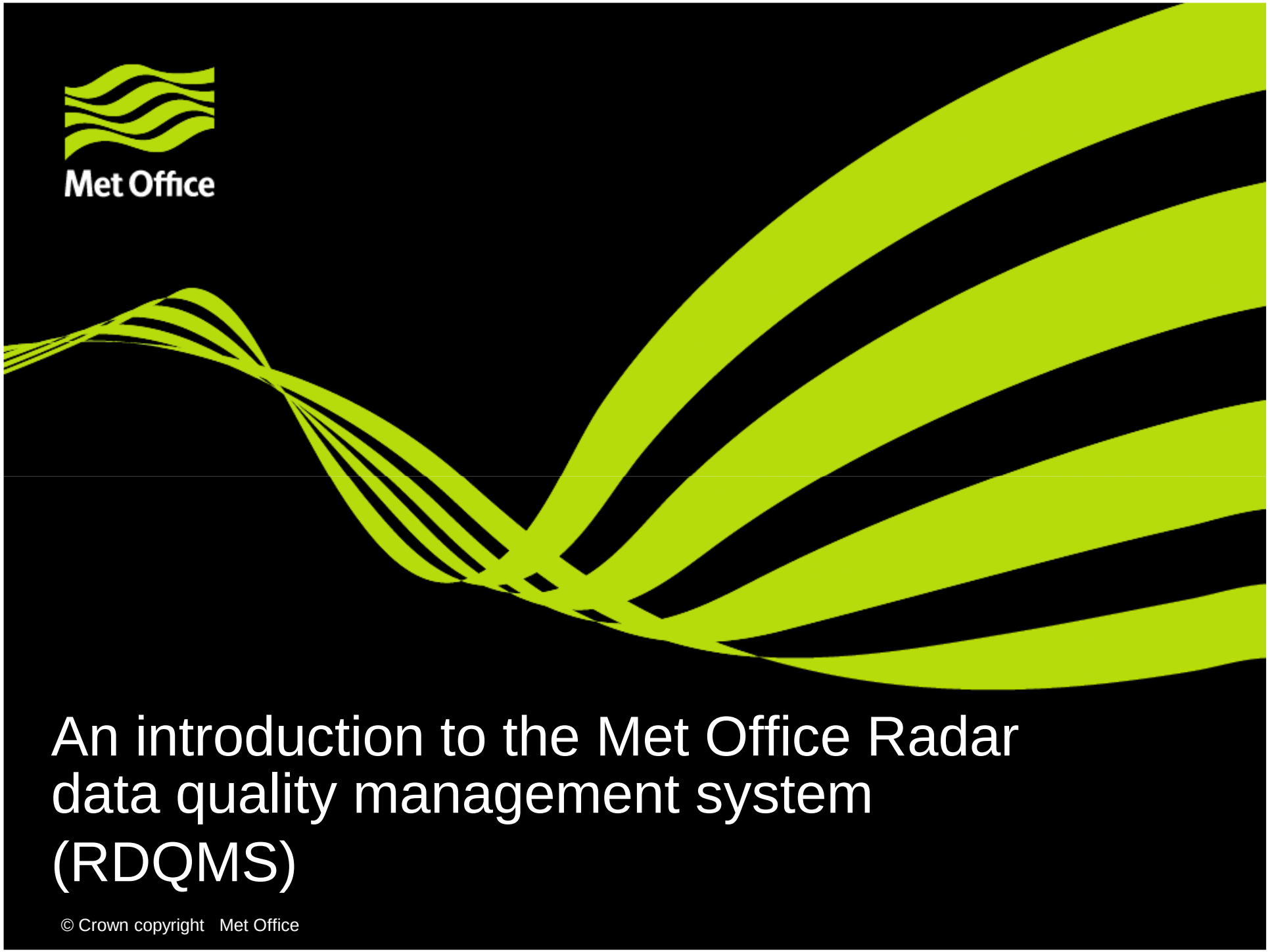


An introduction to the Met Office Radar data quality management system (RDQMS)

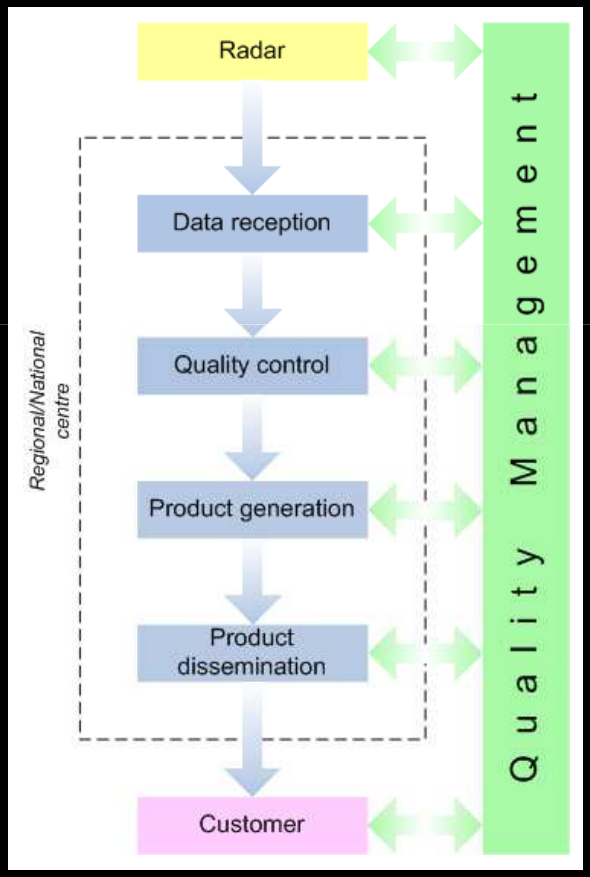
Contents

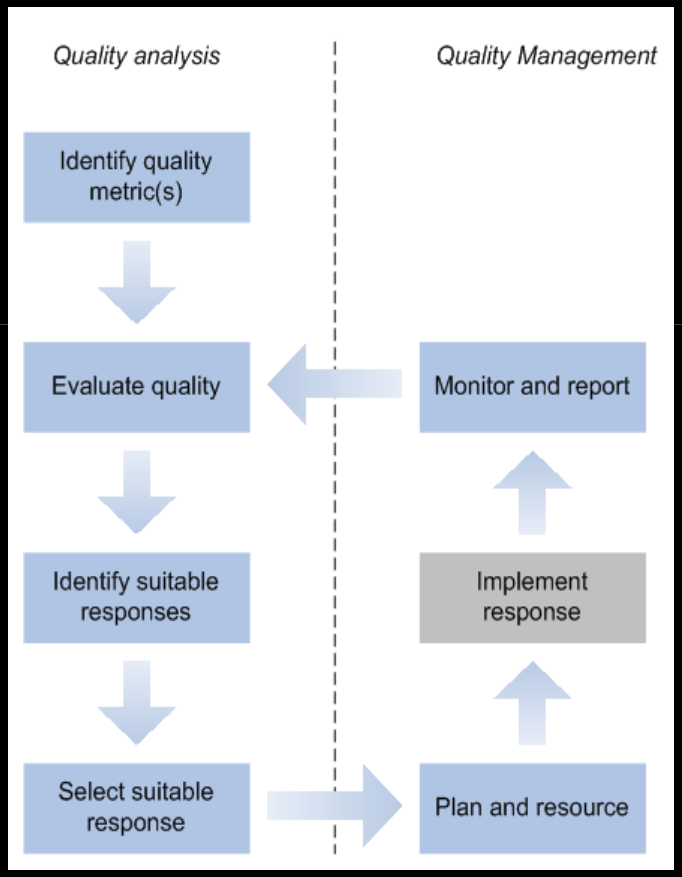
This presentation covers the following areas

- Quality management approaches
- The key components of the RDQMS system
- Examples of where it has been useful
- Discussion of future possibilities

