MINISTERIO
DE ECONOMÍA Y
COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS JUAN DE LA CIERVA-INCORPORACIÓN
HISTORIAL CIENTÍFICO-TÉCNICO DE LOS ÚLTIMOS CINCO AÑOS DEL EQUIPO DE INVESTIGACIÓN
(SCIENTIFIC/TECHNICAL RECORD DURING THE LAST FIVE YEARS OF THE RESEARCH TEAM*)*

Según el artículo 75 de la convocatoria el equipo de investigación es el compuesto por el personal investigador que desarrolla la línea de investigación en la que se integrará el investigador candidato.
(According to what is established in article 75 of Call Resolution, the research team is defined as the one formed by the researchers developing the research line in which the candidate is to participate)

Especificar los trabajos de investigación desarrollados, publicaciones, proyectos, patentes, la capacidad formativa pre y posdoctoral y cualquier otro aspecto de interés, haciendo especial referencia a los méritos del investigador tutor del investigador candidato.
(Please specify the research work that the team has developed, publications, funded projects, patents, capacity for providing guidance and training and any other aspect that may be of interest, with a special reference to the merits of the tutor investigator of the candidate)

CUMPLIMENTAR PREFERIBLEMENTE EN INGLÉS – FILL IN BETTER IN ENGLISH

The candidate, Dr. Neven-Stjepan Fučkar, plans to conduct research in climate dynamics and prediction with, and work on the development of, a state-of-the-art climate general circulation model (GCM) at the Earth Sciences department at the Barcelona Supercomputing Center - Centro Nacional de Supercomputación, and his tutor investigator is the head of the Earth Sciences department, ICREA Prof. Francisco J. Doblas-Reyes.

The Barcelona Supercomputing Center – Centro Nacional de Supercomputación (BSC-CNS) is the National Supercomputing Facility of the Spain. BSC-CNS manages MareNostrum III with 48,128 cores and 1.1 Pflops capacity, one of the most powerful supercomputers in Europe located in the former Torre Girona chapel in Barcelona. BSC-CNS also hosts other high-performance computing (HPC) systems such as MinoTauro, one of the most energy efficient supercomputers in the world. The mission of BSC-CNS is to research, develop and manage information technology in order to facilitate scientific and technological progress. At the BSC-CNS, more than 350 researchers and students from more than 40 different countries perform research in Computer Sciences, Life Sciences, Earth Sciences and Computational Applications in Science and Engineering. This multi-disciplinary approach and the combination of world-leading researchers and HPC experts with state-of-the-art HPC resources make BSC-CNS a unique research institution.

BSC-CNS is located on a campus of the Technical University of Catalonia (Universitat Politècnica de Catalunya - UPC) and has an agreement with the UPC to use university facilities and services. Furthermore, many of the group leaders at BSC-CNS are also university professors with broad knowledge and experience in advance research and teaching, i.e., the BSC-CNS substantially contributes to and benefits from UPC higher educational environment. The BSC-CNS is a key element of, and it coordinates, the Spanish Supercomputing Network, which is the main framework for granting competitive HPC time to Spanish research institutions. Also, BSC-CNS is one of six hosting nodes in France, Germany, Italy and Spain that form the core of the Partnership for Advanced Computing in Europe (PRACE) network. PRACE provides competitive computing time on world-class supercomputers to researchers in the 25 European member countries. BSC-CNS has been accredited as one of the first eight Severo Ochoa Centers of Excellence. This award is given by the Government of Spain as recognition of leading research centers in Spain that are internationally well known institutions in their respective areas. Specifically, BSC-CNS received Severo Ochoa Center of Excellence support and accreditation starting in January 2012 based on accomplishments in scientific research and engineering, applying exascale supercomputers and big data management to tackle major societal problems in areas such as human health and biomechanics, and environment and climate.

