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Vodenje opazovanih hidrometričnih podatkov - Navodilo

Management of observed hydrometric data - Guidance

Mangement gemessener hydrometrischer Datensätze - Empfehlungen

Gestion des données hydrométriques observées - Recommandations

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Management of observed hydrometric data - Guidance

Gestion des données hydrométriques observées - Recommandations

Mangement gemessener hydrometrischer Datensätze - Empfehlungen

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (CEN/TS 17171:2018) has been prepared by Technical Committee CEN/TC 318 “Hydrometry”, the secretariat of which is held by BSI.

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Introduction

Water management decisions and policies ought to be based upon quantitative knowledge of the hydrological system. Commonly, such knowledge results from observational hydrometric data, the collection of which is the subject of other standards, e.g. EN ISO 18365. The subsequent management of such hydrometric data provides the linkage between field measurement and the eventual use of processed data to address a wide range of strategic and operational water management applications. As both the demand for and complexity of hydrometric data increase, it is important that the procedures and processes used to manage these data are standardized to allow greater integration of data and ensure their protection for future use.

The availability of high-quality observational data are vital to developing an understanding of the hydrological cycle. Optimizing data management systems helps ensure that the maximum benefits are achieved from those resources invested in hydrometric monitoring. Effective standardized procedures for data transmission, manipulation, quality control, expression of uncertainty and storage are vitally important and their use should be promoted throughout hydrometric observation networks.

Those responsible for hydrometric data management are encouraged by this Technical Specification to adopt the ethos of professional stewardship and to remember their role as guardians of an important national, and sometimes international, resource.

This Technical Specification is designed for use by all organisations and individuals collecting, processing or storing hydrometric data. Some of the clauses contained in standard are only applicable for those maintaining national or regional collections of hydrometric data (for example, 4.9). However most recommendations are widely applicable to all users, including organisations, companies or individuals involved in: hydropower production, water supply, environmental protection, scientific research or flood risk management.

This Technical Specification is concerned with general aspects of good practice in data management. Techniques for managing data are recommended, covering metadata collection, data storage and quality control. This Technical Specification assumes that the raw data have been collected and transmitted from the field in line with other European Standards for hydrometry, so this Technical Specification concentrates on the subsequent processing and management of these hydrometric data.

1 Scope

This document gives recommendations for the management of observed hydrometric data, including raw data and other data as well as statistics derived from these observations. Although the principles of data management can be applied to all hydrometric observations, particular focus is placed on measurements of precipitation, water level (including stage), volume and discharge in open channels.

NOTE The range of sites where water levels, and sometimes flow, are measured includes lakes, reservoirs, rivers, canals, tidal waters, sewers, wells, and boreholes.

The document covers metadata associated with hydrometric data, including recommendations for the production and management of descriptive, analytical and statistical material relating to sites where and measuring techniques, by which hydrometric data are collected. The recommendations of this document can be applied to some forms of data directly derived from observational records (for example, summary time series of monthly mean river flows). While not primarily designed for the management of data resulting from more complex numerical models or spatially aggregated data sets (for example, remotely-sensed data), many of the recommendations are applicable for such types of data.

This document does not cover the field collection of data or its transmission, but focuses on the management of data once they have been received in a hydrometric information management system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 772, *Hydrometry — Vocabulary and symbols (ISO 772)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 772 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
data flag
indicator relating to the quality and characteristics of an observation

3.2
derived data
information calculated, or deduced, from raw data (3.5)

3.3
precipitation
water or ice derived from the atmosphere and deposited at ground level

Note 1 to entry: Measured in terms of the depth in millimetres (mm) of its liquid equivalent.

3.4
quality control
process of confirming that the data held are a reliable representation of the variable being measured or derived

3.5
raw data
data resulting directly from the measurement of variables

3.6
UTC
Coordinated Universal Time

4 Principles of hydrometric data management

4.1 The requirement for data management

Hydrometric data management systems should be designed such that the utility of data to end-users at all levels is a central consideration. The value of data can be significantly affected by the treatment of data after collection, so data management systems should be designed to maintain (and where possible improve) the quality and continuity of records.

As water management decisions and policies are based upon quantitative knowledge of the hydrological system both now and in the past, the protection of data for future use should be a central requirement of any data management system. As such, the design of such systems should consider, as far as possible, both current and future user requirements.

4.2 The sequence of data management

The management of hydrometric data is a continuous sequence (see Figure 1), which starts in the field at the point of collection and ends if and when data are destroyed. The design of any hydrometric data management system should consider all stages in this sequence.

