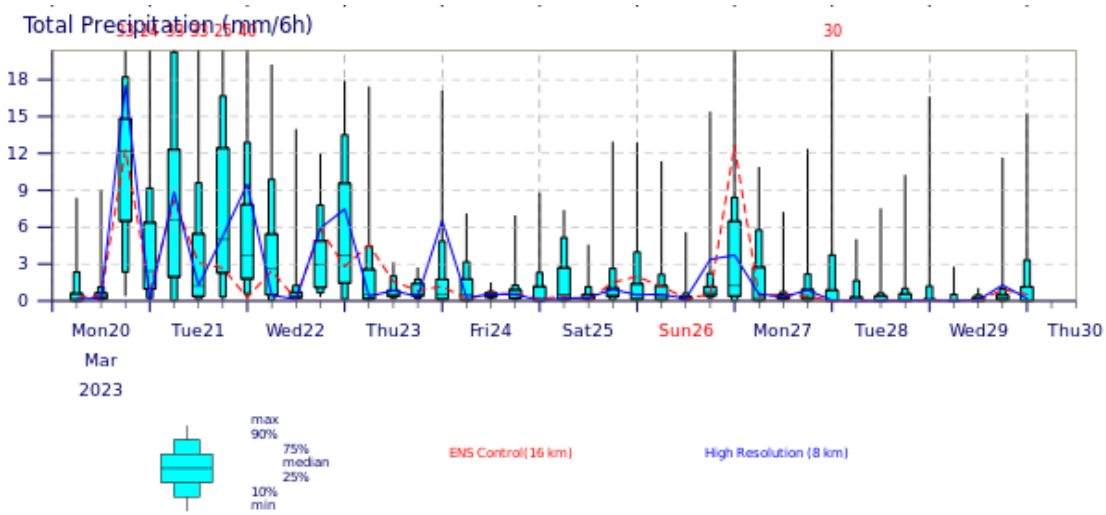
ECMWF ensemble products practicals and exercises

Baltic+ course – 8th November 2023

1) Based on what you have just learned look at the following Meteograms and circle the correct answers (from the text written in bold) or input the correct answers in the text.



a. On Monday 20 March in the afternoon there is **LOW / HIGH** uncertainty in the total precipitation total.

b. The High Resolution forecast (blue line) generally **AGREES / DISAGREES** with the ensemble forecast

c. At midday (12 UTC) on Friday 24th March:

d. The forecast is for **NO RAIN / A LITTLE RAIN / LOTS OF RAIN**

e. The ensemble members generally **AGREE / DISAGREE** this suggests **LOW UNCERTAINTY / HIGH UNCERTAINTY**

f. At 00 UTC on Tuesday 28th March, one ensemble member is forecasting a high of _____mm of rain, this is **AN EXTREME / THE MEAN VALUE / VERY LOW**

g. Write two sentences summarising what this meteogram is forecasting for precipitation over the next 10 days

_____

_____

_____

_____

2) Using OpenCharts (www.charts.ecmwf.int) and the Extra-tropical Cyclone Database (CDB) (https://sites.ecmwf.int/charts/cdb/) create a forecast using ensemble products only for **Riga, Latvia on Saturday 11th November**. Below are ensemble products I'd like you to find and look at and include in your forecast:

- Extra-Tropical Cyclone Database
- Ensemble mean and spread
- Meteograms
- Extreme Forecast Index (EFI)
- Precipitation Type

Things to consider / include:

- Uncertainty in the forecast / the spread of the ensemble
- Model jumpiness
- How you would communicate any uncertainty

3) Answer the questions below which relate to ensemble forecasting

a. What is the main advantage of an ensemble forecast?

i. To provide forecasts months in advance
ii. To give minute-by-minute forecasts
iii. To give a quantitative assessment of risk

b. What are the three main sources of error in NWP forecasts?

i. Initial condition uncertainty, model uncertainties and human errors
ii. Initial condition uncertainty, model uncertainties and boundary condition uncertainty
iii. Model uncertainties, time uncertainties and boundary condition uncertainty

c. What does a nearly vertical Cumulative Distribution Function (CDF) suggest?

i. Bi-model distribution of values
ii. Good agreement between ensemble members
iii. Ensemble members don't agree

d. Why do we use Shift of Tails (SOT)?

i. To indicate which type of weather will be extreme
ii. Because it has a nice name
iii. Because it provides information on how extreme an event might be

e. What is the control ensemble member?

i. The member run from unperturbed initial conditions
ii. The highest resolution member
iii. The member started from the largest perturbation of initial conditions

f. What are meteograms?

i. A product that shows information about the tracks and intensities of storms in the forecast
ii. A way to represent the ensemble forecast for a single location
iii. A product focusing on the extremes of the distribution

g. How many perturbed ensemble members does ECMWF run?

i. 50 in both the 15-day ENS and extended range
ii. 50 in the 15-day ENS and 100 in the extended range
iii. 100 in both the 15-day ENS and extended range