The Earth Sciences department of the Barcelona Supercomputing Center (ES-BSC) was established with the objective of conducting multi-facet research in Earth system modelling. ES-BSC focuses research on atmospheric emissions, air quality, mineral dust transport, and global and regional climate modelling and prediction. The ES-BSC works on the development of and conducts research with a multi-scale set of comprehensive single-component and coupled general circulation models. For example, the high-resolution (horizontally from 12 km down to 1 km) air quality forecasting system CALIdad del aire Operacional Para España (CALIOPE) provides essential variables at hourly frequency to the end-users interested in monitoring and reducing the impact of air pollution on human health at Europe-wide domain down to the national level or specific local hot spots. The team also developed a smart phone application CALIOPE: Air Quality that provides free air quality information all around Spain at city and regional level. Furthermore, ES-BSC is developing and operating an integrated meteorology-air-quality Nonhydrostatic Multiscale Meteorological Model on the B grid/BSC Chemical Transport Model (NMMB/BSC-CTM), an advance chemical weather prediction system for applications on global to regional domains at sub-synoptic and mesoscale resolutions. ES-BSC also uses the BSC-DREAM8b *(*Dust REgional Atmospheric Model 8b) model for daily operational mineral dust forecasts for the Euro-Mediterranean region and collaborates with the UN World Meteorological Organization (WMO) and the Spanish Meteorological Agency (Agencia Estatal de Meteorología - AEMET) to host the Regional Center for Sand and Dust Warming System (SDS-WAS) covering Europe, Northern Africa and the Middle East. In parallel, ES-BSC has developed a versatile regional climate modelling capability with the Advanced Research WRF (Weather and Research Forecasting model), and its predecesor MM5 (Fifth-Generation PSU/NCAR Mesoscale Model**)** in different configurations covering Spain and Catalonia to explore impacts of the climate change and benefit possible adaptation policies in the future. ES-BSC also provides scientific consultancy, assessment services, and impact studies to private and public entities upon request.

ES-BSC research activities with the focus on global climate modelling and prediction are based on research, development and predictions with the EC-Earth climate forecast system. EC-Earth is the state-of-the art coupled climate model that is being developed and used for climate predictions and projections by the European consortium of more than 20 operational and research institutions including the BSC-CNS. Besides contributing to the 5th phase of the Coupled Model Intercomparison Project (CMIP5), which is one of the key datasets used to produce the UN Intergovernamental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5), global climate research activities at the BSC enabled production of historical global climate reconstructions and initial conditions for the EC-Earth community. Such data is critical for analysis of climate dynamics and initialization of seasonal-to-decadal climate predictions. The ES-BSC is an important contributor to the Infrastructure for the European Network for Earth System modeling – Phase1 and Phase2 (IS-ENES1 and IS-ENSE2). They are FP7 European projects fostering the integration of the European climate modelling community and the development of Earth System Models (ESM) for advancing the understanding and predictions of climate variability and change. ES-BSC is already active in the planning of the next phase of coupled climate model intercomparison project, CMIP6, and is preparing to make core contributions including the groundbreaking high-resolution global climate simulations with EC-Earth (with horizontal spacing of 0.25° in the ocean and 25 km in the atmosphere).

The tutor investigator of the candidate is ICREA Research Prof. Francisco J. Doblas-Reyes who is the director of the ES-BSC. Prof. Doblas-Reyes obtained his Ph.D. in Physics with honors at the Universidad Complutense de Madrid in 1996. After finishing his Ph.D. thesis, “Atmospheric blocking: GCM simulation and associated precipitation patterns”, he continued to work extensively on weather and climate modeling and prediction, as well as on climate services, for more than 18 years at research and operational institutions in Spain, France and the United Kingdom. Before becoming the director of the ES-BSC, Prof. Doblas-Reyes was working in Spain at the Instituto Nacional de Técnica Aerospacial (INTA, Torrejón de Ardoz, Madrid) and also at the Institut Català de Ciències del Clima, (IC3, Barcelona). In France, he worked at the Centre National de Recherches Météorologiques (CNRM, Météo-France, Toulouse). In the UK, Prof. Doblas-Reyes worked at the European Centre for Medium-Range Weather Forecasts (ECMWF, Reading) for 10 years. At ECMWF, among other things, he worked on seasonal climate forecasting in two groundbreaking European projects, the Development of a European Multimodel Ensemble system for seasonal to inTERannual prediction (DEMETER) and the Ensembles-Based Predictions of Climate Changes and Their Impacts (ENSEMBLES) that led to the development of operational products on climate prediction and risk estimate. These are very significant accomplishments for the development of EC-Earth because its atmospheric and land components are based on ECMWF operational seasonal forecast system. Prof. Doblas-Reyes is very well regarded in the weather and climate research and operational community, having received in 2006 the Norbert Gerbier-MUMM International Award of the UN World Meteorological Organization (WMO).

