Norwegian streamflow reference dataset for climate change studies

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Available data

All active streamflow time series stored in NVE's Hydra II database classified as active and unregulated constitute the basis for selection of the streamflow timeseries in the hydrological reference dataset (HRD). This 2023-version of the HRD has used the earlier 2012-version (Fleig, 2013) and 2017-version (unpublished) as a starting point. New time series have been added if they now fulfill the criteria for 20 years with data, others have been taken out due to recent termination and some series have been evaluated again due to new metadata or information about data quality. All time series have been selected using the criteria described below.

Criteria for selection of time series

The principles for selecting streamflow time series for the 2023-version of the HRD follow the same overall criteria as used in the original 2012-version (Fleig, 2013), but with some updates in methodology. The six criteria can be listed as (Whitfield et al., 2012; Fleig, 2013):

1. Degree of basin development: Pristine or stable land-use conditions (<10% of the area is affected).
2. Absence of significant regulations, diversions, or water use. Only natural catchments. When regulation is present in a basin some gauging stations may be appropriate for analyzing high flows and average flows, but not low flows.
3. Record length: Minimum 20 years and some stations with >50 years. This length ensures that underrepresented climatic or geographic areas, which are characterized by minimum data availability, are also included. However, record lengths should also be as long as possible to allow decadal variability to be distinguished from long-term trends; due to multi-decadal oscillations in streamflow.
4. Active data collection: Currently active and is expected to continue operation.
5. Data accuracy: Good quality data.
6. Adequate metadata: Adequate metadata should be available to support the previous five conditions.

1. Degree of river basin development

To avoid changes in land-use to cause changes in runoff, stations with more than 10% urban area have been excluded (Fleig, 2013). The same principle for selecting streamflow time series has been used for the 2023-version of the reference dataset.

2. Absence of significant regulations, diversions, or water use

The principles for selecting streamflow time series for the 2023-version of the HRD follow the methodology described in Fleig, (2013). Thus, stations included are all classified as "unregulated". As an extra source of information, findings from a comprehensive review of 56 historical time series conducted in 2017-2020 have been used for identifying historic regulations, diversions, and water use.

3. Record length

As in Fleig (2013), only time series with at least 20 years of data with good data quality have been included in the 2023-version of the HRD. Time series with long periods of missing or reconstructed data (> 1 year) have been excluded, or recommended start of data use has been set to begin after the period with bad data. Series with shorter periods of missing or reconstructed data have been kept in the dataset. Record start and recommended start of data use has been specified for daily data as well as for fine resolution data.

4. Active data collection

As in Fleig (2013), only time series with active data collection have been included in the 2023-version of the HRD.

5+6. Data accuracy and metadata

Data needs to be accurate and have adequate metadata to be included in the HRD. Besides the data sources mentioned in Fleig (2013), information on data accuracy for the 2023-versjon of the dataset has been collected from new reports, as well as new data analysis and new metadata. Reports include background information for the 2012 and 2017-versions of the HRD, a report testing homogeneity in Norwegian streamflow series (Wang & Reitan, 2015) and findings from a comprehensive review of 56 historical streamflow series conducted in 2017-2020. New data analysis has included an evaluation of the highest peak flood value in daily and fine resolution data for every year in every time series within the HRD. New metadata has included evaluation of physical/hydraulic conditions for measuring stage on low/medium/high flows, information on periods with bad water-communication, doubtful height reference for measuring stage as well as quantitative evaluation of rating curves. The latter source of information was not used in Fleig (2013), since in 2013 quantitative evaluation were available only for a limited part of rating curves in the Hydra II database. The quantitative evaluation of rating curves is a combination of number of discharge measurements and spreading of these on the low-, normal-, and high flow parts of the rating curve and gives the designations very bad, bad, medium, good, very good on each of the three parts of the curve. In the 2023 HRD it has been recommended not to use data for peak flood or low flow analysis if the rating curve was rated as “very bad” for high flows or low flows, respectively. Regarding other metadata, information on catchment characteristics is very good, however data describing changes in land cover is missing, as also mentioned in Fleig (2013).

Reference dataset

According to the criteria for selecting streamflow series described above, 151 active and unregulated streamflow stations in Norway have been included in the 2023-version of the HRD. The types of analyses are limited for some of the series as specified by the assigned usability categories. The complete dataset including usability categories and data quality comments are listed in Table 1. Users might want to use only a sub-set of the complete dataset for their studies based on specific criteria, such as record length and completeness or catchment characteristics. For instance, for many climate change related studies it might be sensible to analyze catchments with and without glaciers separately.

Explanations to Table 1

Regine area	River basin number
Main no	Main number
Station name	Station name
Record start daily data	Year with first daily data in time series
HRD start daily data	Recommended first year for use of daily data in analysis
Record start fine resolution data	Year with first fine resolution data in time series
HRD start fine resolution data	Recommended first year for use of fine resolution data in analysis
Area change	The change in area due to water transfer or a lake with several outlets. The change is given in km2 with respect to the natural catchment area as specified in Hydra II, i.e. it is negative when water is transferred out of the natural catchment
Not spring floods	Not recommended for use in spring flood analysis; either the whole time series (x) or specific years
Not floods, daily data	Not recommended for use in daily data flood analysis; either the whole time series (x) or specific years
Not floods, fine resolution data	Not recommended for use in fine resolution data flood analysis; either the whole time series (x) or specific years
Not winter low flow	Not recommended for use in winter low flow analysis; either the whole time series (x) or specific years
Not low flow	Not recommended for use in low flow analysis; either the whole time series (x) or specific years
Not monthly flow	Not recommended for use in monthly flow analysis; either the whole time series (x) or specific years
Not annual flow	Not recommended for use in annual flow analysis; either the whole time series (x) or specific years
Corrections for ice	Comments describing if data is affected by corrections due to backwater from ice/snow in winter
Comment / bad data periods	Additional information regarding data quality which can be relevant for selecting data for analysis. Periods > 6 months with missing or reconstructed data are also mentioned.

References

Fleig A.K. (Ed.), 2013: Norwegian Hydrological Reference Dataset for Climate Change Studies. NVE Report no. 2/2013, Norwegian Water Resources and Energy Directorate.