Quality Management Approaches

Quality Management (QM) and the QM cycle



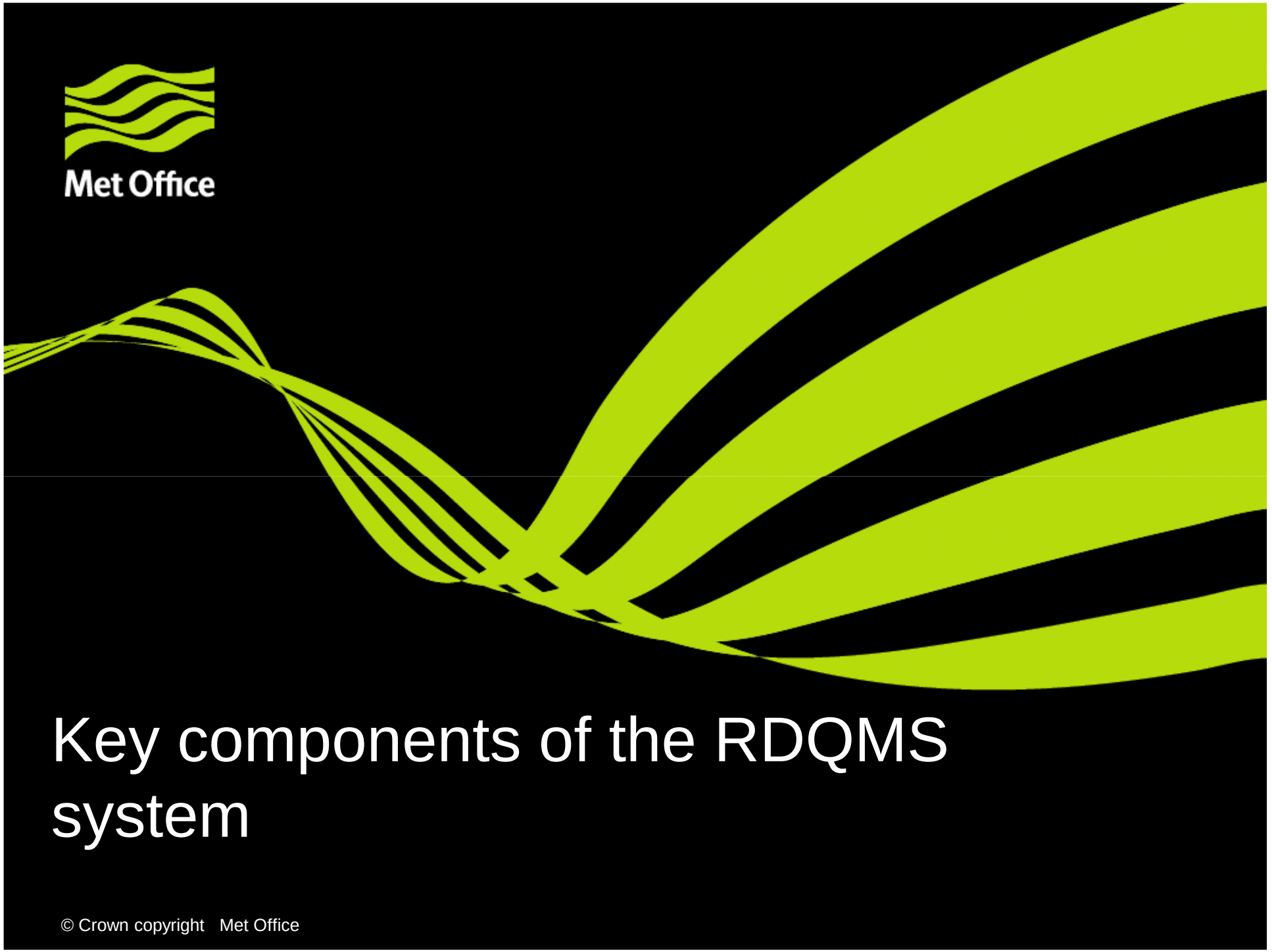


Approaches to quality monitoring

1. Monitoring trends of selected parameters and, flagging deviations from expected trend or range
2. Evaluating radar product quality by routine comparison with ‘ground truth’ observations
3. Evaluating radar product quality by routine comparison with NWP model fields
4. Accumulating diagnostic products over time, investigating the self-consistency and identifying anomalies
5. Off-line case study investigation, to determine product quality during high-impact weather events
6. Indirect evaluation by examining outputs from downstream applications (e.g. precipitation forecast, river flow forecast).

Why do we want an integrated approach to quality monitoring?

- Enable more rapid root cause analysis and remedial action to be undertaken
- Identify areas for development of scientific techniques and technical solutions (by identifying persistent problems)
- …and therefore deliver an overall improvement to radar data and radar product quality
- Increase customer confidence in radar products (resulting in increased customer satisfaction and enabling new customers to be established)



Key components of the RDQMS system

Radar Data Quality Management System (RDQMS)

Completed:

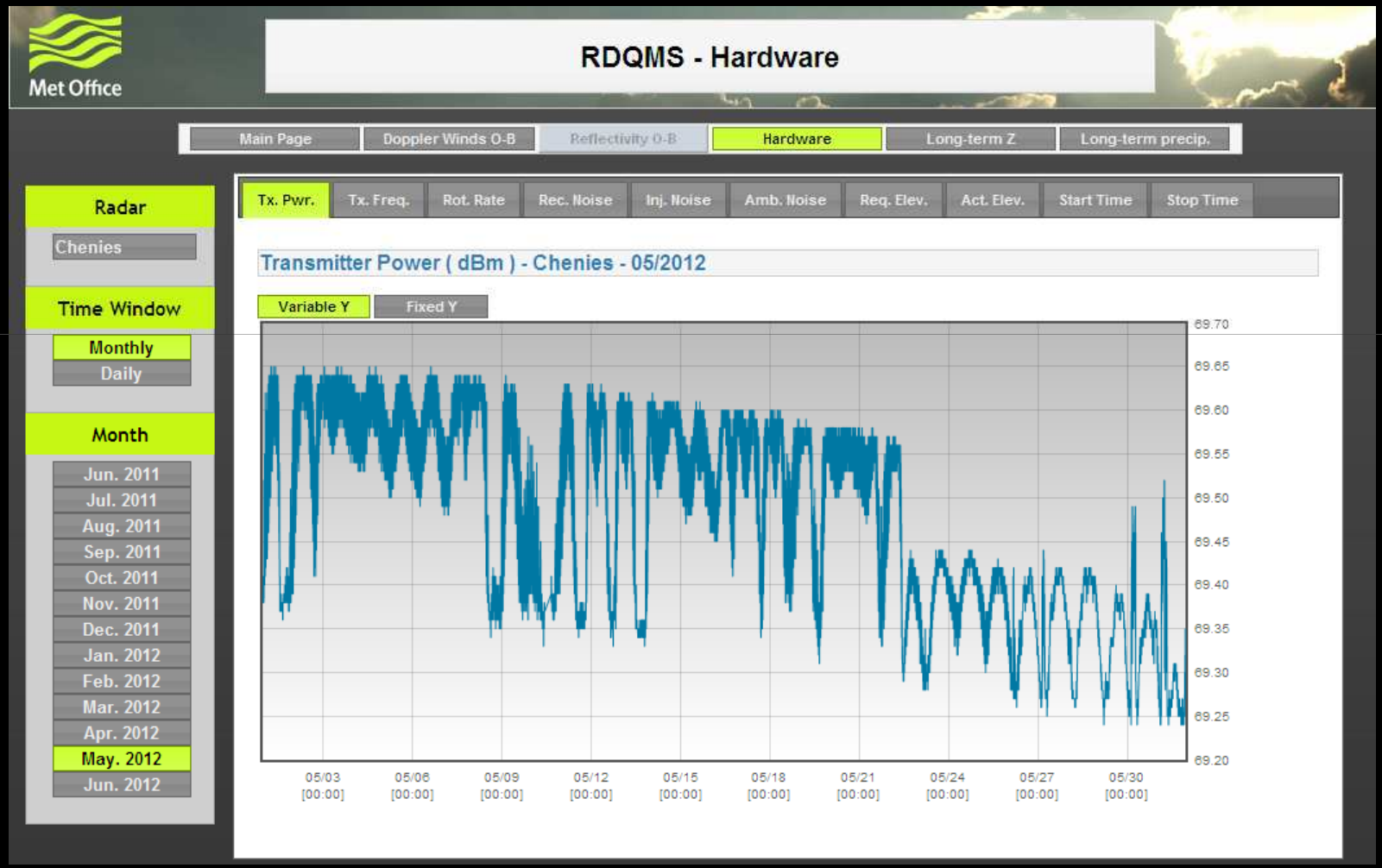
1. RDQMS infrastructure and website established
2. Short-term radar system monitoring developed
3. Monthly/seasonal diagnostics developed
4. Doppler O-B monitoring integrated