Prof. Doblas-Reyes is involved in the development of the EC-Earth climate forecast system since its inception and under his guidance the candidate will further develop and use EC-Earth for climate modeling, and sub-seasonal, seasonal and longer climate predictions. Prof. Doblas-Reyes serves on scientific panels of the World Climate Research Programme (WCRP) and the World Weather Research Programme (WWRP) under the UN WMO, is a member of the European Network for Earth System modelling HPC Task Force and has participated in numerous national and European FP4 and FP7 projects. Currently, Prof. Doblas-Reyes is the principal investigator (PI) or co-investigator in 6 FP7 European projects, and supervises numerous postdoctoral scientists and software engineers. He has led 16 Red Española de Supercomputación (RES) projects using supercomputing resources at the BSC-CNS and won 50 Million hours of computing time for the High Resolution

Ensemble Climate Modeling project through the PRACE network. Prof. Doblas-Reyes was a lead author of the chapter 11, "Near-term Climate Change: Projections and Predictability", in the UN IPCC AR5 Working Group I – The Physical Sciences Basis report. Overall, Prof. Doblas-Reyes has authored and co-authored more than 100 peer-reviewed papers and other publications on climate modeling and prediction, as well as climate services, and currently has 4877 citations, in total, on Google scholar with h-index 36 and i10-index 71 (of which 3272 has been gained over the last 5 years with h-index 30 and i10-index 65). Combined, Prof. Doblas-Reyes and the other members of ES-BSC have published more than 300 peer-reviewed articles and other publications over the last 5 years.

Prof. Doblas-Reyes is working to further the ES-BSC plan for the development of weather and climate modelling services that utilizes the latest developments of HPC and Big Data research to make them available to the Earth sciences community and various stakeholders. The strategic goals are to advance weather and climate research as well as services to improve the resilience of the European society to weather, air quality and near-term climate extremes building on the accomplishments of the ES-BSC and collaborating institutions. Overall, the ES-BSC has been active in numerous national projects such as, only to mention few, CALIOPE COVARIANCE and the Earth Science work package in the SyeC Consolider Program, as well as FP6, FP7 and other European projects such as IS-ENES, IS-ENES2, APPRAISAL, FIELD_AC, MACC-II, ACTRIS and EARLINET (for more information see the list of selected projects below the list of selected publications). The ES-BSC has participated in 4 Initial Training Networks (ITN) from FP7 program and one from Horizon2020 program, and is continuously involved in the organization of numerous summer schools (e.g., European Network for Earth System modelling schools), workshops and other training events (e.g., PRACE Advanced Training Centre, PATC, courses) related to the use of HPC resources in atmospheric and climate modelling.

ES-BSC has a great capacity for training of postdoctoral researchers and students, and has made a strong impact on their career development. Former postdocs and Ph.D. students hosted at the ES-BSC hold positions in several well-known scientific institutions and energy companies around the globe, such as the NASA Goddard Institute for Space Studies in USA (Dr. Carlos Përez García-Pando), the School of Geography and Environment at the Unviersity of Oxford in UK (Dr. Karsten Haustein) and EnBW Energie Baden-Württemberg AG in Germany (Dr. Matthias Piot). Furthermore, some of ES-BSC alumni have already become leading university researchers and professors, such as Prof. René Parra Narváez (Universidad San Francisco de Quito, Ecuador), Prof. Henry Flores Tovar (University of Caracas, Venezuela), Prof. Luis A. García Leyton (Universidad Veracruzana, Mexico), Dr. Pedro Jiménez Guerrero (Universidad de Murcia, Spain), Prof. Leonor Patricia Güereca Hernández (National Autonomous University of Mexico, Mexico), Prof. Carlos Antonio Caballero Valdés (Técnológico de Monterey, Mexico), Dr. María Gonçalves Ageitos (UPC and ES-BSC) and Dr. Oriol Jorba Casellas (ES-BSC). More information about Ph.D. thesis with research conducted at EC-BSC see the recent Ph.D. list below the list of selected projects.

● Selected publications of Prof. Doblas-Reyes and rest of the ES-BSC team:

1. Doblas-Reyes, F.J., I. Andreu-Burillo, Y. Chikamoto, J. García-Serrano, V. Guemas, M. Kimoto, T. Mochizuki, L.R.L. Rodrigues and G.J. van Oldenborgh (2013). Initialized near-term regional climate change prediction. *Nature Communications,* 4, 1715, doi:10.1038/ncomms2704.