Wang T.C. and Reitan T., 2015: Homogenitetstesting av måleserier til Flomkart for Norge. Internal document, Norwegian Water Resources and Energy Directorate, (in Norwegian).

Whitfield P.H., Burn D.H., Hannaford J., Higgins H., Hodgkins G.A., Marsh T. and Looser U., 2012: Reference hydrologic networks I. The status and potential future directions of national reference hydrologic networks for detecting trends. Hydrological Sciences Journal, 57 (8), 1562-1579, doi: 10.1080/02626667.2012.728706.

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
2	11	0	Narsjø	1930	1931	1987	1987			1971, 1972, 1974, 1986, 1999, 2007	1993, 1999, 2007					Considered as little or not ice-influenced	Apr.-Dec. 1986: Reconstructed.
2	32	0	Atnasjø	1916	1917	1993	1993			1920, 1995, 2003	1995, 2003	x	x	x		Yes	Jun. 1934-May. 1935: Reconstructed. Jun.-Dec. 1938: Reconstructed. Jun.-Dec. 1986: Reconstructed. Peak flood value in 1995 most likely reconstructed, and thus most likely represents a daily mean value and not a momentanous value.
2	142	1	Knappom	1916	1917	2000	2000			1928, 1982, 2013	2013	x				Some small ice corretions.	Fine resolution peak flood data in January 2010 is false.
2	265	1	Unsetåa	1961	1994	1999	1999			1996, 2002, 2007, 2011, 2013, 2015	2002, 2007, 2011, 2013, 2015	x				Yes	
2	279	1	Kråkfoss	1966	1983	1966	1983			1984, 2000	1984, 1997, 1998	x		x		Yes	
2	284	1	Sælatunga	1955	1984	1999	1999		x	x	x	x	x	x		Yes	
2	290	1	Brustuen	1966	1967	1986	1986					x		x		Yes	Not recommended for low flow analysis outside the season 01.05-31.10. The station is influenced by ice and there may be some inconsistencies in is reduction
2	291	1	Tora	1966	1988	1986	1988	-6,4		2007, 2022	2007, 2010, 2022	x		x		Yes	The natural catchment area is reduced by 6.4 km2, due to water power regulations.
2	303	1	Dombås	1967	1968	1986	1986		x	x	x	x		x		Yes	Mar.-Sept. 1992: Reconstructed. Jun.-Sept. 2001: Reconstructed.
2	439	1	Kvarstadseter	1979	1999	1987	1999			2007	2007	x				Yes	Sept. 2014-Mar. 2015: Reconstructed.
2	633	0	Stortorp	1979	1996	1998	1998			1998, 2010	2010, 2012		x			No ice	New station with automatic recording in 1995. The observation from the old and new station do not match.
3	22	1	Høgfoss	1976	1977	1976	1977			1984, 1987, 1990, 1992, 1994, 2008, 2012, 2021	1987, 1990, 1992, 1994, 2008, 2012, 2021	x				Yes	
6	10	1	Gryta	1967	1998	1967	1998		1985-2005	1985-2005	1985-2005	x	x	x		Yes, some.	Higher uncertainty in high flow values from 1985 - 2005 due to backwater from a downstream culvert. Jan.-May. 1991: Reconstructed. Jan.-Aug. 1993: Reconstructed. Aug. 1996-Nov. 1997: Bad data.
11	4	0	Elgtjern	1975	1978	1977	1978		x	x	x					No ice	Data from 2005-2016 (maybe also further back in time) might be affected by poor water-communication, Thus flood values should not be used. Mar.-Oct. 1995: Missing data.
12	70	1	Etna	1919	1920	1983	1983		1920-1968	1920-1968	1920-1968	x	1919-1968	1919-1968		Yes	Water levels were regulated somewhat until 1968 due to timber floating.
12	171	1	Hølervatn	1968	1990	1968	1990									No ice	Oct. 2001-Mar. 2002: Bad data. Feb.-Jun. 2011: Reconstructed.
12	178	1	Eggedal	1971	1972	1971	1972			1973, 1978, 1981	1973, 1974, 1978, 1981, 2011	x	x			No ice	Higher uncertainty in lowflow values due to few and deviating water level - discharge measurements.
12	188	1	Langtjernbekk	1973	2001	1973	2001		x	x	x			x	x	No ice	Many reconstructed periods before 2001. High uncertainty on medium and high flows.
12	192	1	Sundbyfoss	1976	1996	1986	1996		x	x	x	x	x	x		Yes, some.	Some kind of regulation, probably to get rid of beavers. High flow values until 2009 are simulated. Since 2009 data are recorded every 30 min.
12	193	1	Fiskum	1976	1977	1980	1980			1981	1981, 1983, 2001	x		x		Yes, some.	Mar.-Jun. 1993: Reconstructed.
12	197	0	Grunke	1977	1978	1977	1978		2015	1979, 1997, 1999, 2001, 2002, 2003, 2005, 2015	1979, 1997, 1999, 2001, 2002, 2003, 2015	x	1978-2000	x		Yes	High uncertainty in the data for 2015 in particular for extremvalues due to problems with the sensor.
12	207	0	Vinde-elv	1981	2001	1981	2001			x	x	x				Yes	Periods with bad water communication 2002-2004, 2005-2009, 2014-2015. Bad conditions for water level registration on high flows.
12	215	1	Storeskar	1987	1988	1987	1988					x	x	x		Yes	
15	21	1	Jondalselv	1993	1994	1993	1994		x	x	x	x				Yes, some.	Possible influence by beavers, trees and branches creating backwater. Some changes in the measuring profil until 1993. Periods with bad water-communication, but difficult to identify beginning and end of these.
15	49	1	Halledalsvatn	1962	1964	1962	1964			1970, 1992	1970, 1971, 1974, 1976, 1982, 1992		x			Considered as little or not ice-influenced	Difficult location for manual discharge measurements. But consistent data and considered as an ok station.

