

The North Sea Floods of 1953: Impacts, Forecasts & Developments

Dr Charlie Pilling, Flood Forecasting Centre

Abstract: This presentation considers the impacts of the North Sea flooding of 1953 when storm surges were poorly understood and before appropriate warning mechanisms were in place. It then explores what improvements across a range of disciplines have been put in place since then, which enabled the coastal event of 2013 which was arguably of similar magnitude, to pass without any loss of life due to flooding.

It will consider the synoptic evolution and impacts, drawing parallels and highlighting differences with the coastal flooding of February 1953 and December 2013. Developments in weather forecasting, impact modelling, warning and communication as well as other mitigation measures will be outlined. These will include the Storm Tide Warning Service and network of tidal gauges, more recently the UK Coastal Monitoring and Forecasting (UKCMF) and UK Coastal Flood Forecasting (UKCFF) along with developments in meteorology (Met Office, ECMWF etc), the Environment Agency and the Flood Forecasting Centre (FFC) as well as our Emergency Services. There will be brief discussions highlighting improvements in modelling capability and performance. It will also show how effective modelling, forecasting and warnings, together with emergency planning and work to strengthen coastal defences, has helped to protect lives and livelihoods.

Biography: Charlie Pilling is the Chief Hydrometeorologist at the joint Environment Agency / Met Office Flood Forecasting Centre (FFC) where he is responsible for shaping and bringing new collaborative science into operations. He also acts as a strategic manager, working with the Government during severe flood events.

Charlie joined the Met Office in 1999 after completing his MSc in Meteorology and PhD on 'The hydrological impacts of climate change'. Following 10 years of operational experience in meteorology he worked as one of the hydrometeorologists to develop the services and modelling capabilities at the then new FFC. Charlie has been working as Chief Hydrometeorologist since early 2013.

"The October Storm: Hurricane Force Winds give Birth to the National Severe Weather Warning Service"

Prof Brian Golding FRMetS, Met Office

Abstract: On 16th October 1987 the UK suffered its worst windstorm since 1703, with 18 deaths, 15 million trees felled and insured costs of £2 billion. The depression that caused the damage developed explosively to the southwest of the UK, making landfall shortly after midnight. Subsequent analysis identified banding in the winds, indicative of sting jets (not then known). The inquiry identified three main shortcomings in the weather warnings: 1. The warning service did not provide the right information to the right people at the right time; 2. The forecasts could have been better, given observations to the SW of the UK and finer model resolution; 3. Uncertainty in the forecast could have been better communicated. These were all responded to, but my talk will concentrate on the first, which resulted in the National Severe Weather Warning Service (NSWWS). It developed further following the Civil Contingencies Act of 2005 which was partly a response to the 1998 floods. Today the NSWWS is risk-based, communicating both probability and impact, and is widely held up as an example of good practice. However, it does not cover all weather-related hazards, and the public response is less than is justified by its skill. The WMO HIWeather project is working to identify the ingredients of next generation warning systems that will be even more effective in saving lives and reducing distress from weather-related hazards.

Biography: Prof Brian Golding is a Fellow in Weather Impacts at the Met Office, visiting professor at Bristol University and co-chair of the World Meteorological Organisation's 10-year High Impact Weather project. Brian's research has spanned data assimilation, NWP model development, flood and ocean wave prediction, interactive forecasting graphics, and several application areas. Following his retirement as Deputy Director of Weather Science in 2012, he was awarded the OBE. His current work is focused on design of next generation warnings for weather-related hazards, applicable worldwide, and spanning crowd-sourcing of hazard observations through impact prediction to the psychology of response.

"The Wettest Summer" - Heavy Rain Events of 2007 – Impacts, Forecasts & Developments

Prof Christel Prudhomme, European Flood Awareness System

Abstract: The UK floods of 2007, and others throughout Europe - particularly in 2002, caused severe devastation as well as numerous casualties in many countries. To improve flood forecasting, including issues of trans-boundary floods, the European Commission developed an early warning service for floods. We will discuss the evolution of the European Flood Awareness system since its conception in 2002 until now, and discuss possible future developments.