2. Doblas-Reyes, F.J., J. García-Serrano, F. Lienert, A. Pintó Biescas and L.R.L. Rodrigues (2013). Seasonal climate predictability and forecasting: status and prospects. *WIREs Climate Change*, doi:10.1002/WCC.217.

3. Guemas, V., F.J. Doblas-Reyes, I. Andreu-Burillo and M. Asif (2013). Retrospective prediction of the global warming slowdown in the past decade. *Nature Climate Change*, 3, 649-653, doi:10.1038/nclimate1863

4. van Oldenborgh, G.J., F.J. Doblas Reyes, S.S. Drijfhout and E. Hawkins (2013). Reliability of regional climate model trends. *Environmental Research Letters*, 8, 014055, doi:10.1088/1748-9326/8/1/014055.

5. van Oldenborgh G.J., F.J Doblas-Reyes, B. Wouters, W. Hazeleger (2012), Decadal prediction skill in a multi-model ensemble, *Climate Dynamics,* 38, 1263-1280.

6. Doblas-Reyes F.J., A Weisheimer, M Déqué, Noel Keenlyside, M McVean, J.M. Murphy, P Rogel, D Smith, T.N. Palmer (2009), Addressing model uncertainty in seasonal and annual dynamical ensemble forecasts, *Quarterly Journal of the Royal Meteorological Society,* 135(643), 1538-1559

7. García-Serrano, J., V. Guemas and F.J. Doblas-Reyes (2014). Added-value from initialization in predictions of Atlantic multi-decadal variability. *Climate Dynamics*, doi:10.1007/s00382-014-2370-7.

8. Rodrigues, L.R.L., J. García-Serrano and F.J. Doblas-Reyes (2014). Seasonal forecast quality of the West African monsoon rainfall regimes by multiple forecast systems. *Journal of Geophysl Research*, 119, 7908-793.

9. Pérez C., Stanton M., Diggle P., Trzaska S., Hugonnet S., Miller R., Perlwitz J.P., Baldasano J.M., Cuevas E, Thomson M. (2014), Seasonal meningitis forecasting based on climate data in sub-Saharan Africa: the Niger case. *Environmental Health Perspectives* 122, 679–686

10. Guemas, V., J. García-Serrano, A. Mariotti, F.J. Doblas-Reyes and L.-P. Caron (2014). Prospects for decadal climate prediction in the Mediterranean region. *Quarterly Journal of the Royal Meteorological Society*, doi:10.1002/qj.2379.

11. Meehl, G.A., L. Goddard, G. Boer, R. Burgman, G. Branstator, C. Cassou, S. Corti, G. Danabasoglu, F.J. Doblas-Reyes, E. Hawkins, A. Karspeck, M. Kimoto, A. Kumar, D. Matei, J. Mignot, R. Msadek, H. Pohlmann,

M. Rienecker, T. Rosati, E. Schneider, D. Smith, R. Sutton, H. Teng, G.J. van Oldenborgh, G. Vecchi and S. Yeager (2014). Decadal climate prediction: An update from the trenches. *Bulletin of the American Meteorological Society*, 95, 243-267, doi:10.1175/BAMS-85-6-853.

12. Pandolfi M, Querol X, Alastuey A, Jimenez JL, Jorba O, Day D, Ortega A, Cubison MJ, Comerón A, Sicard M, et al. (2014), Effects of sources and meteorology on particulate matter in the Western Mediterranean Basin: An overview of the DAURE campaign, *Journal of Geophysical Research: Atmospheres*,119, 4978–5010.

13. Guemas, V., E. Blanchard-Wrigglesworth, M. Chevallier, J.J. Day, M. Déqué, F.J. Doblas-Reyes, N.S. Fučkar, A. Germe, E. Hawkins, S. Keeley, T. Koenigk, D. Salas y Mélia and S. Tietsche (2014). A review on Arctic sea ice predictability and prediction on seasonal-to-decadal timescales. *Quarterly Journal of the Royal Meteorological Society*, doi:10.1002/qj.2401

14. Gonçalves M., Barrera-Escoda A., Guerreiro D., Baldasano J.M., Cunillera J. (2014) Seasonal to yearly assessment of temperature and precipitation trends in the North Western Mediterranean Basin by dynamical downscaling of climate scenarios at high resolution (1971–2050). *Climatic Change* 122, 243-256.

