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United Kingdom hydrometric data, physical catchment descriptors and other hydroclimatological information available via the internet for PUB¹

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These notes were prepared primarily for members of the international Top-Down modelling Working Group (TDWG²), the PUB-MOPEX Working Group³, and other international participants in the IAHS Prediction in Ungauged Basins (PUB) initiative. Details are given of hydrometric data and other related information (e.g. land-use) for UK catchments that can be downloaded *free-of-charge*. The notes are not intended to replace other, more formal, guidance about UK hydrometric data and catchment details available from the UK National Water Archive (NWA⁴) hosted by the Centre for Ecology and Hydrology (CEH⁵). CEH is a component body of the UK Natural Environment Research Council (NERC).

The notes are for information only. They are neither exhaustive nor definitive, and may be expanded upon or otherwise revised without notice. It is the responsibility of users to satisfy themselves that any data or information they download are fit-for-purpose.

It is recommended that users cite the relevant download URLs in any publications, reports, etc. that use the data, stating the date on which the data or information were downloaded (some data and information may change slightly through time). Where source websites give details of the measuring authority, etc., it is requested that users also give this information in any publications, reports, etc.

The notes do not in any way alter conditions related to ownership, or the use, of the data, as might be described in the source websites.

Details are given here of two sets of hydrometric data and/or catchment information:

¹ See "PUB Corner" at <http://iahs.info> and <http://cee.uiuc.edu/research/pub/>

² <http://www.stars.net.au/tdwg/>

³ <http://www.nws.noaa.gov/oh/mopex/index.html>

⁴ <http://www.ceh.ac.uk/data/#NWA>

⁵ <http://www.ceh.ac.uk/>

Data60UK – eleven-year records (1980-1990) of continuous daily catchment (areal) precipitation (mm) and mean streamflow (m^3/s^{-1}) for 61 catchments throughout England and Wales; and

Data200UK – variable-length records of daily mean streamflow (m^3/s^{-1}) and corresponding catchment details (e.g. spatial distributions of average annual rainfall, land-use and topography) for 217 catchments throughout the UK.

Data60UK

For each of 61 catchments in England and Wales (1980-1990) a **Data60UK** file comprises five columns: daily catchment precipitation (mm); mean daily streamflow (m^3/s^{-1}) from the UK National River Flow Archive (NRFA⁶); day number (1-365 or 366, e.g. day 1 is 1st January); year; and an integer. The integer in the last column is the number of raingauges in, and close to, the catchment for which records were used to compute the basin (areal) rainfall given in the first column. The files can be downloaded from an NRFA webpage⁷. For example, Table 1 shows data for the first 50 days in file 62001.

The number in the filename is the hydrometric reference number of the flow gauging station. For example, 62001 is the Teifi at Glan Teifi. This can be verified by going to another National Water Archive website page⁸, where a map like the one in Fig. 1 appears. The dots in Fig. 1 indicate the fairly even spatial distribution of the gauging sites represented in **Data200UK** (see later for details of this dataset). Click on the region labelled “EA – Wales” (EA, Environment Agency) to see a list of flow gauging stations in that region, and scroll down to “62001” to see brief details (e.g. river, location and size).

The **Data60UK** files were prepared in the mid-to-late 1990s for a preliminary assessment of the IHACRES unit hydrograph-based, continuous simulation, rainfall-streamflow, modelling methodology (Jakeman *et al.*, 1990; Jakeman and Hornberger, 1993; Littlewood and Jakeman 1994) for regionalisation in England and Wales (Sefton and Howarth, 1998). Seven of the 61 files were used in a follow-up investigation to derive improved IHACRES model-fits and to make a preliminary assessment of implications of those improved models for regionalisation (Littlewood, 2002; 2003).

