P-08-88

Oskarshamn site investigation

Groundwater Monitoring Program

Report for September 2007 – September 2008

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November 2008

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Keywords: Groundwater, Borehole, Instrumentation, Measurement methods, Monitoring, Oskarshamn.

Abstract

This document reports data obtained within the groundwater monitoring program, which is one of the activities performed within the site investigation at Oskarshamn. The objective of the groundwater monitoring is to support the hydrogeological characterization of the area and to document the groundwater conditions before a possible excavation.

Data presented in this report are collected during the period of September 2007 until September 2008 and consist of groundwater levels in boreholes. Meteorological and hydrological variables are also monitored within the framework of the site investigations but reported separately.

The data collecting system in HMS (Hydro Monitoring System) consists of two measurement stations (computers) which communicate with and collect data from a number of dataloggers. The computers are connected to the SKB Ethernet LAN. All data are collected by means of different transducers connected to different types of data loggers: Minitroll, LevelTroll, Mitec and Datataker.

In order to calibrate registrations from the data loggers, manual levelling of all sections is made, normally once every month. The logger data are converted to water levels using calibration constants. All collected data are subjected to a quality check, during which obviously erroneous data are removed and calibration constants are corrected so that the monitored data are consistent with the manual levelling. The status of the equipment is also controlled and service might be initiated.

Diagrams of groundwater levels for the period of September 2007 – September 2008 (daily values for each section) are presented in Appendix 1. The original results are stored in the primary data base Sicada. The data in this data base may then be used for further analysis.

There are no nonconformities with respect to the activity plan or the method description.

Sammanfattning

Denna rapport redovisar data erhållna inom grundvattenmoniteringsprogrammet, vilket är en av aktiviteterna inom platsundersökningen i Oskarshamn. Syftet med grundvattenmoniteringen är att stödja den hydrogeologiska karakteriseringen av platsen och att dokumentera grundvattenförhållanden före en eventuell byggnation.

Data presenterade i rapporten är insamlade under perioden september 2007 till och med september 2008 och består av grundvattennivå i borrhål. Inom ramen för platsundersökningarna moniteras aven meteorologiska och ythydrologiska variabler, men dessa presenteras i en annan rapport.

Datainsamlingssystemet i HMS (Hydro Monitoring System) består av två mätstationer (datorer) vilka kommunicerar med och samlar in data från ett antal dataloggers. Datorn är förbunden med SKB:s nätverk. Alla data samlas in med hjälp av olika givare förbundna med olika typer av dataloggrar: Minitroll, LevelTroll, Mitec och Datataker.

För att kunna kalibrera registreringarna från dataloggrarna utförs, vanligtvis en gång i månaden, manuell nivåregistrering (lodning) i alla sektioner. Loggerdata omvandlas till vattennivåer genom användande av kalibreringskonstanter. Alla insamlade data kvalitetskontrolleras. Under detta arbete tas uppenbart felaktiga data bort och kalibreringskonstanterna korrigeras så att automatiskt registrerade data överensstämmer med manuella nivåregistreringar. Vid dessa tillfällen kontrolleras utrustningens status och service kan initieras.

Diagram över grundvattennivåerna för perioden september 2007 till september 2008 (en datapunkt per sektion och 24 timmar redovisas) visas i Appendix 1. Ursprungsresultatet lagras i primärdatabasen Sicada. Data från denna databas kan användas för vidare analyser.

Aktiviteten har utförts i överensstämmelse med aktivitetsplanen och metodbeskrivningen.

Contents

1 Introduction

This document reports data collected within the groundwater monitoring program, which is one of the activities performed within the site investigation at Oskarshamn. The work was carried out in accordance with activity plans SKB AP PS 400-06-159 and SKB AP PS 400-07-069. In Table 1-1, controlling documents for this activity are listed. The activity plans and the method descriptions are SKB's internal controlling documents. The site investigation internal report, Table 1-2, presents the results from the quality check performed once every three months, see Chapter 4.4.

Data presented in this report include groundwater levels collected during September 2007 – September 2008.

The HMS (Hydro Monitoring System) is used to collect and store all data.

