The 3-month Outlook provides an indication of temperature and rainfall conditions in the next 3 months, averaged over the UK. It is part of a suite of forecasts designed and produced on behalf of Government, for use by contingency planners, and is one of several tools used in environmental risk planning by a number of different sectors. The 3-month Outlook should not be used in isolation. It is recommended that it is used in conjunction with other information provided by the Met Office for the contingency planning community. This includes shorter range forecasts which cover timescales of 1-month, 15-days and 5-days.

So what information do we provide in the 3-month outlook? Outlook information is provided for temperature; and also for precipitation, such as rain or snow. For each parameter a text section is included to convey the key messages. And then, for each parameter, there are three different graphical representations of the 1-month and 3-month forecasts for the UK, which place the outlook forecasts into the context of long-term and recent climatology. The forecast information on the graphs is essentially the same; the reason for having three separate plots is to enable the user to view this information alongside climatological data that is usefully displayed in three different ways. No part of the Outlook should be taken in isolation, as each element provides complementary information that should be used together to inform decisions.

We will next look at the guidance which illustrates the sort of information provided for each parameter, using temperature to illustrate the general content.

The outlook text section provides a synthesis of all the information conveyed on the graphs. Firstly, in the green box, there is a summary for the UK, to convey all the key messages. The context section that follows uses the commentary of expert forecasters to provide some underpinning background information. Specifically, the section highlights how the graphs that follow relate to the key messages, and it also describes some of the different factors that came into play in determining the content of the forecast.

*Figure T1* shows, in the box on the right hand side, the forecasts for UK average temperature over the next 3-month period – and places this in the context of relevant past observations – which make up the rest of the plot.

The vertical axis on the graph shows values for the variable represented, in this case average UK temperature. Temperature here is represented in degrees Celsius. In passing note that on the precipitation graphs this axis shows average UK precipitation in mm, accumulated over the whole forecast period. The horizontal axis shows time. This time axis is divided up into overlapping 3-month periods throughout the year. The groups of letters on the horizontal axis show the initials of the component months, for example JAS equals July, August, September.

Past observations are shown in two ways:
Each year during the period 1971-2000 is represented with a black symbol, denoting the observed average temperatures over each 3-month period. The 30-year climatological means are also shown on this graph, using green circles.

Meanwhile the values observed in the most recent twelve 3-month periods are shown by the blue line. This is included so that the user can relate the current forecast to the most recent past.

Fifteen overlapping periods are shown to provide a full year’s worth of values for earlier years. In this example the most recent period for which we had quality-controlled observations at the time of issue was July-August-September, so this is the reason that the blue line stops at JAS.

As one can see from the black symbols there is a strong seasonal cycle in UK average temperature. It is also clear that the broadest range of year-to-year variations are seen in winter and early spring. Extreme high and extreme low values, as observed within the 30-year climatological reference period, also stand out clearly on this graph.

The outlook information in the box on the right shows 42 predictions of the average over the upcoming 3-month period. These different predictions derive from each of the 42 ‘members’ of our ensemble prediction system, but incorporate also expert modification designed to take account of all the relevant information from other sources. The key point here is that each blue cross represents an equally likely outcome for the period in question.

Figure T2 places the outlook in the context of the observed UK climatology for the forthcoming month in the panel on the left, and in the context of the observed UK climatology for the 3-month period in the panel on the right. Although the plots look similar please note that the scales on the vertical axes do differ.

Climatological information for 2 distinct historical periods is displayed. The black symbols represent the long-term climatology from 1971-2000, whilst the grey symbols represent observations for the most recent period, from 2001-2010. In addition, the grey symbols that are for last year, and for the year before that, are labelled. So this enables the user to directly compare predictions for this year with what happened in the two most recent years.

Differences between the 1971-2000 and the 2001-2010 climatologies reflect long-term variability in the UK’s climate, for example warming temperatures.

Each coloured point, purple or blue, represents one of the expert-adjusted ensemble member predictions. All the individual points are equally likely outcomes.

The forecast, and the observed reference climatology, are both also represented as continuous distributions, the forecast distributions being shown by coloured curves and the reference climatological distributions, for 1971-2000, by black curves. The black curves denote the probabilities of different outcomes as represented purely by climatology, whilst the coloured curves denote the probabilities of different outcomes as represented within the forecast. So differences between the coloured curves and the black curves are indicative of where the forecasting system, and expert judgement, are aiming to add value to the forecast, over and above what one could do by purely predicting a climatological distribution of probabilities.
The background colouring – in red and blue shades on this temperature example - indicates the quintile categories of the reference 1971-2000 climatology. These are shown as well-below average; below average; average; above average and well-above average temperature. These are defined as having been equally likely over the reference period. Each category has a climatological probability of 20% - this is how quintiles are defined.

*Figure T3* shows, in the box on the right, the forecast for the coming month, and for the upcoming 3-month period. The user can place this forecast in the context of recent year to year variations in single month and 3-month mean UK temperatures, which are all shown to the left.

As indicated on the horizontal axis, observations are shown for each year since 1996. We only show data for each month during the 3-month period of interest – in this case November, December and January. Note that only 15 years are covered and so this period is shorter than and very different from the standard 1971-2000 climatological reference period. So the points may not be representative of the full climatological variability that is possible.

The graph sets the 1-month and 3-month outlook in the context of conditions observed in recent years, and emphasises that some caution is required – one should not over-interpret the forecast. Specifically it should not be assumed that the 3-month average outlook will necessarily be representative of conditions prevailing in individual months within the period. In some years UK temperatures in consecutive months can be very different. Indeed these month-to-month variations are generally larger than the spread of the predicted 3-month average.

Outlook information shows the prediction for the average over the next 1-month and 3-month period from each of the 42 ‘members’ of the ensemble prediction, after expert modification. Again the key message is that each point represents an equally likely outcome.

Finally it is important to mention that although very unlikely it is certainly possible that the final observed value, for temperature or precipitation, will lie beyond the range of the forecast values, as shown by the blue and purple crosses on the different graphs.

Users should also be aware that the products provide forecast and climatological data averaged over the UK, and that it is not unusual to see large regional variations within the UK, especially for precipitation. At present we are unable to give any reliable indication of likely regional differences across the UK within the forecast.