cmcc ANNUAL meeting 2014

JUNE 10-13 • MARINA DI UGENTO (LE) •

# *Agenda*

| **Tuesday, 10 June** | |
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| **08.30 – 08.45** | **Welcome**<br>Antonio Navarra |
| **08.45 – 10.45**<br>*Roman Room* | **Climate Modelling Challenges: from short term forecasts to long term projections**<br>Alessio Bellucci // Giovanni Coppini<br>Through the years, the international climate modelling community, also thanks to the coordinating action exerted by the WCRP (in particular through the CMIP model inter comparison efforts), has made substantial progresses in understanding processes and mechanisms governing climate change and variability, providing the scientific basis for the IPCC future climate change assessment.<br>The challenge of addressing societal needs requires a constant knowledge osmosis and dialogue between the scientific community, the operational centres manning atmosphere and ocean weather and seasonal forecasting systems, and the numerous players acting in the wide end-users community. Within this complex landscape, climate modellers play a key role. However, in order to deliver trustworthy and actionable climate information, a number of old unresolved and new, recently emerged, science questions and challenges need to be tackled.<br><br>**Key Questions**<br>• *How can we reduce uncertainty in future climate projections?*<br>• *How can we improve the predictive capabilities of state-of-the-art-models, from short term (submonthly) to multiyear timescales?*<br>• *What are the origins and consequences of systematic model biases?*<br>• *Are changes in the frequency and intensity of extremes predictable?* |
| | **Presentations** |
| 08.50 | *Operational forecasting systems and Sea-Conditions.com* – Rita Lecci |
| 09.00 | *Advancements in Seasonal Forecasting at CMCC* – Stefano Materia |
| 09.10 | *Prediction and predictability challenges: the Indian Summer Monsoon case* – Annalisa Cherchi |
| 09.20 | *Climate-Human-Land interactions: major modelling approaches* – Melania Michetti |
| 09.30 | **Posters**<br>*A1 – Synergies and interactions between climate change policies and air pollution control* (Aleluia L.)<br>*A2 – Regional and global climate scenarios: a comparison of impacts estimate on European agriculture* (Marson P.)<br>A3 – *Linking South Asian summer monsoon and eastern Mediterranean climate in CMIP5 simulations: performance and 21st century projections* (Cherchi A.)<br>*A4 – Ocean forecast value added products: Search and Rescue* (Coppini G.) |
| 09.45 | **Creative workshop & discussion** |
| 10.45 – 11.00 | *Coffee break* |