Radar Data Quality Management System (RDQMS)

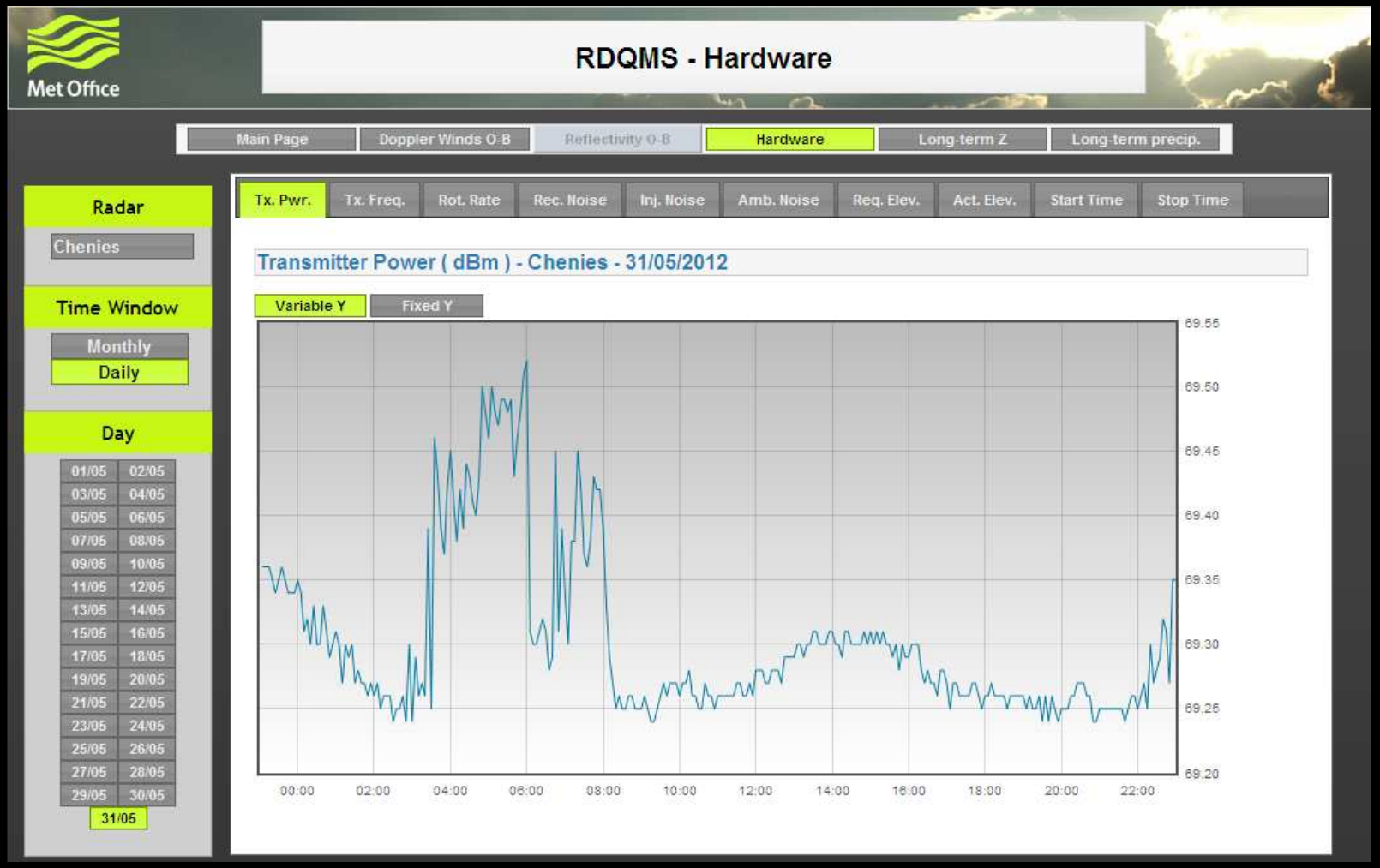
Future projections:

1. Reflectivity O-B monitoring to be integrated.
2. Possibility to automatically bias correct the reflectivity data using the relative calibrations.
3. Integration of the NWP monitoring suite of tools that are shared with ECMWF.
4. Set up components of the RDQMS within the centralised ODC – use within a European context.
5. Improve feedback we provide to customers by selecting relevant product oriented monitoring.