Table 1-1. Controlling documents

Activity Plans	**Number**	**Version**
Platsundersökning i Oskarshamn – Grundvattenmonitering 2007	AP PS 400–06–159	1.0
Platsundersökning i Oskarshamn – Grundvattenmonitering 2008	AP PS 400–07–069	1.0
Method Descriptions	**Number**	**Version**
Metodbeskrivning för grundvattenmonitering vid SKB:s platsundersökningar	SKB MD 360.002	1.0

Site investigation Internal Reports (in Swedish)	**Number**
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: maj – september 2007.	PIR–07–40
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: september 2007 – januari 2008.	PIR–08–19
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: januari – juni 2008.	PIR–08–46
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: juni – oktober 2008.	PIR–08–53

2 Objective and scope

The objective of the groundwater monitoring program during the site investigation is to determine baseline conditions of the natural variations of the groundwater levels prior to the potential excavation for a nuclear waste repository and to support the hydrogeological site characterization.

Data collected within this activity are:

- groundwater level in boreholes.
- surface water level in streams.

There are also some parameters that are used for monitoring of the function of the measurement system itself. However, these are not reported herein.

The following numbers of boreholes and probing points were monitored during the reporting period within the Oskarshamn site investigation:

- 40 core-drilled boreholes.
- 41 percussion-drilled boreholes.
- 70 soil wells.
- 2 probing points for monitoring of surface water level in streams.

The locations of the boreholes and probing points monitored during the reporting period are shown in Figure 2-1. A list of the boreholes along with some basic information is compiled in Table 2-1 and in Table 5-1.

