

Automatic Forecasts: an overview

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Overview

- **1. Public forecasts**
- 2. Methodology
- **3. Further developments**





Run: 2018091300 Fcst: 20180917







- Forecasts for 400 locations
- Observations from weather stations

140 (Mainland, Madeira and Açores)

• Models:

ECMWF HRES e ENS (10 days) and AROME (48h)

• Statistical Post-processing (MOS and Kalman Filter)



- MOS (40 days); KALMAN (30 days)
- Applies to AROME and ECMWF HRES

2 m temperature and 10 m wind speed

relative humidity is corrected using the temperature



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- Final forecast is the average of all available statistical post-processing values
- 0-48h: 4 values; from day 3: 2 values
- Forecasts for locations without observations: assumes the statistical adjusment in locations with similar topography is the same



Post processing: Chaves, T2m



STATION: CHAVES PERIOD: 2018080300-2018080600



Methodology - Spread



STATION: LISBOA-GC; PERIOD: 2018090212 - 2018091612



Using only HRES will lead to excessive spread in forecast temperatures, mainly beyond day 6/7.

Use ECMWF-ENS to control this issue.





Methodology - HRES/ENS

ALLCITIES PERIOD: 2016070100 - 2016100100



DMO: direct model output

STA: only HRES

IPMA: HRES+ENS



Hourly/3h, up to day 6

Initial forecast weather from ECMWF-HRES

The weather may be changed, since H+3, based on the probability of precipitation comming from ECMWF-ENS



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Advantages:

Takes into account the uncertainty of the forecast

Reduces somewhat the variability between consecutive forecasts

Weather: total of 19 types, from "clear" to "thunderstorms"



Daily, up to day 6:

Precipitation/No precipitation: most severe

Inside each class: Most frequent

A daily symbol with or without sun depends on how long and how much cloudiness there will be





Daily, up to day 6:

Severe or *unusual* weather is avoided (*e.g. thundestorms or snow at medium/low levels*)



Wind intensity: usually, depends on the mean value

Wind direction: depends on the frequency and the mean wind speed of each direction



Daily, from day 7 to 10:

Goal is to provide an outlook, with low spatial variability

Forecast depends exclusively on ECMWF ENS (probability of precipitation in 24h)