Potential users of **Data60UK** might like to note that if the files were re-generated from relevant sources today there might be some small changes because either (a) an archived NRFA streamflow time series has been modified as a result of retrospective quality control by the measuring authority or CEH or (b) the software used to compute areal rainfall from rain gauge records has been modified since the files were originally generated. However, because **Data60UK** has undergone extensive analysis, as reported in several publications, it is considered that it might be of considerable utility to PUB participants as a ‘frozen’ dataset. The work of Sefton and Howarth (1998) and Littlewood (2002; 2003) provide arbitrary benchmark results against

⁶ <http://www.nwl.ac.uk/ih/nrfa/index.htm>

⁷ <http://www.nwl.ac.uk/ih/nrfa/pub/index.html>

⁸ http://www.nwl.ac.uk/ih/nrfa/station_summaries/crg.html

which results from revised, or new, methods applied to **Data60UK** catchments can be compared. Users of **Data60UK** are requested to keep the TDWG informed of any such comparisons, especially publications, reports, etc.

Data200UK

For 217 catchments spread fairly evenly over the UK (see Fig. 1), time series of daily mean flows from the UK streamflow gauging network are currently downloadable from the NRFA website (<http://www.nwl.ac.uk/ih/nrfa/index.htm>).

The time series are largely continuous but of variable length depending on when the gauging station was installed and, if it is no longer in operation, decommissioned. In addition to the flow time series and their start and end dates, a substantial amount of complementary information describing the **Data200UK** catchments and their flow regimes can be obtained by navigating around the excellent NRFA website. The following examples, for the Teifi at Glan Teifi (62001), highlight just some of the information downloadable for the 217 catchments. Fig. 2 is an extract from the Gauging Station Summary Sheet available from the Concise Register of Gauging Stations, Fig. 3 shows the topography, Fig. 4 the spatial distribution of land-use types, and Fig. 5 the spatial distribution of annual average rainfall. The spatial datasets depicted in Figs 3 to 5 assist with maximising the utility of the UK national hydrometric network and the corresponding NRFA (e.g. Laize, 2004).

Although daily UK streamflows can be downloaded, only monthly catchment precipitation data are available currently from the NWA. If (when) additional, or complementary, precipitation data are downloadable from the NWA (e.g. daily catchment precipitation time series for UK catchments) these notes will be revised accordingly.

It is strongly recommended that potential data users navigate around the NWA and NRFA websites to discover the wide range of useful data and information that can be downloaded for UK catchments.

Acknowledgements

The TDWG is grateful to the National River Flow Archive for hosting **Data60UK** on their website.

References

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Sefton, C. E. M. & Howarth, S. M. (1998) Relationships between dynamic response characteristics and physical descriptors of catchments in England and Wales. *Journal of Hydrology*, **211**, 1–16.