Biography: Christel Prudhomme is a hydrologist with over 20 years' experience working on hydrological extremes and a visiting Professor (Loughborough University) specialised in Hydro-climatology. She joined ECMWF in April 2017, where she leads the Environment Forecasts team, responsible for the development and

operational maintenance and running of the Computation centre of the Copernicus Emergency System - Early Warning System on floods. Prior to that, she was principal scientist at the Centre for Ecology and Hydrology, a public research institute in the UK, leading a small team dedicated to study, understand and model the development in time and space of water deficits across spatial scales (from local to global), to assess their associated uncertainty and to quantifying the impact of climate variability and change on the hydrological processes and how in turn this impacts on the environment.

Progress in Flood Forecasting Across Britain From Advances in Hydrological Modelling and Numerical Weather Prediction

Movie-loops from research centres including Dr Joanne Williams (NOC) and Dr Steven Cole, Robert Moore and Dr Seonaid Anderson (CEH)

Abstract: "The movie-loop will showcase progress in flood forecasting across Britain through advances in hydrological modelling and numerical weather prediction (NWP). Case studies highlight the advantages of using high-resolution deterministic and ensemble NWP precipitation as input to flood models. Benefits from key hydrological model developments, such as gridded models with national-coverage and inclusion of snowmelt, will be illustrated. The value of introducing risk- and impact-based flood forecasting, provided for example through the Surface Water Flooding Hazard Impact Model (SWF HIM), will also be demonstrated."

Biography: Dr Joanne Williams | Joanne Williams has been a sea-level scientist at the National Oceanography Centre in Liverpool since 2008. She specialises analysing and predicting tides and storm surges, both from models and tide-gauge data, globally and in the UK. She has collaborated with the Met Office to identify means of improving operational surge forecasts, focussing on the importance of the tide-surge interaction in predicting tides, and has recently worked on the 2018 update of UK sea level extreme events analysis. She is currently working on automation of tide gauge data processing and quality control.

"The Beast from the East" and Storm Emma – Unusually Low Temperatures and Heavy Snowfall in Early 2018 – Present-Day Forecasting Problems

Tim Hewson, ECMWF

Biography: Tim Hewson leads the team responsible for "Forecast Performance Monitoring" and "Product Development" at ECMWF. As such his primary roles are leading the creation of new types of forecast chart, mainly for forecasters, and managing the production of the "Forecast Daily Report". This report is a high-profile internal document that summarises important aspects of the real-time analyses and forecasts of ECMWF's operational models. It aims to bridge the gap between forecast users and model developers in the Research Department, and is pivotal in paving the way for user-related modelling issues to be resolved.

Previously Tim was a Met Office Chief Forecaster, who carried out various related R&D roles alongside. Indeed at ECMWF he also continues to be involved in wide-ranging internal and external research initiatives.

"Live Science Session" - How do you Perceive Progress over the Last 25 Years?

John Hammond & Sara Thornton weathertrending.com, Dr Mark Rodwell FRMetS, ECMWF

Biography: After gaining his MSc in Meteorology from Birmingham University, John joined the Met Office in 1990. After spending several years as a 'bench' forecaster at various Weather Centres, he joined the media team at ITV in 1996, transferring to the BBC in 2003. While at the Beeb, John branched out to appear in such programmes as Horizon and regularly on Countryfile.

John remains a freelance presenter, but last year he left BBC Weather to start a new online business, weathertrending, with fellow broadcaster and journalist, Sara Thornton. They provide independent forecasts, together with written and video content for weather-affected retail brands, as well as presenter-training.

Sara Thornton has more than 20 years experience as a presenter and journalist working for the BBC, ITV and other major U.K. broadcasters. After several years in news and current affairs, she moved into weather broadcasting and a role as an environment correspondent in 2001. Since then she's been a senior presenter and producer at the Met Office, BBC Weather and ITV. She set up weathertrending with her colleague John Hammond in 2017, and continues to provide expert commentary and content production, as well as still regularly appearing on TV and radio.