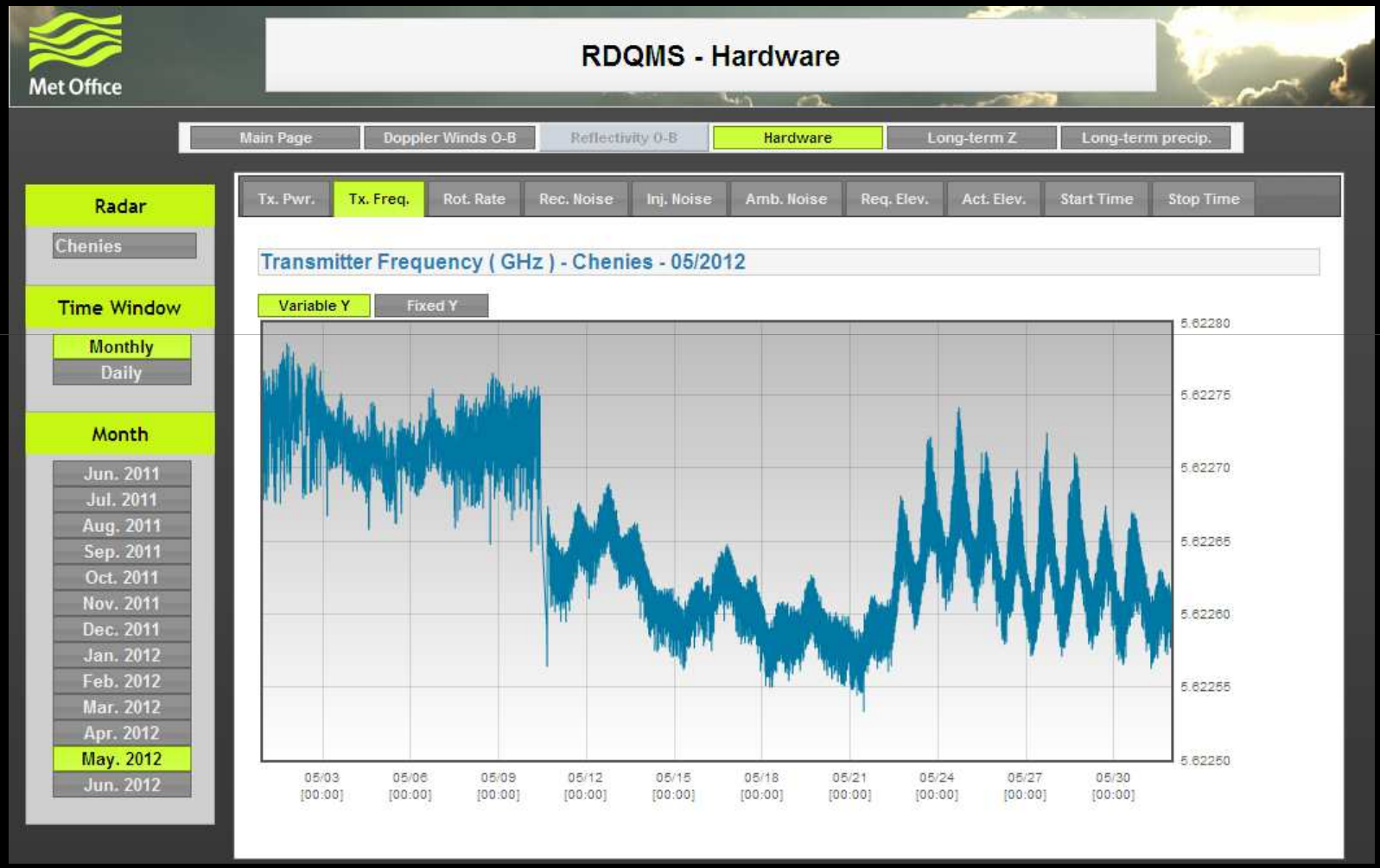
Hardware monitoring interface



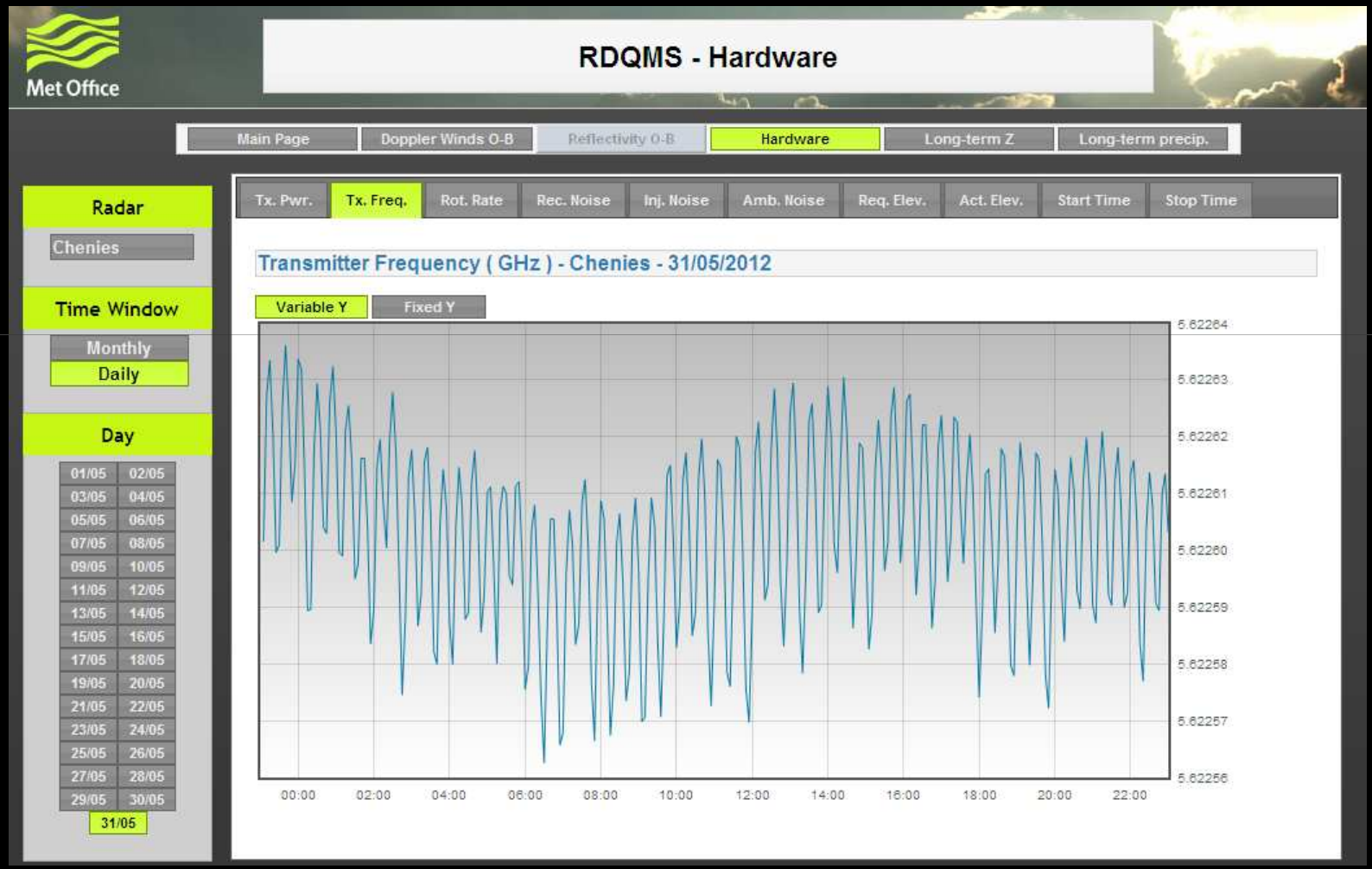
Hardware monitoring interface



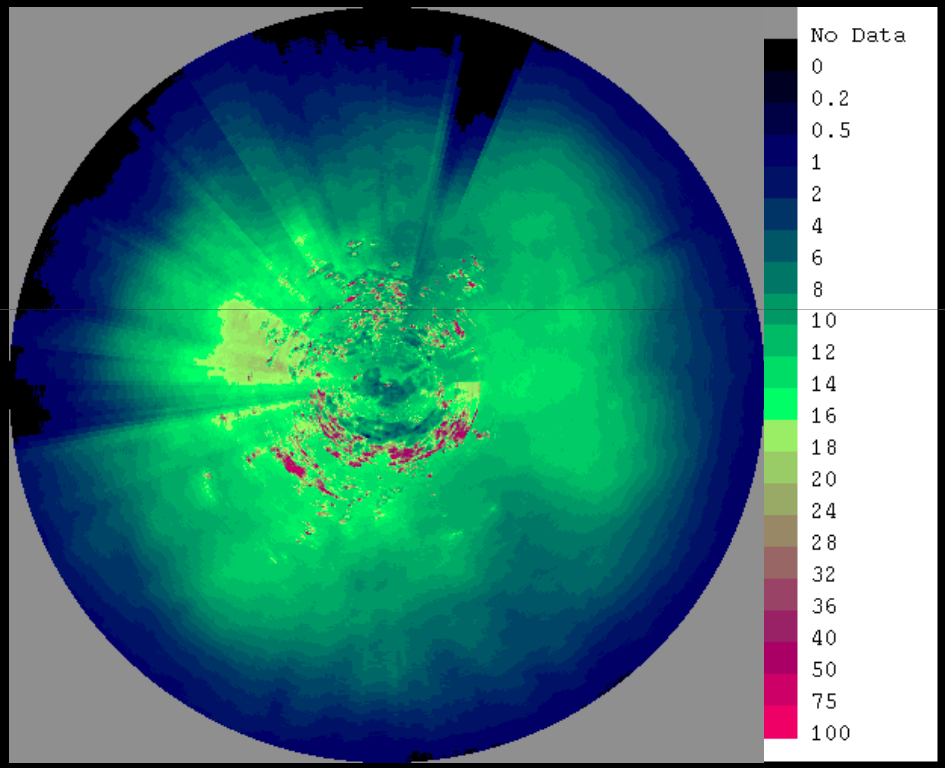
Hardware monitoring interface



Hardware monitoring interface

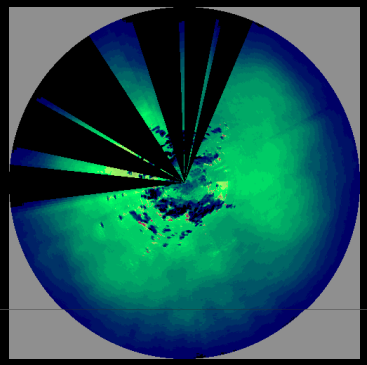


Example probability of detection: Munduff Hill, Jan 2011

