Introduction to the NAWDEX case study: Extratropical phase of tropical storm Karl

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Plot courtesy: Malcolm Brooks (UK Met Office)
The North Atlantic Waveguide and Downstream Impacts Experiment (NAWDEX)

- Airborne field campaign
- 4 research aircraft including the German HALO (High Altitude and LOng Range Research Aircraft)
- Based in Keflavik, Iceland
- Sep/Oct 2016
- 47 research flights (205 flight hours)
Overarching Science Aim of NAWDEX

To quantify the effects of diabatic processes on disturbances to the jet stream near North America, their influence on downstream propagation across the North Atlantic, and consequences for high-impact weather in Europe.
Key dates:
Extra-tropical transition of Tropical Storm Karl

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• Progressed polewards rapidly on **25 Sept**
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- Associated moisture transport and strong surface winds resulted in localised flooding and wind damage in Norway on **28-30 Sept**
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26 Sept: Interaction with the jet stream

HALO flight track (flight: 10am to 7pm)

Plots Courtesy: Andreas Schäfler
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\[ PV = \frac{\zeta \cdot \nabla \theta}{\rho} \]

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27 Sept: Strong jet streak North of UK
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Recap: 1-hourly animation
http://www.met.reading.ac.uk/~ben/karl.gif
Predictability

To assess predictability at a glance:
Rate of spread of EC ensemble with respect to lead time

Figure Courtesy: Claudio Sanchez
Predictability

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Rate of spread of EC ensemble with respect to lead time
UKMO Forecasts
All valid at 12Z 27 Sept
Solution fairly well converged at 3 day lead time
Very jumpy beyond 3 days
Summary

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• Link to click through some plots from the whole period: http://www.met.reading.ac.uk/~ben/nawdex/analyses
• Animation: http://www.met.reading.ac.uk/~ben/karl.gif