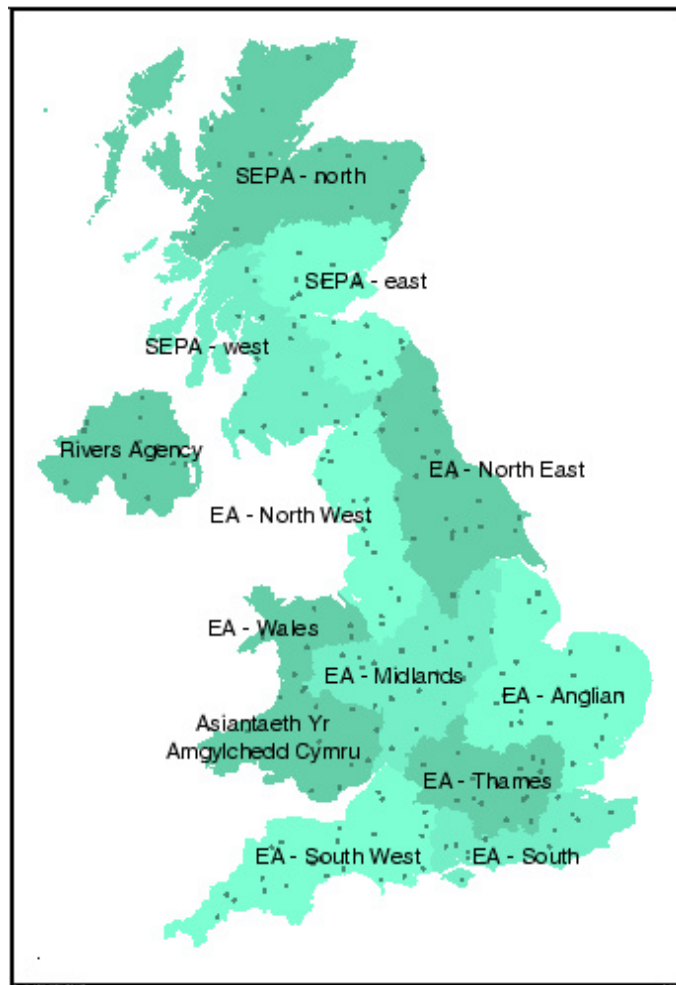


Fig.1 Measuring authority regions and *Data200UK* gauging sites

Table 1 The first 50 days in file rq62001

0	52.83	1	1980
7.5	45.1	2	1980
13	61.89	3	1980
2.9	65.2	4	1980
0.2	56.7	5	1980
0.1	48.18	6	1980
0	42.44	7	1980
0	36.99	8	1980
4	33.07	9	1980
0.1	29.07	10	1980
2.3	25.32	11	1980
0	23.91	12	1980
0	21.27	13	1980
9.8	21.55	14	1980
0	21.69	15	1980
0	19.72	16	1980
0	17.89	17	1980
0.1	16.56	18	1980
1.5	15.98	19	1980
24.3	19.67	20	1980
12.9	62.44	21	1980
3.4	57.34	22	1980
1.8	52.82	23	1980
0	46.64	24	1980
0	40.25	25	1980
0	32.67	26	1980
0.6	27.48	27	1980
0.8	24.92	28	1980
3.7	24.62	29	1980
11.7	24.97	30	1980
3.2	36.31	31	1980
5.1	29.72	32	1980
4.9	30.42	33	1980
3.4	32.34	34	1980
16.7	41.14	35	1980
2.1	58.07	36	1980
8.4	59.53	37	1980
25.1	79.13	38	1980
25.1	148.5	39	1980
6.1	190.6	40	1980
0.7	134.2	41	1980
0	82.68	42	1980
0.1	60.44	43	1980
0	49.12	44	1980
4.2	43.34	45	1980
5.5	41.3	46	1980
0.7	39.99	47	1980
1.6	33.15	48	1980
7	32.02	49	1980
0.1	30.75	50	1980

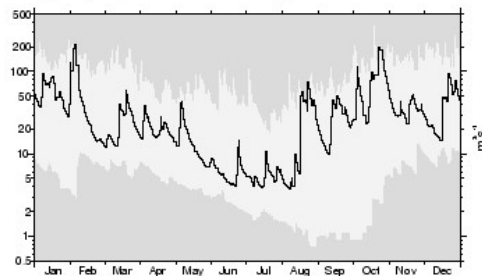
62001 - Teifi at Glan Teifi

Grid Reference: 22 (SN) 244 416
Operator: EA
Local number: 62001
Catchment Area: 893.6 km²
Level of Station: 5.2 mOD
Max. Altitude: 593.0 mOD
Mean flow: 28.82 m³s⁻¹
95% exceedance (Q95): 3.033 m³s⁻¹
10% exceedance (Q10): 66.19 m³s⁻¹
61-90 Av. Ann. Rainfall: 1382 mm

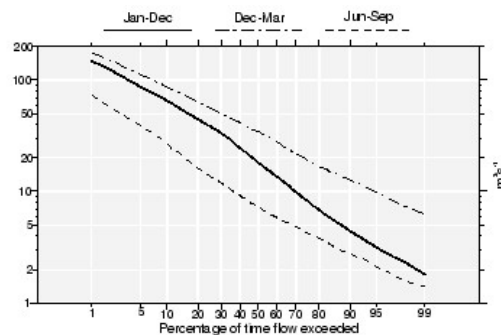


Sample Hydrograph of Gauged Daily Flows

Max. and min. daily mean flows from 1959 to 2005 excluding those for the featured year (2004; mean flow: 32.50 m³s⁻¹)