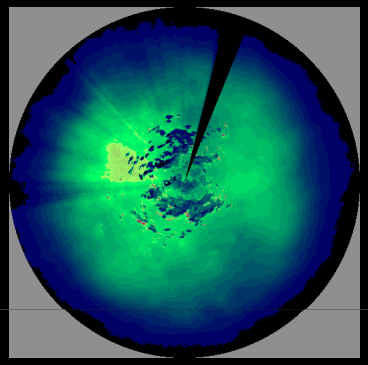


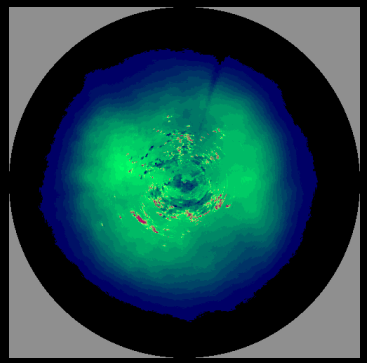
Surface precipitation

0.5 deg scan

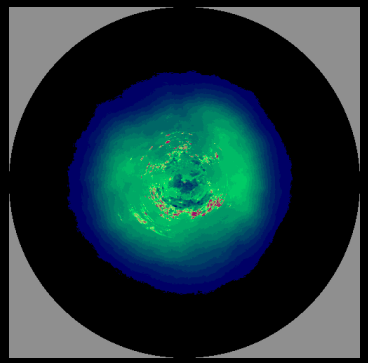


1.5 deg scan





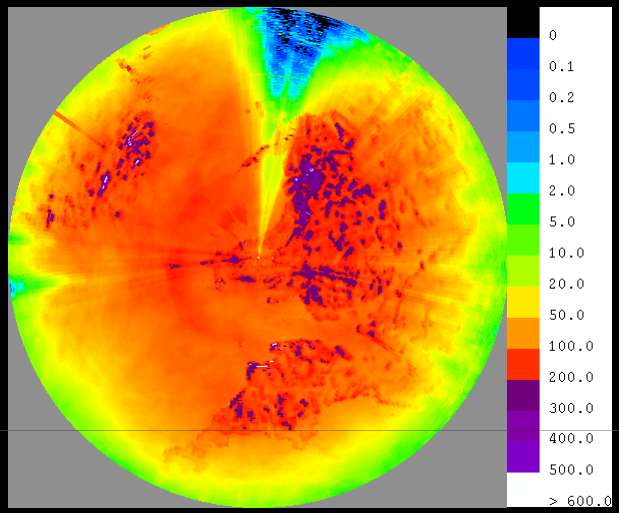
2.5 deg scan

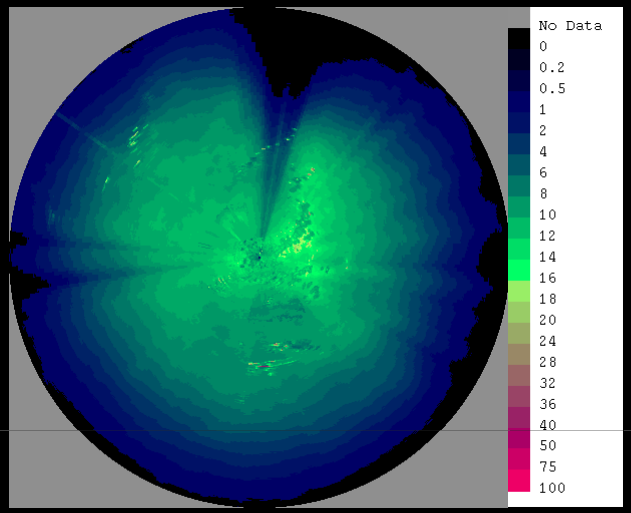


4.0 deg scan

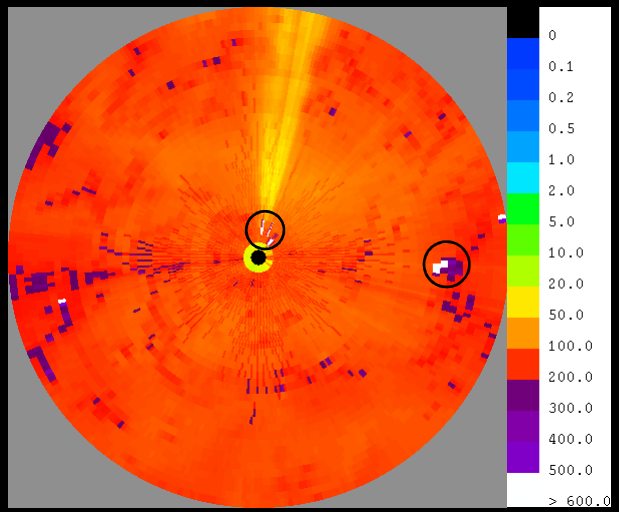
3-month QPE diagnostics
Crug-y-gorllwyn Feb – Apr 2012