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
16	66	1	Grosettjern	1949	1975	1953	1985		Before 2007	Before 2007	Before 2007		2013			No ice	Changes in the measuring profil in 1973. Unstable profile some years before 1975. Problems with bad water-communication before 2007.
16	122	1	Grovåi	1972	1975	1972	1975			1976, 1996, 2001, 2005	1976, 1996, 2001, 2005	x		x		Yes	Indications of some damage to V-profile in 1989 and 2001. Data from those years should be used with caution.
16	127	1	Viertjern	1977	2000	1977	2000			2004, 2009, 2011	2004, 2011, 2018	x				Yes, some. Other winters are reconstructed.	Peak floods on fine resolution should be used with caution. Can be affected by ice.
16	194	0	Kilen	1991	1991	1991	1991			1999, 2001, 2000, 2011	1999, 2000, 2001, 2011	x	1991-1996	x		Yes	New station with data from 1991. Removal of sediments in 1996, which affected low flow values. Feb.-Jun. 2001: Missing data.
18	10	1	Gjerstad	1980	1982	1985	1985			1990, 2000	1990, 1993, 1994, 2000	x	x			Yes	Potential problems with vegetation in profile. Thus not recommended for low flow analysis. Jan.-Jun. 1991: Reconstructed.
18	11	1	Tjellingtjernbekk	1981	1990	1981	1990					x				Yes, some.	Data before 1990 should not be used because of bad data 1987-1989.
19	79	1	Gravå	1970	1986	1970	1986			2000, 2003, 2006	2000, 2003, 2006	x		x		Yes	Data before 1986 should not be used because of bad data 1981-1985.
19	80	1	Stigvassåi	1972	1985	1972	1985		Before 2014	Before 2014	Before 2014	x		x		Yes	Flood values before 2014 should not be used. Jun. 1990-Feb. 1991: Reconstructed.
19	82	1	Rauåna	1972	1985	1972	1985			1991, 1992, 1994	1987, 1991, 1992, 1994, 1995, 2011	x		x		Yes	Data before 1985 should not be used because of bad data 1981-1984.
19	96	1	Storgama ovf.	1974	1975	1974	1975			1976, 1977, 1979, 1983	1976, 1977, 1979, 1983	x		x		Yes	
19	104	1	Songedalsåi	1981	1981	1981	1981			1992, 2019	1992, 2019	x		x		Yes	
20	2	1	Austenå	1924	1983	1985	1985			1989, 1990, 1992	1989, 1990, 1992	x		x		Yes	Data before 1983 should not be used due to unstable control at old station. Apr. 1992-Jan. 1993: Reconstructed.
20	11	1	Tveitdalen	1972	1973	1972	1973			1976	1976	x		x		Yes	May.-Sep. 1992: Bad data.
22	16	0	Myglevatn ndf.	1951	1952	1986	1986			1987, 1990, 1991, 1998, 2007	1987, 1990, 1991, 1998, 2007	x				No ice but many winters containing reconstructed data.	Oct. 1990-May. 1991: Reconstructed. Aug.-Dec. 1991: Reconstructed.
22	22	1	Søgne	1973	1974	1973	1974			1981, 1988, 1992	1979, 1981, 1988, 1992					Considered as little or not ice-influenced	Data for Feb.-Dec. 1992 are missing.
24	8	0	Møska (Skolandsvatnet)	1978	1983	1978	1983			1992, 1993, 1994, 2010	1992, 1993, 1994					Considered as little or not ice-influenced	Jun.-Oct. 1992: Reconstructed. Apr.-Oct. 1994: Reconstructed.
24	9	0	Tingvatn (Lygne)	1922	1923	1994	1995			1932			x			No ice	Potential problems with vegetation in profile. Thus not recommended for low flow analysis.
26	29	1	Refsvatn	1978	1980	1978	1980			1987	1987	x	x	x		No ice	Uncertainty in low flow values due to a small local water extraction
27	15	1	Austrumdal (Austrumdalsvatnet)	1986	1986	1986	1986			1986, 1988, 1989, 1993, 1999, 2011	1986, 1988, 1989, 1992, 1993, 1994, 1995, 1999, 2011	x		x		Yes, some.	No data before 1986. Nov. 2014-Mar. 2015: Reconstructed.
35	9	1	Osali (Botnavatnet)	1982	2000	1982	2000		2010	2010, 2011	2010, 2011	x		x		Yes	
35	16	1	Djupadalsvatn	1990	1991	1990	1991			1992, 2007	1992, 2007					No ice	Data between 2000 – 2009 has an uncertainty at 1-2 cm in water level.
36	13	1	Grimsvatn	1973	1988	1973	1988			2005	2005	Before 2002	x			Considered as little or not ice-influenced	-
38	1	1	Holmen	1982	1983	1985	1986			1990, 1996, 1998, 2000, 2001, 2002,	1990, 1996, 1998, 2000, 2001, 2002,	Before 2006				No ice	Mar. 2001-Sep. 2001: Reconstructed. Jan. 2002-Okt. 2002: Missing.
41	8	1	Hellaugvatn	1981	1982	1981	1982			1985, 1989, 1993, 2014	1985, 1989, 1993, 2014	x	x			Considered as little or not ice-influenced	Apr.-Oct. 1989: Reconstructed. Jun.-Dec. 2014: Reconstructed. Many winters have reconstructed data.
42	2	1	Djupevad	1963	1977	1963	2006			1978, 1980, 1981, 1993, 1997	Before 2006	Before 1999				Considered as little or not ice-influenced	High uncertainty in data before 1976. High uncertainty in fine resolution data before 2006.