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| **11.00 – 13.00**<br>*Roman Room* | **Global to coastal ocean: issues on modelling and big data**<br>Giovanni Aloisio // Simona Masina // Nadia Pinardi<br>With the recent increase in the CMCC computational power, more modeling groups are conducting high-resolution ocean-ice simulations from the global to the coastal scales.<br>These activities open several new challenges, from the physical to the computational aspects of numerical modeling.<br>The current models do not fully exploit the computational architectures at petascale. The computational performance of climate models, measured in terms of floating-point operations per seconds, reach at the most the 5% of the peak performance provided by the hardware. According to the roadmap on future computing architectures, exascale machines are expected to be available by 2020, which implies that strong efforts are needed to re-design the ocean/climate models codes using "co-design" approaches.<br>On the other hand, the output of high-resolution model simulations consists of large volumes of data that need to be post-processed, analyzed and visualized in order to distill knowledge and insights. This workflow involves several big data challenges and need to be implemented through a set of different tools like scripts, libraries, command line interfaces, visualization and analysis software, which are today mostly sequential. Such an approach is not adequate with the current size of data and will definitely fail in the near exascale future.<br>**Key Questions**<br>• *Which are the on-going efforts for global and regional high-resolution ocean modeling?*<br>• *What are the main challenges to move toward next generation models ready for exascale architectures?*<br>• *Can new numerical approaches such as parallelization in time bring the models toward high level of scalability (order of 100.000.000 of cores)?*<br>• *What are the key issues and promising approaches to efficiently move from big volumes of data to knowledge?* |
| | **Presentations** |
| 11.05 | *Towards next generation climate models at high resolution: the computational perspective* – Silvia Mocavero |
| 11.15 | *Ophidia: big data analytics for eScience* – Sandro Fiore |
| 11.25 | *Modeling the sea ice-ocean system at eddy-resolving resolution* – Dorotea Iovino |
| 11.35 | *Adriatic-Ionian Seas and coastal ocean modeling* – Stefania Ciliberti and Ivan Federico |
| 11.45 | **Posters**<br>*B1 – The CMCC Data Platform* (Marra O. et al)<br>*B2 – Ophidia: toward big data analytics for climate change* (Fiore S. et al)<br>*B3 – EUBrazil Cloud Connect: Integrating Services for heterogeneous infrastructures* (Aloisio G. et al)<br>*B4 – NEMO performance analysis and scalability results* (I. Epicoco et al)<br>*B5 – The new CMCC Climate System Model* (Fogli P.G. et al)<br>*B6 – Simulation of Barotropic and Baroclinic Tides in the Adriatic Sea with NEMO* (Wang D. et al)<br>*B7 – Denmark Strait Circulation Scheme In An Eddy-resolving Model* (Iovino D. et al.)<br>*B8 – Factors responsible for max water levels along the Mediterranean coast and their representation in numerical models* (Lionello P., Conte D., Marzo L., Scarascia L.)<br>*B9 – PC Interactive Demonstration: VISIR ship routing system* (Mannarini G.) |
| 12.00 | ***Creative workshop & discussion*** |
| 13.00 – 14.00 | *Lunch* |

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| **14.00 – 16.00**<br>*Roman Room* | **Back to Regional Climate Aspects**<br>Pasquale Schiano // Donatella Spano<br>It is recognized that future CC impacts will vary among regions (sub-continents). In the AR5, the attention is focused on risk consideration and its management through adaptation strategies from the local to the national level. This important approach has been made possible through the new modelling achievements on the analysis of the climate change impacts.<br>So that, this session focuses on recent advances in modeling techniques to investigate regional aspects of CC impacts, risk (and its components such as exposure, vulnerability, and hazard), adaptation and mitigation strategies, with emphasis on uncertainty assessment and evaluation.<br>**Key Questions**<br>• *Which are the available techniques to simulate regional impact from local to broader scale?*<br>• *How to embed these approaches to implement national or local adaptation strategies, policies, and planning?*<br>• *To what extent uncertainty is known? Assessment and evaluation: approaches, methodologies, results.* |
| | **Presentations** |
| 14.05 | *Assessment of performances of bias correction approaches for the evaluation of slow movements in clayey slopes under the effect of climate changes* – Guido Rianna |
| 14.15 | *Likelihood based evaluation of climate change impacts on natural ecosystems in the Euro-Mediterranean region* – Monia Santini |
| 14.25 | *Modelling agricultural systems at European scale by implementing a geo spatial platform DSSAT-CSM based* – Valentina Mereu |
| 14.35 | *Climate change impacts on fire exposure: the Italian case study* – Valentina Bacciu |
| *14.45* | **Posters**<br>*C1 – Hydrological simulations driven by RCM climate scenarios at basin scale in the Po river in Italy* (Vezzoli R., Zollo A., Montesarchio M., Zenoni E., Pecora S., Mercogliano P.)<br>*C2 – A new dataset of EO snow cover maps generated from MODIS products: potentiality for hydrologic and climate studies on the Alps* (Da Ronco P., De Michele C., Montesarchio M.)<br>*C3 – Delta change variations in extreme values of precipitation for the next century in Central Campania* (Rianna G., Guarino F., Vezzoli R., Cattaneo L., Mercogliano P.)<br>*C4 – Uncertainties on irrigation demand and productivity to support future population in Africa* (Mancosu N., Mereu V., Snyder R., Spano D.)<br>*C5 – Uncertainty in simulating crop production considering different climate projections and downscaling methods in sub-Saharan Africa* (Mereu V., Gallo A., Carboni G., Spano D.)<br>*C6 – Past, present and future variations of fire danger predicted by wildfire simulation systems: a case study in North-East Sardinia* (Arca B., Pellizzaro G., Duce P., Scoccimarro E., Santini M., Bacciu V.)<br>*C7 – Preliminary analysis of COSMO CLM over the Alpine area using a very high grid resolution configuration* (Montesarchio M., Mercogliano P.)<br>*C8 – On the coexistence of Mediterranean oaks having different hygrophilia* (Di Paola A., Paquette A., Trabucco A., Valentini R. and Paparella F.) |