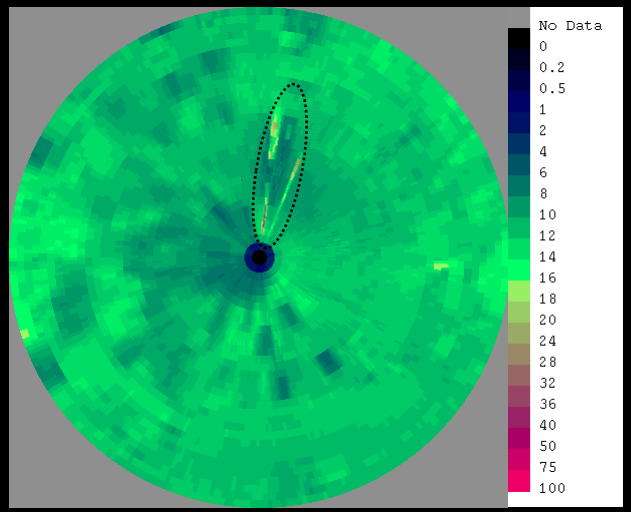
255 km range





20 km range

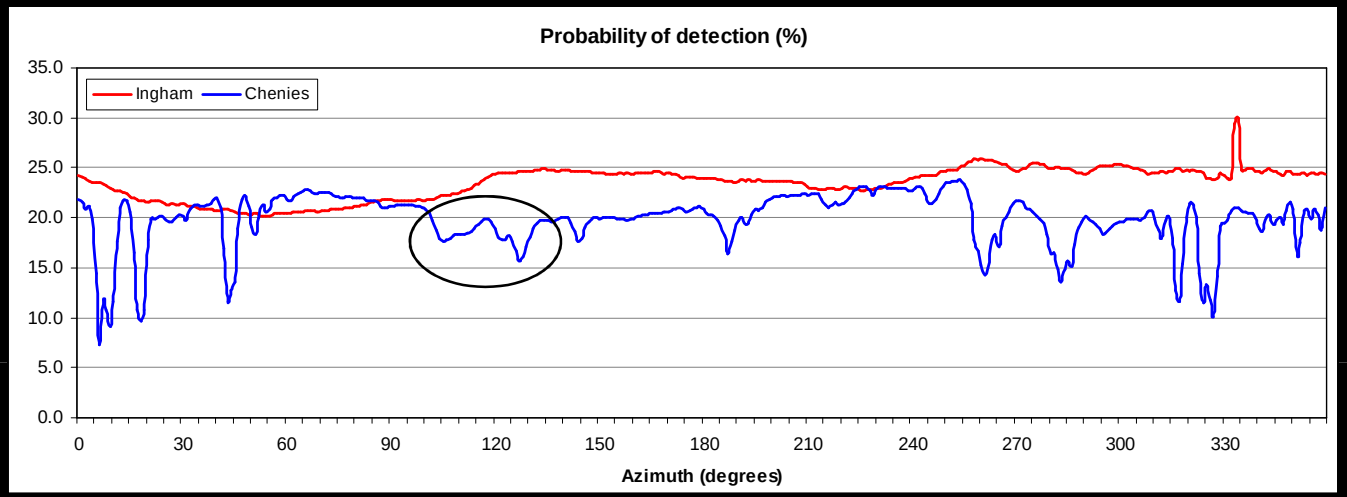


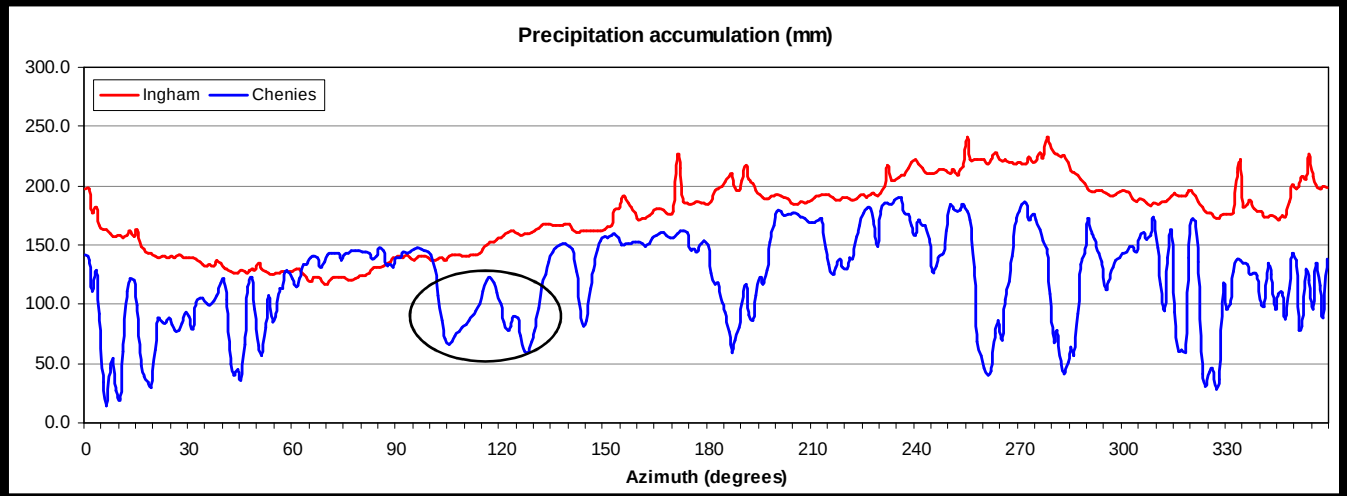


Precipitation accumulation (mm)

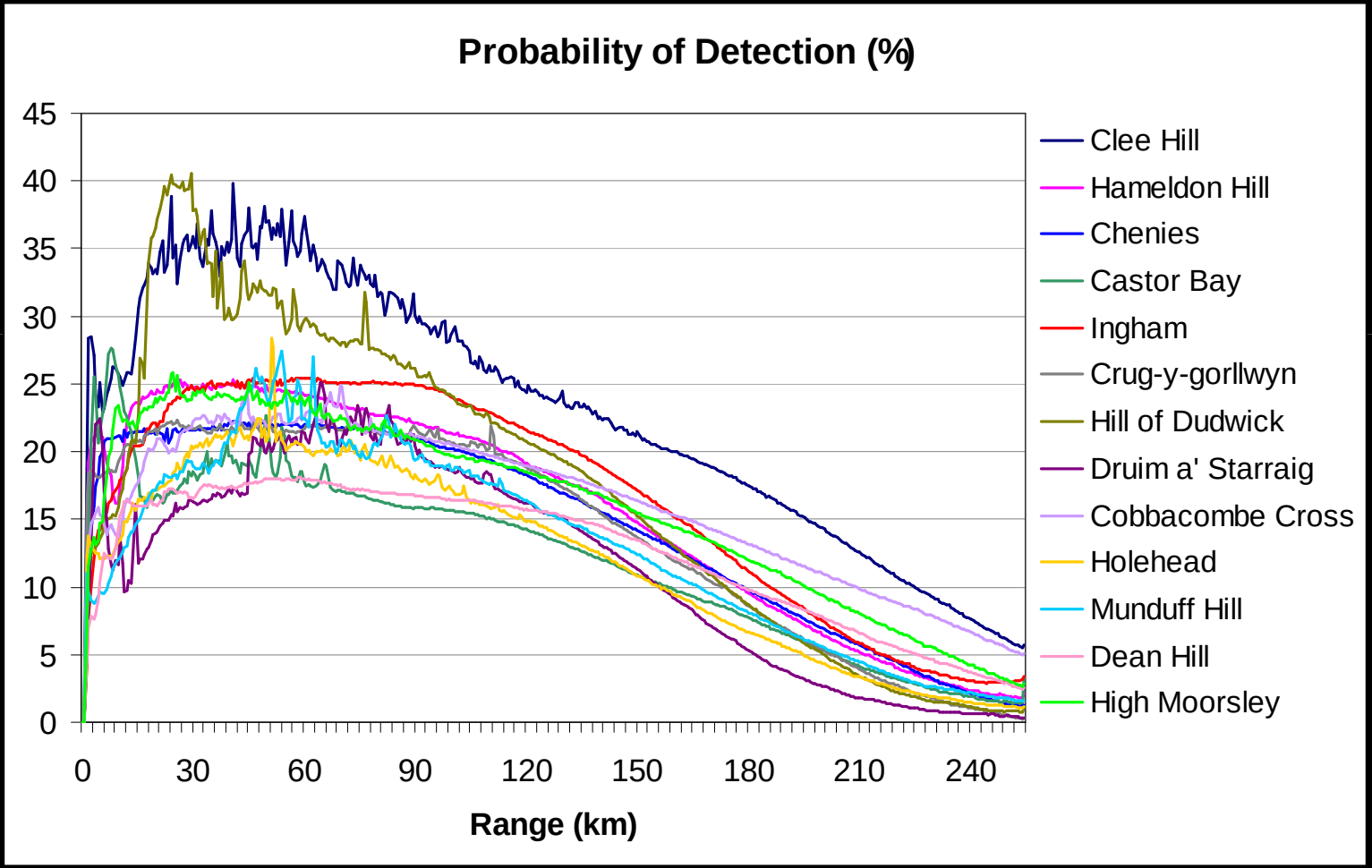
Probability of precipitation (%)