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
48	1	1	Sandvenvatn	1908	1909	1997	1998	-8,3 km2 from 1968		1978, 1979, 1986-1990, 1993, 2007	2007	x	x	x	x	No ice	Since 1968 water from 8,3 km2 are constantly transfered out of the catchment. In addition there are some water abstractions for local drinking water supply and water to the industry. The abstractions has changed through time and in volume. It is assumed that the amount of water abstractions would not affect the flood values. Periods with bad data: Feb.-May. 1920, Oct. 1920-Mar. 1921, Jan.-Jun. 1957, Mar. 1976, Jun.-Jul. 1978, Aug.-Nov. 1978, Feb.-Sept. 1979, Mar. 1986-Feb. 1991, Jun.-Jul. 1997, Mar.-May. 2006, Okt. 2009
48	5	1	Reinsnosvatn	1917	1966	1977	1977			1988, 1996, 1997	1978, 1984, 1988, 1996, 1997	Before 2003				Considered as little or not ice-influenced	Data before 1966 should be avoided due to old rating curve not possible to evaluate. The rating curve produces different discharge. Dec. 1974-May. 1975: Reconstructed. Dec. 1981-Apr. 1982: Reconstructed. Feb.-Jun. 1988:Reconstructed. Oct. 1996-Jun. 1997: Reconstructed. Nov. 1998-Apr. 1999: Reconstructed.
50	1	1	Hølen	1923	1923	1961	1962		1923-2003	1923-2003	1962-2003	x		x		Flood peaks caused by ice jams are reduced. Most of low flow data is considered to be correct. Some years without any ice correction	Insignificant regulation. High flows values from 11.06.97 – 31.08.03 are up to 10 % underestimated due to unfortunate location of temporary gauging station. May.-Nov. 1969: Reconstructed.
55	4	1	Røykenes	1934	1993	1977	1993									No ice	
62	5	1	Bulken (Vangsvatnet)	1892	1892	1989	1995			1943, 1983, 1989, 1990, 1993		Before 1905	Before 1905			No ice	Insignificant regulation since 1919. Apr. 1983-Jan. 1984: Uncertain data. 1989-1990: Uncertain data. Jan. -Jun. 1993: Reconstructed. Nov. 1993-May. 1994:Reconstructed. Low flow data has limited quality before 1905. Oct. 1988-Dec. 1990: Uncertain data.
62	10	0	Myrkdalsvatn	1964	1964	1970	1971		1964-1987	1964-1987, 2011	1971-1987, 2011		1986-1991	1986-1991	1986-1991	Considered as little or not ice-influenced	Be careful with use of data between 18.08.1986-03.04.1987, due reduction of the water level at Myrkdalsvatn. Data from 1986-1991 should not be used for other than flood analysis. Inhomogeneity in flood values due to change in location of the gauging station (1971) and ratingcurves (1987).
62	14	1	Slondalsvatn	1983	1984	1985	1985			1986, 1987, 1994, 1997, 1998	1986, 1987, 1994, 1997, 1998	x				Yes, but relatively small changes/corrections at winter low flow. Flood peaks caused by ice jams are also reduced, but they are few.	Feb.-Aug. 1986: Reconstructed. Apr.-Jun. 1997: Reconstructed. May.-Sep. 1994: Reconstructed. Apr.-Sep. 1997: Reconstructed. Apr.-Aug. 2000: Reconstructed.
62	15	1	Kinne	1983	1984	1983	1984			2001	2001	x				Somewhat ice-influenced winter data, and short periods.	-
62	18	1	Svartavatn	1987	2002		2002									Considered as little or not ice-influenced	-
73	21	1	Frostdalen	1967	1994	1967	1994		x	x	x	x	2015-2016			Yes	Avoid using summers 2015-2016 for low flow analysis due to small water extractions. Flood data should not be used.May.-Sept. 1997: Reconstructed. Apr.-Jul. 1998: Reconstructed.
73	27	1	Sula	1967	1992	1967	1992			1993, 2007	1993, 1996, 2007, 2015, 2017	x				Yes	No data 1983-1991. May.-Jul. 1993: Reconstructed. Extremely high peaks in fine resolution data in Nov. 1996, Dec. 2015, Jan. 2017 are caused by backwater.
75	28	1	Feigumfoss	1972	1974	1972	1974			1974, 1977, 1981	1974, 1977, 1981, 2000	x	x	x		Yes	
76	5	0	Nigardsbrevatn	1962	1963	1985	1985			Before 1980	Before 1985					No ice	Dec. 1971-May. 1972: Reconstructed. Data before 1980 affected by potential water-communication problems at the station, and flood values are not to be used from that period.

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
77	3	1	Sogndalsvatn	1962	1963	1990	1991						(x)			No ice	The rating curve is not god for low flows, however the profile is stable and only has one period, so it can be used for trend analysis on low flow, but the absolute values are not certain.
79	3	1	Nessedalselv	1983	1984	1983	1984				1985, 1986, 1994, 1996, 2000, 2011	x		x		Yes	Be aware of highly ice-affected peaks in 1985, 1986, 1994, 1996, 2000, 2011. Nov. 1989-Mar. 1990: Reconstructed.
80	4	1	Ullebøelv	1928	1929	1982	1983		x	x	x	x	1929-1967	x		Yes	Poor condition (supercritical flow) for registration of water level at high discharge/flood. Inhomogeneity in flood values between rating curve periods. The station delivers data of good quality up to 3 m3/s during the entire observation period.
81	1	1	Hersvikvatn (Hagevatnet)	1934	1934	1976	1977		(x)	x	x		1934-1958	1934-1958		No ice	Low flow values should not be used from 1934 -1958 due to leak in the profile. Jun.-Nov. 1995: Reconstructed. Mar.-Nov. 1994: Reconstructed.
82	4	0	Nautsundvatn	1908	1986	1986	1986				2018					Considered as little or not ice-influenced	
83	2	1	Viksvatn (Hestadfjorden)	1902	1903	1985	1985			1970, 1983						No ice	Insignificant transfer out of the catchment since 1960 (1km2). Jan.-Nov. 1983: Reconstructed.
83	6	1	Byttevatn	1965	1978	1985	1985			1978, 1979						No ice	Insufficient data quality prior to 1978. 1878/1979 reconstructed peak flood or big part of flood
83	7	1	Grønengstølsvatn	1965	1999	1965	1999			2003	2003		x			Considered as little or not ice-influenced	2003 most of the year reconstructed
83	12	0	Haukedalsvatn ndf.	1935	1984	1984	1984			1985, 1993, 1997, 1999						No ice	Winter 1988-1989: 4 months reconstructed winter 1997-1998: 8 months reconstructed 1999: 9 months reconstructed
84	11	0	Hovefoss	1963	1964	1988	1988		x	x	x		Before 1999	Before 1999		Some ice correction. Many years without any ice correction.	Inhomogenity in flood values after moving the gauging station in 1998 (only problem at large discharge; high velocity). Flood values prior to 1998 are better than those 1998 to date. 1990-1991: 6 months reconstructed 1991-1992: 7 months reconstructed 1992: 4 months reconstructed 1997-1998:almost 10 months reconstructed
84	20	0	Holsenvatn	1963	1963	1983	1984		1963-1983	1963-1983, 2002	2002					No ice	Inhomogenity in flood values, due to change of gauging station. 1987: 4 months reconstructed 1989-1990: reconstructed winter data 2002: 7 months of reconstructed summer data
85	4	1	Straumstad (Solheimsvatnet)	1974	1985	1982	1985			1995, 1997	1995, 1997		1974-1976	1974-1976		No ice	Solheimsvatnet has to outlets. All measurments at the gauging station are a sum of both outlets. Unrealistic lowflow data from 1974-1976. 1995: mostly reconstructed 1997: mostly reconstructed 2007: 4 months reconstructed
86	12	1	Skjerdalselv	1982	1991	1982	1991			1996, 1997, 2008	1996, 1997, 2008					Flood peaks caused by ice jams are reduced. Winter low flow data is considered to be correct	1996: mostly reconstructed 1997: mostly reconstructed
87	10	0	Gloppenelv v/Bergheim	1970	1970	1986	1986		1970-1985	1970-1985		(x)				Flood peaks caused by ice jams are reduced. Less corrections last years. Winter low flow data is considered to be correct.	Floodvalues seem unreasonable high from 1970-1985 compared to later period. Other stations nearby do not show the similar pattern. Some vegitation in the profile.

