A previsão numérica em Portugal: interações superfície-atmosfera
Numerical Weather Prediction in Portugal 2021: Surface-Atmosphere Interactions
Universidade de Évora, 11-12 November 2021

Summary report

The workshop "A previsão numérica do tempo em Portugal 2021: interações superfície-atmosfera" was held at the University of Évora (at the Conference Room of Colégio do Espírito Santo) during the two days of 11-12 November 2021, gathering important Portuguese Institutions with research on Science & Development of Earth System Models. Four sounding scientists from forefront European organizations and consortia for Earth Observation and Modelling were invited to provide keynotes on the latest developments and plans on their fields of expertise: Clément Albergel (ESA Climate Office); Tânia Casal (ESA/ESTEC); Gianpaolo Balsamo (ECMWF); and Patrick Samuelsson (ACCORD Surface Area Leader). Furthermore, communications and posters were presented by specialists from the following institutions: Instituto Português do Mar e da Atmosfera (IPMA), Instituto de Ciência da Terra (ICT-Universidade de Évora (ICT-UÉvora), Instituto Dom Luiz (IDL-FCL/ULisboa), Centro de Engenharia e Tecnologia Naval e Oceânica (CENTEC-IST/ULisboa), Centro de Estudos do Ambiente e do Mar (CESAM-Uaveiro), Universidade de Trás-os-Montes e Alto Douro (UTAD), Universidade da Beira Interior (UBI), CoLAB +ATLANTIC, and Forschungszentrum Juelich, IBG-3. In total, more than 70 participants were present.

The organizing committee was constituted by the following members: Maria José Monteiro (IPMA), João Paulo Martins (IPMA), Rui Salgado (ICT), Flávio Couto (ICT), Rita Cardoso (IDL), David Carvalho (CESAM), José Castanheira (CESAM), Mariana Bernardino (CENTEC), João Santos (UTAD) and José Luís Argain (Universidade do Algarve).

This was the 2nd edition of the workshop "Numerical Weather Prediction in Portugal", after the first edition held at IPMA in 2018 [1], which was dedicated to the presentation of the different groups working in this scientific field in Portugal. The Surface-Atmosphere Interactions have a key role in NWP systems these days and rely on a deep understanding and modelling of localized processes, thus justifying the focus of Portuguese teams work.

The invitation to the meeting was done through a Circular Letter [2] and the inherent information communications were carried out through a dedicated website [3]. The aim of this summary report is to outline the main outcomes from the workshop. The Circular Letter, the Agenda and the Presentations of the workshop can be found on IPMA's dedicated website [4].

Main workshop conclusions and outcomes:

1. During the meeting, it was emphasized the importance of having a better understanding of the local-scale surface-atmosphere interactions to the adequate performance of (very) high-resolution numerical models for both meteorological and climatological purposes. In particular,
2. focus should be put on the spatial and temporal detailed description of the surface cover (especially land), which is foreseen to be used in the short-term upgrades on worldwide numerical models.
3. In this sense, satellite data is crucial.
4. Surface Iberian in-situ observation networks still add value to short-term numerical forecasts (through assimilation schemes), besides being essential in NWP quality assessment, validation and post-processing contexts, as well as in experimental field campaigns.
5. Particularities of land cover description and modelling also play an important role in wildfire simulations, which is a topic for forefront research among academic groups in Portugal.
6. SURFEX [5] and ECLand [6] are two European surface modelling platforms that can provide the framework for further research in Portugal: the first is maintained by Météo-France as a research tool and is used by the ACCORD [7] models and, in particular, by IPMA's operational model AROME versions; while the second is maintained by ECMWF (and will be used in the new project Destination-Earth where the global model IFS will be run at 1km horizontal resolution).
7. EURO-CORDEX is a research platform that still provides the framework for many climatological studies in the Iberian Peninsula and Adjacent Atlantic Ocean.
8. Artificial Intelligence (AI) is a new widely spread source of investment. It has the potential to add value to univariate meteorological forecasts when used as a post-processing tool.
9. Surface-Atmospheric Interaction observations and modelling activities in Portugal were discussed and a 'White Paper' from this workshop should be written and published in order to deliver the status of the actual know-how in Portugal under different aspects: available observations and processing tools, surface modelling and data assimilation, post-processing tools (including AI) and downstream application impacts.
10. Attention was also given on the 'Special Issue' of the journal 'Atmosphere' [8], which was devoted to this workshop and to which it is possible to submit papers up to end of June; and, finally,
11. A survey on i) next editions format and ii) expectations and requirements to derive a profitable collaboration between research groups and IPMA should be launched on the participants soon.

[1] https://www.ipma.pt/pt/publicacoes/meteorologia/index.jsp?page=NWP-workshop-2018.xml
[2] https://www.ipma.pt/resources.www/docs/publicacoes.site/nwp/NWP2021_announcement.pdf
[3] https://sites.google.com/view/nwpportugal/home
[4] https://www.ipma.pt/en/publicacoes/meteorologia/index.jsp?page=NWP-workshop-2021.xml
[5] http://www.umr-cnrm.fr/surfex/
[6] https://www.mdpi.com/2073-4433/12/6/723/htm
[7] http://www.umr-cnrm.fr/accord/
[8] https://www.euro-cordex.net/
[9] https://www.mdpi.com/journal/atmosphere/special_issues/interaction