QPE diagnostics – variation with azimuth, April 2012

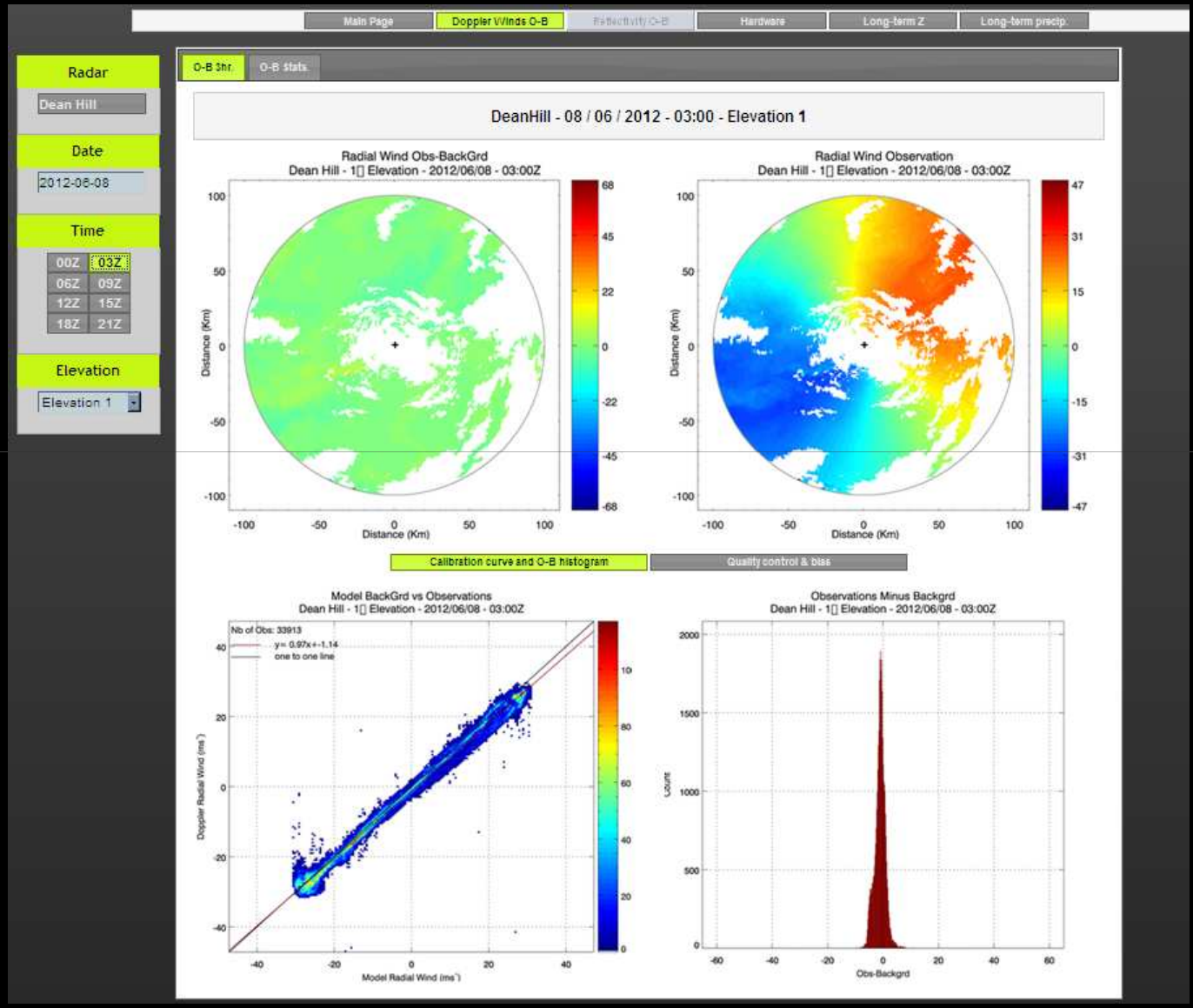




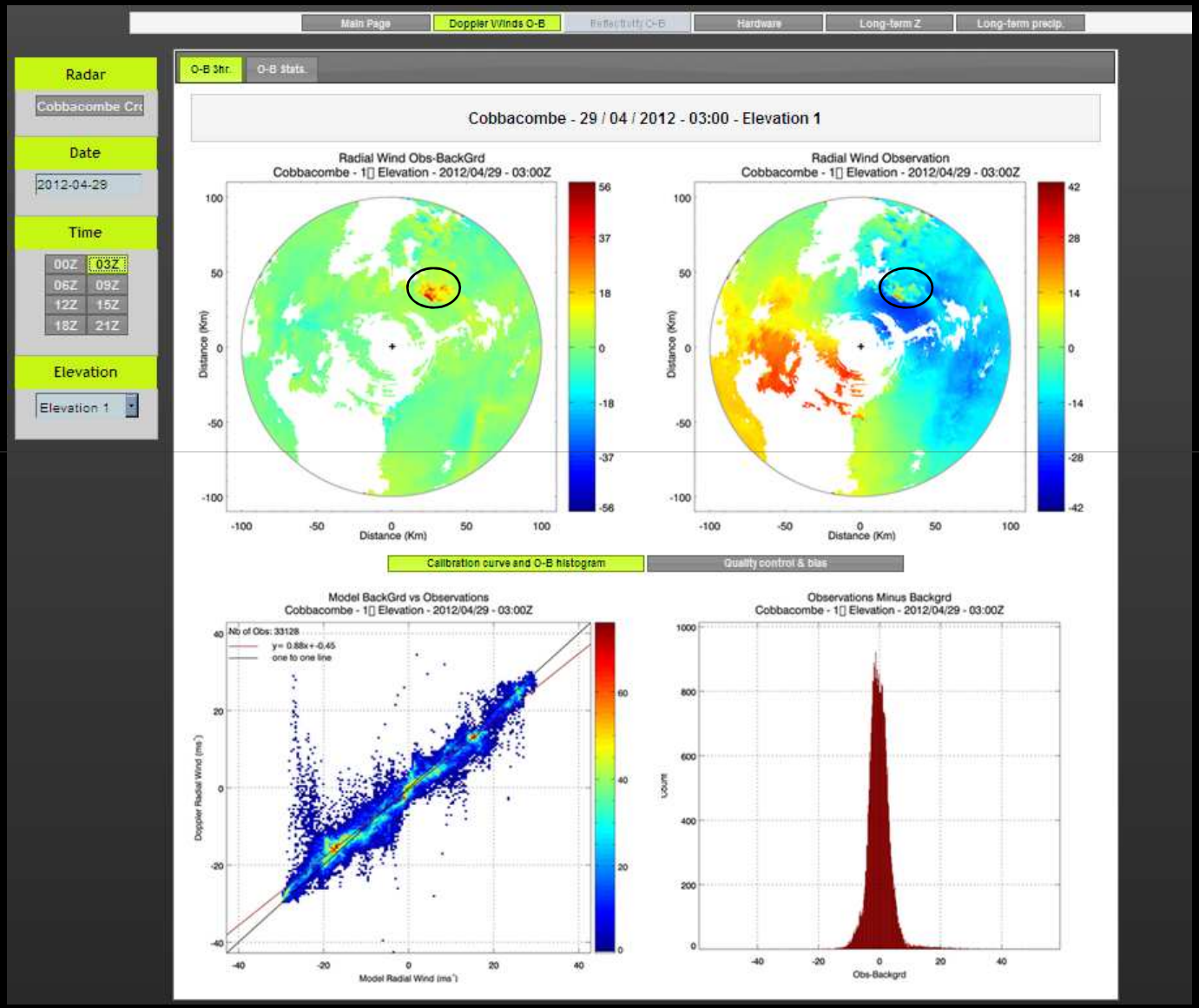
QPE diagnostics – variation with range, April 2012



