



**Barcelona  
Supercomputing  
Center**  
*Centro Nacional de Supercomputación*



# The BSC Earth Sciences Department

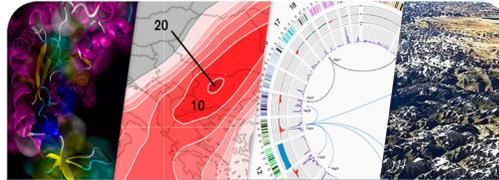
Francisco J. Doblas-Reyes

# Barcelona Supercomputing Center Centro Nacional de Supercomputación

## BSC-CNS objectives



Supercomputing services  
to Spanish and  
EU researchers



R&D in Computer,  
Life, Earth and  
Engineering Sciences



PhD programme,  
technology transfer,  
public engagement

BSC-CNS is  
a consortium  
that includes

Spanish Government

60%



Catalan Government

30%



Univ. Politècnica de Catalunya (UPC)

10%



# MareNostrum 4 supercomputer

Total peak performance:

**13,7 Pflops/s**



80%



Access: [prace-ri.eu/hpc\\_acces](http://prace-ri.eu/hpc_acces)

16%



RED ESPAÑOLA DE  
SUPERCOMPUTACIÓN

Access: [bsc.es/res-intranet](http://bsc.es/res-intranet)

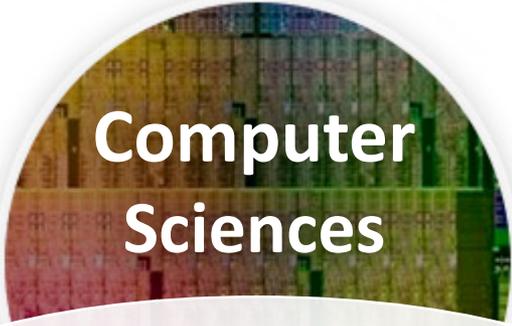
4%



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# Mission of the BSC Scientific Departments

A circular graphic with a background of colorful, abstract patterns in shades of green, yellow, and red, resembling a digital or data visualization.

## Computer Sciences

To influence the way machines are built, programmed and used: programming models, performance tools, Big Data, computer architecture, energy efficiency

A circular graphic showing a stylized, colorful map of the Earth with various shades of blue, green, and red, representing different geographical or climate zones.

## Earth Sciences

To develop and implement global and regional state-of-the-art models for short-term air quality forecast and long-term climate applications

A circular graphic with a dark background, featuring colorful, abstract shapes in shades of green, yellow, and purple, resembling molecular structures or biological forms.

## Life Sciences

To understand living organisms by means of theoretical and computational methods (molecular modeling, genomics, proteomics)

