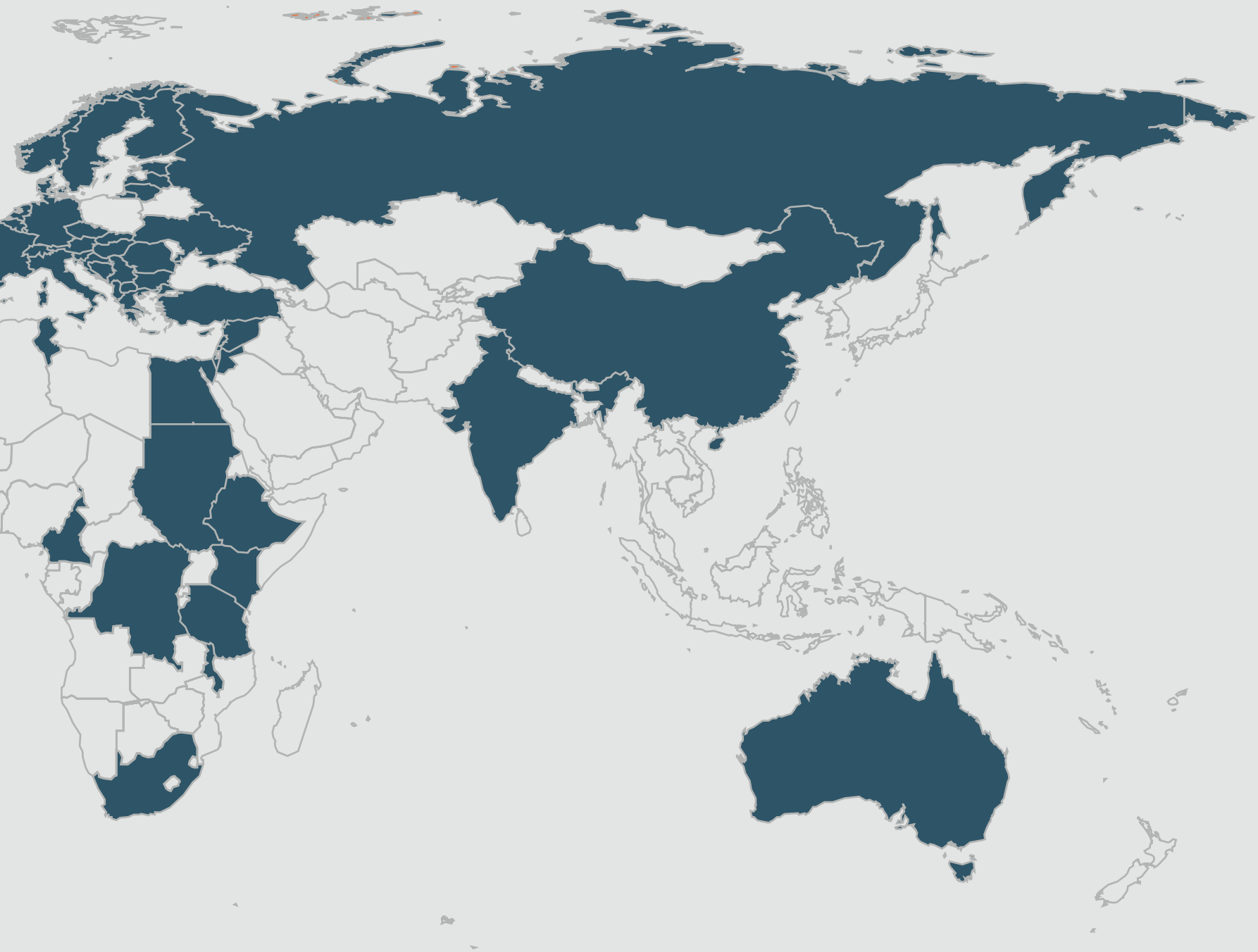


Since its inception, CMCC has played an active role in the international climate change research arena and provided assistance to public decision-makers and international institutions. The Center has entered into partnership agreements with some of the most authoritative climate science research centers, with which it has conducted international research projects for years.

CMCC in the global Think Tank ranking

The Global Go To Think Tank Report is an initiative of the University of Pennsylvania Think Tanks and Civil Societies Program, which analyzes the activities of thousands of think tanks and, with the help of specialists, teachers, journalists, public and private institutions, draws up a ranking that highlights the work performed by these entities in support of policy decision makers and society.
According to the 2012 edition, the Euro-Mediterranean Center on Climate Change is one of the leading organizations in the world and a major one in Italy. In particular, CMCC is one of the Top 100 world organizations (excluding the United States) and among the top 150 in the global ranking.

CMCC collaborates with **centers** and **institutions** based in more than **70 countries**



Oceans: monitoring and forecasting data and models

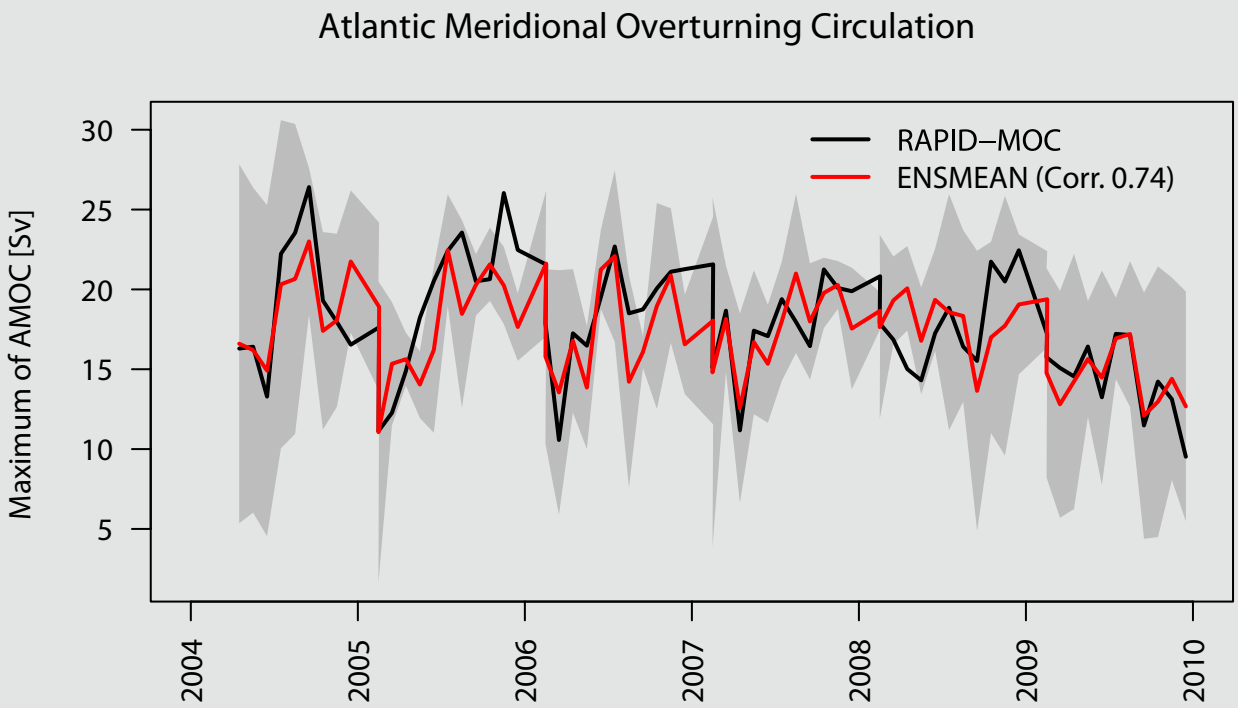
MyOcean consists of a series of projects funded by the European Commission as part of the 7th Framework Programme for European Research and Technological Development, with the objective to design and set up a system for sea forecasting and monitoring at pan-European level.
The diverse activities around which the project revolves include: safety at sea, prevention of spills of polluting substances, marine resource management, climate change, seasonal forecasts, coastal activities, ice analysis and quality of water resources. The first MyOcean project, now continuing with MyOcean2, started in January 2009 and is composed of a consortium of 60 partners from 28 countries (the 22 EU member States bordering the sea, plus 6 non-EU countries).
The products generated by the MyOcean project are available to all agencies, bodies and institutions with a view to bringing added value to their respective operating systems or to contribute to their research and development programmes. The Oceans and European seas are monitored using leading edge equipment which use information received through satellite systems and on-site measurements, which are then processed in 3D models to represent the physical characteristics, ice and oceanic ecosystems with references to the last 25 years and projections for the next 1-2 weeks.
Observations, model-based data and advanced products are obtained and implemented through the work of research centers dedicated to the observation, analysis and forecasts of global oceans, the Arctic region, the Baltic Sea, the northwestern regions of the Atlantic, the Atlantic area delimited by the Iberian peninsula, the Gulf of Biscay and Ireland, and lastly the Black Sea and the Mediterranean.
In order to provide services and products also after the project end date (2014), MyOcean2 will set up a European structure dedicated to its activities, named ECOMF – European Center for Ocean Monitoring and Forecasting.
As part of this project, CMCC coordinates the "Multi-Year Assessment" Work Package which aims to improve, harmonize and consolidate the work done in MyOcean with respect to the production and assessment of global and regional re-analyses; another objective of the WP coordinated by CMCC is to demonstrate the operational capability of MyOcean2 in producing specific products (e.g. indicators) and services to the benefit of end users like bodies and institutions in charge of conducting environmental assessments at the regional and European level.

Project name
MyOcean2

Financed by
European Commission

Duration
30 months (04/2012 – 09/2014)

Website
www.myocean.eu



Atlantic Meridional Overturning Circulation (AMOC) calculated as maximum of the Meridional Streamfunction at 26.5N in the Atlantic Ocean for the ensemble mean of the MyOcean reanalysis products. The figure also shows observations from the RAPID-MOC array, with respect to which the mean of the MyOcean products exhibits largely significant correlation (0.74). The shaded area represents +/- 1 ensemble standard deviation, emphasizing the additional value of the MyOcean products as an ensemble of reanalyses in providing the time-varying accuracies of the data.

