



Scenario: Emergency Response



Buncefield oil depot explosion, Hertfordshire, UK

- **Police say 43 people were injured, two of them seriously, after flames shot hundreds of feet into the sky at the Buncefield oil depot near Hemel Hempstead in Hertfordshire, UK.**
- **The blast in 2005 was the largest in Europe since the end of World War II.**
- **The ignition of the vapour cloud which followed the spillage of 300 tons of petrol, caused an explosion which caused a tremor equivalent to a 2.4 magnitude earthquake.**

BBC

11th December 2005

NEWS



Meteorological service contributions

- Information on the transport and dispersion of the plume provided by the Met Office assisted with decisions on potential evacuation areas and safe approaches for fire crews and played a vital part in getting people to safe locations
 - Sophisticated dispersion models (NAME), together with weather forecasting model to predict the spread of the smoke
 - Dedicated Facility for Airborne Atmospheric Measurement (FAAM) research aircraft to take gas and aerosol measurements from within the plume
 - Forecasters and support was available 24 hours a day through Environmental Monitoring and Response Centre
- As a result of the services from the Met Office the emergency services gained:
 - Clear guidance on how the smoke would move, spread and disperse
 - Identification of the areas at risk from grounding of the smoke plume
 - Indications on what the plume contained



Boscastle flash flooding

- Flash floods have devastated a north Cornwall coastal village after the area's average August rainfall fell in just two hours. A major operation is now underway to rescue those trapped by the floods.
- Seven helicopters were scrambled to winch to safety dozens of people stranded on roof tops and in cars.
- The deluge has also swept an estimated 50 cars into the sea and caused several buildings to collapse. Rescue workers have described the situation as "horrendous".

BBC

16th August 2004

NEWS

Meteorological information requirements



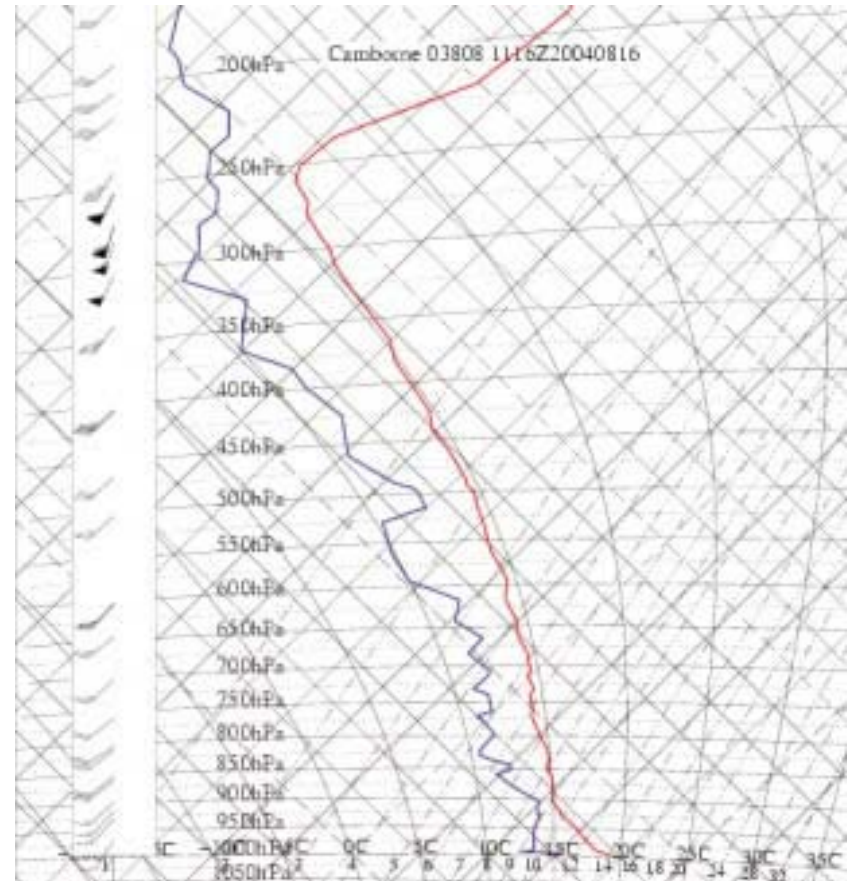
- Between 1200 and 1700 UTC on 16th August 2004 a huge amount of rain fell into the catchment of the Valency river which runs through Boscastle.
- [Rain gauge](#) and [weather radar data](#) show that the rainfall was extremely localised, with only 5 2x2 km radar pixels showing a total more than 100 mm, and two rain gauges showing 184.9 and 200.4 mm respectively.



Meteorological information requirements



- Tephigrams are used as areas contained by the curves have equal energies for equal areas, leading to better comparisons of Convective Available Potential Energy (CAPE) and hence better assessment of convective systems.
- This Tephigram from Camborne also presents wind information from the sonde ascent; also highly useful in assessing the behaviour of storms



