



## **Earth System Services communication: bringing science to society**

Marta Terrado (1), Dragana Bojovic (1), Albert Soret (1), Francisco Doblas-Reyes (1,2)

(1) Earth Sciences Department, Barcelona Supercomputing Center (BSC), Barcelona, Spain, (2) Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain

Users are the center of any applied research on services. In fact, any service should be user-oriented and fulfil certain user needs. Communication becomes utterly important during a service development process, enabling dialogue between the scientific community and users to deliver usable science to society.

The Earth Sciences Department at the Barcelona Supercomputing Center (BSC) works on demonstrating the ongoing value of climate services, air quality services and dust services to the citizens and the economy. Our aim is to ensure knowledge and technology transfer to support adaptation to a rapidly changing environment that is already affecting those most vulnerable to changes. In this sense, services that help anticipate adverse effects of climate change and air quality deterioration offer a valuable tool for both citizens and policy-makers.

Climate services provide information and knowledge on the future variation wind, temperature or precipitation conditions, at different time scales. Having this type of information in advance can support decision-making in different sectors (from agriculture and water management to insurance, renewable energy or urban development) and minimize economic losses. BSC has been successfully using climate services for the prediction of the future global variability in the wind resource (RESILIENCE prototype, <http://www.bsc.es/projects/earthscience/resilience/>) and the seasonal hurricane activity in the North Atlantic ([www.seasonalhurricanepredictions.org](http://www.seasonalhurricanepredictions.org)).

The effect of climate change is not only limited to climate variables but also affects the atmosphere. In this context, air quality services allow understanding and predicting the variation of the atmospheric composition along with its effects on air quality, climate and health. An example is operational air quality forecast system CALIOPE <http://www.bsc.es/caliope/>, that provides detailed predictions of the major regulated air pollutants for the next 24/48 hours. A web and smartphone application provide citizens and air quality managers information about the air we breathe, so that they can take well-informed decisions. However, air quality is also affected by natural pollution sources and here is where dust services can provide additional information to anticipate the deleterious effects of Saharan dust on solar energy production, agriculture, transportation and health. The daily dust forecast issued by the Barcelona Dust Forecast Center <http://www.bsc.es/ESS/bsc-dust-daily-forecast> can be used as an early-warning system for citizens and air pollution managers.

These ‘success stories’ of services aimed at various user profiles, present different communication efforts and levels of complexity but share a common flow of information and knowledge from science to society.