Urban areas as living organisms

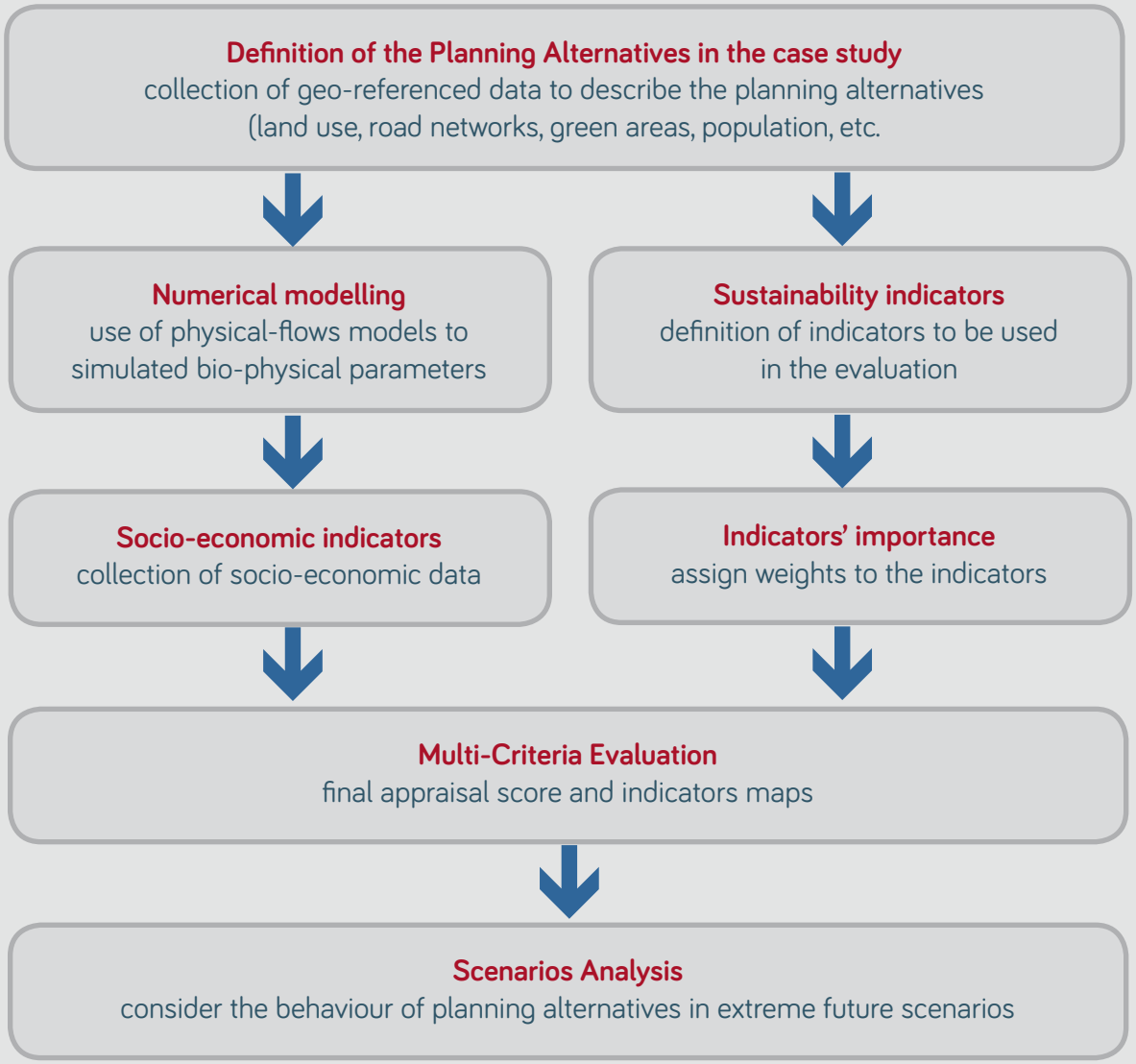
In this project, a metropolitan area and all the activities within it are viewed and analyzed as if they were a living organism that consumes matter and energy, transforms them into usable forms, and expels waste: an organism with its own metabolism. This way of studying cities could provide very useful information to those in charge of making urban planning decisions.
It was the principle underlying the BRIDGE project: considering that the city is run through by flows of carbon, polluting substances, water and energy, the project's main objective was to build a Decision Support System (DSS) to assist with urban planning decisions and with the assessment of their environmental impact.
The 14 European partners of the Bridge project (including the CMCC's IAFENT and CIP divisions) used their multidisciplinary knowledge, ranging from physics and biology to economics and social sciences, synergistically to conduct analyses of real measures and models, in order to simulate the reactions of an urban organism under certain real or hypothetical conditions, and to obtain information on the costs of the possible physical, economic, social and urban impacts caused by a shift in the flows under examination. The resulting DSS offers methods and tools for a structured evaluation of the urban metabolism processes, and provides methods for performing comparative analyses and selecting the most sustainable planning strategies, i.e. the most suitable under the current and future climate conditions.
The project focused on urban metabolism components (flows of energy, water, carbon, and pollutants) using a bottom-up approach based on: quantitative flow estimates, development of indicators and their use in the DSS to determine the environmental impact of alternative planning options, formulation of sustainable planning strategies on the basis of these evaluations.
The project's activities were carried out in five cities, or case studies (Helsinki, London, Gliwice, Florence and Athens) and also required intensive networking to coordinate the different partners, ensure consistent procedures, protocols and instruments, and analyze and discuss the results, which were presented to the stakeholders during a workshop organized in Brussels.
CMCC gave a significant contribution to the project, specifically by providing direct measurements of the flows of particulates in the city of Florence, simulations of the impact of alternative planning options and future climate scenarios on urban metabolism components in Florence and Helsinki, the creation of urban development scenarios for Florence and Athens, and the determination of sustainability indices on the basis of socioeconomic criteria.

Project name
BRIDGE – SustainaBle uRban plannIng Decision support accountinG for urban mEtabolism

Financed by
European Commission – FP7

Duration
36 months (12/2008 – 11/2011)

Website
www.bridge-fp7.eu



Flow-chart of the BRIDGE methodology (from the paper: Chrysoulakis N., Lopes M., San José R., Grimmond C. S. B. , Jones M. B. , Magluilo V., Klostermann J., Synnefa A., Mitraka Z., Castro E. A. , González A., Vogt R., Vesala T., Spano D., Pigeon G., Sustainable urban metabolism as a link between bio-physical sciences and urban planning: The BRIDGE project, 2013, Landscape and Urban Planning, Volume 112, pages 100-117)

African cities and vulnerability to climate change

Although the African continent is considered particularly vulnerable to climate change, the impacts of this change on the territory and the population have never been actually measured, especially at the local level. Climate projections in Africa are still based on low resolution global models, which are inadequate to describe phenomena that play an important role in African climate change, such as El Niño. Yet, the ability to manage the risks arising from climate changes and the availability of tools to reduce vulnerability and improve adaptation are all the more important in areas that are particularly vulnerable to such changes. These issues are the primary objective of the project named CLUVA – Climate change and Urban Vulnerability in Africa.

Specifically, the project focuses on vulnerability to the risk related to climate change in some of the main urban areas of the African continent, and in particular on the environmental, social and economic impacts of the main natural events linked to climate change such as floods, droughts, heat waves, desertification and rising sea levels.

CLUVA focuses on the need to improve the ability of local scientific institutions and public administrations to face the impacts of climate change. The project saw the participation of European experts in climate studies, risk management and urban planning, alongside their African counterparts.

Project activities include different work areas, such as climate projections using high resolution simulations, assessment of extreme events caused by climate change, construction of innovative multi-risk models, and urban planning. An important part of project activities concerns initiatives aimed at transferring skills and capacity building to operators and institutions active in the areas involved.

Special emphasis was placed on the identification of factors that make the population and infrastructure particularly vulnerable to extreme events, by developing indicators and methods for generating risk maps for the areas involved. Additionally, appropriate training was provided to students and doctorate graduates from the five African universities involved in the project.

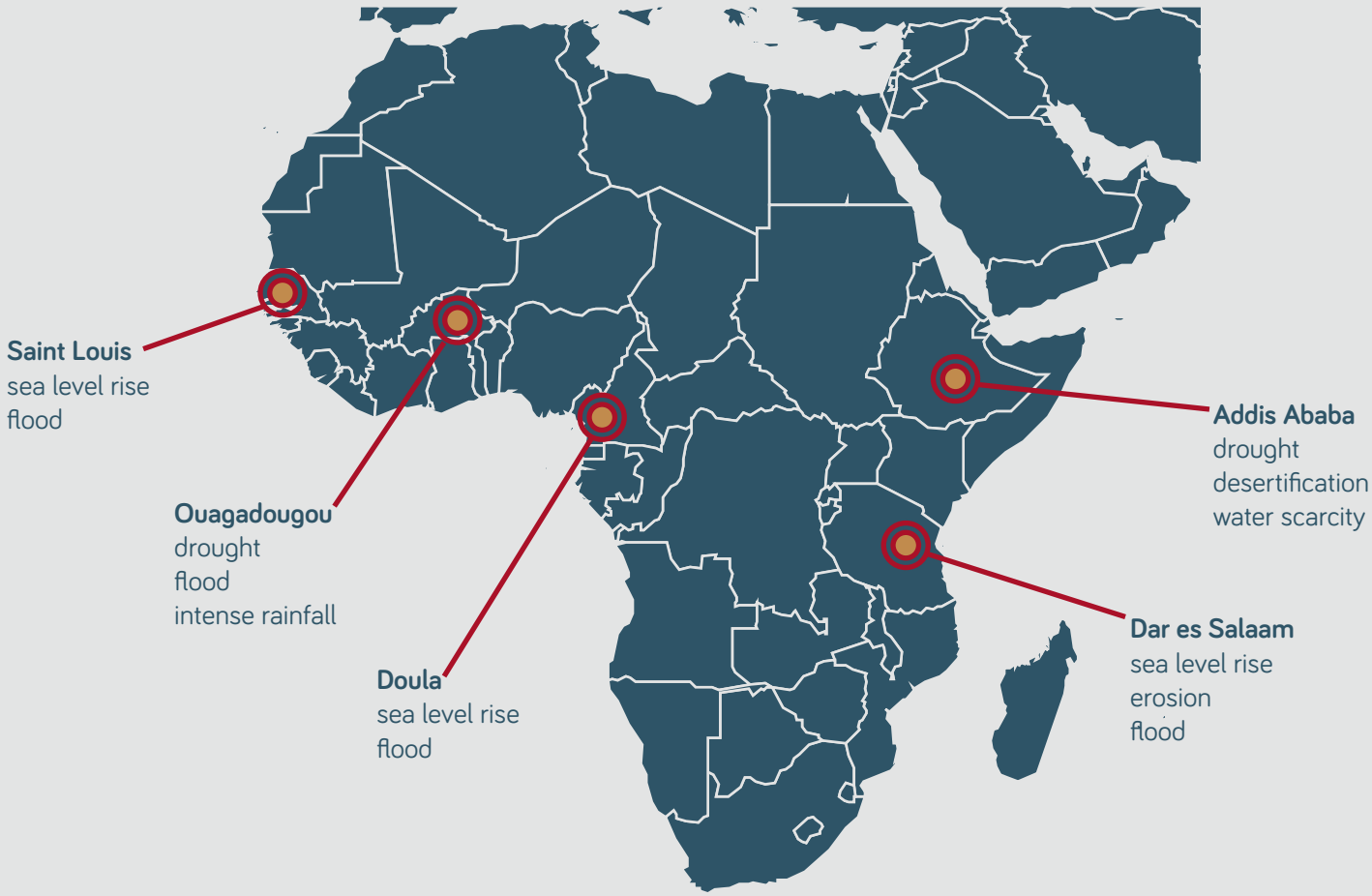
CMCC was involved in the activities related to high resolution climate simulations. More in detail, CMCC performed global simulations according to two new IPCC scenarios. The simulations were then used as forcers for performing high resolution regional simulations on the areas of interest to the project. Lastly, CMCC carried out an ultra-high resolution statistical precipitation downscaling for the cities studied by the project.

Project name
CLUVA – Climate change and Urban Vulnerability in Africa

Financed by
European Commission – FP7

Duration
36 months (12/2010 – 11/2013)

Website
www.cluva.eu



Location of the five African cities studied by the project. The main extreme phenomena linked to climate change are shown for each city.