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
88	4	1	Lovatn	1900	1900	1988	1988			1937, 1938, 1939, 1940		Before 1936	1900 - 1936			No ice	Low flow data from the first rating curve period (1900-1936) is excluded due to a comment when the quality of the rating curve is discribed " wrong low flow values" . 1989: 5 months reconstructed 1938-1942: intervalls between datapoints is more then one day.
88	11	0	Strynsvatn	1967	1967	1985	1985			1970, 1987, 1990, 1994, 1996, 1998, 2000, 2001-2006	1987, 1990, 1994, 1996, 1998, 2000, 2001-2006					No ice	1996: 2 months reconstructed 2000: 6 months reconstructed
88	30	0	Nordre Oldevatn	1902	1987	1987	1987						1939-1988			No ice	Insignificant transfer out of the catchment since 1938. New station in 1988. Low flow data bevore and after 1988 do noe match properly.
97	1	1	Fetvatn (Fitjavatnet)	1946	1946	1973	1973		x	x	x					Considered as little or not ice-influenced	Floods are affected by storm surge when there is a combination of low pressure and strong winds. High uncertainty in floodvalues. Some trouble with winter data in the 1960s 1994: 4 months reconstructed 1995: 9 months reconstructed
98	4	0	Øye ndf.	1917	1991	1985	1991		1991	1999, 2002, 2013-2017	1991,1992, 1999, 2002, 2004, 2013-2017					Considered as little or not ice-influenced	There exist data from 1917. Data from 1967-82 should not be used in any analysis due to not reliable data (the gauging station was not running from 01.01.79 to 02.08.82). The gauging station was moved in 1991. Only good quality on floodata from then. The flood at 2th October 1956 is a peak value and not an daily value. 2013-2017: suspected bad communication between station and river
101	1	0	Engsetvatn	1923	1990	1989	1990									No ice	Problems with changes in the control profile caused by human activity several times in the 1970s and 1980s.The reason for the homogentity break 1957 is not known. Other gauging station nearby do not show similar trend in data before 1957, but are following similar pattern in the years after 1957. 1989: a lot of reconstruction 1949-1977: intervall between datapoints is less then one day
103	1	2	Ulvåa v/Storhølen	1971	1971	1986	1986			1971, 2003	1991, 2003	x	x	x		Yes	1 m3/s are transfered out of the catchment. 1972: 7 months of reconstuction
104	23	1	Vistdal	1975	1984	1976	1984		1984, 1985, 1986, 1987, 1989	1984, 1985, 1986, 1989		x	x	x		Partly ice influenced winter data. Flood peaks caused by ice jams are reduced.	Homogeneity break and likely profil changes in 1983. Smaller profil changes that might affect low flows also during other times.
105	1	2	Osenelv v/Øren	1923	1923	1986	1987			1926, 1927, 1997, 2003	1997, 2003					No ice	1996-1997: 9 months of reconstruction 2003-2004: 11 months of reconstruction
109	9	1	Driva v/Risefoss	1935	1935	1979	1979			1936, 1939, 1985	1985	x		x		Yes	It is established a rating curve (at high flows) with a hydraulic model. The water level might be too low on floods before 2018 due to hydraulic influens on the station. There where reported 15 cm lower waterlevel inside the station compared to the outside waterlevel for a flood.
109	21	1	Driva v/Svoni	1970	1997	1981	1997	-28		1997, 2000, 2003	1997, 1998, 1999, 2000, 2003, 2017, 2021	x		x		Yes	Minor hydropower reservoir high up in the catchment. Considered as neglactable. Low data quality prior to 1997. There is a bifurcation affecting the contribution from 35 km2 of the catchment. During average flows about 80% of the water from that part drain to another catchment. The catchment area for Driva v/Svoni is therefore reduced by 28 km2.
112	8	1	Rinna	1969	1969	1985	1985			1982, 1993, 2000, 2003	1993, 2000, 2003			x		Yes	High uncertainty in the rating curve due to few streamflow measurements at high flows. Poor condition for streamflow measurements at high flows.