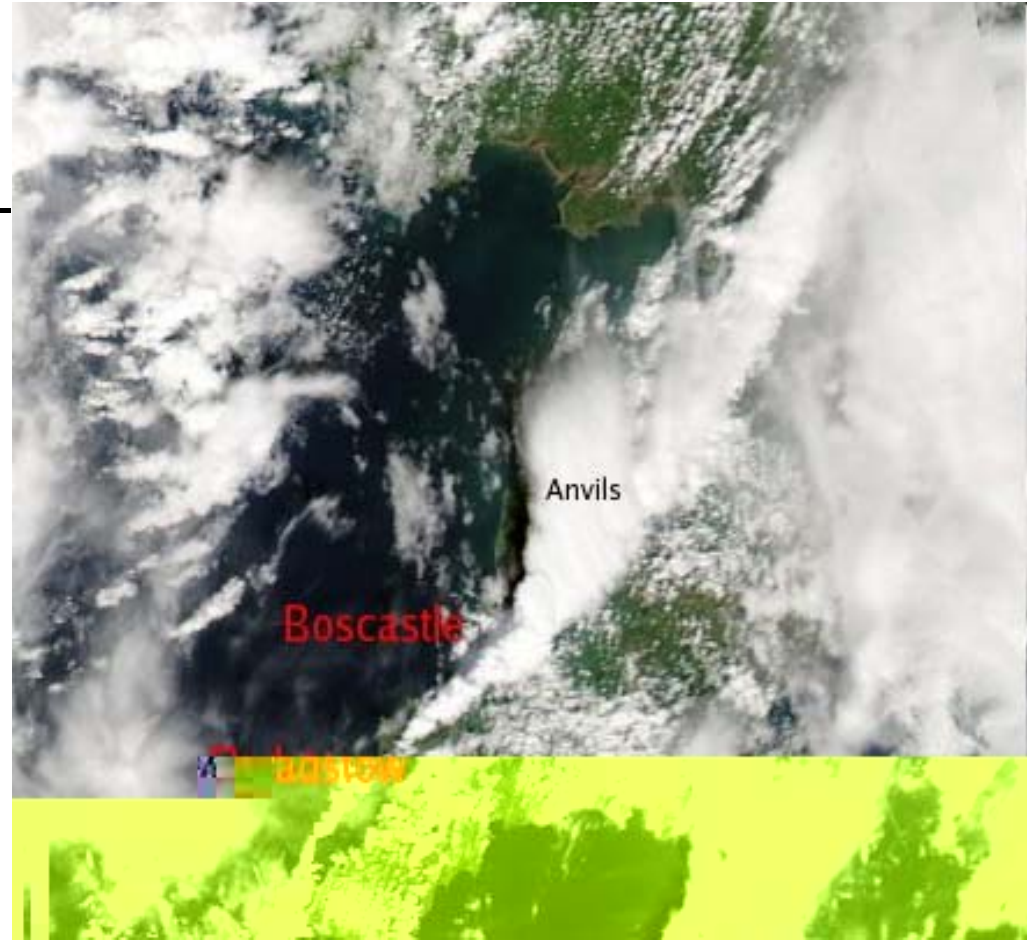
Tephigram showing 1200 UTC [radiosonde](#) from Camborne



Meteorological information requirements



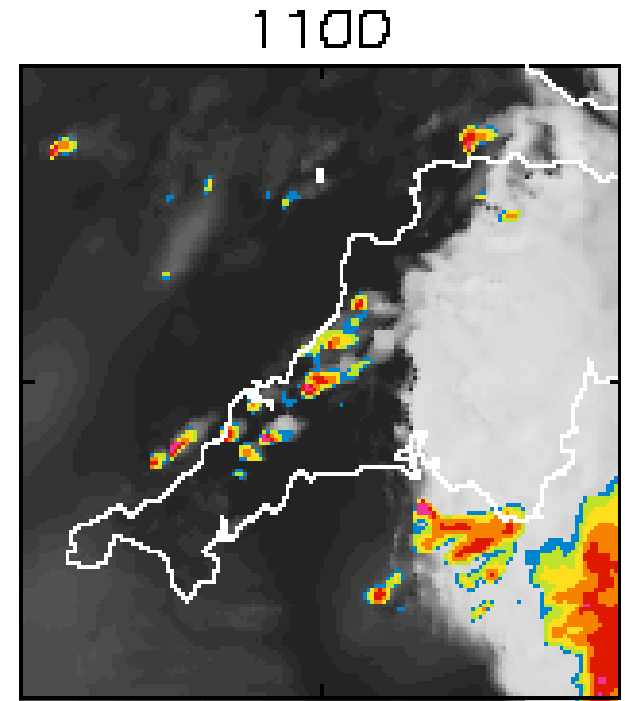
- A very high resolution visible wavelength image from the [MODIS satellite](#), shows a line of storm clouds starting to the south-west of Boscastle.
- [Radar](#) data showed a sequence of many individual intense 'cells' each starting at roughly the same place and moving north-east along the coast as they grew, but these are so close together the clouds merge together to form a line. These eventually develop the broad 'anvil' cloud characteristic of thunderstorms.



Meteorological information requirements



- A version of the Met Office's [Unified Model](#) has been run at a resolution of 1 km*.
- This animation shows a representation of cloud top temperature (white shows high cloud) and rainfall rate in mm/h (only rates greater than 1 mm/h are shown: blue=1-2, green=2-4, yellow=4-8, orange=8-16, red=16-32, purple=>32).
- The forecast was run from data at 0000 UTC and it is certainly not perfect. However, it does predict a continuous stream of intense storm along the N Devon coast in the Boscastle area.



Authoritative voice?



- Emergency response is safety critical by definition
- Just because a mash-up is easy to create and publish, does this mean that anyone and everyone should be able to?
- Example:
 - WMO provides international guidelines regarding who can issue hurricane warnings
 - When CNN started presenting hurricane warnings as part of its service, WMO was forced to challenge them
- In safety critical situations, should only legally-mandated organisations be responsible (liable)?
- How do we ensure service consumers can verify the source of the advice?
- How can service providers ensure that only authorized consumers can access the service ... and not create mass-panic?