New media for a safer sea in real time

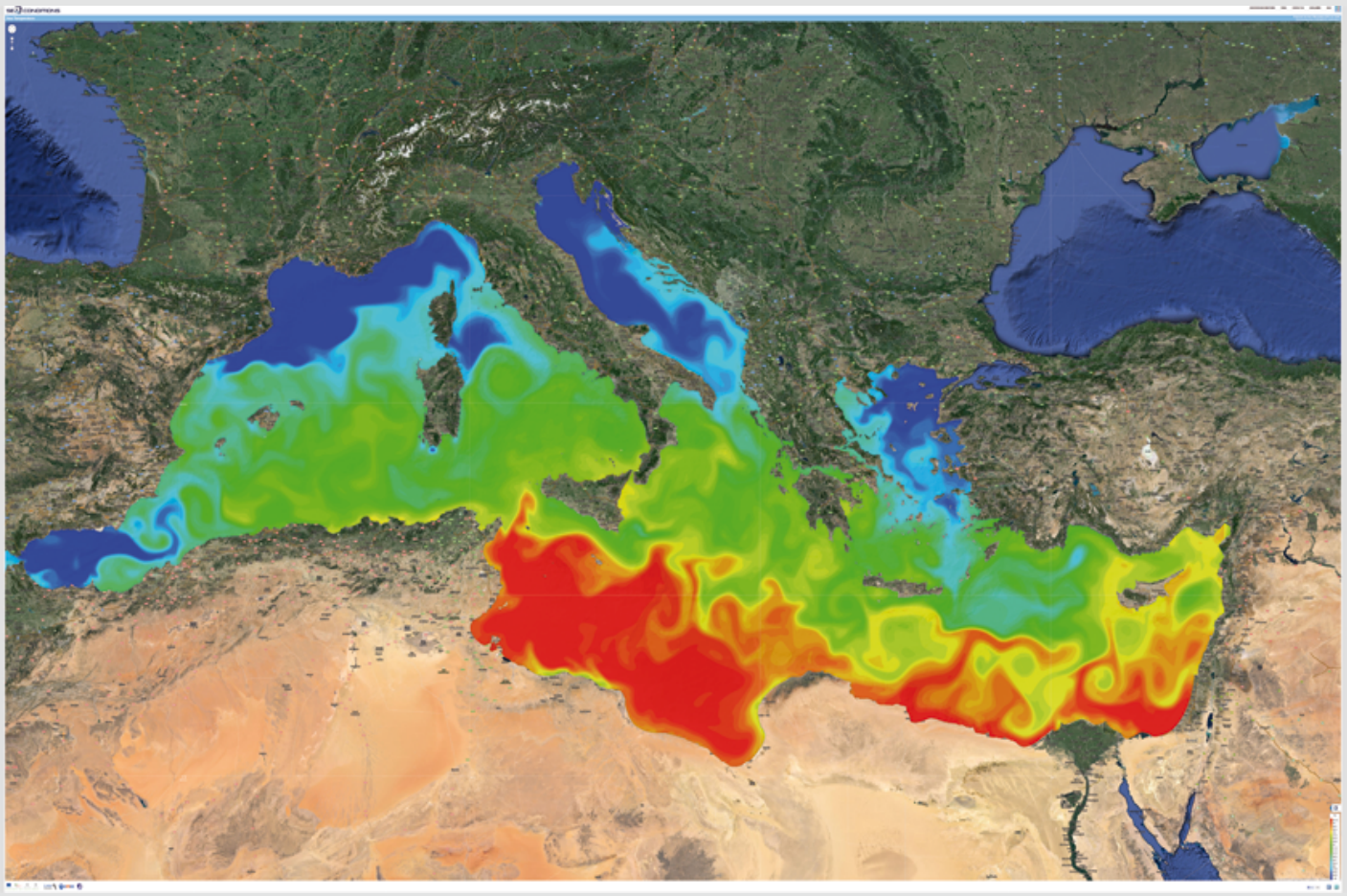
One of the most significant innovations of the last decades in the area of marine sciences was the development of operational oceanography, the ability to forecast the state of oceans and seas through the monitoring, processing and dissemination of information. These data have high ecological and economic value, with applications ranging from testing the health state of the marine ecosystem and prevention of possible damage caused by pollution and coastal eutrophication, to the sustainable development of all sea-related production activities, to ship routing and search and rescue services.
The development of operational oceanography has led to the implementation of a marine service that produces high quality, innovative high resolution information on the state of the sea, similar to the weather forecast based on atmosphere data. These raw data are further processed for safety at sea and environmental protection purposes.
TESSA aims to develop tools and services which, thanks to a sophisticated oceanographic study and advanced electronic instruments (e.g. the CMCC's Supercomputing Center), can be used on platforms like satellite navigators, mobile information devices (tablets, smartphones etc.) and the web in general. For each of these different platforms the TESSA project is developing, among other things, maps on the state of the sea around the navigator's position or in an area of interest, text information to be viewed along the planned or followed course, decision support systems and tactical early warning models.
The potential users of these instruments are diverse, ranging from maritime transport operators to recreational boaters and beach swimmers; from authorities and Coast Guards to the offshore boating industry, to environmental protection agencies and companies.
The operational heart of the TESSA project is divided between two centers in Puglia (Lecce) and Campania (Naples) that produce and distribute high and ultra-high resolution oceanographic analyses and forecasts for the seas of southern Italy and the coastal areas and ports of Puglia, Calabria, Sicily and Campania.
The Lecce operational center is managed by the Euro-Mediterranean Center on Climate Change (CMCC), which, through its Ocean Lab, is also in charge of the forecasting systems for the Mediterranean, Adriatic and Ionian seas and of developing and operating high resolution systems. CMCC also contributes to the modelling for the transport of polluting substances, the development of the Data Analysis Center and Decision Support Systems (DSS), and services of the TESSA project.

Project name
TESSA – TEchnologies for Situational Sea Awareness

Financed by
Programma Operativo Nazionale "Ricerca e Competitività" 2007-2013

Duration
36 months (01/2012 –12/2014)

Website
tessa.linksmt.it



"SeaConditions" is a public service set up by the TESSA project that provides forecasts of the weather at sea. The forecasts concern the Mediterranean sea, and are produced using numerical models combined with satellite observation data and data collected on site (e.g. from ships of opportunity and buoys)
www.sea-conditions.com

Possible scenarios towards a low carbon economy

The ROSE project pursues ambitious objectives for the abatement of CO_2 emissions. Scientists and experts in economics and energy from the most authoritative European, US and Chinese research centers have contributed to the project with various integrated assessment models, in order to produce a set of roadmaps to sustainable energy futures and their costs, qualified and reviewed by experts in the field, so as to identify resource and supply chain bottlenecks as well as environmental, economic and societal limitations that might constrain or qualify the proposed roadmaps. CMCC participated to the RoSE model comparison with the World Induced Technical Change Hybrid Model (WITCH).

The set of RoSE scenarios characterizes future sustainable Roadmaps along three key dimensions, 1) the future socio-economic development determined by population and economic growth, 2) the long-term fossil fuel availability of coal, oil, and gas, and 3) the stringency, timing, and regional fragmentation of climate policy. The variation of the first two dimensions yields a number of baseline scenarios that informs about the sensitivity of system transformations to socio-economic and fossil resource assumptions. The baseline assumptions are then combined with climate target scenarios in order to provide insights into the costs and feasibility of mitigation options under alternative futures.

The key findings of the projects suggest that neither slow economic growth nor scarce fossil fuel resources remove the need for climate policy. Economic growth cannot solve the climate problem by itself, as improvements in the energy and carbon intensity are overcompensated by the growth-induced scale effect. Fast economic growth stimulates green investments (e.g. renewables, clean energy R&D), but it also increases investment in conventional, fossil technologies. As a consequence, energy demand and emissions increase with economic activity, as shown in Figure 1. The grey area depicts the range of Kyoto gas emission profiles of the baseline scenarios simulated by the models involved in the project. Fossil fuel scarcity can create an economic opportunity for decarbonizing the energy mix and for investing in breakthrough, radical innovations, even in the absence of policy signals. Yet, although economic growth and fossil fuel prices create an economic opportunity for more investments in non-fossil energy technologies and clean energy R&D, emissions would remain way above the levels required for limiting warming below 2 degree Celsius (orange area in Figure 1. Figure 2 shows the corresponding profiles for temperature increase above pre-industrial levels.)

Stabilization requires massive emissions reductions (Figure 1, orange area). This includes a transformation to a low carbon energy system with historically unprecedented decarbonization rates. The result holds over a wide range of assumptions on future fossil resource availability and economic growth. Baseline assumptions can alter costs substantially and mitigation costs increase by approx. 30 to 100% from low to high economic growth, and from low to high fossil fuel availability. In this context, weak near-term climate policy until 2030 jeopardizes the attainability of the 2°C target.

Project name
RoSE - Roadmaps towards Sustainable Energy Futures. A Model-Based Assessment of Scenarios For Decarbonising the Energy System in the 21st Century

Financed by
Stiftung Mercator, Germany

Duration
48 months (01/2010 – 12/2013)

Website
www.rose-project.org

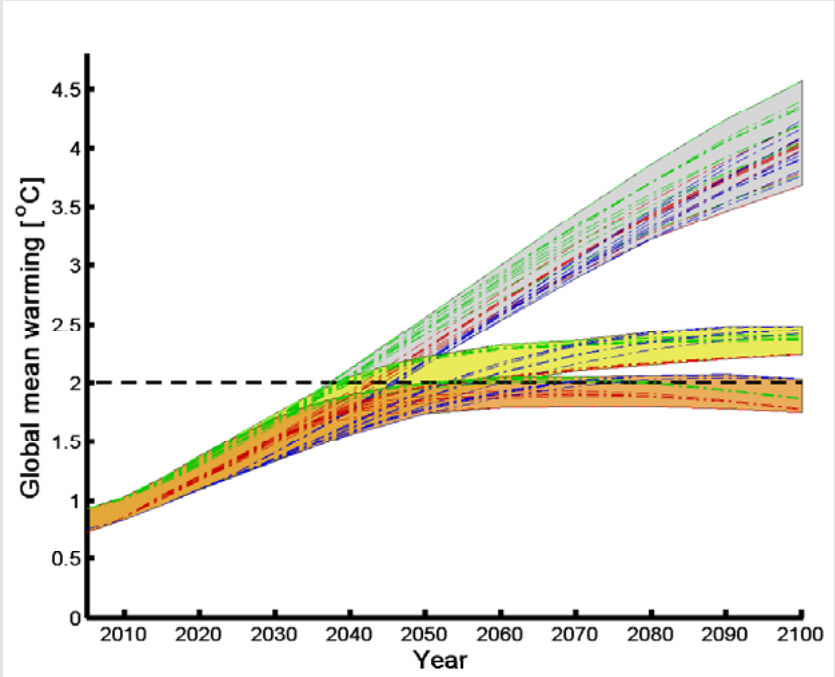


Figure 1. Kyoto gas emissions (the broken line represents emissions at 2005). The coloured areas show the changes for the different scenarios (current scenario in grey, 550 ppm in yellow, 450 ppm in orange). The results of the individual models are shown by the broken lines.

