British Rainfall Digital Archive Rainfall Maps

1.       The British Rainfall Digital Archive (BRDA) was compiled in 2007-8 by Hydro-GIS Ltd as part of the NERC project with Oxford University, "Quantifying Flood Risk of Extreme Events using Density Forecasts based on a New Digital Archive and Weather Ensemble Predictions". The BRDA is the most comprehensive resource on historical extreme rainfall in the UK, including

- over 28,000 observations of extreme rainfall back to the year 1866;

- over 1000 pages of text and eye-witness accounts describing the rainfall events and associated impacts such as flooding;

- over 250 rainfall maps and photographs.

For the Oasis data the rainfall maps have been digitised and made available as raster data to provide the rainfall depths and extents in a useable format for further research and analysis.

2.       The data was created by digitising the isohyetal (rainfall contour) maps in jpg format from the BRDA using ArcGIS, and converting the contours into a raster using interpolation tools within the software. The raster gives a rainfall depth in mm at a 5km grid cell resolution for the temporal extent of each individual storm. This is normally the accumulation of rainfall over the 24-hour period from 9:00 to 9:00, but some maps are combinations of 2 or more rainfall days. The rainfall depths are given in mm.

3.       This is the only digital source of historical extreme rainfall as a "rainfall footprint" in a useable GIS format. Over 200 maps are available in the dataset, including maps of the rainfall which produced some of the UK's most extreme flood events such as the Norwich flood in 1912 and the Lynmouth flood in 1952. The BRDA is the most comprehensive digital archive of historic extreme rainfalls for the UK.

4.       The data can be used for a variety of applications including: emergency planning - to test what would happen if these historical events were to occur today; strategic and site-specific flood risk assessments - to properly identify the flood risk by demonstrating historical events; the validation and auditing of commercial flood catastrophe models - to ensure that such extreme events have been captured by the cat model event set; validation of sustainable drainage system (SUDS) designs - to ensure the design rainfall would have replicated the most extreme historical events.

5.       The BRDA rainfall map data is in two formats. The basic image files in .jpg format are the scans of the original rainfall maps which were published as hard copies. The file names are given by date e.g. *27October192.jpg* for a single rainfall day or *29-30September1912.jpg* for more than one rainfall day.

The raster data is in ascii grid format to allow users to import the files to a range of GIS software platforms. Filenames are also given by date but with the added text "_cg" to denote the grid format e.g. 01071968_cg.asc for a single rainfall day or 29_30091912_cg.asc for more than one rainfall day.

6.       The jpg files are not georeferenced. The raster files are georeferenced to the Ordnance Survey British National Grid. As the files have been converted into ascii grid format they will be described as lacking a spatial reference or projection when opened in ArcGIS. They can be projected using the project raster define projection command.

7.      The extent of the Jpg files covers the British Isles but for the ascii files this currently limited to cover Great Britain. Events which affect Northern Island and the Republic of Ireland have not been converted to grids as these need to use the Irish grid. A later version of the data will include all events affecting the area covered by the Irish grid. Some of the jpg files only cover a very small area where georeferencing to the British National Grid was not possible.

8.      The original jpg files have isohyets either in inches for events from 1866-1963, or mm for events from 1964 onwards. The ascii files have depth in mm and are floating point values.

9.      The file format is already explained under point 5.

10.     The pixel size of the ascii files is 5km, the jpg files have been scanned at 300 dpi or higher.

11.     The generation of the BRDA is covered in :

**Rodda, H.J.E.**, Little, M.A, Wood, R. G., MacDougall, N. and McSharry, P.E. (2009). A digital archive of extreme rainfalls in the British Isles from 1866 to 1968 based on *British Rainfall*. *Weather*, Vol 64, No. 3, 71-75.

Other research using data from the BRDA is covered in:

**Little M.A.**, Rodda H.J.E, McSharry P.E. (2008), Bayesian Objective Classification of Extreme UK Daily Rainfall for Flood Risk Applications, (2008), *Hydrology and Earth Systems Sciences Discussion*, 5:3033-3060

12.     Contact Dr Harvey J.E. Rodda, Hydro-GIS Ltd:  T +44 1865 400675 M +44 7971 108980 E Harvey.rodda@hydro-gis.co.uk

Example files: 22July1907.jpg, 26june1917.jpg, 23031968_cg.asc