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| | *C9 – Projections of vegetation shifts in Mediterranean Area* (Costa Sauro J.M., Mereu S., Trabucco A., Spano D.) |
| *15.00* | ***Creative workshop & discussion*** |
| 16.00 – 16.15 | *Coffee break* |
| 16.15 – 17.15<br>*Greek Room* | **POSTER SESSION** |
| 21.30 | **CMCC: THE GAME** |

| Wednesday, June 11 | |
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| **08.30 – 08.45** | **Opening**<br>Antonio Navarra |
| **08.45 – 10.45**<br>*Roman Room* | **Towards an integrated assessment of climate related impacts and associated risks: methodologies, tools and applications**<br>Silvio Gualdi // Riccardo Valentini<br>A robust and reliable assessment of the climate related impacts and associated risks requires an integrated approach, where interactions and feedbacks between the different sources of impacts are properly considered and accounted for in a systemic way. Beside, the knowledge produced by the scientific community often needs to be translated into user oriented and tailored products in order to provide simple, effective and usable information.<br>The main objective of this session is to illustrate and discuss methodologies and tools aimed at the integration of the various climate related impacts, either already existing or in development at CMCC. In particular we will focus on tools and methodologies aimed at:<br>i) allowing a simple and user friendly access, manipulation and visualization of the massive amount of model outputs produced by the Centre;<br>ii) improving and increase the models' integration in the CMCC modelling chain;<br>iii) enhance transferability and synthesis capacity across disciplines, sectors, regions and scales.<br>**Key Questions**<br>• *What is still missing and should be prioritized in order to reach a more comprehensive, solid and efficient integration of the scientific knowledge on climate change and related impacts at multiple spatial-temporal scales and complexity levels?*<br>• *What are the available application examples and further promising approaches to efficiently communicate produced data, translating them into insight?*<br>• *How optimizing the ongoing manifold efforts and developments toward unifying languages, platforms and analysis methods into a common framework of modular tools?* |
| | **Presentations** |
| 08.50 | *Clime: analyzing climate data in GIS environment* – Luigi Cattaneo |
| 09.00 | *Galahad - Lancelot's companion* – Alex Zabeo |
| 09.10 | *GIS DSSAT: GIS spatial platform analyzing yield and crop risk for climate time-series geodatasets* – Antonio Trabucco |
| 09.20 | *Economic downscaling with CGE models, improving the "dialogue" across impact types"* – Francesco Bosello |
| 09.30 | **Posters**<br>*D1 – Assessing the consequences of climate change on extreme pluvial floods in urban areas: a tailored risk tool for local stakeholders of the municipality of Venice* (Sperotto A., Torresan S., Gallina V., Critto A., Furlan E., Marcomini A.)<br>*D2 – Assessing the impacts of climate change on marine water quality through a spatially resolved risk assessment approach: the North Adriatic Sea (Italy) as case study* (Rizzi J., Torresan S., Zabeo A., Critto A., Brigolin D., Carniel S, Pastres R., Marcomini A.)<br>*D3 – A Web Map of Hot Spot Analysis applied to Mediterranean forest presence* (Noce S., Santini M., Valentini R.) |