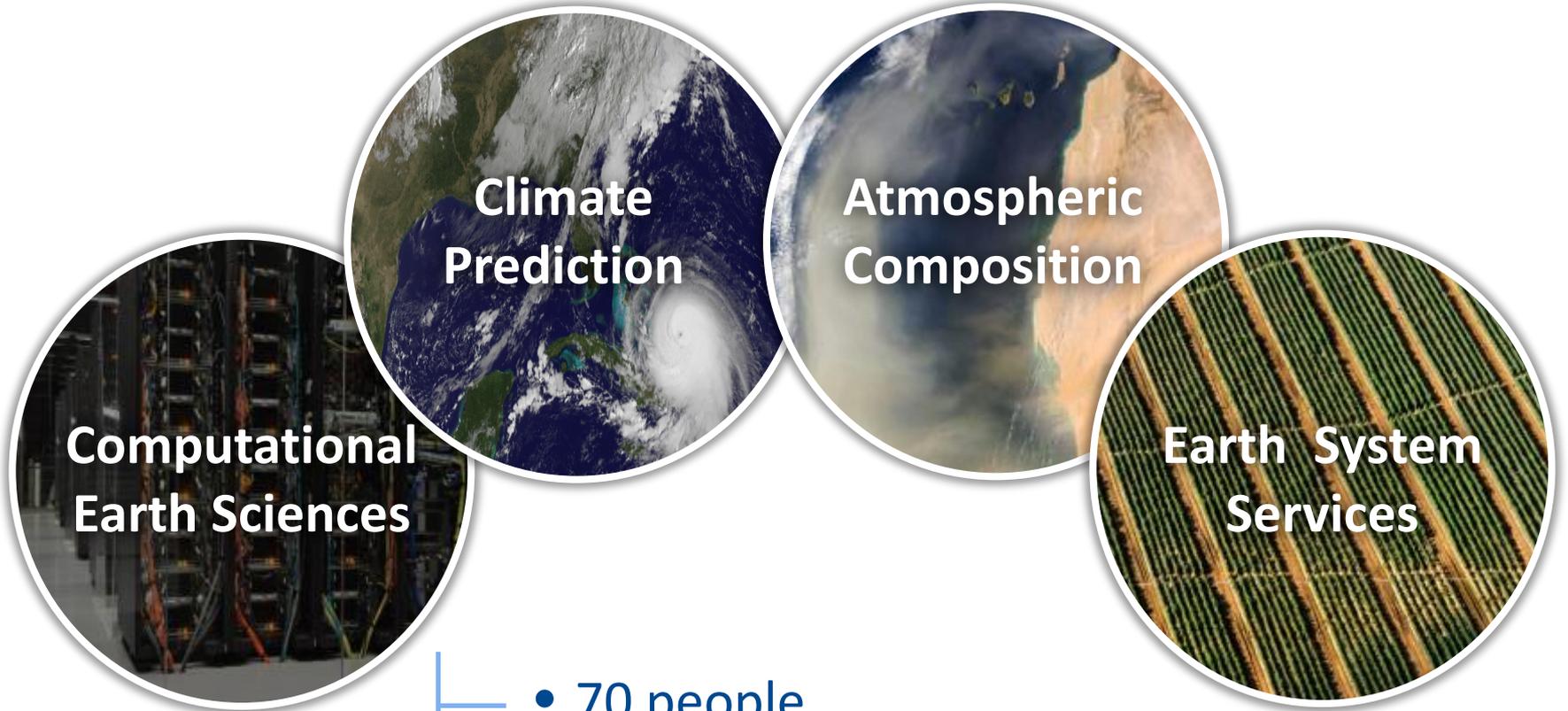
A circular graphic with a dark background, featuring colorful, abstract shapes in shades of green, yellow, and red, resembling a complex simulation or data visualization.

## CASE

To develop scientific and engineering software to efficiently exploit super-computing capabilities (biomedical, geophysics, atmospheric, energy, social and economic simulations)

# Earth Sciences Department

Environmental modelling and forecasting, with a particular focus on weather, climate and air quality