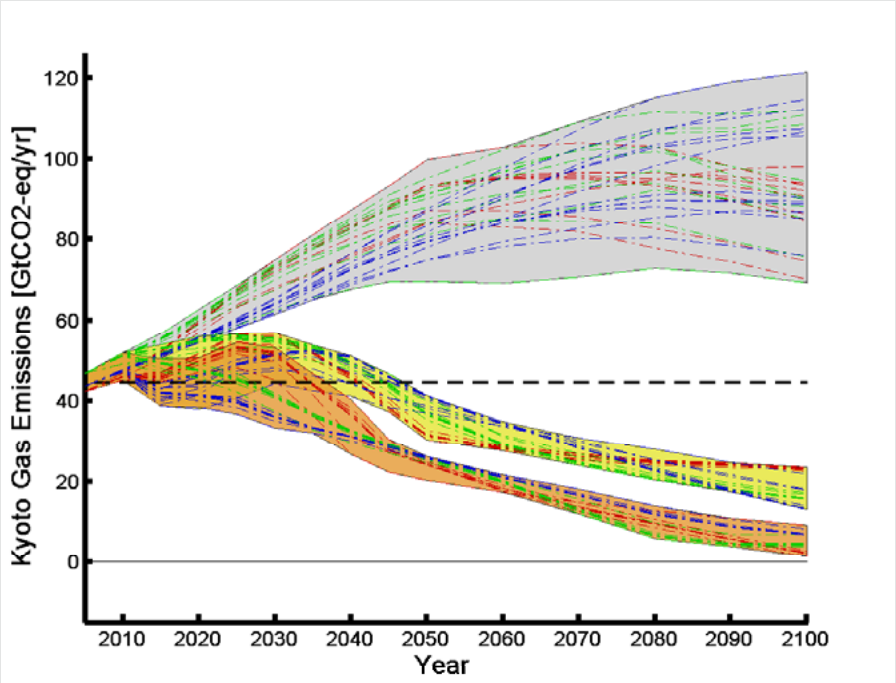


Figure 2. Rise in average global temperatures from pre-industrial times (broken line at 2°C). The coloured areas show the changes for the different scenarios (current scenario in grey, 550 ppm in yellow, 450 ppm in orange). The results of the individual models are shown by the broken lines

Integrating climate knowledge within territorial planning

The OrientGate project aims to implement concerted and coordinated climate adaptation actions across South Eastern Europe (SEE). The partnership comprises 19 financing partners, 11 associates and 3 observers, covering 13 countries, and the role of the partners can be grouped into three main categories:

- National hydrometeorological services, responsible for monitoring climate variability and risk.
- Territorial development policy organisations, responsible for translating climate variability and climate risk assessment information into territorial development planning instruments.
- Scientific institutions.

Together they will explore climate risks faced by coastal, rural and urban communities, contributing to a better understanding of the impacts of climate variability and climate change on water regimes, forests and agroecosystems.

The way in which OrientGate aims to coordinate climate change adaptation efforts in SEE countries is by building a lasting partnership between communities that produce knowledge and experimental studies, and communities that apply that knowledge.

The project aims to:

- develop a comprehensive and consistent methodology for assessing the risks arising as a result of climate variability and change;
- harmonise risk assessment and communication on the part of hydro meteorological services;
- encourage the use of acquired climate adaptation knowledge and experience in territorial planning and development;
- enhance capacity to reconcile the risks and opportunities inherent in environmental changes, including rising temperatures.

The core output to be developed by OrientGate is a set of web tools, designed to provide access to data and metadata from climate observations and simulations that will be available through a data platform connected to the European Climate Adaptation Platform.

Other project outputs will include six pilot studies of specific climate adaptation exercises developed by the project's three thematic centres (Forest and Agriculture, Drought, Water and Coasts, and Urban Adaptation and Health); capacity-building seminars and workshops; and a working partnership among the hydrometeorological services of SEE countries.

In particular, one of the pilot studies is located in the Italian region of Apulia and it will concentrate on the production of tools and guidelines for regional and local institutions in order to promote effective planning for the management and protection of Apulian water resources and coastal environments. The planning will take into account impacts, vulnerabilities and risks related to climatic changes with a special focus on extreme events such as heat waves, draughts and intense rainfalls, which are all causes of water resource imbalances.

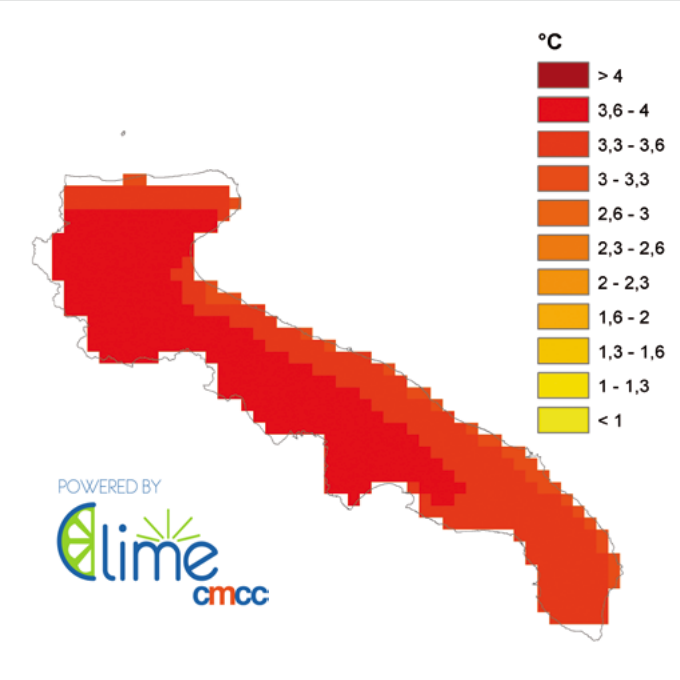
A final book collecting the lessons learned and a set of policy guidelines will be published as final output of the project.

Project name
ORIENTGATE – A structured network for the integration of climate knowledge into policy and territorial planning

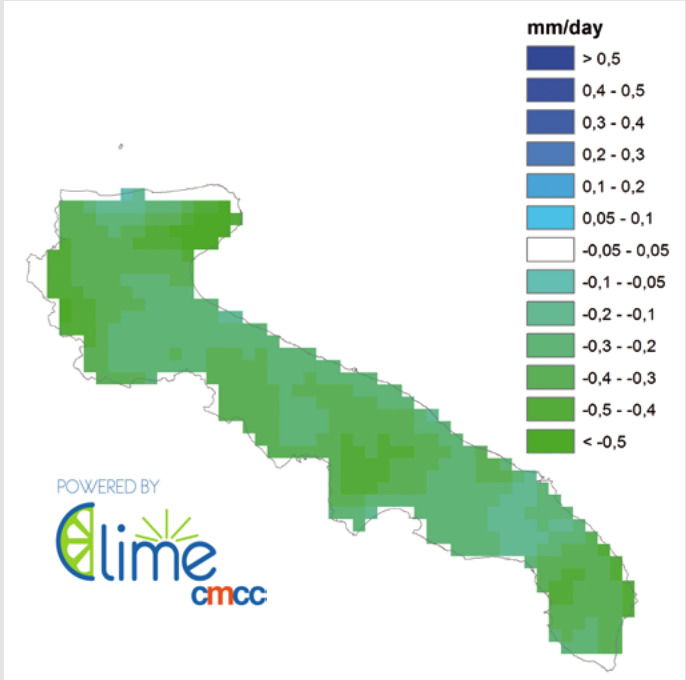
Financed by
South East Europe Transnational Cooperation Programme

Duration
30 months (07/2012 - 12/2014)

Website
www.orientgateproject.org



Seasonal differences (summer) of 2 meter temperature values (°C) between the period 2041-2070 and 1971-2000 considering the worst case IPCC scenario (RCP8.5). Data provided by COSMO CLM regional climate model simulation with a horizontal resolution of 0.0715° (about 8 km)



Seasonal differences (autumn) of daily precipitation values (mm/day) between the period 2041-2070 and 1971-2000 considering the worst case IPCC scenario (RCP8.5). Data provided by COSMO CLM regional climate model simulation with a horizontal resolution of 0.0715° (about 8 km).

Climate simulations: contribution to the IPCC report

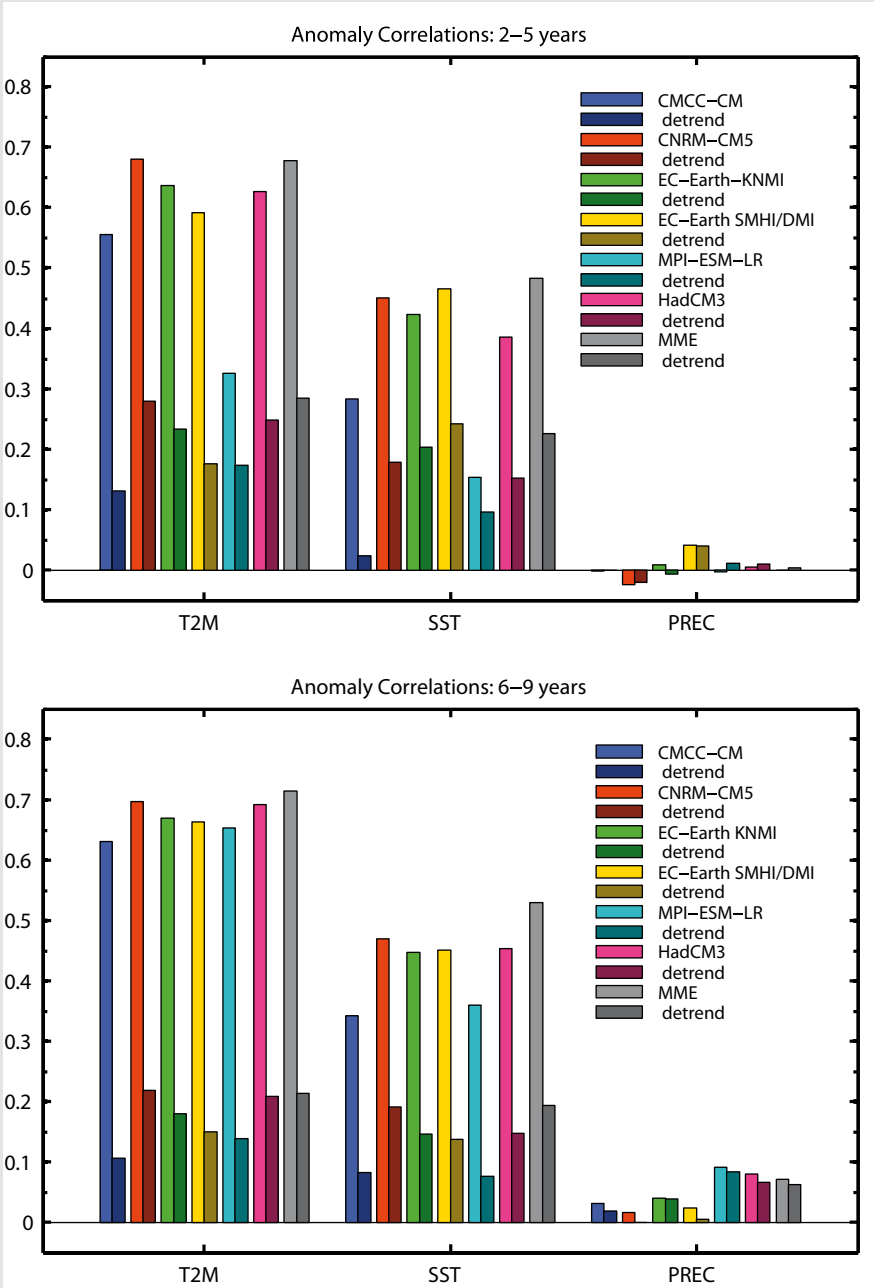
The Fifth IPCC – WGI Report is the volume dedicated to scientific knowledge on the physics of climate change, a publication where the international body takes stock of the knowledge produced by the international scientific community on the physical bases of climate change. The Report uses a large number of simulations, some of which were contributed by CMCC which, through the COMBINE project, helped by providing data and climate models contained in the IPCC report together with other contributions from major international research centers.
The general objective of the COMBINE project was to improve the ability to make predictions and projections based on Earth System Models through the collaboration between top European centers conducting research studies in these areas and that have used a set of seven models.
Specifically, the project focused on three aspects. First, part of the research concerned the dynamic, physical and biogeochemical processes in the Earth system and the related feedback linked to natural climate variability and to climate change induced by human activity. Secondly, COMBINE worked on the ability to make climate predictions on time scales of up to several decades, and on the development of methods that could ensure the actual achievement of better predictions on these time scales. Lastly, one of the project's objectives was to connect Earth System simulations built for the past and for predictions of the future to global and regional impacts, with special attention to water resources and the request to set up new climate change scenarios; this made it possible to include socioeconomic scenarios as well as climate change projections within Earth System Models, in an integrated manner.
Moreover, the COMBINE project's research activities were carried out within an international context: in effect, the simulations performed in this project were selected from the CMIP5 protocol, the fifth phase of the Climate Model Intercomparison Project (http://cmip-pcmdi.llnl.gov/cmip5) that was promoted by the Working Group on Climate Modelling of the United Nations' World Climate Research Programme to answer the questions raised by the fourth assessment report of the Intergovernmental Panel on Climate Changes (AR4). Therefore, the CMIP5 represents a framework programme for the coordination of climate simulations, adopted by the leading global climate study centers, which has provided the scientific modelling bases for the preparation of the Fifth IPCC Report (AR5). Thus, the research conducted as part of the COMBINE project not only produced results within the project, but also provides useful support to the international research community and for the climate change evaluations contained in the Fifth IPCC Report.