15. Barrera-Escoda A, Gonçalves M, Guerreiro D, Cunillera J, Baldasano JM (2014), Projections of temperatura and precipitation extremes in the North Western Mediterranean Basin by dynamical downscaling of climate scenarios at high resolution, *Climatic Change*,122(4):567-582.

16. Pay MT, Martínez F, Guevara M, Baldasano JM (2014). Air quality forecasts on a kilometer-scale grid over complex Spanish terrains. *Geoscientific Model Development* 7, 1979–1999

17. Pavan, V. and F.J. Doblas-Reyes (2013). Calibrated multi-model ensemble summer temperatura predictions over Italy. Climate Dynamics, 41, 2115-2132, doi:10.1007/s00382-013-1869-7.

18. Guevara M, Martínez F., Arévalo G., Gassó S , Baldasano J.M. (2013). An improved system for modelling Spanish emissions: HERMESv2.0. *Atmospheric Environment* 81, 209 - 221

19. Du, H., F.J. Doblas-Reyes, J. García-Serrano, V. Guemas, Y. Soufflet and B. Wouters (2012). Sensitivity of decadal predictions to the initial atmospheric and oceanic perturbations. *Climate Dynamics*, 39, 2013-2023.

20. Haustein K, Pérez C, Baldasano JM, Jorba O, Basart S, Miller RL, Janjic Z, Black T, Nickovic S, Todd MC, Washington R, Müller D, Tesche M, Weinzierl B, Esselborn M, Schladitz A (2012). Atmospheric dust modeling from meso to global scales with the online NMMB/BSC-Dust model - Part 2: Experimental campaigns in Northern Africa. *Atmospheric Chemistry and Physics* 12, 2933 - 2958.

21. van den Hurk, B., F.J. Doblas-Reyes, G. Balsamo, R. Koster, S. Seneviratne and H. Camargo Jr. (2012). Soil moisture effects on seasonal temperature and precipitation forecast scores in Europe. *Climate Dynamics*, 38, 349-362, doi:10.1007/s00382-010-0956-2

22. Baldasano J.M., Pay M.T., Jorba O., Gassó S., Jiménez-Guerrero P. (2011). An annual assessment of air quality with the CALIOPE modeling system over Spain. *Science of the Total Environment*, 409 (11): 2163-2178, doi: 10.1016/j.scitotenv.2011.01.041

23. Weisheimer, A., T.N. Palmer and F.J. Doblas-Reyes (2011). Assessment of representations of model uncertainty in monthly and seasonal forecast ensembles. *Geophysical Research Letters*, 38, L16703,

24. Pay MP, Jiménez-Guerrero P, Baldasano JM (2011). Implementation of resuspension from paved roads for the improvement of CALIOPE air quality system in Spain. *Atmospheric Environment*, 45 (3): 802-807, doi:10.1016/j.atmosenv.2010.10.032

25. Doblas-Reyes, F.J., M.A. Balmaseda, A. Weisheimer and T.N. Palmer (2011). Decadal climate prediction with the ECMWF coupled forecast system: Impact of ocean observations. *Journal of Geophysical Research: Atmosphere*, 116, D19111, doi:10.1029/2010JD015394

26. Pérez C, Haustein K, Janjic Z, Jorba O, Huneeus N, Baldasano JM, Black T, Basart S, Nickovic S, Miller RL, Perlwitz JP, Schulz M, Thomson M (2011). Atmospheric dust modeling from meso to global scales with the online NMMB/BSC-Dust model – Part 1: Model description, annual simulations and evaluation. *Atmospheric Chemistry and Physics*, 11 (24): 13001–13027, doi: 10.5194/acp-11-13001-2011

27. Weisheimer, A., F.J. Doblas-Reyes, T. Jung and T.N. Palmer (2011). On the predictability of the extreme summer 2003 over Europe, *Geophysical Research Letters*, 38, L05704, doi:10.1029/2010GL046455

28. Philippon, N., F.J. Doblas-Reyes and P. Ruti (2010). Skill, reproducibility and potential predictability of the West African monsoon in coupled GCMs. *Climate Dynamics*, 35, 53-74, doi:10.1007/s00382-010-0856-5

29. Gonçalves M, Jiménez-Guerrero P, Baldasano JM (2009). Contribution of atmospheric processes affecting the dynamics of air pollution in South-Western Europe during a typical summertime photochemical episode. *Atmospheric Chemistry and Physics*, 9, 849-864

30. Palmer T.N., F.J. Doblas-Reyes, A. Weisheimer, M.J. Rodwell (2008), Toward seamless prediction: Calibration of climate change projections using seasonal forecasts, *Bulletin of the American Meteorological Society*, 89(4), 459-470.