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
121	20	1	Åmot	1988	1995	1988	1995		x	x	x		1988-1993			Some small ice corrections, both at winter low flows and at flood peaks caused by ice jams. The volume of the corrections are not very large.	Profile change in the riverbed that affects low flows. Not recommended for high flow analysis due to problems with bad water-communication. 1997: 11 months reconstructed
122	11	1	Eggafoss	1941	1941	1986	1986		1941	1941, 1952, 1965, 2013	1965, 1975-1985, 2013,2021	x		x		Yes	Challenging hydraulic conditions where the gauging station is located at high flows. Be careful with use of flood value in April 1941, not clear yet if this is a peak or a daily value. Reported some instability in low flow relations, however it is considered to be minor
122	14	1	Lillebudal bru	1963	1997	1986	1997				2002, 2003, 2011, 2013, 2016, 2018,	x	x	x		Yes	Profile change in the riverbed that affects low flows. A lot of reconstructed data up to 1994 probably due to problems with the measuring device.
122	17	1	Hugdal bru	1972	1972	1972	1972			1986-1990, 1993-1996, 2001-2006, 2010, 2016	1986-1990, 1993-1996, 2001-2006, 2008, 2010, 2013, 2016	x	x	x		Yes	Profile change in the riverbed that affects low flows. A lot of corrections on the time series.
124	2	1	Høggås bru	1912	1912	1965	1965		1912-1965	(Before 1965) 1926, 1928, 1941, 1966, 1969	(Before 1965)1926,1928, 1939, 1941, 1966, 1969, 1974, 1977, 1979, 1991, 2009, 2014	x	1912-1965	1912-1965		Yes	Most floods are affected by timber floating from 1912-1965
127	6	0	Grunnfoss	1951	1965	1989	1989			1970-1974	1998, 1999, 2005	x	Before 2005	x		Flood peaks caused by ice jams are reduced. Winter low flow data is also corrected, bur not big volumes.	Insignificant transfer out of the catchment since 1951.
127	11	1	Veravatn	1966	1968	1981	1981			1986	1986, 1988					Considered as little or not ice-influenced	An old dam was taken down during a flood in 1967.
127	13	1	Dillfoss	1973	1973	1973	1973			1975, 2006, 2008, 2021	1975, 1981, 1982, 1986, 1991, 2002, 2006, 2008, 2021		1973-1981			Some ice correction, both at winter low flows and at flood peaks caused by ice jams. The volume of the corrections are not very large for most of the years.	1983-1984: 6 monts reconstructed
128	5	1	Støafoss	1932	1969	1989	1989		x	x	x	x				Some ice	Unregulated after end timber floating 15.6.1966. Very high uncertainty in the rating curve for high flow values due to lack of discharge measurements. 1994: 5 months with reconstructed data
128	9	1	Leksdalsvatn	1972	1972	1989	1989			1972, 1977, 1981, 1983		x	x			No ice	Drinking water source for Verdal municipality. Information from the technical department in the municipality of Verdal indicates an average water supply of 70 l / s. New pumps installed in 2008, 3 pieces each with 48 l / s capacity. There are constraints in the piping system that provide maximum capacity of 122 l / s.
133	7	1	Krinsvatn (Kringsvatmet)	1912*	1969	1969	1969									No ice	The station was influensed by timberfloating untill 1967 and was moved in 1969.
138	1	1	Øyungen	1916	1997	1977	1997			2007	2007		Before 1976			No ice	Somewhat influenced by timber floating dam before 1976.
139	26	1	Embrethølen	1980	1980	1989	1989			1995, 1999, 2000	1995, 1999, 2000	x		x		Yes, but relatively small changes / corrections.	1995-1996: 8 months with reconstructed data 1998-1999: 8 months with reconstructed data 1999-2000: 9 months with reconstructed data
139	35	0	Trangen	1934	2002	1989	2002				2018, 2021	x				Almost all years have korrections for ice for about 5 months	

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140	2	0	Salsvatn	1916	1990	1989	1990		x	x	x					No ice	New bridge build in the outlet of the lake, downstream the station, in 1946, 1989 and 2006. Possible profile change after 1989. The new bridge from 2006 seems to affect flood values.
148	2	1	Mevatnet	1973	1973	1973	1973			1973, 1983, 1994, 1995, 1996, 1997, 1998	1973, 1983, 1994, 1995, 1996, 1997, 1998					No ice	Data appears to be reconstructed in the period 1993-1998. 1984-1985: 5 months reconstructed data
150	1	1	Sørra	1953	1989	1952	1989		x	x	x	x				Yes	Coastal catchment. The years 1979 - 1981 are uncertain due to gradual change of concrete threshold. The extremely large flood in 1981 and the extremely low flow in 1980 are doubtful.
151	13	1	Øvre Glugvatn	1968	1988	1968	1988		x	x	x					No ice	
151	15	1	Nervoll	1968	1968	1968	1968			1971, 1976, 1978	1971, 1976, 1978, 2018	x	x	x		Yes, some.	Ice corrections almost all winters befor 1995
152	4	1	Fustvatn	1908	1908	1975	1975			1977, 1991	1977, 1981-1988, 1991		No low flows befor 1950			No ice	1990-1991: 6 months reconstructed data
153	1	1	Storvatn	1916	1916	1971	1973			1930, 1954, 1956, 1972, 1981	1981, 1997, 1998, 2001,					No ice	Some regulation, however the storage capacity is only 5000 m^3 so it is considered negligible
156	8	1	Svartisdal	1929	1961	1967	1989			1970-1986, 1996, 1998, 2009	1990, 1996, 1998, 2009	x		x		Yes	Changes in catchment area due to glacier meltdown, stable since 1961. 46% glacier in the catchment area. Very uncertain rating curve on low water levels (lowflow). Low water levels/flow generally occur during the winter months. The water speed at the discharge station are high, which gives uncertainties when reading water level, especially during flooding. There are difficult discharge measuring conditions at the station. 1998: 6 months with reconstructed data
156	15	1	Forsbakk	1963	1989	1968	1989		x	x	x	x	x	x		Yes, ice corrections both on winter low flows and on winter floods.	Coastal catchment with floods all year round. Many of the highest floods are observed in the winter period and they are often corrected due to ice influnce. 2006-2007: 9 months reconstructed data
156	24	1	Bogvatn	1970	1970	1970	1970			1970, 1972, 1977, 1978, 1979, 1983, 1985, 1994, 1995, 2010	1970, 1972, 1973, 1974, 1977, 1978, 1979, 1983, 1985, 1994, 1995, 2010, 2020	x	x	x		Yes	20% glacier in the catchment area. Very uncertain rating curve on low flow due to very few messurments on low flow. Low flow generally occur during the winter months 1971-1972: 8 months reconstructed. 1974-1975: 6 months reconstructed. 1978: 7 months reconstructed data 1979: 5 months reconstructed data 1985: 5 months reconstructed data 1987: 5 months reconstructed data 1990: 5 months reconstructed data 2010: 5 months reconstructed data
159	5	1	Strømdalen	1976	1989	1976	1989		x	x	x	x	Before 1992			Yes	
163	5	1	Junkerdalselv	1937	1989	1977	1989			2002	1996, 2002	x	x	x	1937-1989	Yes	Homogenity break in lowflow (and possibly even middel flow) in 1989. The station was moved about 20 m upstream in 1988. The rating curve before 1989 is very uncertain below median flow.
163	6	1	Jordbrufjell	1945	1954	1964	1964			1970, 1971, 1978, 1979, 1983, 1985, 2007, 2013	1970, 1971, 1978, 1979, 1983, 1985, 1998, 2007, 2013	x	x	x		Yes	1965-1967: two periods of 5 months with reconstructed data
168	2	1	Mørsvik bru	1985	1986	1985	1986			2004	2004, 2022	x		x		Yes, annual corrections of false and/or unrealisticly high peaks in winter	