Project name
COMBINE – Comprehensive Modelling of the Earth system for better climate prediction and projection

Financed by
European Commission - FP7

Duration
48 months (05/2009 – 04/2013)

Website
www.combine-project.eu



Global area-weighted average ACC for each member of the multi-model ensemble and for the ensemble-mean. Results for three variables are displayed, that is: T2M, SST, and precipitation (PREC).
The same lead-time periods, 2-5 years (top) and 6-9 years (bottom) are used. Each pair of columns displays the ACC before and after the trend removal.

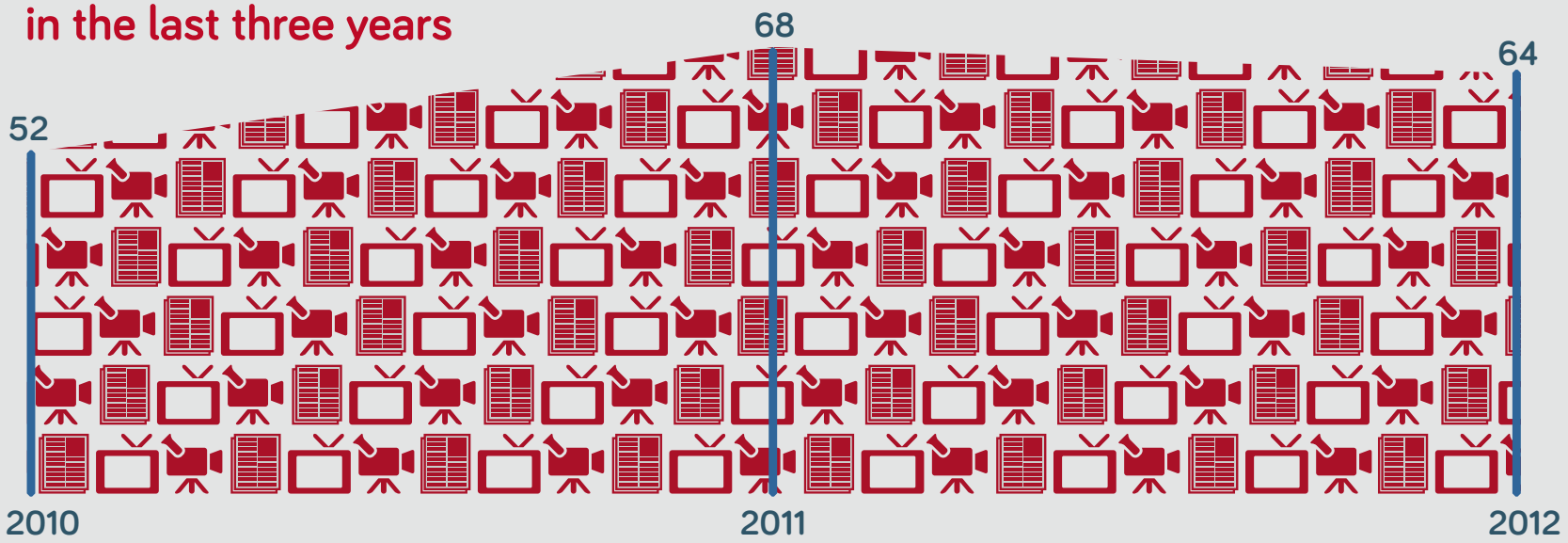
PUBLICATIONS

CMCC's editorial production is addressed to a diverse audience that includes the scientific community, policy decision makers, opinion leaders, and a general public interested in staying abreast on issues related to climate change research and policies. Therefore, the different types of publications issued by CMCC take into account, in terms of form and contents, the different recipients of the published information.

Refereed papers

Intended for an expert and specialized readership, scientific publications are one of the main tools to disseminate the results of the CMCC's activities among the international scientific community.
Works considered for publication include articles and papers published by CMCC researchers in peer reviewed journals, many of which are included in the Journal Citation Report (JCR). The selected papers represent a tangible indicator of the quality of the Center's scientific production, resulting from multidisciplinary interaction between research divisions and from collaborations with major international institutions.

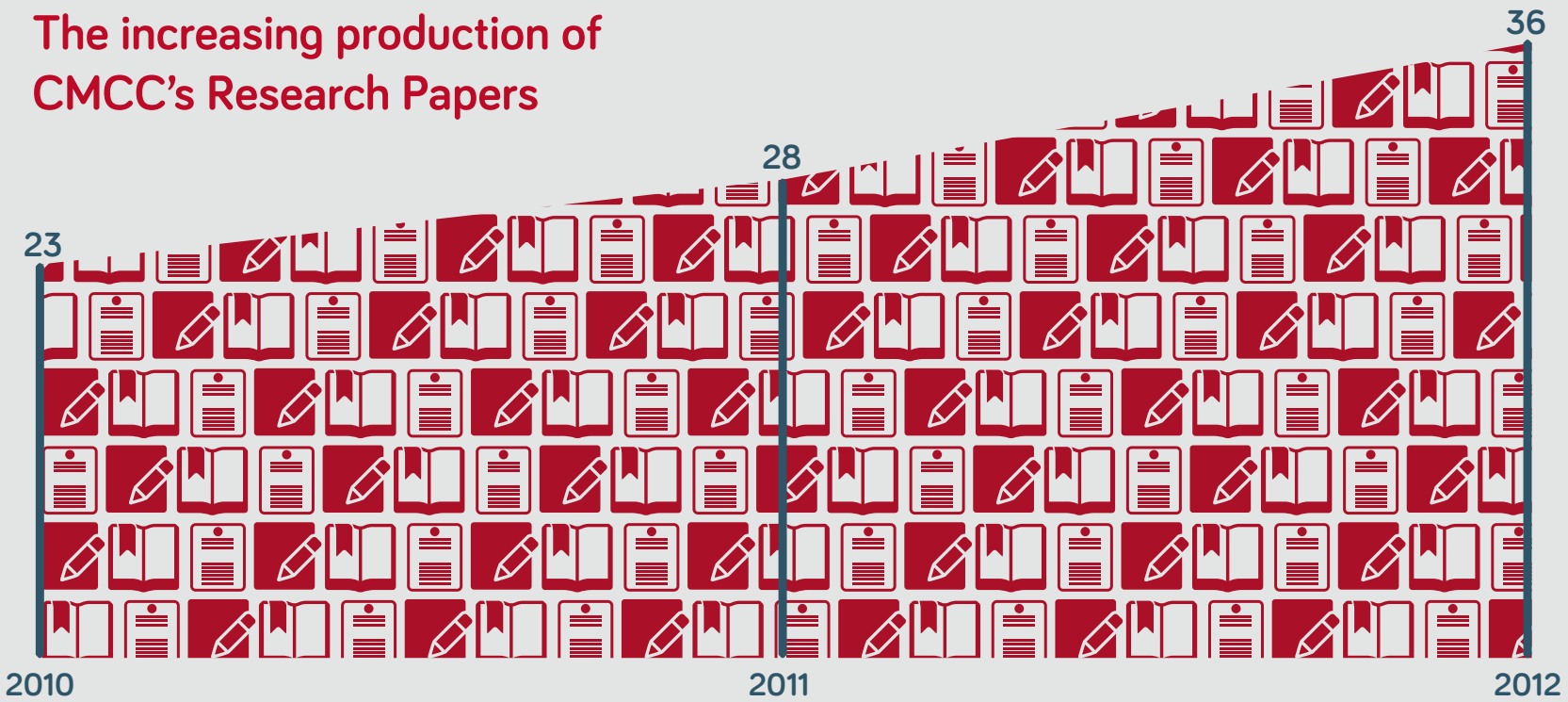
184 refereed papers published in the last three years



Research Papers

As with the papers published in refereed journals, CMCC's Research Papers are intended for the scientific community and contain the results of research activities performed by the Center's divisions. These papers are published in a special CMCC collection available online at www.cmcc.it. The works published in the Research Papers series are also available for consultation and downloading from the SSRN (Social Science Research Network) platform.

The increasing production of CMCC's Research Papers



Approximately **2,000** downloads of CMCC research papers in 2012 from the **Social Science Research Network**

Climate Policy News

Climate Policy News is a weekly column containing updates on international climate policies and news on energy markets and technology legislation. Every week, it also provides updates on the carbon market in Europe. The publication is available on the CMCC website and is also distributed via e-mail.

International Climate Policy and Carbon Market

International climate negotiations, measures adopted by individual States to face climate change, and recent research studies on climate economics and policies are the subjects of this bimonthly column available on the CMCC website and also distributed via email to newsletter subscribers.

Climate Policy News and **International Climate Policy and Carbon Market** are the result of CMCC's partnership with Fondazione Eni Enrico Mattei and with the International Center for Climate Governance.

2012
CMCC Publications

Papers in refereed journals	64
Research papers	36
Climate Policy News	42
International Climate Policy & Carbon Markets	6

ClimateScience&Policy

Climate Science&Policy is an online magazine published by CMCC, featuring contributions from international experts concerning scientific research on climate change and climate policies and economics. Articles, interviews and videos offer visitors the point of view of authoritative scientists and in-depth information on many issues revolving around scientific research on climate change and on the effects of climate and its changes on ecosystems, society and the economy. Designed and written for a non-specialist and not exclusively Italian audience, Climate Science&Policy offers a multidisciplinary, well documented view on climate change in a language that is understandable to the public at large without overlooking scientific rigor in dealing with the different topics.

www.climatescienceandpolicy.eu

What's the meaning of wealth?