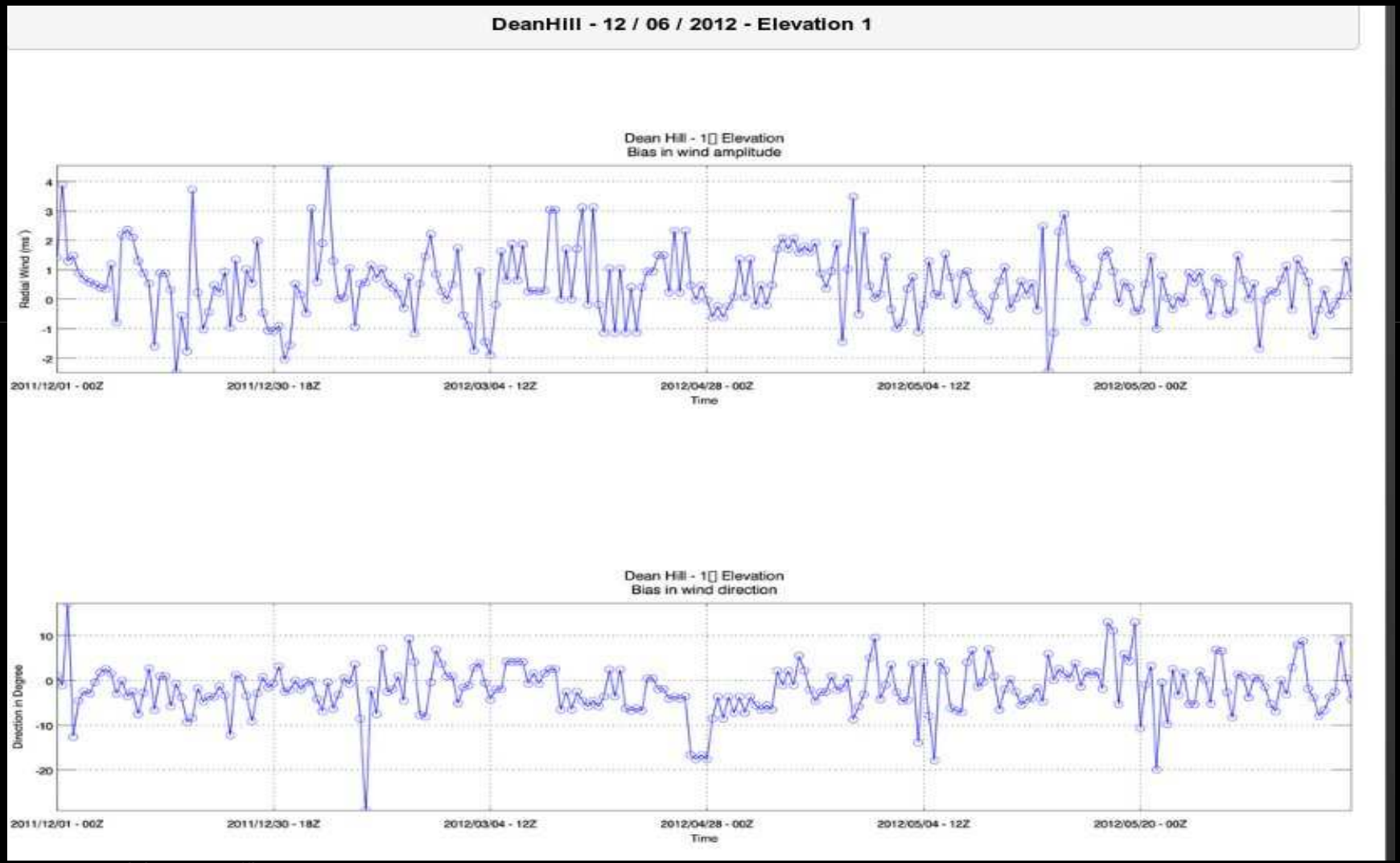
Doppler and NWP model winds



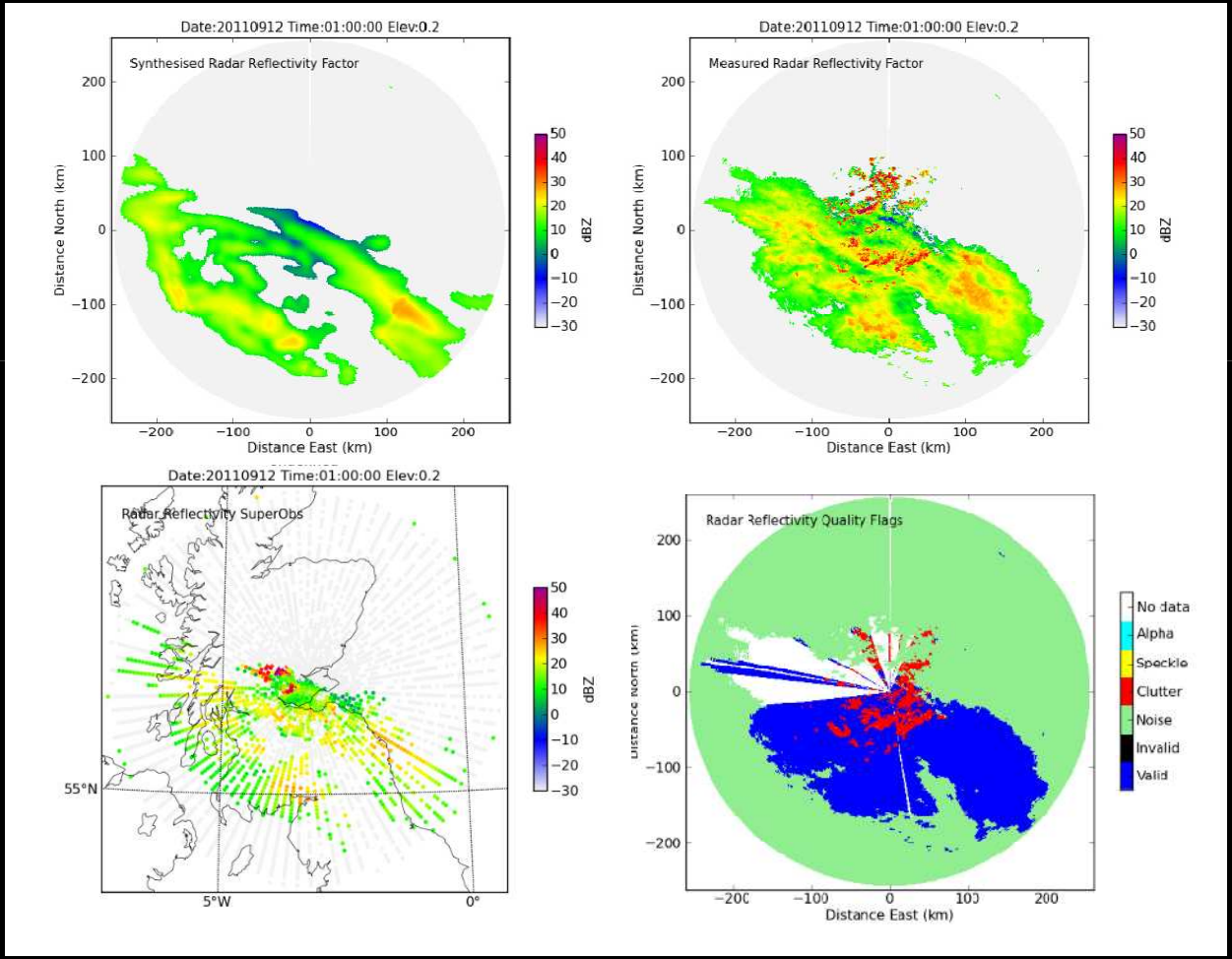
Doppler and NWP model winds



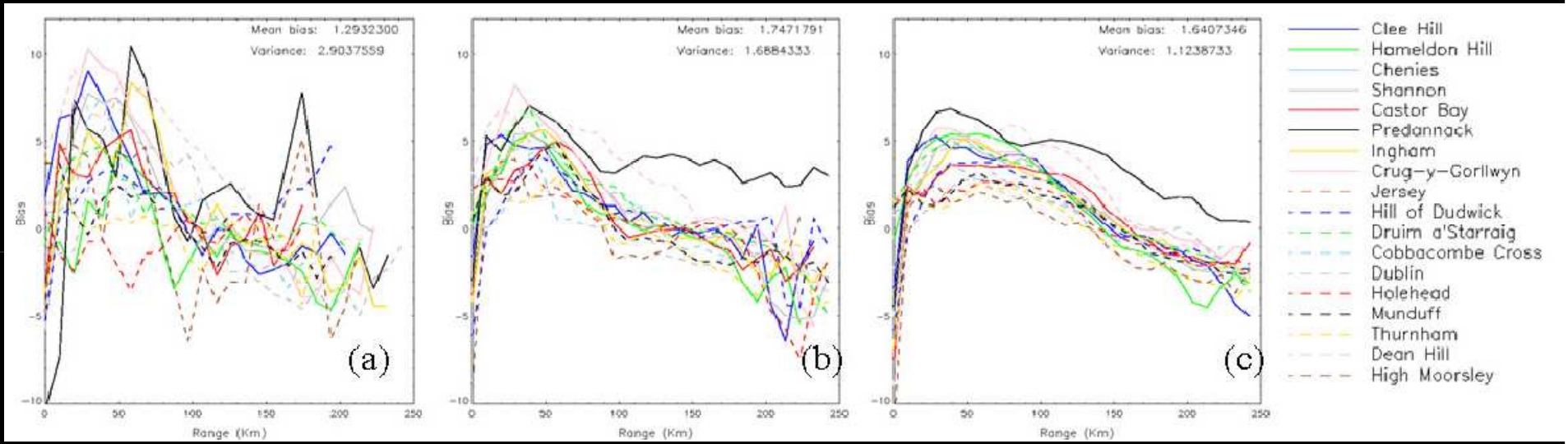
Doppler and NWP model winds- O- B stats



Comparison of radar and NWP simulated reflectivity



Observed – simulated reflectivity: variation with range



(a) 5 days (b) 30 days (c) 90 days

RDQMS: Future plans

Summary

- RDQMS running for over 1 year within Met Office.
- Monitors end to end radar data processing chain and evaluates product quality by delivering a wide range of monitoring and verification information and tools.
- Such an improved monitoring system and its associated diagnostic products allow for earlier identification of any issues with the radars or radar data quality.
- Enables the optimum potential to be achieved from the weather radar network.

Any questions?

Radar v rain gauge comparison

- Automate generation of gauge v radar monthly time series
- Investigate alternative quality metrics using historic radar and rain gauge data
- Develop interactive radar v rain gauge analysis tools
- Change way in which rain gauge and corresponding radar data are stored (move to SQLite database)

Development of the OPS reflectivity monitoring

- Visualisation of the OPS reflectivity monitoring
- Mapping anomalies with greater accuracy

  - polar plots displaying the long term O-B bias

  - used to better establish where and why deficiencies in the radar calibration may arise e.g. residual clutter; residual beam blockage; radar processing errors; model orographic enhancements.

  - sea/ land model parameterisations could also be investigated.