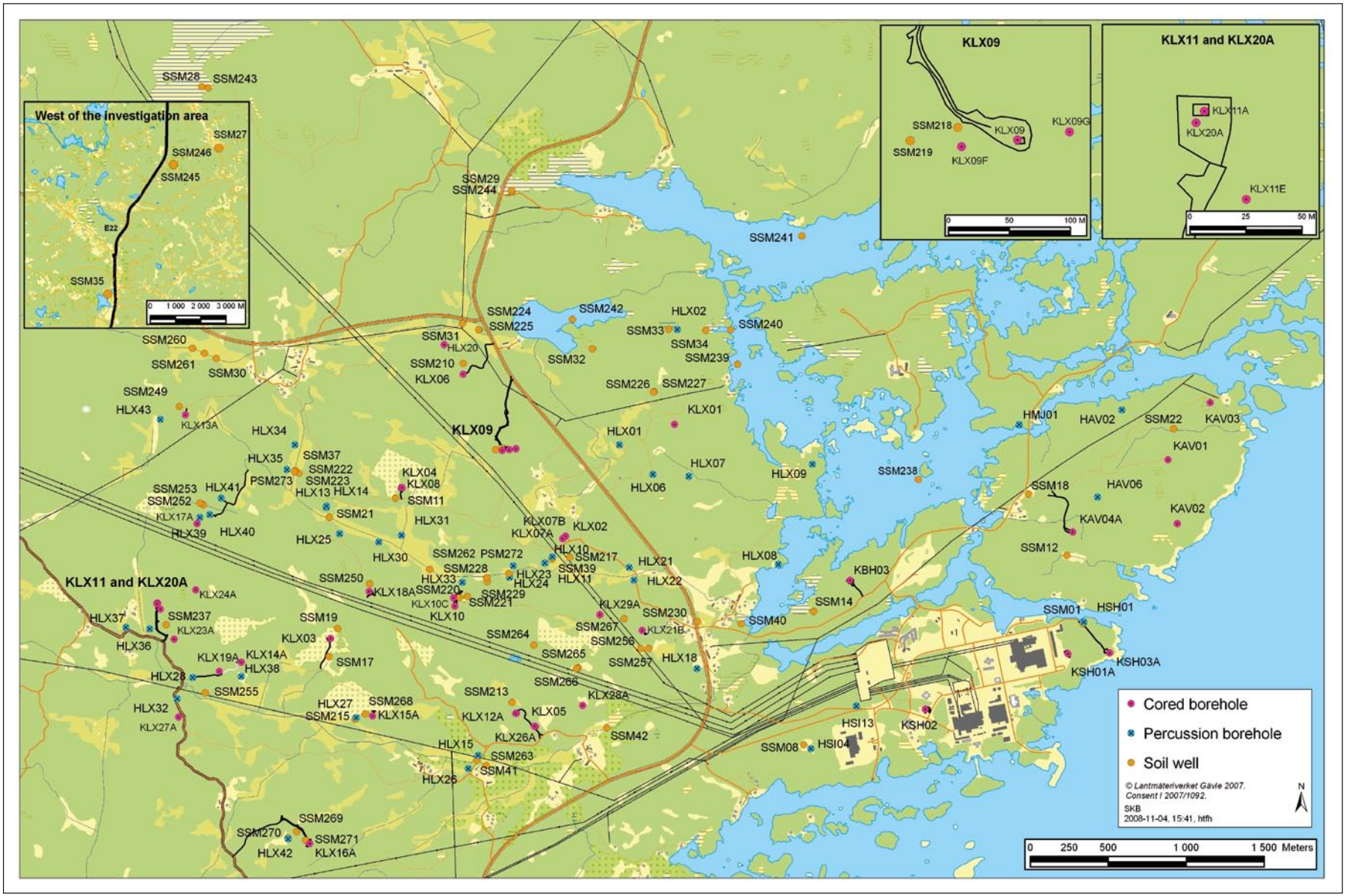


Figure 2-1. *Overview of the Oskarshamn site investigation area showing the locations of monitored boreholes.*

Table 2-1. Borehole length, inclination, elevation at top of casing (TOC) and date for the completion of drilling.

Borehole	Borehole length (m)	Inclination at ground (°)	Elevation at TOC (m.a.s.l)	Drilling completed	Length of casing (m)	Comment
HAV02	163.0	–89.1	6.11	1986-08-21	?	
HAV06	100.0	–59.5	12.42	1987-07-30	1.20	
HLX01	100.63	–59.4	8.90	1987-10-21	3.00	
HLX02	132.0	–59.3	9.04	1987-10-27	0.60	
HLX06	100.0	–58.6	15.48	1987-10-30	1.00	
HLX07	100.0	–60.8	8.61	1987-11-03	1.00	
HLX08	40.0	–47.8	2.22	1991-11-14	6.00	
HLX09	151.0	–61.3	3.31	1991-11-21	3.00	
HLX10	85.0	–68.7	11.74	1992-09-30	3.00	
HLX11	70.0	–68.5	13.15	1992-10-01	6.00	
HLX13	200.2	–58.1	17.39	2004-02-26	11.85	
HLX14	115.9	–68.6	17.11	2004-03-11	11.90	
HLX15	151.9	–58.4	4.81	2004-04-29	12.04	
HLX18	181.2	–57.6	4.04	2004-07-06	15.03	
HLX20	202.2	–60.4	11.18	2004-06-21	9.03	
HLX21	150.3	–57.0	10.31	2004-09-02	9.03	
HLX22	163.2	–59.4	10.06	2004-08-26	9.03	
HLX23	160.2	–58.2	14.69	2004-09-16	6.03	
HLX24	175.2	–58.4	12.77	2004-09-09	9.03	
HLX25	202.5	–58.6	20.66	2004-08-19	6.03	
HLX26	151.2	–60.4	6.48	2004-09-28	9.03	
HLX27	164.7	–59.4	8.25	2004-09-22	6.03	
HLX28	154.2	–59.5	13.42	2004-10-02	6.03	
HLX30	163.4	–61.0	12.18	2004-11-30	9.03	
HLX31	133.2	–58.8	12.16	2004-12-03	9.03	
HLX32	162.6	–58.7	10.84	2005-01-11	12.30	
HLX33	202.1	–58.8	12.20	2004-12-20	9.03	
HLX34	151.8	–59.7	14.29	2005-06-14	9.03	
HLX35	151.8	–60.1	14.44	2005-06-02	6.03	
HLX36	199.8	–59.0	15.56	2005-09-22	6.03	
HLX37	199.8	–59.2	15.19	2005-09-28	12.03	
HLX38	199.5	–59.5	11.53	2006-04-24	15.02	
HLX39	199.3	–59.3	27.04	2006-06-14	6.02	
HLX40	199.5	–59.8	25.74	2006-05-09	6.02	
HLX41	199.5	–59.1	21.80	2006-06-01	6.02	
HLX42	152.6	–57.1	12.88	2006-11-16	9.10	
HLX43	170.6	–50.5	24.20	2006-10-26	6.00	
HMJ01	46.0	–60.0	1.41	1991-10-30	6.00	
HSH01	200.0	–70.0	2.86	2002-07-02	12.00	
HSI04	37.0	–58.5	6.63	1995-02-02	?	
HSI13	4.0	–90.0	5.54	1980-02-02	?	
KAV01	502.0			1977-05-16		
	746.6			1986-11-16		
	757.31	–89.2	14.10	2004-01-10	68.04	
KAV02	97.1	–89.5	7.55	1977-05-31	12.40	
KAV03	248.4	–89.4	8.74	1986-10-05	2.80	