● Selected projects of Prof. Doblas-Reyes (as principal investigator or co-investigator) and the ES-ESC:

1. SPECS (Seasonal-to-decadal climate Prediction for the improvement of European Climate Services) is an EU FP7 project (lasting 51 months) supported by 19 European institutions and a Brazilian institution. The main

scientific objective of SPECS is to deliver a new generation of European climate forecast systems and efficient regionalisation tools; these will produce local climate information over land at seasonal-to-decadal time scales with improved forecast quality including a critical prediction of extreme climate events. It aims, among other things, to coalesce many different research efforts with climate services (both public and private).

2. EUPORIAS (EUropean Provision Of Regional Impact Assessment on a Seasonal-to-decadal timescale) is an EU FP7 project (lasting 48 months). The main aim is to develop and deliver a reliable and trusted impact prediction system for two or three semi-operational prototypes. These will provide working examples of end-to-end climate-to-impacts-to-decision-making services operating on seasonal to decadal tim escales. This project is shared by 24 European institutions and it will also assess and document key knowledge gaps and vulnerabilities of important sectors (e.g. water, energy, transport, etc.) along with the needs of specific users in these sectors.

3. PREFACE (enhancing PREdiction oF tropical Atlantic ClimatE and its impacts) is an EU FP7 project (lasting 48 months). It involves 28 institutional partners across 18 countries in Europe and Africa. This project aims to reduce uncertainties in our knowledge of the dynamics of Tropical Atlantic climate, particularly of climate-related ocean processes and circulation, coupled ocean-atmosphere-land interactions, and internal and externally forced climate variability. Also, it plans to improve the simulation and prediction of Tropical Atlantic climate on seasonal and longer time scales, and contribute to better quantification of climate change impacts in the region.

4. EUCLEIA (EUropean CLimate and weather Events: Interpretation and Attribution) is an EU FP7 project. It aims to provide well verified assessments of the extent to which weather-related risks have changed due to human influences on climate, as well as to identify those types of weather events where the science is still too uncertain to make a robust assessment of attributable risk. It gathers experts from 11 academic, research and operational institutions across Europe to develop a system that will deliver reliable and user-relevant attribution assessment on a range of time scales from immediate aftermath of extreme events to seasonal and anual basis.

5. RUCSS (Reducing Uncertainty in global Climate Simulations using a Seamless climate prediction system) is project funded by the Spanish government. The main goal of the RUCSS project is to test the EC-Earth Earth System Model (ESM) in order to constrain the sources of uncertainty in both short-term climate predictions, and longer-term climate-change projections.

6. CLIM-RUN (Climate Local Information in the Mediterranean region Responding to User Needs) is an EU FP7 project. This project aims at developing a protocol for applying new methodologies and improved modeling and downscaling tools for the provision of adequate climate information at regional to local scale that is relevant to and usable by different sectors of society (policymakers, industry, cities, etc.).16 institutions plan to develop a Mediterranean-wide network of climate services that would eventually confluence to a pan-European network.

7. QWeCI (Quantifying Weather and Climate Impacts on Health in Developing Countries) is an EU FP project. QweCI is a consortium of several European climate institutions. This project aims to further understanding of the climate drivers of sevral vector-borne and tick-borne diseases which all have major impact on human and livestock health in Africa, in order to assist with short-term management of these diseases and make projections of their future likely impacts.

8. DENFREE (Dengue research Framework for Resisting Epidemics in Europe) is an EU FP7 project. This multidisciplinary project addresses the key factors that determine dengue fever transmission, outcome of infection and epidèmics. It also aims to develop predictive models and diagnostic surveillance methods of the disease since one of the consequences of climate change will be an increased burden of vector-borne diseases.

9. IS-ENES1 (InfraStructure for the European Network for Earth System modelling - phase 1) is an EU FP7 project. This is an infrastructure project that aims to further integrate the European climate modelling community, to help the definition of a common future strategy, to ease the development of full ESMs, to foster the execution and utilization of HPC simulations, and to support the dissemination of model results and the interaction with the climate change impact community. It also fosters link with the EU large research infrastructures such as PRACE.