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| | *D4 - ICCG Observatories: Actors, Policy and Best Practices on Climate Governace* (Davide M.)<br>*D5 - Assessing the economic general equilibrium effects of Sea Level Rise in the Italian Regions* (Standardi G.)<br>*D6 – Revealing the Willingness To Pay for income insurance in agriculture* (Perez Blanco D.) |
| 09.45 | ***Creative workshop & discussion*** |
| 10.45 – 11.00 | *Coffee break* |
| 11.00 – 13.00<br>*Roman Room* | **Mitigation and Adaptation Policies**<br>Francesco Bosello // Sergio Castellari<br>Climate change impacts have a clear site specific and local characterization. This implies that also mitigation policies, which are traditionally considered as top-down actions decided at the national or even global level, have important local differentiations in costs and benefits. Needless to say, adaptation strategies and plans are also strongly dependent upon local specificities. Furthermore the recent released EU Adaptation Strategy (April 2013) encourages the EU Member States to adopt comprehensive adaptation strategies and provides funding to help them build up their adaptation capacities and take action, in particular at the urban level (LIFE funding). Aim of this session is thus to focus on local aspects of impacts, mitigation and adaptation spurring the discussion on the direction that CMCC research and modelling effort should/could take to better capture these aspects and on the role it can/wants to play as support to the policy decision making process. A crucial issue is the potential for integration across CMCC divisions and expertise that, especially in the field of impact and adaptation analysis, can be particularly fruitful.<br>**Key Questions:**<br>• *In which direction should/could modelling techniques developed and under development at CMCC move to capture cost and benefits of adaptation at the appropriate "micro" scale? What is the potential to integrated different disciplines?*<br>• *Along this vein, urban adaptation is emerging as a key topic at European level – which is the potential role of opportunity for CMCC in developing proposals and conduct research in this area?*<br>• *After the completion of the Italian national adaptation strategy, the next step will be the adaptation plan. What are the opportunities and obstacles related to its implementation? Which kind of research and support to policy making can CMCC provide?* |
| | **Presentations** |
| 11.05 | *Climate change impacts and market driven adaptation: The costs of inaction including market rigidities* – Francesco Bosello |
| 11.15 | *The challenge of urban adaptation to climate change: the Life program* – Sergio Castellari |
| 11.25 | *Georeferenced economic model* – Lurent Drouet |
| 11.35 | *Urban climate: How reliable are regional climate models?* – Paola Mercogliano |
| 11.45 | **Posters**<br>*E1 - Which role for biodiversity under a changing climate?* (Di Paola A., Cazzolla Gatti R., Valentini R.)<br>*E2 - Integrated tools to evaluate mitigation strategies in urban environment* (Marras S.) |
| 12.00 | ***Creative workshop & discussion*** |
| 13.00 – 14.00 | *Lunch* |