The management of data at the point of collection and their subsequent transmission vary depending on the hydrological variable being recorded, hydrometric methods employed and instrumentation used. Any data management system used should ensure that adequate data and metadata are recorded at the point of collection to allow future management and use.

Some data management processes, such as quality control, may occur at more than one stage in the sequence and be completed by more than one organization. In designing, operating and reviewing data management systems, all stages in the acquisition, processing and dissemination of data should be considered.

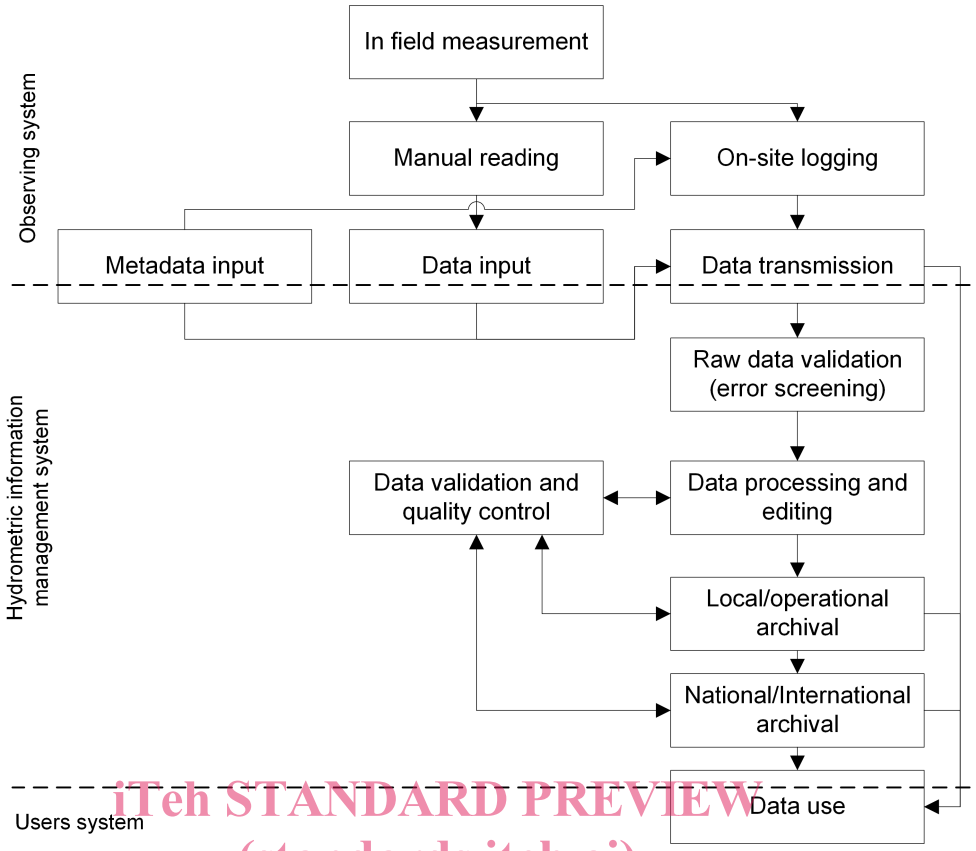

Figure 1 — Data management sequence

4.3 Duty of care

4.3.1 General

Data often have significant value outside the organization that collected them, and data management systems should be designed, where possible, to capture all information required for future, sometimes unforeseen, uses.

Responsibility for the operation of hydrometric monitoring systems may be transferred (for example, to another organization or other personnel), so data management systems should be capable of preserving all data and associated metadata required to inform new operators.

4.3.2 Legacy data

The duty of care to manage hydrometric data should be taken to cover any such data currently held by an organization. In addition to data collected under the direct control of the organization, the duty of care extends to data collected by predecessors and inherited.

An assessment should be made of all legacy data upon inheritance (or discovery) to determine their contents and current state. An assessment should be made of their current, and likely future, utility to the organization and other external parties. While the management (and improvement) of legacy data can be demanding, the value of the resulting information can be high.

NOTE Long historical records, even those of lower hydrometric quality, can be particularly valuable in providing an indication of previous hydrological conditions and often improve the value of current data through extending record lengths.

All legacy data should be actively managed. Where possible, such data should be brought into current data management systems and managed in accordance with 4.5 to 4.10 and Clause 5 to Clause 9.

