Prof. Florian Pappenberger

Forecast Department Director

European Centre for Medium-Range Weather Forecast - ECMWF

Juan Carlos Fallas

General Director

Meteorological National Institute of Costa Rica

25th June 2018

Dear Juan Carlos Fallas,

We are writing you because the National Meteorological Institute (IMN) has been invited to collaborate with ECMWF in the verification of a new test product, which produces probabilistic rainfall forecasts at points, called ecPoint-Rainfall. This is the first branch of what has the potential to be transformed into a bigger family of post-processed products from ECMWF ENSemble system (ENS), called ecPoint.

ecPoint-Rainfall is part of a research and development project started at ECMWF in 2016 to tailor a rainfall product to identify areas at risk from localized intense rainfall, and use this as a proxy for more reliable and skilful flash flood forecasts. This project is therefore the result of the joint effort between hydrologists and meteorologists at ECMWF, sponsored by the Application Team (Prof. Christel Prudhomme) and the Forecast Performance and Products Team (Tim Hewson) within the Forecast Department at ECMWF, and the University of Reading since September 2017 as part of Fatima Pillosu's PhD (supervisors Prof. Hannah Cloke and Dr. Elisabeth Stephens). For further reading, please refer to the following ECMWF Newsletter article: <https://www.ecmwf.int/en/newsletter/153/news/new-point-rainfall-forecasts-flash-flood-prediction> (a more comprehensive journal article is now under preparation).

After an initial period of development, the ecPoint-Rainfall test product is now produced on a routine basis, and in addition to our internal verification work to assess its reliability and skilfulness, it is our intention to collect information from independent parties about the usage of this test product and its performance during localized intense rainfall and flood events.

We would like to thank you for your willingness to participate in this verification process. Before proceeding, there are a number of commitment required from both sides that should be mutually understood and accepted. The annex to this document outlines these commitments and we would be grateful if you would sign both copies and return one signed copy to ECMWF.

We are excited to begin this partnership between our organizations, and look forward to this strategic data exchange that we hope will bring measurable and significant benefits to both organizations.

Many thanks for your time and consideration.

Yours sincerely,

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Florian Pappenberger

Director of Forecast Department

ECMWF

ANNEX

**Commitment from ECMWF**

ecPoint-Rainfall is free distributed with a special authorization of the Director of the Forecast Department given its status of “test product”. Any commercial use of ecPoint-Rainfall is not allowed.

ECMWF agree to provide the following services:

* ecPoint-Rainfall test product will be provided for one year, July 1th 2018 - 30th June 2019. Subsequently, the terms of the agreement will need to be re-discussed (please, see point b).
* If required, the development team of ecPoint-Rainfall (Fatima Pillosu and Tim Hewson) will provide training (i.e. webinars, skype calls or via email) on the usage of the test product according the needs of the end user.
* The ecPoint-Rainfall test product will be provided:
  + In grib format, only for the area of interest (Costa Rica and Central America).
  + On daily basis.
  + Twice per day: for the midnight run (00 UTC) we aim to deliver the forecasts by 09 UTC, and for the midday run (12 UTC) we aim to deliver the forecasts provided by 21 UTC.
  + In four overlapping 12-hourly rainfall accumulations (for valid times 00-12, 06-18, 12-00, 18-06 UTC).
  + Up to day 10 (i.e. up to T+246).
* The forecasts will be provided in probabilistic format, expressed as percentile probabilities (from 1 to 99) for rainfall measured at points.
* The forecasts will be put in the following ftp account provided by ECMWF:
  + IP: dissemination.ecmwf.int
  + userID: ecpointcr
  + password: Tg67WS4n

It is necessary to stress the following points:

1. ecPoint-Rainfall is a test product, produced in routine basis mode. Therefore, it could be subjected to delays in the production, as well as to corrections and adjustments if needed. ECMWF will strive to minimise any delays, and will endeavour to also send notification to the following email (wstolz@imn.ac.cr) if such problems occur. However, ECMWF cannot guarantee a full assistance on this respect because this is more part of an operational service. On the other hand, ECMWF will promptly notify to the same email any changes introduced in the test product.
2. As and when the product becomes an official ECMWF product and is archived in its official archive system, called MARS, the distribution of the ecPoint-Rainfall product will need to be revised. However, this is not going to happen in the near future.

Read and accepted,

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Florian Pappenberger

Forecast Department Director

ECMWF

**Commitment from IMN**

* By the end of June 2019, IMN commits to provide a report or a slide deck where the most significant cases in which the ecPoint-Rainfall test product was used are indicated, as well as a critique about its performance on those cases (e.g. whether it gives extra information that helps in taking decisions, issuing alerts, preparing in case of extreme events, etc.). If a km-scale model is available for the region of interest, it would be very valuable if the institution could compare ecPoint-Rainfall products with those from the high-resolution model. If a comparison with the ECMWF raw ENS wants to be provided it is suggested to extract the plots in dates close to the event or send an email to Fatima Pillosu ([fatima.pillosu@ecmwf.int](mailto:fatima.pillosu@ecmwf.int)) to provide you with the requested raw data or plots for those case studies if needed. The report must be written in English.
* It is agreed that Fatima Pillosu can use the case studies in the report as "independent verification case studies" in scientific publications regarding the ecPoint-Rainfall test product. In that case we offer a collaboration on those papers with 1 or 2 nominees from your group as co-author(s). These case studies are considered as an invaluable source of independent verification cases because there will not be any involvement in their selection by the development team at ECMWF.
* No redistribution of the ECMWF data.

IMN will provide meteorological observations (historical and real-time data for 24-hourly accumulated rainfall). These observations may come from automatic or manual stations, and they will be made available through the same ftp account provided by ECMWF. IMN should be aware that the meteorological observations will be used only for verification purposes internally at ECMWF. ECMWF guarantees that the meteorological observations will be stored on a secure network at ECMWF, and will be accessible only for the internal use of ECMWF scientists, and only for the purposes stated above. No redistribution of the meteorological data will be allowed.

Read and accepted,

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Juan Carlos Fallas

General Director

Meteorological National Institute of Costa Rica