Wealth, as defined in the 20th and 19th centuries, was based on manufacturing mining the globe's natural and nature-based assets; later on wealth depended on service sectors propelled by growing patterns of consumption that are frankly unsustainable today and totally inconceivable in a world of over nine billion people by 2050 if – the "if" is very important here– they keep growing at the present rate.

Many critical sectors of the economy such as human capital and the full ecosystem of 'natural' capital – i.e. forests, the atmosphere, and freshwaters – were either marginalized or made invisible in the ledgers of profits and loss. (...) On its current trajectory the world is undercutting some of the essential services nature has freely provided for millennia and is driving unprecedented conditions that could tip these services into new and perhaps less productive states with significant consequences for global supply chains, human well-being, and social stability"

The sustainable transition. Overcoming the crises from Rio to Rio and beyond, by Achim Steiner, UN Under-Secretary General and Executive Director at the UN Environment Programme (UNEP) – March 30, 2012

Climate change as humanitarian issue

The nexus of climate change, migration, and conflict multiplies the pressure on governments in vulnerable regions around the globe. Human migration driven by environmental crises, as well as social conflict caused by this migration and competition for more scarce resources adds complexity to existing and future crisis scenarios. Governments must plan to address these new threats. Environmental degradation, the movement of people from rural areas to already overcrowded cities, and rising food prices exacerbate the cumulative effects of long-term economic and political failures in a number of vulnerable regions of the world, such as Northwest Africa.

Climate change and its humanitarian consequences. Understanding a long term interplay, by Michael Werz, Senior Fellow at the American Progress – March 13, 2012

Frames competing in the climate field

There are a lot of different ways in which mass media address dimensions and aspects of climate change. When I introduce the notion of "competing frames" I want to explicitly discuss how media rely upon actively shape public discussions on climate change and its impacts. For example, a charismatic leader talking about climate change action becomes a chance for the media to cover the issue. This, in turn, shapes ongoing considerations on action in the public arena.

Statements and pronouncements of leaders, politics and policy makers often become frames.

When covering climate change mass media mainly focus on few topics such as weather extreme events or charismatic megaphones like polar bears, while some important themes – i.e. socioeconomic aspects of climate change or environmental justice – are completely ignored.

Who speaks for the climate? Trying to make sense of media reporting on climate change, a conversation with Maxwell T. Boykoff, Cooperative Institute for Research in Environmental Sciences, University of Colorado-Boulder – January 23, 2012

The "sound-bites" dilemma

Part of the communication problem is that the real science is not simple. "It's cold here today!" is a sound bite that, on the right day, anyone can repeat. Explaining why today's weather does not disprove global warming takes more words and sounds less exciting. Similarly, one can easily make a false but scientific-sounding declaration such as "Volcanoes release more CO2 than humans." Explaining how scientists know that, in fact, human activities release far more CO2 than volcanoes do requires a lot more patience and understanding.

Communicating climate science, the Internet may be the key, interview with Lawrence Hamilton, Professor of Sociology and Senior Fellow of the Carsey Institute at the University of New Hampshire – March 12, 2012

Climate change and moral judgement

Because our moral intuitions are demonstrably powerful motivators, the current disconnect between climate change and our moral judgment system is a significant barrier to action (although certainly not the only one). Our widespread failure to recognize and treat climate change as a moral issue—rather than just a scientific technological or political one—saps our personal and collective willingness to respond forcefully and with conviction. Yet this present deficit thereby is also a way to spread the recognition of climate change as a moral imperative; potentially, it could has the potential to unleash a powerful and as-of-yet under-mobilized source of sustainable motivation for action.

The moral case of climate change, by Ezra Markowitz (Earth Institute & Center for Research on Environmental Decisions, Columbia University) and Azim Shariff (University of Oregon) – September 26, 2012

If adaptation is a private matter

Most of the effort towards adaptation has been based on the fundamental premise that adaptation will be motivated by individuals, communities, and organizations perceiving a threat to their way of life, and responding to that threat. They will take action believing this will reduce that threat, or enable them to cope with the anticipated impacts. Farmers thus will act to protect their livelihoods from the threat of increased drought; coastal communities will act to protect their assets from sea level rise. In these cases, private actors provide for their own adaptation, or public actors (e.g., local governments) act on behalf of the public interest. But what if achieving the desired reduction in vulnerability for a population or region requires the actions of many individuals, who, on their own, have no motivation to act? Or who may actually experience individual losses or harm if they engage in actions that would reduce vulnerability across a population?

Private Actors and Public Adaptation to Climate Change, by Hallie Eakin (Arizona State University) and Emma Tompkins (Southampton University), – June 4, 2012

Climate is Culture

Climate change is not a scientific responsibility; it's a cultural one. In that sense climate is culture; culture is actually affecting climate change, and if you really want to find the solution to the problem, you need to foster a cultural shift in societies. When I say culture I mean a lot of things; politics, economy, systems of values are all about and related to culture. Everything society is based on is about culture. Our model of progress based on fossil fuels is not sustainable anymore: it's up to us to change our cultural values and to find reliable solutions.

Come on-board and appreciate climate culture, interview with David Buckland, artist, filmmaker and designer, founder and director of Cape Farewell Project – May 11, 2012

EVENTS

CMCC organizes different types of events to build and maintain an active dialogue with interlocutors including the scientific community, students, policy decision makers, public bodies, companies, the public opinion in general, and the media. Throughout the Center's activities, events have proved to be an excellent vehicle to disseminate the contents of research activities, exchange opinions with the outside world, and find new themes and areas of interest, strengthen existing collaboration relationships and start new ones with national and international research centers.

Seminars

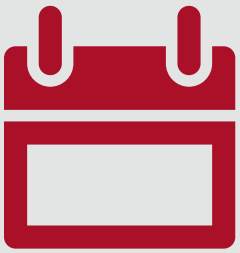
intended mainly for a specialized audience, students of the Center's educational initiatives and the scientific community with the aim to encourage discussion and debate on frontier themes relating to climate research and policies.

Meetings

usually set up within the scope of scientific research and partnership projects, for the purpose of launching a project, defining technical aspects or disclosing scientific results.

Conferences

large scale events addressed to the public at large, with the participation of renowned international speakers in the area of climate research and policies.

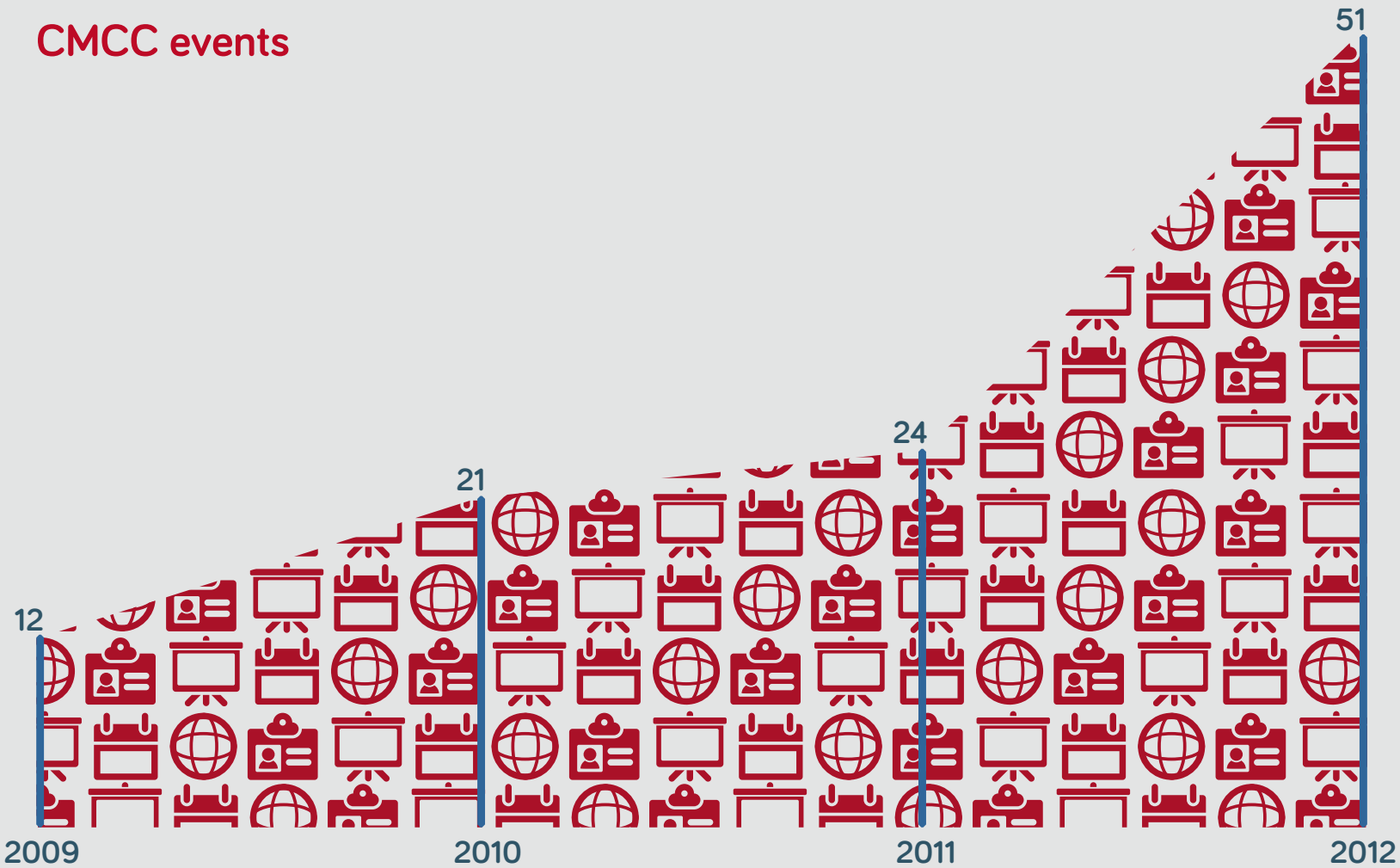


Workshops

dedicated to CMCC researchers, they offer opportunities for brainstorming and updates on ongoing activities.

The chart shows a significant increase in the number of events organized by CMCC in 2012, compared to the previous three years. Additionally, to expand the public's participation in the events, over the years the Center has increased the use of technologies and services enabling users, whenever possible, to follow the event and participate actively through webinars and online conferences.

CMCC events



CMCC at the COP18 in Doha: Mediterranean climate areas and adaptation challenges

Doha, Qatar - December 04, 2012

The challenges posed by climate change adaptation and those involved in mitigation strategies are closely related. Both require an approach that takes into consideration the local and regional aspects, engages all the stakeholders, and offers optimal conditions for interaction with scientific knowledge in order to identify the best choices and the most effective tools to be implemented. Scientists, politicians and NGOs representatives met on 4 December in Doha, within the framework of the COP18, in a side event organized by CMCC with the MC-4 consortium, entitled "Mediterranean-Climate Regions: ready for a successful adaptation to present and future climate?". The meeting gave rise to fruitful debate on the needs and outlooks of adaptation strategies in five regions with similar climate conditions (Mediterranean climate regions). MC-4, Mediterranean City Climate Change Consortium, was created on the basis of studies on climate similarities between these regions, and ever since the first meeting held in Los Angeles in June 2012 has established a cooperation between entities and institutions of these areas (Southern California, Mediterranean Basin, South Africa, west coast of Australia and Chile) to discuss together how to adapt to climate change, and a highly innovative governance level between geographically distant regions with similar climate conditions.