Where legacy data are not integrated into current data management systems, they should be secured in archives maintained either by the organization which collected/inherited them or by independent bodies (for example, national archives, libraries).

Where the quality of legacy data (including inherited data) are poor, efforts should be made to improve it. Special attention should be paid to the collation and storage of metadata (both hard copy and digital) associated with the legacy data. In the case of discharge data, current meter gauging records and details of derived rating relationships are of particular value and should be maintained. Care should be taken to preserve operational catchment management information, for example, sluice gate operation, reservoir releases and resiting of raingauges, which is often vital for understanding apparent anomalies in hydrometric data.

Where data are considered "at risk" (for example, due to physical deterioration or storage in obsolete systems/formats) then consideration should be given to a programme of "data rescue" (see 4.8.7).

Due to the difficulty in assessing future, currently unknown, requirements for hydrometric data, legacy data and associated information holdings should normally be preserved even if there is no immediate requirement to use the data.

NOTE Where data are deemed surplus to requirements, their archival (alongside metadata describing their lineage) is highly preferable to disposal. Recommendations for data disposal are given in 4.8.3.

4.4 Data types and terminology

For the purposes of 4.5 onward, hydrometric data should be considered to include:

a) time series of continuous or regular observations of a hydrological variable at a point-in-space;

b) sporadic or single point-in-time observations of a hydrological variable at a point-in-space.

Both of these types of operational data normally have a third type of hydrometric data associated with them:

c) metadata (including, discovery metadata and temporal metadata) and other descriptive material which provide information about the measurement, hydrological conditions and/or subsequent processing of hydrometric data.

Hydrometric data should also be taken to include time series and statistics derived from these data types. Typical examples of such hydrometric data include: total monthly rainfall, mean annual flood and Q_{95} (the flow equalled or exceeded 95 % of the time).

NOTE Spatially aggregated data (e.g. data produced by remote sensing or areal rainfall estimates) are not covered by this Technical Specification as their nature and management often differ from those used for other hydrometric data.

4.5 Time series data

4.5.1 General

For the purposes of this Technical Specification data types a) and b), as well as time series subsequently derived from such data, are considered to be time series data.

4.5.2 Time of observation

All data points in a time series should be associated with a single point-in-time or period of time (e.g. for integrations), either by:

a) recording the start point-in-time and interval of a regular time series; or

b) recording the point-in-time associated with every value in a time series.

The representation of dates and times should conform to ISO 8601. When storing raw data, the standard Gregorian calendar conventions should apply, both to the year (1 January to 31 December) and day (midnight to midnight). To avoid gaps or overlaps in the records caused by biannual daylight-saving time adjustments, all times should be recorded in UTC (or to a consistent offset from UTC throughout the database which is clearly recorded in the metadata). When recording an observation made at the instant dividing one calendar day from the next, then the time should be given as 00:00:00 (i.e. the start of the new calendar day).

Raw data should be recorded together with the point-in-time at which the observation was made. Therefore, instantaneous observations should be recorded against the point-in-time the measurement was taken, and accumulations (e.g. rainfall totals) should be recorded against the end point of the accumulation.

Processed data (including derived data representing integration over a set period of time, e.g. daily mean flow or monthly rainfall total) may be recorded against either the start or end of the period in question. The convention used should always be clearly specified in the metadata associated with the record or a related data dictionary.

In many European countries, a commonly used convention is to calculate derived data using a hydrological day/month/year (otherwise known as water or rainfall days/months/years) in addition to (or instead of) using the calendar day starting 00:00:00. The following norms apply when deriving data using such conventions:

1) hydrological day = observations made in the 24-h period starting at a given time, recorded against the start point of the period;

2) hydrological month = observations made during the hydrological days of that month; and

3) hydrological year = observations made during a year of hydrological days starting on a given date, recorded against the end year of the period.

The starting time for the hydrological day and date of the start of the hydrological year may vary between countries. Examples of the local conventions in use within Europe are given in Table 1. Whether using these periods or others, the convention applied should be clearly specified in the metadata associated with the record or a related data dictionary.

Table 1 — Examples of hydrological day/month/year conventions used in Europe

Countries using convention	***Start of Hydrological Day***	***Hydrological Year (all dates are inclusive)***
United Kingdom of Great Britain and Northern Ireland	09:00 UTC	01 October to 30 September
Italy	08:00 UTC	
Slovakia	00:00 UTC	01 November to 31 October
Sweden	06:00 UTC	01 October to 30 September