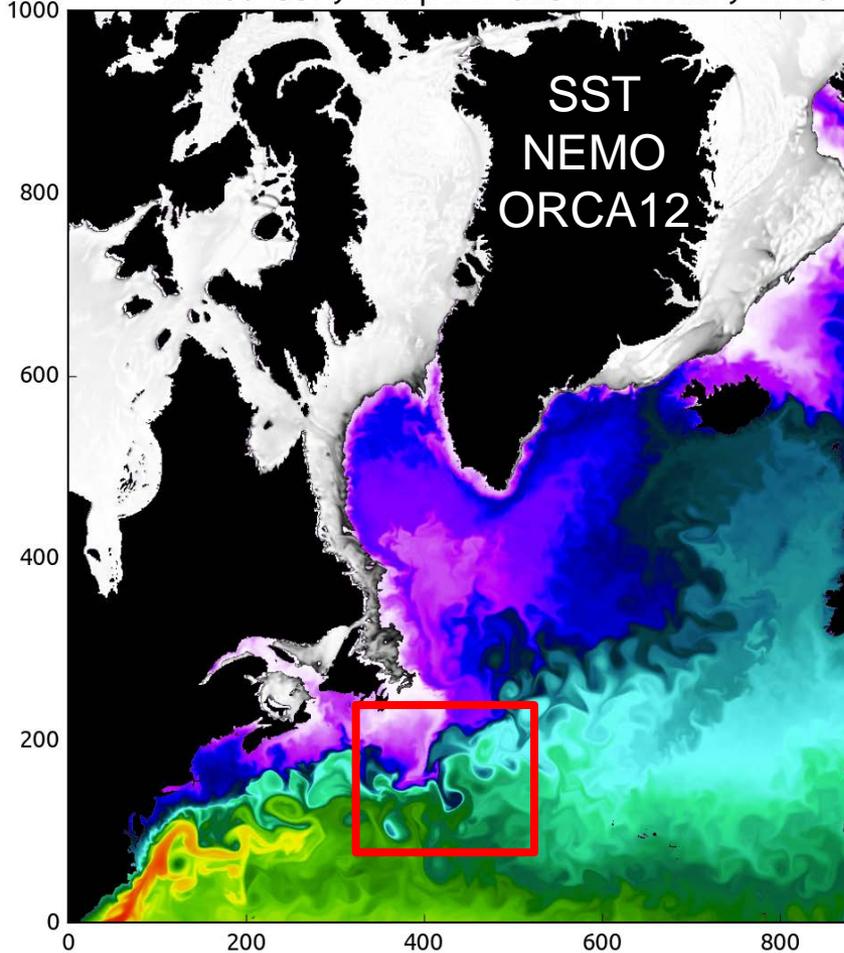


- 70 people
- H2020 projects, COPERNICUS contracts, ESA grants, MINECO projects, ERC Consolidator Grant and AXA Chair

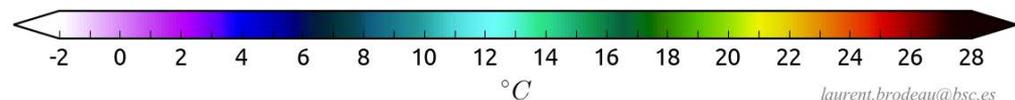
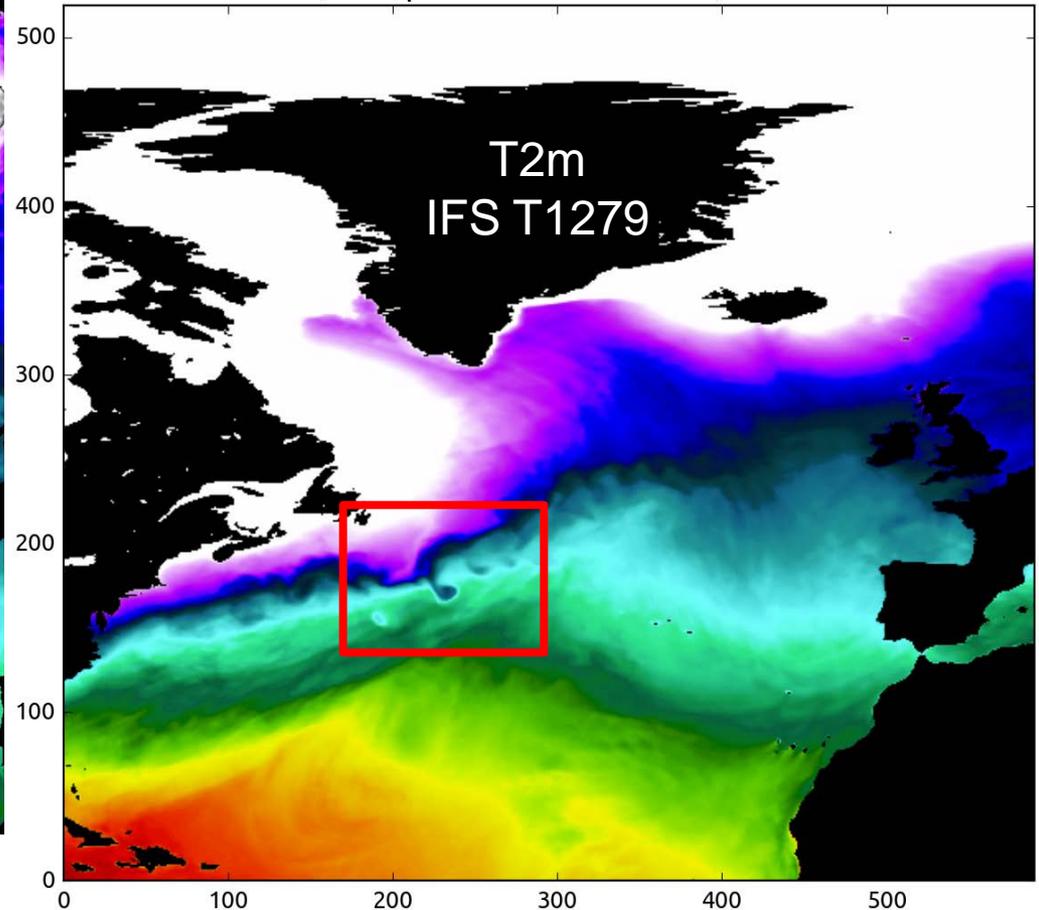
# Earth Sciences Department