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| **14.00 – 16.00**<br>*Roman Room* | **Assessing and managing the risks of climate change and extremes to improve decision-making**<br>*Alessandro Lanza // Monia Santini // Massimo Tavoni // Silvia Torresan*<br><br>According to the Fifth Assessment Report of the IPCC (AR5, 2014) and to the Special Report on Extreme Events (SREX, 2012), the development of multi-disciplinary methodologies integrating climate science with environmental, social and economic sciences for the assessment of impacts, vulnerability and risks related to climate change is essential in order to understand how sectoral and cumulative risks from climate change can be reduced through effective adaptation and mitigation strategies. This session will present and discuss more recent research achievements of CMCC in the field of uncertainty and risks with the aim to improve science-based decision-making and facilitate the definition of mitigation and adaptation solutions for different societal and environmental challenges.<br><br>In particular, the session is intended to: i) coordinate and cluster CMCC research activities (e.g. physical impact modeling, environmental and socio-economic assessment) in relation to the concept of risk and uncertainty, which was recently being acknowledged by IPCC as key concept to support decision-making in the context of global climate change; ii) to develop a more standardized basis (including shared definitions of key concepts) towards the identification of transferable and widely applicable methodologies for assessing potential impacts, vulnerabilities and risks of climate change; iii) to provide an overview of methodologies and case studies from varying geo-climatic and socio-economic contexts, tailored to the needs of different end-users (e.g. public and private sectors).<br><br>**Key Questions**<br>• *How to harmonize risk-based approaches developed at CMCC toward the use of more standardized methods for risk and vulnerability assessment?*<br>• *How to combine the environmental risk assessment expertise with the socio-economic valuation of costs and benefits associated to risk?*<br>• *How to integrate the huge amount of spatial temporal information about climate change and extremes, the related physical impacts (e.g. sea level rise, floods, drought) and the assessment of exposure and vulnerability in order to identify key risks across sectors and regions?*<br>• *How to translate information about long term climate change and extreme events into risk indicators and services to better inform decision makers?*<br>• *How to adequately assess the multiple impacts of climate change in different regions, sectors and case studies to provide a systemic approach for multi-hazard risk management?*<br>• *How to communicate the uncertainties characterizing climate change?* |
| | **Presentations** |
| 14.05 | *Developing climate risk and adaptation services through multi-disciplinary research: the bottom-up approach adopted in the North Adriatic coastal region* – Silvia Torresan |
| 14.15 | *Analysis of extreme events in Italy using the regional model COSMO-CLM* – Paola Mercogliano |
| 14.25 | *Economic impacts of flooding under current and future climate* – Lorenzo Carrera |
| 14.35 | *Risk perception and communication in climate change* – Valentina Bosetti |
| 14.45 | **Posters**<br>*F1 – Assessing the risk of flooding: application of the KULTURisk Regional Risk Assessment Methodology in Zurich* (Critto A.)<br>*F2 – Multi-risk concepts and methodologies: from natural hazards to climate change* (Torresan S.) |

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| | *F3 - Priority research areas for risk analysis for extreme events* (Carrera L.)<br>*F4 – Optimal Abatement Policy in the Presence of Model Uncertainty and the possibility of AMOC Collapse* (Tavoni M.) |
| 15.00 | ***Creative workshop & discussion*** |
| 16.00 – 16.15 | *Coffee break* |
| 16.15 – 17.15<br>*Greek Room* | **POSTER SESSION & BEST POSTER POLL** |
| 21.30<br>*Dinner Room* | **CMCC AWARDS CEREMONY** |
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| **Thursday, 12 June** | |
| 09.30 – 12.30 | **PROJECT PROPOSALS MARKETPLACE!** |

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# Meeting of the CMCC Scientific Advisory Panel

| **Thursday, 12 June** | | |
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| 08.30 – 09.00 | Welcome Message (A. Navarra & G.R. Asrar) | *Greek Room* |
| 09.00 – 10.00 | Presentation of CMCC Division activities (SERC Division Director) | |
| 10.00 – 10.30 | *Coffee Break* | |
| 10.30 – 11.30 | Presentation of CMCC Division activities (CIP Division Director) | |
| 11.30 – 12.30 | Presentation of CMCC Division activities (ISC Division Director) | |
| 12.30 – 14.00 | *Lunch* | |
| 14.00 – 15.00 | Presentation of CMCC Division activities (IAFENT Division Director) | |
| 15.00 – 16.00 | Presentation of CMCC Division activities (ANS Division Director) | |
| 16.00 – 16.15 | *Coffee Break* | |
| 16.15 – 17.15 | Presentation of CMCC Division activities (SCO Division Director) | |
| 17.15 – 17.45 | Discussion and end of the session | |

| **Friday, 13 June** | | |
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| 08.30 – 10.30 | SAP internal discussion & report writing | Etruscan Room |
| 10.30 – 11.00 | *Coffee Break* | |
| 11.00 – 13.00 | SAP internal discussion & report writing | |
| 13.00 – 14.30 | *Lunch* | |
| 14.30 – 16.00 | SAP internal discussion & report writing | |
| 16.00 – 16.30 | Coffee and closure of the meeting | |