10. IS-ENES2 (InfraStructure for the European Network for Earth System modelling - phase 2) is an EU FP7 projects. This is the second phase project of the distributed e-infrastructure of models, model data and metadata of the European Network for Earth System Modelling (ENES). It furthers understanding of climate variability and change, and provides support for HPC simulations and related educational acitivites. This enables improvement of the prediction of climate variability and change, on which EU mitigation and adaptation policies rely on.

11. APPRAISAL (Air Pollution Policies foR Assessment of Integrated Strategies At regional and Local scales) is an EU FP7 project. The project aims to address and assess impact of local and regional air quality plans and their public health implications and it encompasses 15 group with outstanding expertise in this area. This project will perform an overall review of the methodlogies from simple ones (e.g. scenario analysis) to more comprehensive ones (e.g., cost-benefit analysis), design an integrated assessment modeling framework and communicate to key stakeholdes scientific knowledge on emission abatement assessment.

12. Implementation of an on-line coupled chemical mechanism within the NMMB/DREAM global regional atmospheric model is project funded by the Spanish government. The aim of this project is to introduce fully coupled (on-line) chemical mechanisms within the DREAM (Dust Regional Atmospheric Model) model with the objective to develop a chemical weather prediction system able to resolve gas-aerosol-meteorology interactions from a global to local scales. This is a major development with respect to still common approach in which chemical processes in air quality modeling systems are treated independently (off-line) from dynamical models.

13. Development of the air quality forecast system for Spain CALIdad del aire OPerativo para España

(CALIOPE) is project funded by the Spanish government. The project will further advance CALIOPE system developed at the ES-BSC. CALIOPE provides operational air quality forecast for Europe and Spain at high spatial and temporal resolution using a set of models: HERMES emission model, WRF-ARW meteorological model, BSC-DREAM8b model, and CMAQ chemical transport model. Specifically, the aim is to forecast air quality with high skill on hourly base for Europe (12x12 km), the Iberian Peninsula (4x4 km) Andalusia (1x1 km), Canary Islands (2x2 km), Catalonia (1x1 km) and Madrid (1x1 km) by means of nesting techniques

14. FIELD_AC (Fluxes, Interactions and Environment at the Land-ocean boundary - Downscaling, Assimilation and Coupling) is an EU FP7 project. Its main objective was to provide higher accuracy and reliability of meteo-oceanographic predictions that encompass a wide range of physical and ecological variables with the ultimate aim of predicting the water quality status near coastal cities, tourist beaches or rich aquaculture and fishery areas. It formulated more comprehensive land discharge conditions, improved local parameterisations and provided new strategies for the studied field cases (Liverpol Bay, German Bight, Catalan coast and Venice gulf). This project bridged the gap from shelf predictions to local (river mouth or harbour/beach scales) simulations required at the coastal zone

15. MACC-II (Monitoring Atmospheric Composition and Climate - Interim Implementation) is an EU FP7 project, in collaboration with AEMET, that combines state-of-the-art atmospheric modelling with Earth observation data to provide information services covering European air quality, global atmospheric composition, climate forcing, the ozone layer, solar energy, and emissions and surface fluxes. This project aims to establish the core global and regional atmospheric environmental services to be delivered as a component of the European Global and regional Earth system (atmosphere) Monitoring using Satellite and in-situ (GEMS) initiative.

16. ACTRIS (Aerosols, Clouds, and Trace gases Research InfraStructure network) is an EU FP7 project. It aims to integrate European ground-based stations equipped with advanced atmospheric instrumentation for aerosols, clouds, and short-lived gas-phase species. ACTRIS will have the essential role to support building of new knowledge as well as policy issues on climate change, air quality, and long-range transport of pollutants.

● Recent Ph.D. thesis at the UPC with research conducted at the ES-BCS:

1. Author: Albert Soret Miravet
Title: Air quality management: assessing the impacts of on-road transport strategies and industrial emissions in urban areas
Reading date: 18/12/2014
Thesis supervisors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

2. Author: Marc Guevara Vilardell
Title: Development of a high-resolution emission model for air quality modelling in Spain
Reading date: 17/12/2014
Thesis supervisors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

3. Author: Alba Badia i Moragas
Title: Implementation, development and evaluation of the gas-phase chemistry within the Global/Regional NMMB/BSC Chemical Transport Model (NMMB/BSC-CTM)
Reading date: 12/12/2014
Thesis supervisors: Dr. Oriol Jorba Casellas (ES-BSC) and Dr. Santiago Gassó Domingo (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

