Evidence of long-term improvements in the quality and completeness of UK river flow data

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Summary

- National River Flow Archive (NRFA) is the focal point for UK hydrometric data, quality controlling and disseminating data submitted by UK Measuring Authorities (MAs)[1].
- The Service Level Agreement (SLA) setup in 2002 has driven improvements in data completeness and quality, essential for all data uses (e.g. water management).

Introduction

- Operation of hydrometric network and data processing rests with UK MAs.
- NRFA provides independent national-level appraisal of data, focussing on long-term consistency, hosts the Peak Flow Dataset, and real-time data on portals.
- The SLA was introduced to maintain a core network of gauging stations and long-term river flow records for dissemination to the user community[2].

NRFA Data Acquisition Process

Data Submission
- Check expected stations, data types and time periods have been submitted
- Report missing data to MAs asking for infill / reason

Automated Quality Control
- 7 'sense-checking' tests performed on data
- Allow issues to be corrected before going through Manual QC

Manual Quality Control
- Regional Reps assess data using nearby stations, all data types, raingauge data and historical context

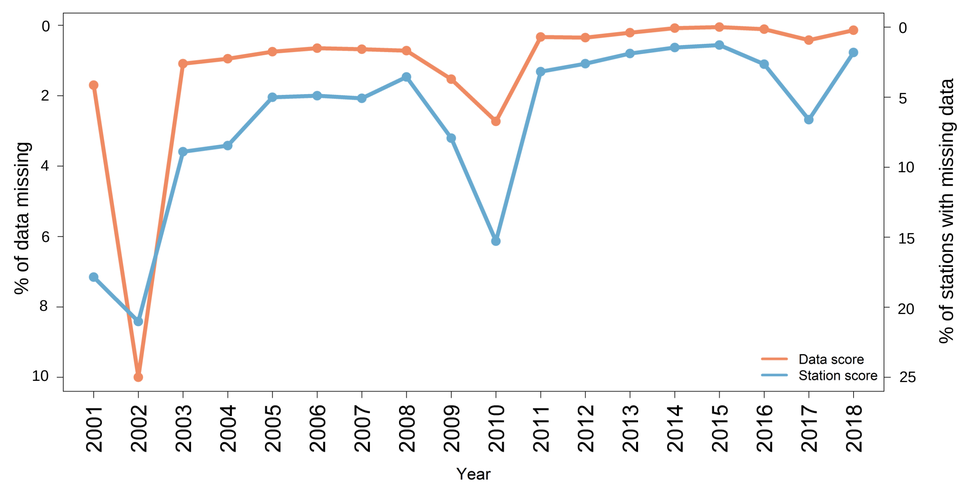
Query Process
- Any queries are sent back to the MAs
- Replacement data or explanations are returned

SLA Performance Indicators
- Calculation of scores for data timeliness, completeness and quality
- Fed back to MA management at annual meeting

Results

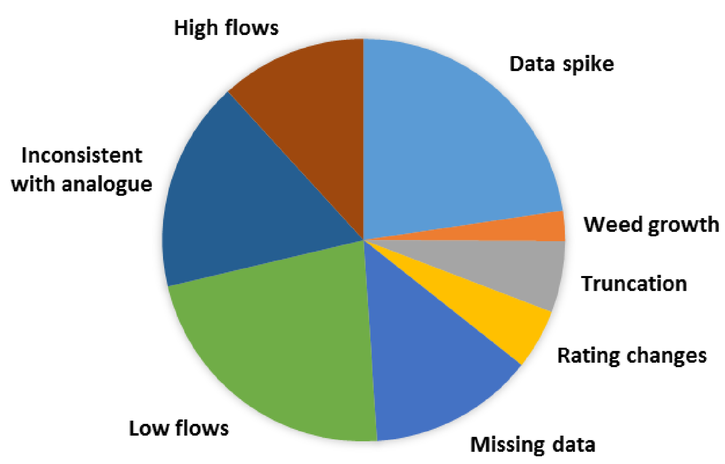
Data Completeness

- Overall rise since 2002, for the last 8 years completeness levels have been >99.5%
- In the last 10 years, the number of stations submitting a complete dataset rose from 92% to 98%
- Although the amount of missing data is small, it is generally spread across 2-10% of the SLA gauging station network



Data Quality

- Since the SLA started, there has been a gradual increase in the number of stations where no valid queries were issued indicating an improvement in UK hydrometric data submission
- Data that were queried represented around 1% of those submitted, generally spread across <5% of the network.
- These valid queries were sent to the MAs and improved data were returned leading to an improved dataset.
- Reason for query raised is varied, with the highest proportion logged for low flows (22%), data spike (22%) and inconsistency with an upstream / downstream / hydrologically similar station (16%)



Concluding remarks

- Since introduction of the SLA, data completeness and quality of UK river flow data has improved
- The SLA has helped ensure long-term continuity in monitoring and promoted improvement to the utility of data available to users
- The SLA framework has the potential to be applied across other hydrological monitoring networks
- A paper on the SLA is in preparation with further analyses on station types and query classification

1 Dixon, H., Hannaford, J., Fry, M. (2013) The effective management of national hydrometric data: experiences from the United Kingdom. *Hyd. Sci. Jou., 58(7), 1383-1399.*
2 Muchan, K., Dixon, H. (2014) Ensuring hydrometric data are fit-for-purpose through a national Service Level Agreement. In: Daniell, T. M. (ed.) Hydrology in a changing world: environmental and human dimensions. IAHS, Wallingford, UK. 323-329.

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