Rio + 20: World Sustainability Conference

Rio de Janeiro, Brazil - June 20/22, 2012

One of the most awaited events of the year on the subject of environmental policies , the United Nations Conference on Sustainable Development was once again held in Rio de Janeiro twenty years after the first historical edition, and there the international community took stock of the developments of the last two decades and the future outlook for sustainability.

The Euro-Mediterranean Center on Climate Change actively participated in Rio +20 with a number of side events hosted in the pavilion of the Italian Ministry of the Environment, Land and Sea.

"Adaptation to Climate Change in Tropical Areas" is the title of the meeting organized by CMCC (Tuesday, 19 June 2012) during which, in the presence of Minister Corrado Clini, experts in the matter discussed the strategies to be adopted in areas particularly vulnerable to the effects of present and future climate change with Carlos Nobre (Brazilian Space Research Institute), Antonio Navarra (CMCC President) and Riccardo Valentini (Director of the CMCC IAFENT Division – Impacts on Agriculture, Forests and Natural Ecosystems).

CMCC also participated in other meetings concerning cross-references between the study of climate change and prospects for sustainable development. Forests, for example, were the subject of an extremely interesting session that discussed measurements and monitoring of the Amazon's deforestation. Energy, environmental risks and the reduction of greenhouse gas emissions were the topics of two separate round tables. The first one focused on a collaboration between Italy and Brazil for the achievement of Low Carbon Economy, while the second was dedicated to a discussion on oil extraction prospects, and in particular on the risks arising from oil spills during the extraction process.

International research and cooperation: Dialogue on water

Venice, Italy - September 27/28, 2012

A scarce and vital resource, water is a major challenge in prospects for development, and is directly related to issues of global importance like food production, energy supply, and public health. Some international meetings, and primarily the Rio+20 conference and the World Water Forum of Marseilles, highlighted the absolute need for an integrated approach able to address the multidisciplinarity and the global dimension of these issues, which were discussed in depth during a conference entitled "Dialogue on water resources: from research to livelihood impacts". Held on 27 and 28 September 2012 at the University Ca' Foscari of Venice, the conference was the result of an initiative shared by three institutions (the University of Venice, CMCC and FEEM), within the framework of a partnership with the Ministry of Foreign Affairs in the university network for international cooperation. During the event the participants, including international institutions, academics, experts and public decision makers of the Mediterranean area, analyzed strengths and weaknesses in the search for innovative policies to address the scarcity of water resources in the Mediterranean. Special attention was given to empirical evidence, operating tools and technological solutions to put into practice the principles and guidelines at the center of international debate on the management of water resources.

Asia, Europe, USA: Collaboration for integrated models of climate change scenario assessment

Venice, Italy - September 17/18, 2012

To promote the development of integrated assessment models through the collaboration of different countries and the assessment of mitigation scenarios in China, India, Europe and the United States. These were, in very short summary, the objectives pursued by Climate Policy Outreach (CPO), a research project funded by the European Commission and coordinated by the Euro-Mediterranean Center on Climate Change, in partnership with the Potsdam Institute of Climate (PIK), the MIT, the Indian Statistical Institute, the Indian Institute of Management Ahmedabad, the University of Renmin and the University of Tsinghua. The Final CPO Conference took place in Venice on 17 and 18 September 2012 at the CMCC's Headquarters, and was organized in two main sessions. On the first day, the results from the latest expert assessments on national and global climate policies were presented by modelling experts and discussed by decision makers and specialists. The next morning was devoted to a discussion between modelling experts and policy decision makers. Based on the results presented in the morning, stakeholders and policy decision makers had the opportunity to interact in a high profile session, discussing the most pressing policy issues.

Capacity building: economic tools and evaluation of climate change policies

Bangkok, Thailand - March 5/8 2012

"Strengthening Planning Capacity For Low Carbon Growth In Developing Asia" is an initiative conducted in collaboration with the Asian Development Bank, within which CMCC provides training and capacity building services on the use of economic tools for assessing climate change policy strategies. The meetings are intended for experts, policy decision makers and researchers from Indonesia, Malaysia, the Philippines, Thailand and Vietnam. The inaugural workshop, entitled "Regional Capacity Building Workshop on Low Carbon Tools", was held from 5 to 8 March 2012 in Bangkok. The meeting focused, in particular, on tools useful to support the transition process towards low-carbon growth in the Asian regions. The participants' presentations were aimed at providing indications and guidelines derived from the development and application of economic models specific to the areas of interest. The objective of the meeting was therefore to improve the capability of agencies and institutions in charge of using these quantitative tools for economic analysis and planning activities. Lastly, the workshop was part of the process for the creation of a shared knowledge platform, to promote dialogue and cooperation between participating countries on development strategies above and beyond low-carbon growth.

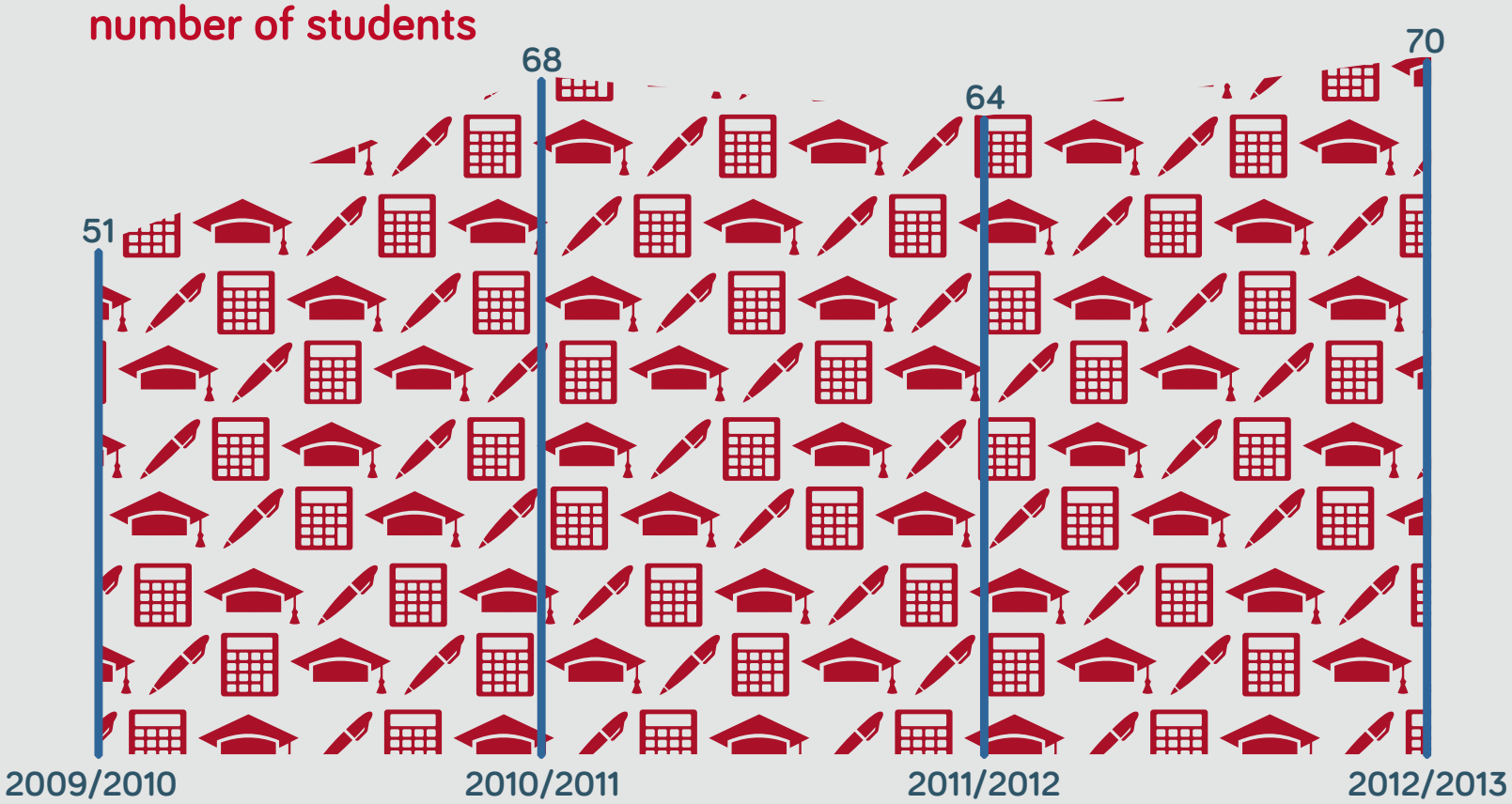
TRAINING PROGRAMS

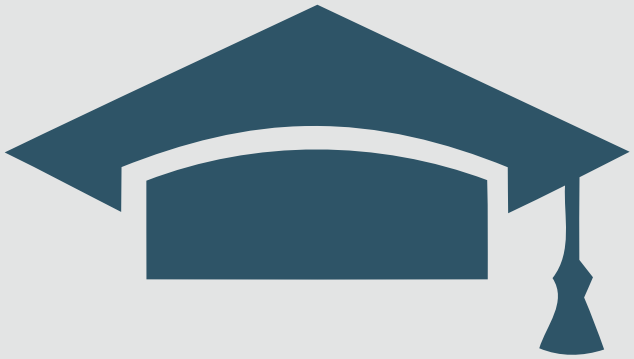
Education programs are a very important part of the wide range of activities carried out by CMCC. The Graduate Programs, as well as the summer schools and winter schools, have earned an outstanding reputation over time within the climate change scientific community, thanks to the high level and international breadth of their offering and to partnerships with European universities, international institutions and world famous experts participating as professors and guest speakers.
Addressed to researchers already engaged in scientific activities with CMCC as well as to external students, the Center's educational initiatives aim to improve the participants' research performance, provide opportunities for professional growth and take full advantage of the energy and motivation of the younger generations - a valuable resource for an institution that operates in the area of advanced research.

Graduate Programs

CMCC Graduate Programs were inaugurated in 2008, in collaboration with three Italian universities (Università Ca' Foscari Venezia, Università del Salento and the Università di Sassari) with the objective of promoting and coordinating advanced studies on the impacts of climate change and climate policies. The programs offer advanced courses and research activity, with special focus on themes concerning innovative management strategies, both from a physical and a socioeconomic perspective, for phenomena related to climate and its changes.
The three universities contribute to the Graduate Programs through four distinct doctorate programmes: Science and Management of Climate Change (Università Ca' Foscari Venezia), Agrometereology and Ecophysiology of Agricultural and Forestry Eco-Systems (Università di Sassari), Energy Systems and Environment and Climate Change Sciences (Università del Salento).