4. Author: Ángel A. Rincón Rodríguez
Title: Sistema de pronóstico de radiación solar a corto plazo a partir de un modelo meteorológico y técnicas de post-proceso para España
Reading date: 28/06/2013
Thesis supervisors: Dr. José M. Baldasano Recio (ES-BSC/UPC) and Dr. Oriol Jorba Casellas (ES-BSC)
Doctoral Program: Environmental Engineering (UPC)

5. Author: Simone Marras
Title: Variational Multiscale Stabilization of Finite and Spectral Elements for Dry and Moist Atmospheric Problems
Reading date: 10/12/2012
Thesis supervisors: Dr. Oriol Jorba Casellas (ES-BSC) and Dr. Mariano Vázquez (CASE-BSC)
Doctoral Program: Environmental Engineering (UPC)

6. Author: Karsten Haustein
Title: Development of an atmospheric modeling system for regional and global mineral dust prediction: Application to Northern Africa, Middle East and Europe
Reading date: 31/01/2012
Thesis supervisors: Dr. Carlos Përez García-Pando (IRI, Columbia University, New York, USA) and Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

7. Author: Sara Basart Alpuente
Title: Desert dust characterization in Northern Africa, Middle East and Europe through regional dust modelling,

and satellite-borne and ground-based observations
Reading date: 30/01/2012
Thesis supervisors: Dr. Carlos Përez García-Pando (IRI, Columbia University, New York, USA) and Dr. Emilio Cuevas Agulló (AEMET)
Doctoral Program: Environmental Engineering (UPC)

8. Author: María Teresa Pay Pérez
Title: Regional and urban evaluation of an air quality modelling system in the European and Spanish domains
Reading date: 22/11/2011
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC) and Dr. Pedro Jiménez Guerrero (UM)
Doctoral Program: Environmental Engineering (UPC)

9. Author: María Gonçalves Ageitos
Title: Assessing variations in urban air quality when introducing on-road traffic management strategies by means of high-resolution modelling. Application to Barcelona and Madrid urban areas
Reading date: 09/03/2009
Thesis supervisors: Dr. José M. Baldasano Recio (ES-BSC/UPC) and Dr. Pedro Jiménez Guerrero (UM)
Doctoral Program: Environmental Engineering (UPC)

10. Author: Carlos Antonio Caballero Valdés
Title: Metodología genérica de evaluación ambiental estratégica (EAE), mediante el uso de indicadores ambientales (IA), y análisis multicriterio (AMC), con aplicación al Plan Director Sectorial Energético de las Islas Baleares (PDSEIB)
Reading date: 17/09/2007
Thesis supervisors: Dr. Santiago Gassó Domingo (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

11. Author: Leonor Patricia Güereca Hernández
Title: Desarrollo de una metodología para la valoración en el análisis del ciclo de vida aplicada a la gestión integral de residuos municipales
Reading date: 14/12/2006
Thesis supervisors: Dr. Santiago Gassó Domingo (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

12. Author: Susana Saiz Colmenar
Title: Evaluación de la estrategia energética de la industria española intensiva en consumo energético a partir del análisis histórico de un complejo químico y aplicación a otro tipos de industrias
Reading date: 08/06/2006
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

13. Author: Carlos Pérez García-Pando
Title: Local to regional atmospheric modeling and lidar methods in the Mediterranean
Reading date: 15/12/2005
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

14. Author: Gustavo Arévalo Roa
Title: Inventario de emisiones atmosféricas en la Comunidad Valenciana para uso en modelización fotoquímica y de material particulado
Reading date: 25/11/2005
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Programme: Environmental Engineering (UPC)

15. Author: Nelson Vera Mella
Title: Determinación de atlas climáticos de radiación solar a partir de imágenes de satélite. Aplicación a la Península Ibérica
Reading date: 22/09/2005
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

16. Author: Pedro Jiménez Guerrero
Title: Air quality modeling in very complex terrains: ozone dynamics in the Northeastern Iberian Peninsula
Reading date: 09/03/2005
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)

17. Author: Oriol Jorba Casellas
Title: Simulación de los campos de viento de la zona geográfica de Catalunya con alta resolución espacial para las situaciones meteorológicas típicas
Reading date: 08/03/2005
Thesis supervisiors: Dr. José M. Baldasano Recio (ES-BSC/UPC)
Doctoral Program: Environmental Engineering (UPC)