EC-Earth global ORCA12-T1279, ocean and atmosphere at ~15 km

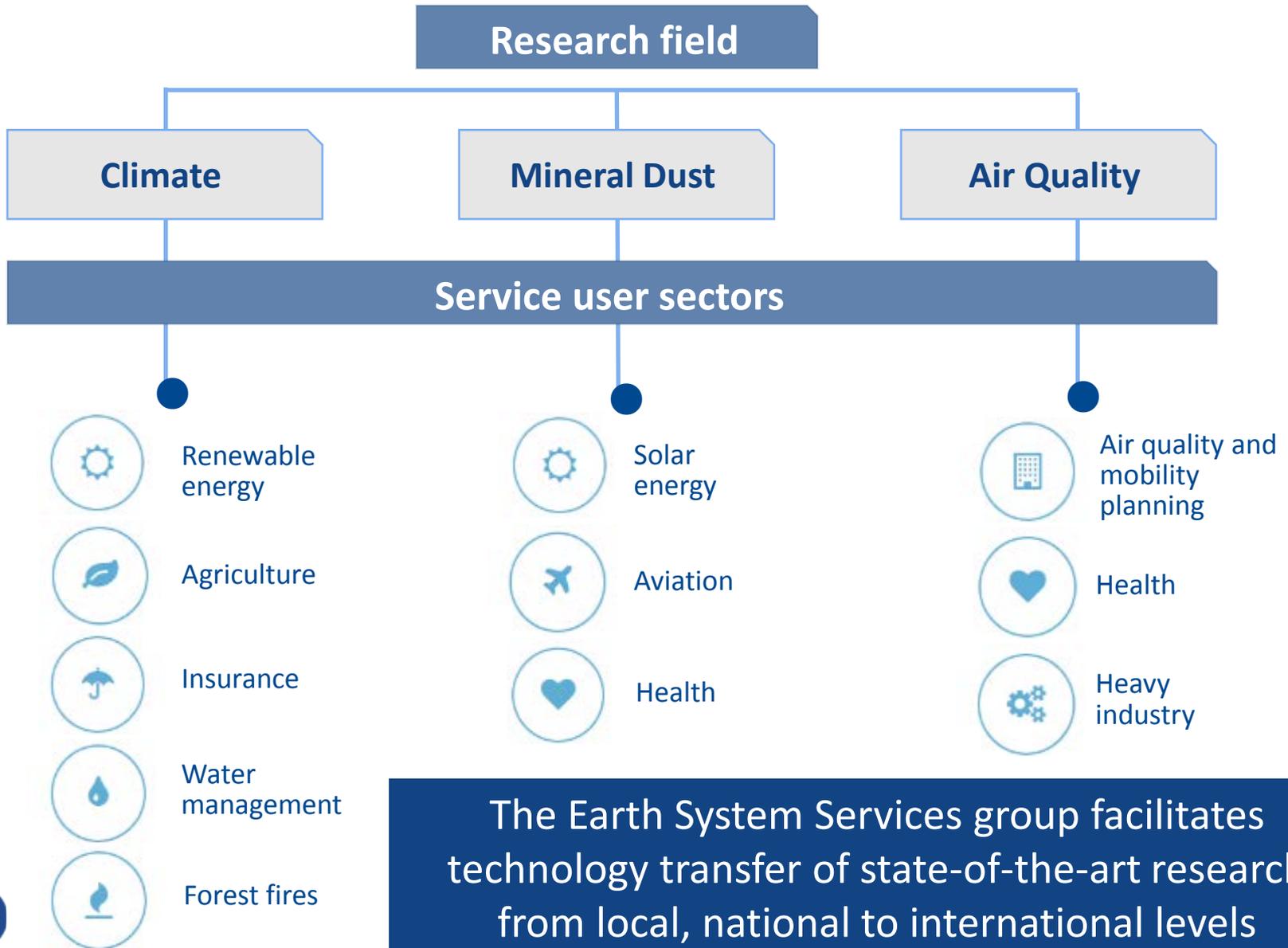
NEMO: SST, coupled ORCA12-T1279, 1990-03-10