Regine area	Main no	Version	Station name	Record start	HRD start daily data	Record start fine resolution data	HRD start fine resolution data	Area change	Not spring flood	Not floods, Daily Means	Not floods, Fine Resolution	Not winter low flow	Not low flows	Not monthly flow	Not annual flow	Corrections for ice	Comment / bad data periods
168	3	1	Lakså bru	1953	1954	1991	1991			x	x		x			Yes, annual corrections of false and/or unrealisticly high peaks in winter	Not possible to check the quality of winterdata before 1992. Annual peak floods tend to happen in January/February, indicating ice-influenced water level and uncertain peak flood levels in the entire time series.
172	8	1	Rauvatn	1977	1978	1977	1978		x	x	x	x		x		Yes, moderate	The rating curve on flood is very uncertain due to very few discharge measurements. The highest discharge measurement is about a third of mean flood. Apr.-Sept. 1991: Reconstructed. Apr.-sept. 1992: Reconstructed. Feb.-Jun. 2001: Reconstructed.
177	4	1	Sneisvatn	1916	1917	1976	1977			1920, 1960, 1977, 1978, 1979, 1981, 1984, 1985, 1986, 1987, 1988, 2003, 2017, 2022	1977, 1978, 1979, 1981, 1984, 1985, 1986, 1987, 1988, 2003, 2017, 2022	x				Some ice corrections wintertime, especially on winter floods early in the season (in recent times), probably much less affected on low waterlevels	Jan.-Oct. 1976: Reconstructed.
178	1	1	Langvatn	1953	1954	1977	1978			1978	1978, 1980, 2021	x	Before 1994	x		Yes	
185	1	1	Gåslandsvatn	1934	1935	1977	1978			1977, 1985, 1994, 2008, 2009, 2013	1985, 1994, 2008, 2009, 2013		Before 1958			Considered as little or not ice-influenced	Jan.-May. 1976: Reconstructed. Dec. 1987-Apr. 1988: Reconstructed. Apr.-Sept. 1991: Reconstructed.
186	2	0	Ånesvatn	1978	1998		1998			2014	2014, 2015 ,2019					Considered as little or not ice-influenced	The station was moved in 1997 (old no. 186.1) and data from the two locations do not match.
189	3	1	Tennevikvatn	1978	1979	1989	1989			1994, 2004, 2011, 2014	1994, 2004, 2006, 2011, 2014, 2022	x				Ice corrections and bad winter data.	Jan.-Nov. 1994: Bad data due to problems with water-communication, highly reconstructed. Jan.-Jul. 1998: Highly reconstructed, but flood data in May are correct. Nov. 2011-Feb. 2012: Reconstructed.
191	2	0	Øvrevatn	1913	1914	1967	1968			1969, 1975, 1982, 1984-1988, 2001, 2002	1969, 1975, 1982, 1984-1988, 2001, 2002		1959-1972			Some small ice corretions.	Data from 1984-1988 are of limited quality and should be used with caution.
196	7	1	Ytre Fiskeløsvatn	1960	1961	1977	1978			1981, 1984, 1986, 2004, 2018	1981, 1984, 1986, 1992, 1998, 2004, 2018					No ice	
196	11	1	Lille Rostavatn	1959	1960	1988	1989			1996, 2003	1996, 2003					No ice	At the end of the catchment lies the lake Rostujavre cachment area 282 km2) which has runoff both to Norway and Sweden. Based on measurements in 1959 and 1960 it is estimated that 60% of the drainage goes to Norway and 40% to Sweden (this is the runoff to Rostajaure, not the entire field). Nov. 1998-Apr. 1999: Reconstructed. Apr. 2003-Mar. 2004: Reconstructed.
200	4	0	Skogsfjordvatn	1957	1958	1989	1989			1990, 1992, 1997, 2001, 2007, 2012, 2016, 2019	2016, 2019						Oct. 1963-Mar. 1964: Reconstructed.
203	2	0	Jægervatn	1955	1990	1988	1990			2011	2011	1990-2000	1990-2000	1990-2000	1990-2000	No ice	Uncertainty about the elevation-system for waterlevel measurements in the 90's, especially for extreme low water levels, little influence on flooding.
205	6	1	Didnojokka	1979	1980	1979	1980		x	x	x	x	x	x		Yes (but this is generally limited to the beginning of the winter season and just before the spring floos)	The station does not work on flood. The water surface is "boiling" when flooding and there is probably little correlation between ws. and discharge. Difficult measurement conditions. Jul. 2004-May. 2005: Reconstructed.
206	3	2	Manndalen bru	1971	1972	1971	1972			1986, 1994, 2001, 2002, 2010	1978, 1981, 1986, 1993, 1994, 1995, 1996, 2002, 2004, 2010	x	x	x		Yes	Not recommended for low flow analysis due to unstable control.
208	2	1	Oksfjordvatn	1955	1956	1985	1985			1964, 1984, 1986, 2001, 2011	1986, 2001, 2011					No ice	Oct. 1985-Jun. 1986: Reconstructed. Aug. 1986-May. 1987: Reconstructed.
208	3	1	Svartfossberget	1981	1982	1985	1985	-45,8		1985, 1997		x		x		Yes	Transmission of water out since 1967 of 45,8 km2. Sept. 1996-May. 1997: Reconstructed.