Only 6 weather types allowed, but usually only 4 used





Methodology – daily weather



Forecast model: ENS_ECMWF PROB_OVER_0.8 Variable: PROB PRECIP024h Run: 2018090600 Valid: 2018091300 - 2018091400 0.12 0.18 0.18 0.20 0.16 0.22 0.32 0.50 0.54 0.50 0.50 0.52 0.50 0.54 0.56 0.58 0.60 0.56 0.66 0.64 0 0.14 0.18 0.20 0.22 0.22 0.26 0.38 0.48 0.48 0.54 0.56 0.54 0.62 0.66 0.72 0.68 0.64 0.72 0.66 0.62 0. 42° 10, 12 0, 16 0 18 0 20 0 24 0 32 0 44 0 50 0 54 0 56 0 58 0 56 0 58 0 60 0 68 0 70 0 70 0 64 0 60 0 58 0 0.16 0.14 0.20 0.14 0.20 0.32 0.36 0.50 0.60 0.58 0.62 0.60 0.54 0.48 0.48 0.56 0.58 0.58 0.52 0.50 0. 14 0.18 0.18 0.26 0.42 0.52 0.56 0.60 0.52 0.62 0.54 0.54 0.50 0.52 0.56 0.56 0.58 0.60 0. 0 18 0 41.5°N 18 0.16 0.22 0.24 0.36 0.48 0.52 0.56 0.60 0.58 0.60 0.56 0.50 0.52 0.52 0.58 0.60 0.58 0.6 0.12 0. 41° 10, 10 0. 0.50 0 56 0 60:0 62 0 62 0 54 0 50 0 48 0 0.12 0.12 0.16 0.18 0.18 0.18 0.24 0.44 0.54 0.56 0.64 0.66 0.56 0.58 0.52 0.54 0.54 0.60 0.62 0.62 0.62 0.10 0.16 0.14 0.16 0.18 0.32 0.42 0.54 0.56 0.58 0.62 0.60 0.58 0.58 0.56 0.60 0.60 0.64 0.60 0. 40.5 0.10 0.14 0.20 0.20 0.14 0.16 0/18 0.34 0.44 0.52 0.58 0.60 0.64 0.66 0.66 0.62 0.60 0.64 0.70 0.66 0. 16 0.14 0.18 0.36 0.44 0.46 0.52 0.60 0.56 0.62 0.62 0.62 0.60 0.62 0.62 0.12 0 20 0.18 0.18 0.14 0.38 0.44 0:46 0.68 0.64 0.66 0.62 0.60 0.52 0.50 0.52 0.50 40° 10, 10 0, 18 0.10.0 0.14 0.16 0.20 0.22 0.38 0.45 0 46 0 62 0.52 0.58 0.52 0.52 0.46 0.48 0.46 0.54 0.52 0.50 0. 0.12 0.14 0.16 0.34 0.38 0.48 0.48 0.50 0.54 0.58 0.52 0.48 0.50 0.48 0.48 0.50 0.52 0.58 0. 0.10 39.5°N 0.16 0.12 0 16 0.38 0.40 0.40 0.36 0.42 0.48 0.56 0.50 0.50 0.58 0.50 0.46 0.48 0.54 0.58 0. 0,10 0,12 0,20 0,24 0,36 0,36 0,32 0,36 0,42 0,50 0,48 0,48 0,54 0,54 0,52 0,40 0,40 0,48 0,52 0 39° 10, 10 0, 12 0, 24 0, 26 0, 30 9, 30 0, 36 0, 36 0, 40, 0, 44 0, 46 0, 54 0, 48 0, 46 0, 38 0, 36 0, 44 0, 54 0, 0.10 0.22 0.28 0.28 0.39 0.36 0.42 0.38 0.36 0.32 0.46 0.46 0.46 0.48 0.44 0.46 0.50 0.50 0. 0.10 0.12 0.10 0.14 0.22 0.26 0.36 0.36 0.36 0.42 0.44 0.46 0.48 0.48 0.46 0.48 0.50 0.50 0.54 0. 38.5°N 0.10 0.12 0.12 0.25 0.30 0.32 0.40 0.48 0.50 0.54 0.52 0.42 0.50 0.50 0.56 0.56 0.60 0.6 0.10 0.10 0.10 0.12 0.28 0.30 0.38 0.42 0.44 0.40 0.50 0.46 0.44 0.48 0.54 0.58 0.58 0.58 0. 0.10 38° 10.10 0.10 0.10 0.10 0.10 0.14 9.26 0.30 0.30 0.40 0.42 0.42 0.46 0.48 0.54 0.54 0.54 0.58 0.66 0.62 0 10 0.10 0.12 0.12 0.16 0.26 0.38 0.34 0.36 0.40 0.44 0.52 0.56 0.54 0.56 0.62 0.64 0.66 0 0 10 0 0.10 0.10 0.12 0.10 0.12 0.12 0.16 0.26 0.34 0.32 0.34 0.34 0.40 0.52 0.44 0.46 0.50 0.56 0.46 0.52 0. 37.5°N 0.10 0.12 0/14 0/26 0/36 0.32 0.38 0.38 0.40 0.42 0.44 0.42 0.50 0.50 0.52 0.50 0.5 0.16 0.16 0.12 0.10 0.12 0.10 0.20 0.22 0.26 0.36 0.40 0.40 0.42 0.30 0.28 0.32 0.34 0.44 0.46 0.46 0. 37° 10, 10 0.14 0.12 0.10 0.10 0.18 0.14 0.14 0.14 0.12 0.20 0.20 0.14 0.20 0.20 0.20 0.24 0.26 0.46 0.52 0. 0.12 0. 0.10 0.12 0.18 0.18 0.24 0.28 0.45 0.60 0 0.12 0.12 0.12 0.14 0.12 0.10 0.12 0.12 0.10 0.10 0.10 0.12 0.12 0.16 0.18 0.24 0.26 0.40 0.56 0.4 7°W 6.5°W 9.5°W 8.5°W 8°W 7.5°W

Probability of precipitation >= 0.8

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- Using AROME for weather, mainly by probability of precipitation
- Using new variables from ECMWF, both HRES and ENS (e.g. precipitation rate, lightning flashes)
- Post-processing 10 m wind gusts



1mm/24h

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Operational Weather Centre



1. Checking the forecasts

2. May change the forecasts if the model provides limited guidance



Public verification





Questions?