IFS: T2M, coupled ORCA12-T1279, 1990-03-10



# From Research to Services



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

# R2O and O2R

**BARCELONA DUST FORECAST CENTER**



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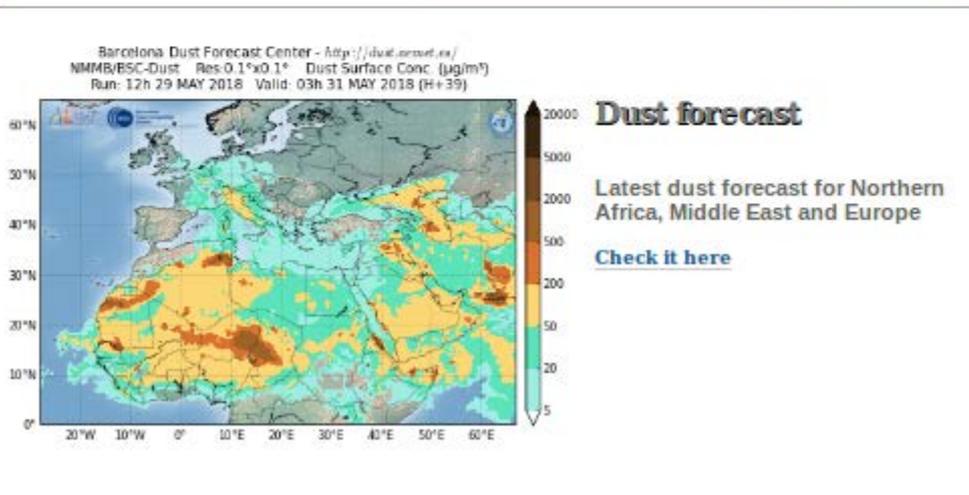
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## Training Workshop on Sand and Dust Storms in the Arab Region

[Read More](#)



- Contact Gabriela [gabriela.tarabanoff@bsc.es](mailto:gabriela.tarabanoff@bsc.es) or myself [francisco.doblas-reyes@bsc.es](mailto:francisco.doblas-reyes@bsc.es) if you have questions or need help with some local organisation aspects.
- Group photo at 10:30 in the staircase on the 1st floor.
- Coffee breaks and lunches will take place in the meeting room.
- One of the breakout groups will meet at the Vertex building.
- Visit to Marenostrum on Friday evening at the end of the sessions.
- Upload your presentations well in advance. Files will be kept should WMO decide to publish them, unless you express the contrary.
- Do not leave your belongings unattended at any time in the room and when walking around in the city.



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**EXCELENCIA  
SEVERO  
OCHOA**

# Discussion on potential mechanisms for accelerating R2O and O2R value cycle

Francisco J. Doblas-Reyes