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209	4	1	Lillefossen	1961	1971	1970	1971	-16,4	x	x	x	x		x		Yes	Transmission of water out since 1969 of 16.4 km2. Bad conditions for registration of water levels at high discharge. Jun.-Oct. 2007: Reconstructed.
212	10	1	Masi	1966	1967	1985	1985		x	x	x	x	x	x		Yes	Poor communication for a long time between the river and the station. Peak flows and lowflows are therfore at times under- or overestimated. Jun. 2001-Nov. 2002: Reconstructed.
212	48	0	Sagafoss	1971	1972	1984	1985					x	x			Ice corrected until 1999, very few and small corrections after 1999. It is still likely thow that the waterlevel/discharge is a little influenced by ice during the winter.	The station has 3 different versions 212.48 (1990-dd), 212.12 (1980-1990), and 212.4 Tverrelv (1971-1980). Annual minimum values does not look ok in the period 70-80, possibly different ice correction methods? Do not use for low flow analysis due to problems with vegetation and negative discharge values.
212	49	0	Halsnes	1920	1972	1992	1992			2002	2002					Considered as little or not ice-influenced	Missing values 1944-46, 1965-66, 1968-71. The station has been moved two times: 1955 and 1966. Higher values before 1966.
213	2	1	Leirbotnvatn	1961	1962	1981	1981				1993, 1997, 2005, 2010			x		Considered as little or not ice-influenced	
213	4	1	Kvalsund	1978	1980	1979	1980			1984, 1992, 2017	1984, 1992, 2017, 2022	x		x		Yes	Nov. 2016-Aug. 2017: Reconstructed. The profile consists of rocks that may move with ice runs, although there are no clare indications of profile changes as of now.
234	13	0	Veahkkava, Iesjokka	1973	1990	1985	1990					x		Oct.-Apr.	Oct.-Apr.	The timeseries is very much ice corrected all winter months (end of October to beginning of May). There has been used different ways to ice-correct data during diferent time periods.	Data for the period 01.01.1987-12.10.1989 are reconstructed.
234	18	0	Polmak nye	1911	1947	1985	1985			1966, 2002, 2004	1985, 1987, 1993, 1994, 1999, 2002, 2004, 2006	x		Oct.-Apr.	Oct.-Apr.	The timeseries is very much ice corrected all winter months (end of October to beginning of May).	Sept. 1944-Jan. 1946: Missing data.
237	1	1	Båtsfjord	1980	1993	1980	1993			x	x	x		x		Yes	Flood values are of bad quality. There is high uncertainty in lowflow values. However, flow values at that level occure only during the winter months.
244	2	0	Neiden	1911	1979	1985	1985	-64,2		1982, 2000, 2011, 2019	1986, 1987, 1989, 2000, 2009, 2011, 2019	x		Oct.-Apr.	Oct.-Apr.	The timeseries is very much ice corrected all winter months (end of October to beginning of May).	Missing data in the period 1974-78. Transmission of water out of the cachment from 1952 (64.2 km2). Considered as largely unregulated.
246	9	0	Sametielv	1962	1963	1985	1985		1981-1989	1966, 1981-1989, 2005	1985-1989, 2005	x	1981-1989	Oct.-Apr.	Oct.-Apr.	The timeseries is very much ice corrected all winter months (end of October to beginning of May).	Some biofouling in summer but it is not known if it contributes to any seasonal variation.
247	3	0	Karpelva	1927	1947	1985	1986			1985, 1987, 1990, 1994	1987, 1990, 1994	x				Mostly flood events at the beginning of the winter are corrected but a lot of low winter discharge, later in the winter season, is not corrected	Data missing from Oct . 1944 to Jul. 1946.
307	5	1	Murusjø	1925	1926	1989	1989			1947, 2010	2010					No ice	

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307	7	1	Landbru	1943	1988	1965	1988		x	x	x	2002/2003				No ice	Discharge from karstland. The discharge station is located below the outlet "Landbru", which is a cave (tunnel) of about 150m. Very good probability of hysteresis effect here, especially when flood. The rating curve is very unceartain for water levels > 1.7 (about QM, 18-19m3/s). Water surface observations becomes difficult when hight water levels, especially when the tunnel/cave is filled up it becomes very turbulent and messy hydraulics. 1985-1987: Reconstructed.
308	1	1	Lenglingen	1925	1926	1989	1989				2008	Before 1977				No ice	
311	4	1	Femundsenden (Femunden)	1896	1896	1987	1987			1945, 1997, 1998, 2003	1997, 1998, 2003	x	x	x		No ice	Transfer of water out from the northern end of lake Femunden. The transfer is probably of little importance on most waterlevels. 1896-1916, measurements were made of the transfer. It was estimated that the transfer was 27 million m3 a year on average, which corresponds to an annual average water transfer of 0.86m3 / s. It is doubtful whether the transfer has been so great in recent times. The channel has been remodeled several times, last time in 1996. Timber floting until approx. 1970. Mar. 1926-Jan. 1927: Reconstructed. Jun.-Dec. 1986: Reconstructed.
311	6	0	Nybergsund	1908	1912	1986	1989			1914, 1929, 1973, 1986, 1987, 1988, 1992, 1995	1992, 1995	x		x		Yes	Located in the same river as gauging station Femundsenden (Trysilelva), but much further down the river. Transfer of water out from the northern end of lake Femunden. The transfer is probably of little importance on most waterlevels. 1896-1916, measurements were made of the transfer. It was estimated that the transfer was 27 million m3 a year on average, which corresponds to an annual average water transfer of 0.86m3 / s. It is doubtful whether the transfer has been so great in recent times. The channel has been remodeled several times, last time in 1996. Timber floting until approx. 1970. 1908-1911: Data is of limited quality. 1973: Data is of limited quality. 1986-1988: Data is of limited quality.
313	10	0	Magnor	1911	1981	1980	1981		(x)	x	x					No ice	Influenced by "Glomma's bifurcation at Kongsvinger" (Pettersson, 2001) at Q > average flood. Homogenity break in 1978/80, probably due to change of lokation of the discharge station.