Flow Duration Curve for Gauged Daily Flows



Station Description

Velocity-area station. Straight reach (width: 35m), natural control. Flood flows (> c3m) spill over right bank. Well gauged - recent gaugings include floodplain flows. PWS impounding reservoirs in upland and minor agricultural abstractions; Tregaron bog (10 sq.km.) has partial effect on flows. Nonetheless, a sensibly natural regime.

Catchment Description

Geology: mainly Ordovician and Silurian deposits. Dairy farming predominates in south; hill farming in upper catchment. Forest: 5%. Peaty soils on hills, seasonally wet. Apart from Tregaron bog, most of the lower areas have soils with permeable substrate.

Factors Affecting Runoff

- Reservoir(s) in catchment affect runoff.
- Runoff reduced by public water supply abstraction.

Fig. 2 Extracts from the Gauging Station Summary

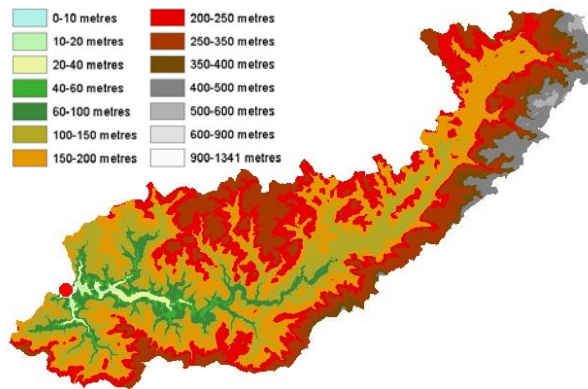


Fig. 3 Topography: Teifi at Glan Teifi

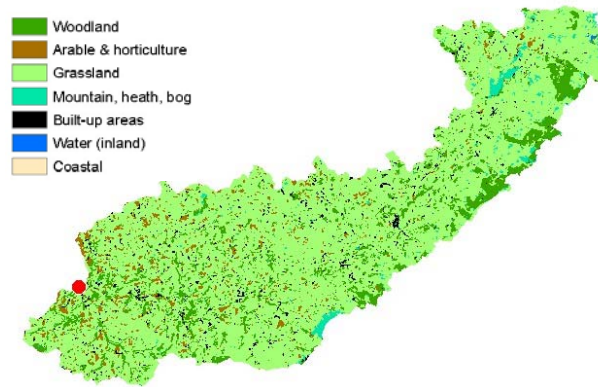
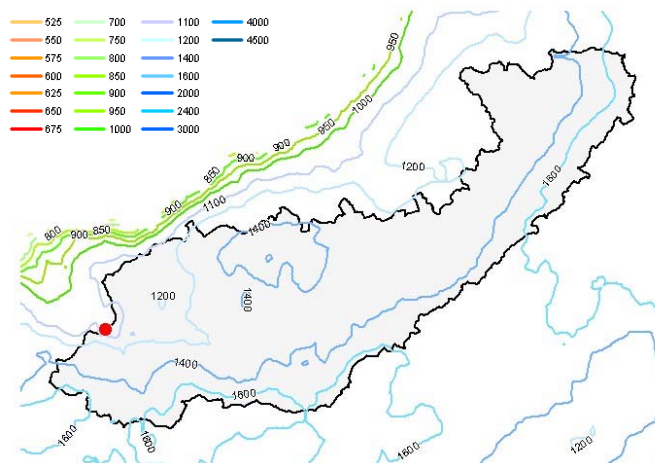


Fig. 4 Land-use: Teifi at Glan Teifi



**Fig. 5 Average annual precipitation 1961-1990:
Teifi at Glan Teifi**