Product description for Radarnet IV polar format single site reflectivity data

Purpose

- To understand the detailed nature, purpose and function of the product
- To identify the sources of information or supply for the product
- To describe the required appearance of the product
- To identify the level of quality required of the product
- To enable activities to develop and quality control the product to be identified
- To define the people or skills required to develop and check the product.

Composition

- *Identifier:*
  *yyyymmddhhmm*_polar_pl_radar*xx*b*n*_reflectivity

  where:
  yyyymmddhhmm is the data validity date/time
  n is the scan number, i.e. a number equating to the elevation angle at which the scan is performed. 0 (lowest), 1, 2, and 3 (highest) only available initially.
  xx is a 2-digit identifier for the radar site:
  04 = Hameldon Hill
  05 = Chenies
  08 = Predannack
  11 = Wardon Hill
  12 = Jersey
  16 = Cobbacombe Cross
  The other parts of the filename are constant:
  'polar' indicates the format of the data
  'ref' indicates the data are reflectivity measurements

- *Title:*
  Single site radar reflectivity data, on a polar grid

- *Purpose*:
  To provide the academic community with access to the basic radar measurements of reflectivity factor (Z) at the measured resolution possible. The data will mainly be used to develop algorithms and procedures for deriving rainfall products (e.g. estimates of surface rainfall rate).

- *Composition:*
  This product is a Polar format binary data file made up of a volume header, scan header, ray headers and data blocks (see Polar file format document for details).

- *Derivation:*
  What are the source products from which this product is derived?
  - This product is the polar format reflectivity data, as obtained direct from radar sites located in the UK. Each radar executes a sequence of PPI scans at different elevation angles which is repeated at 5 minute intervals. The lowest scan elevation used is normally between 0.0 and 0.5 deg above the horizontal. The elevation angel is encoded in the scan header.
  - The current spatial resolution for these data is 1 deg (radar azimuth relative to grid north) x 750 m (radar range). The data resolution is encoded into the data headers and may be subject to change.
  - The data supplied to the archive may be for the full scan sequence of from just a single elevation angle.
  - The data as currently supplied has 340x 750m range gates, giving coverage out to 255km from the radar location.
  - The data are ' as received' at the Met Office central radar data processing facility and have been subjected to minimal

processing at the radar site. The only material correction applied is to compensate for the loss of received power as a result of the inverse square law. The data show obvious contamination with ground clutter (permanent), anaprop (intermittent), other non-meteorological targets (aircraft, ships). In areas of rainfall, the measured reflectivity may include bright band effects and other variations arising from total or partial blockage of the radar beam, attenuation and the variation in the vertical profile of reflectivity. The data are also subject to small misalignment of the radar beam in both elevation (typically up to 0.1deg) and azimuth (typically up to 2 deg).

- *Format and Presentation*:
  – The product conforms to the Polar file format definition (see Radarnet IV file format document for details).
  – File size for each product is 615920 bytes
  – Current data volume per site, per day is ~177MB for each radar site

- *Allocated to*:
  The product has been derived on the Radarnet IV system. The Radarnet IV system was developed by the Radar Development team in TAS and is maintained by Production (Operational Applications).

- *Quality criteria*:
  There are no direct quality criteria for this reflectivity product since there is no 'ground truth' available for comparison. However, there is routine monitoring of the characteristics of the radar signal and the performance of the various radar hardware components. The rain rate estimates which are derived from the reflectivity measurements are routinely assessed using available rain gauges and ground truth. A number of quality measures are derived for the rain rate products (probability of detection, false alarm rate, bias, root-mean-square difference (RMS) and root-mean-square factor difference (RMSF).

- *Quality method*:
  The main quality checking method for this data is visual comparison with reflectivity data from a radar with overlapping coverage (available internally to the Met Office via the Radarnet IV system web site). Additionally, there is routine monitoring of the radar signal characteristics by Met Office technicians who visit the radar sites at regular intervals to perform maintenance tasks.

- *Quality check skills required*:
  A knowledge of radar meteorology, a familiarity with radar hardware characteristics are the skills required to check data quality.