

100 years of scientific forecasting

Author: Press Office

14:09 (UTC+1) on Fri 22 Sep 2017

The forecast system used today results directly from experiments carried out in the trenches of WW1.

Met Office mathematician Lewis Fry Richardson recognised that pre-First World War weather forecasting practices were fundamentally unscientific, merely matching current weather phenomena with historic records. While volunteering for the Friends Ambulance Unit at Passchendaele he conducted a series of weather experiments.

Richardson broke new ground with a gridded approach to forecasting, and while it took him more than six weeks to calculate a six-hour forecast for a single location, this mathematical approach to weather forecasting has become the basis on which today's forecasting system has been built. What took six weeks to produce 100 years ago can now be accessed in seconds via an app on our mobile phone.

Lewis Fry Richardson and his Forecast Factory



Research, technological developments and advances in computer power have allowed forecast grid sizes to be cut (i.e. over the last 30 years our Global Model grid sizes have reduced from 90km down to 10km) and improvements in our forecast accuracy. Our four day forecast is now as accurate as our one day forecast was 30 years ago.

Met Office Deputy Director of Weather Science Dale Barker said “Recent significant improvements to our modelling and forecast system include increased resolution of our global models and a greater number of [ensemble](#) members to support forecasting for high impact events. We have also enhanced the physics in our UK models and added new hourly updates to the UK forecast from the first 12 hours.

MODEL UPGRADES SEPTEMBER 2017



Our new supercomputer's increased computational capacity helps us unlock new science and provide even more accurate data and forecasts

<p>GLOBAL NUMERICAL WEATHER PREDICTION MODEL</p> <p>Provides medium-range UK forecasts and short-range weather forecasts for all around the world.</p> <p>INCREASED HORIZONTAL RESOLUTION</p> <p>From -17km to -10km in mid-latitudes</p> <ul style="list-style-type: none"> Improves model outputs Improves medium and short term forecast accuracy <ul style="list-style-type: none"> particularly near the surface during snow-melt Better representation of coastlines & topography Enhanced representation of tropical cyclones 	<p>UK HIGH RESOLUTION MODEL</p> <p>Provides detailed accurate weather information to the UK.</p> <div data-bbox="526 302 758 537"> <p>INTRODUCTION OF HOURLY 12 HOUR FORECASTS</p> <ul style="list-style-type: none"> Improves very short-period forecasts </div> <div data-bbox="766 302 989 537"> <p>CHANGE FROM 3 TO 4 DIMENSIONAL ANALYSIS SYSTEM (4D-VAR)</p> <ul style="list-style-type: none"> Uses observations more intelligently to produce more accurate forecasts </div> <div data-bbox="526 548 758 784"> <p>ENHANCED PHYSICS</p> <p>Provides detailed accurate weather information to the UK</p> <ul style="list-style-type: none"> Improves forecasting of cloud and precipitation Helps with more accurate rainfall information, in support of flood forecasting </div> <div data-bbox="766 548 989 784"> <p>HIGHER RESOLUTION LATERAL BOUNDARIES</p> <p>Now at global 10km resolution</p> <ul style="list-style-type: none"> Gives us better information about weather coming in to the UK model </div>
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September 2017 | 00212

“We have the world’s largest [supercomputer](#) dedicated to weather and climate science here at the Met Office. This allows us to continually pull through cutting edge mathematical and scientific developments into our forecast models meaning we are able to produce more detailed and accurate forecasts, helping maintain our world-leading position in weather and climate prediction”.

Our global [NWP model](#), the foundation of our accurate weather provision, is recognised as a world leading National Met Service model verified using standards defined by the [World Meteorological Organisation](#). The high level of trust in our forecast accuracy is underlined by the fact that our model is used under licence by six other forecast centres and over 50 research centres around the world.

Over the last 100 years, developments in our science and technology have led to many step changes in forecasting. The continual improvement in accuracy of our weather forecasts has ensured they have become a trusted tool, embedded in decision-making for government, industry and the public.

As we remember the work of Lewis Fry Richardson we also pay tribute to the thousands of British troops who fought, were injured or who died at Passchendaele, particularly the Battle of Menin Road (20 to 25 September 1917) whose anniversary falls this week.

Our latest global model improvements