



BSC

Earth System Services

“As soon as we have some large computers working, the problems of meteorology will be solved“

John von Neumann, 1950

The Earth System Services group facilitates technology transfer of state-of-the-art research from local, national to international levels in:

- Climate predictions
- Mineral dust modeling
- Air quality assessments
- Weather forecasting

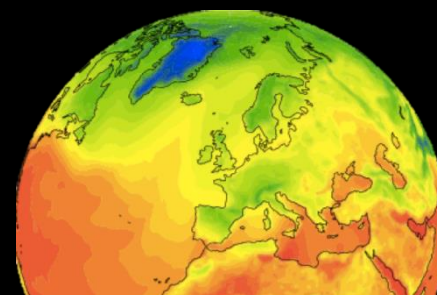


Our main goal is to advance sustainable development in key sectors such as **energy, urban development, infrastructure, transport, health, agriculture and water management.**

By combining highly qualified scientific researchers, impact modelers and in-house software developers, BSC-ES works with the end-user to develop a complete range of services that meet their requirements.



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Climate Prediction Services for Energy

“[Renewable] energy provision may be anticipated, not only in the short and long term as it is today, but also at intermediate horizons, where a huge market niche appears.”
Ignacio Lainez Aracama, Professor of Wind Energy, EOI and Director of Energy Assessments, EDP

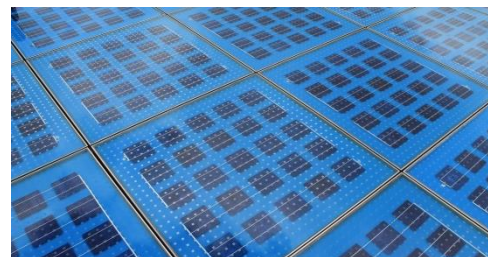
Products

1. Monthly to decadal predictions

Climate predictions evaluate the variability of weather over near-term future timescales. They represent the cutting-edge in climate modeling and the most robust climate information currently available, by demonstrating the probability of possible scenarios alongside which is the most likely.

2. Impact assessment

Early identification of climate-related vulnerabilities for the energy sector that help identify risks and opportunities for electricity producers, distributors and traders. Support in defining management strategies and precautionary adaptation to climate change.



Applications

Renewable Energy Sector

- Mid-term operations & maintenance planning
- Energy trading and electricity prices
- Estimation of more accurate budgets
- Pre- and post-construction assessments for wind and solar farms
- Meet the balance between demand and supply



Our projects on climate predictions for the energy sector have received funding from:

Contact us at:
info-services-es@bsc.es



Mineral Dust Services

“Desert dust and sea salt are the largest contributors to the global aerosol burden”
IPCC, 2013

Products

1. Mineral dust assessment

Dust models are developed for short to medium-term prediction of mineral dust events worldwide and for regional climate modelling. Our team has developed the NMMB/BSC Dust model in collaboration with the NOAA's National Centers for Environmental Prediction (NCEP).



2. Forecast system

Early-warning information about current and future dust concentration and derived parameters critical for specific sectors.

Applications

- **Solar energy**
 - Power forecasting
 - Mid-term maintenance planning
 - Site planning for new projects
- **Transportation**
 - (air) Visibility assessments for airlines and flight management
 - (ground) Transportation impacts
- **Health**
 - Early-warning system for people with respiratory problems
- **Agriculture/ Insurance**
 - Crop damage



Atmospheric Composition Services

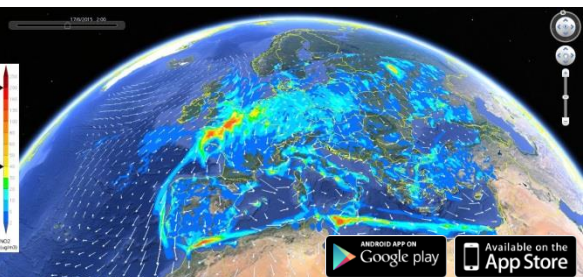
“In all zones and agglomerations [...] a combination of measurements and modelling techniques may be used to assess the ambient air quality”
Directive 2008/50/EC

Products

1. Air quality forecast

Air quality modelling from global to regional scales provides a comprehensive description of air quality problems, relating emission sources and atmospheric conditions.

CALIOPE models the atmospheric conditions to provide air quality information for short-terms action plans <http://www.bsc.es/caliope>



2. Air quality impact assessment

Detailed diagnosis of areas with pollution problems to estimate the health impacts and economic benefits of management strategies directed to reduce atmospheric emissions.

Applications

- **Health**
 - Early-warning system for people with respiratory problems or those looking for a cleaner itinerary
- **Urban planning**
 - Integrated pollution and control of heavy industry
 - Road transport management measures
- **Infrastructure**
 - Infrastructure corrosion by marine aerosol



Our projects on atmospheric composition have received funding from:

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Climate Prediction Services for Agriculture & Water Management

“To feed a growing world population, we have no option but to intensify crop production. But farmers face unprecedented constraints. In order to grow, agriculture must learn to save”.

FAO, 2011

Products

1. Monthly to decadal predictions

Climate predictions evaluate the variability of weather over near-term future timescales. They represent the cutting-edge in climate modeling and the most robust climate information currently available, by demonstrating the probability of possible scenarios alongside which is the most likely.



2. Impact assessment

Early identification of climate-related vulnerabilities for the agricultural and other water-sensitive sectors that help identify risks and opportunities for farmers and water managers. Support in defining management strategies and adaptation to climate change.

Applications

- **Water management**
 - Distribution of water resources to satisfy different demands
 - Management of water quality
 - Market and business opportunity of hydraulic engineering companies
 - Management of infrastructure for hydropower generation
 - River transport
- **Agriculture**
 - Decision-making during the growing season (fungicide acquisition, pruning, harvest date...)
 - Selection of the crop type
 - Crop trade in the market

Our projects on climate predictions for the agriculture and water management sectors have received funding from:

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