CMCC Graduate Programs: number of students





Modelling climate change impacts on water and crops at different scales

Held in Alghero, Sardinia, from 5 to 9 September 2012, the seminar was conducted with the main objective of providing a comprehensive overview of the themes, tools and methods used in estimating the impact of climate change on agriculture and water resources on a local and regional scale. The lectures also focused on the identification and assessment of adaptation strategies, and in particular on threats to food supply security. Lastly, the seminar saw the participation of doctorate and post-doc students from international research centers and universities, involving ten countries in Africa, America, Russia and Europe.

OTTIMA - Operational Oceanography and Computer Technologies for Maritime Safety

Created in 2012 as part of the TESSA technological innovation project, Ottima is a training course aimed at mapping out and providing an education path that will allow students to acquire a mastery of the methodological and operational aspects of basic sciences, operational oceanography, technology and engineering applied to oceans and seas.
The Ottima programme develops through two educational paths offered in Lecce and Naples. The first, scheduled in 2013, is a course in “Operational and safety oceanography”, in which students learn about the methods, techniques and equipment of the basic operating systems and infrastructure that are essential in oceanographic and coastal operational research, the monitoring, protection and exploitation of marine resources, and maritime safety. The second pathway, scheduled in 2014, is a course in “Information technology for maritime safety”. In this case, the students acquire knowledge and mastery of information technology applied to the analysis of marine environmental data and operational oceanography data derived from observation systems and models, and of decision support systems for maritime safety, the protection of the maritime environment and the sustainable exploitation of its resources.

WEB, MEDIA AND THE PUBLIC OPINION

The results of studies on climate change and interactions between climate and environmental and socioeconomic systems arouse interest not only in the scientific community but also in a highly diverse audience composed of policy decision makers, sectors of society such as associations and NGOs, journalists and information professionals, and lastly the general public interested in these issues.
In order to be an active presence in this constantly and rapidly evolving context, CMCC has developed a range of communication and information activities through which the Center acts as a reference point in the public debate on issues related to climate change research.

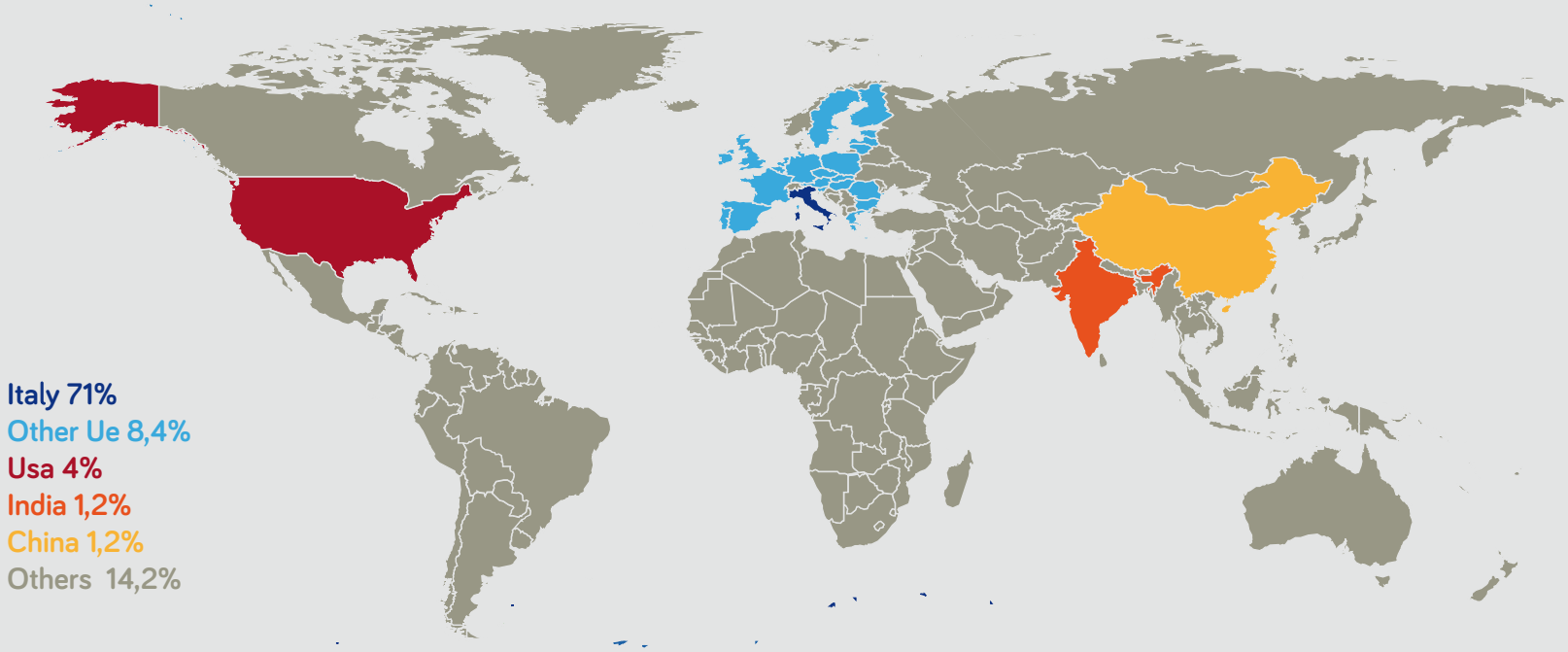
+20% visitors compared to 2011

over **90.000** visits

more than **260,000** pages visited

The CMCC's information and communication activities are carried out through the website – **www.cmcc.it** – which serves as multimedia and multidisciplinary repository of the contents produced by CMCC. The website structure and the activities conducted through it were designed and set up not only to provide access and visibility to CMCC's production (from scientific activities and publications to events and institutional communication), but also to offer access to the broader public debate on climate change research that is ongoing at international level.
The CMCC's website is intended as a reliable, authoritative and easily accessible source of information on the most current and relevant issues related to research on climate change and its effects on the environment, policies, economy and society.

Map of visitors of the CMCC's website



TEC A blog on the changing climate

@cmccclimate

Cmcc Climate
Cmcc Press

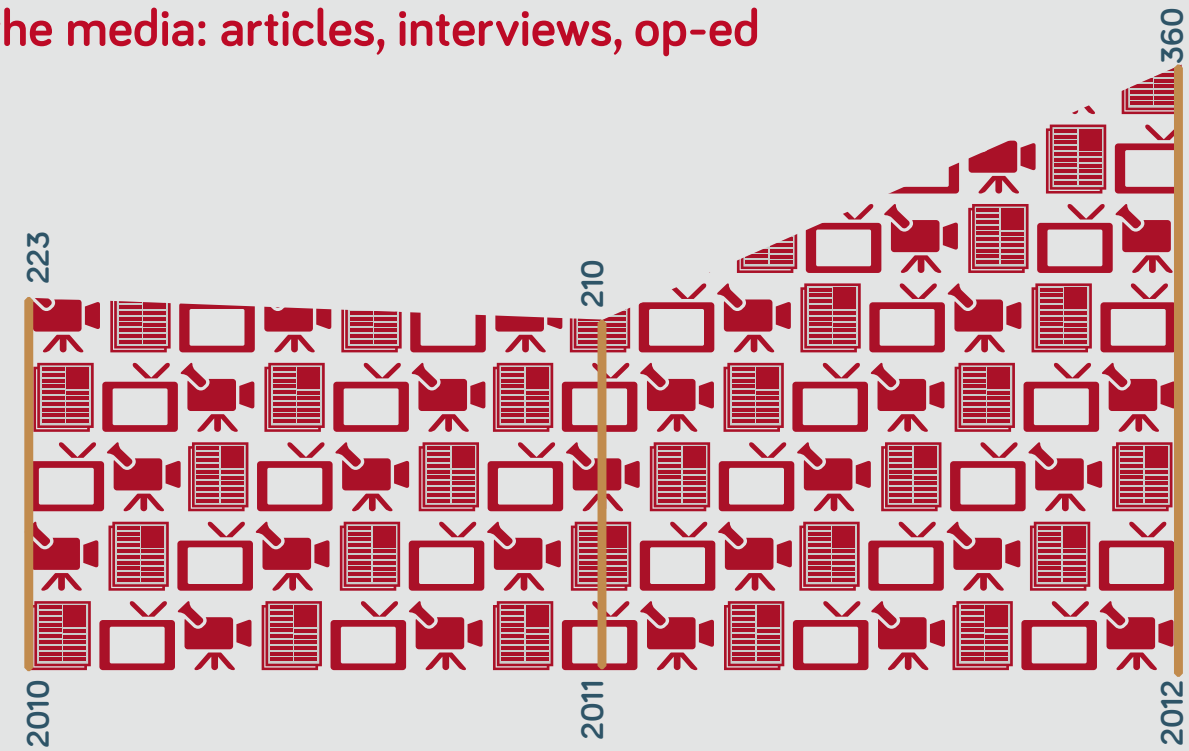
CMCC Channel
CMCCvideo

CMCC profile
on Linkedin

Press and Media

Over the years, CMCC has strengthened its role as source of in-depth analyses and trustworthy information on scientific research on climate change. This has resulted in growing interest by the media in contacting Center experts to obtain information and interviews every time climate change comes to public attention.

CMCC on the media: articles, interviews, op-ed



FINANCIAL REPORT

BALANCE SHEET: ASSETS	2012	2011
A) Receivables from shareholders for contributions due	**281.052**	
B) Fixed assets	**6.195.313**	**4.050.770**
I. Intangible fixed assets	107.718	27.388
II. Tangible fixed assets	6.066.106	4.007.815
III: Financial assets	21.489	15.567
C) Current Assets	**38.915.332**	**29.750.587**
I. Inventories (Work In progress - WIP)	33.654.980	25.693.622
II. Receivlables	648.092	464.129
III. Current financial assets	4.000.000	2.000.000
IV. Cash at hand	612.260	1.592.836
D) Prepayments and accrued income	**255.061**	**486.314**
TOTAL ASSETS	**45.646.758**	**34.287.671**

BALANCE SHEET : LIABILITIES	2012	2011
A) Net Liabilities	**506.043**	**117.770**
Capital	474.736	100.000
Reserve Funds	17.771	11.035
Profit for the year	13.536	6.735
B) Provisions for risks and charges	**35.000**	**0**
C) Employee Severance indemnities	**74.542**	**53.450**
D) Payments from Clients	**23.598.446**	**32.572.438**
E) Accruals and deferred charges	**21.432.727**	**1.544.013**
TOTAL LIABILITIES	**45.646.758**	**34.287.671**

PROFIT AND LOSS	2012	2011
A) Revenues	**12.498.182**	**9.072.825**
Revenues from sales and services	254.378	39.500
Variations in stocks (WIP)	8.046.948	5.186.972
Other revenues	4.196.856	3.846.353
B) Expenses	**12.345.813**	**9.009.506**
Consumable	181.415	70.598
Services	8.905.838	5.706.925
Leases	446.622	215.585
Personnel	499.004	342.104
Depreciation	2.256.312	2.561.214
Other Operating Expenses	56.622	113.080
Difference between revenues and expenses (A-B)	152.369	63.319
C) Financial income and charges	**88.638**	**3.275**
D) Impairment on financial assets	**-**	**-**
E) Extraordinary income and charges	**-173.793**	**1.002**
Results before taxes (A-B±C±D±E)	**67.214**	**67.596**
Income tax expenses - current and deferred	53.678	60.861
a) Current taxes	83.203	60.861
b) Deferred taxes	-29.525	
Profit (loss) for the year	**13.536**	**6.735**

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