EMS Annual Meeting Abstracts
Vol. 16, EMS2019-702, 2019

Using the best available physiography to improve weather forecasts for Ireland

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Ireland is a rainy country and the accurate forecasting of rainfall, temporally and spatially, is of high importance for society. One of the main goals in numerical weather prediction (NWP) at Met Éireann is to improve the short term forecast. Met Éireann is part of the international research programme HIRLAM and uses since 2011 the ALADIN-HIRLAM NWP system under the HARMONIE-AROME configuration for operational weather forecasting. The current focus of HIRLAM is the optimisation of the HARMONIE-AROME configuration over the whole ALADIN-HIRLAM NWP domain which covers Europe and northern Africa.

Limitations in the performance of the current HARMONIE-AROME configuration are attributed to surface processes and physiography issues [1]. Inspection of the surface topography in Iceland showed that the description of physiography in the HARMONIE-AROME default version revealed an outdated and incomplete description with errors in e.g. glacier extent, vegetation fraction, leaf area indices and soil depths. The use of an improved physiography database over Iceland improved significantly the HARMONIE-AROME wind forecasts [2].

In Ireland, a number of projects have addressed specific elements of land cover [3] [4]. None of these projects covered every aspect of Ireland's landcover until the start of the Irish Land Mapping Observatory (ILMO) project in 2012 which aimed at developing methods to detect land cover and land use specifically in agricultural lands. ILMO established Prime2 the new Ordnance Survey Ireland digital map as the ideal mapping base for national land cover [5]. In 2014, the Toward Landcover Accounting and Monitoring project aimed to process, using Prime2 combined with satellite imagery, a new landcover map that is compatible with the CORINE dataset [6] which is currently used in HARMONIE-AROME.

The development of new high-resolution landcover datasets provides a unique opportunity to implement them to improve the HARMONIE-AROME forecasts for Ireland. This work will present an inventory of the available landcover maps over Ireland and a comparison between the HARMONIE-AROME performance in its default configuration against that which uses an updated Irish physiography configuration.

References

[1] Bengtsson, et al. (2017). The HARMONIE–AROME Model Configuration in the ALADIN–HIRLAM NWP System. Monthly Weather Review, 145(5), 1919–1935. https://doi.org/10.1175/mwr-d-16-0417.1
[2] Petersen, G. N., et al. (2017). Using the best available physiography to improve weather forecasts. EMS Annual Meeting. Retrieved from https://presentations.copernicus.org/EMS2017-677_presentation.pdf
[3] Green, S. (2011). The Irish hedge map. Retrieved from https://www.teagasc.ie/media/website/publications/2010/The-Irish-hedge-map-version1_5690.pdf
[4] Cawkwell, et al. (2010). Industrialised Peat Extraction Scoping Project Cataloguing of exposed peat soil areas identified on Peatlands of Ireland Mapped from Landsat Imagery (PIMLI) Technical Report & Results from University College Cork November 2010. Retrieved from https://www.friendsoftheirishenvironment.org/images/peat/gis/peat_cat_final_report_nov2010.pdf
[5] Green, S. (2015). ILMO: Irish Land Mapping Observatory. Retrieved from https://www.teagasc.ie/media/website/publications/2016/6405-ILMO.pdf
[6] Cawkwell, F., et al. (2018). TaLAM: Mapping Land Cover in Lowlands and Uplands with Satellite Imagery. Retrieved from
http://www.epa.ie/pubs/reports/research/land/Research_Report_254.pdf