Borehole	Borehole length (m)	Inclination at ground (°)	Elevation at TOC (m.a.s.l)	Drilling completed	Length of casing (m)	Comment
KAV04A	1,004.0	–84.9	10.35	2004-05-03	100.00	
KBH03	100.43	–84.7	7.82	2004-02-13	24.97	
KLX01	702.11			1988-02-05		
	1,077.99	–85.3	16.77	1990-08-04	101.30	
KLX02	1,700.5	–85.0	18.40	1992-11-29	202.95	
KLX03	1,000.42	–74.9	18.49	2004-09-07	100.05	
KLX04	993.49	–84.8	24.09	2004-06-28	12.24	
KLX05	1,000.16	–65.2	17.63	2005-01-22	15.00	
KLX06	994.94	–65.2	17.68	2004-11-25	11.88	
KLX07A	844.73	–60.0	18.47	2005-05-04	11.80	
KLX07B	200.13	–85.1	18.38	2005-06-03	9.64	
KLX08	1,000.41	–60.5	24.31	2005-06-13	12.20	
KLX09	880.38	–84.9	23.45	2005-10-15	11.95	
KLX09F	152.3	–59.7	19.57	2006-01-06	9.00	
KLX09G	100.1	–61.1	19.63	2006-02-03	9.30	
KLX10	1,001.2	–85.2	18.28	2005-10-15	12.10	
KLX10C	146.25	–60.0	16.94	2006-02-28	9.00	
KLX11A	992.29	–76.8	27.14	2006-03-02	12.05	
KLX11E	121.3	–60.9	22.65	2006-04-21	2.00	
KLX12A	602.29	–75.3	17.74	2006-03-04	17.92	
KLX13A	595.85	–82.2	24.15	2006-08-16	11.75	
KLX14A	176.27	–50.0	16.35	2006-09-04	6.45	
KLX15A	1,000.43	–54.4	14.59	2007-02-25	11.65	
KLX16A	433.55	–65.0	18.85	2007-01-09	11.25	
KLX17A	701.08	–61.3	27.63	2006-10-23	11.95	
KLX18A	611.28	–82.1	21.01	2006-05-02	11.83	
KLX19A	800.07	–57.5	16.87	2006-09-20	98.75	
KLX20A	457.92	–50.0	27.24	2006-04-24	99.50	
KLX21B	858.78	–70.8	10.68	2006-11-29	11.85	
KLX23A	100.15	–61.4	22.26	2006-05-27	2.30	
KLX24A	100.17	–59.1	21.29	2006-06-29	2.41	
KLX26A	101.14	–60.4	15.63	2006-08-11	2.64	
KLX27A	650.56	–65.4	16.98	2007-11-21	14.76	
KLX28A	80.23	–60.0	10.05	2006-09-20	5.10	
KLX29A	60.25	–60.9	13.63	2006-09-13	2.35	
KSH01A	1,003.0	–80.4	5.32	2002-12-18	12.10	
KSH02	1,001.11	–85.6	5.48	2003-06-11	80.00	
KSH03A	1,000.7	–59.2	4.15	2003-11-07	100.05	
SSM000001	3.0	–86.7	2.79	2002-10-08		
SSM000008	7.6	–88.2	4.64	2003-12-08		
SSM000011	3.8	–88.6	16.50	2004-01-29		
SSM000012	9.5	–86.0	1.77	2004-01-22		
SSM000014	6.3	–85.9	1.64	2003-12-09		
SSM000017	2.15	–81.2	10.99	2004-05-04		
SSM000018	6.4	–86.2	0.78	2003-12-11		
SSM000019	3.2	–82.8	13.21	2004-05-04		
SSM000021	4.15	–86.4	12.63	2004-05-04		
SSM000022	11.4	–87.7	5.03	2004-01-12		

Borehole	Borehole length (m)	Inclination at ground (°)	Elevation at TOC (m.a.s.l)	Drilling completed	Length of casing (m)	Comment
SSM000027	5.2	–87.8	9.21	2004-06-28		
SSM000028	3.1	–87.8	4.09	2004-06-09		
SSM000029	8.1	–87.5	1.26	2004-06-08		
SSM000030	8.2	–85.7	11.19	2004-09-10		
SSM000031	4.1	–87.2	6.32	2004-06-10		
SSM000032	4.1	–86.4	2.81	2004-06-15		
SSM000033	2.1	–88.3	5.82	2004-06-15		
SSM000034	4.5	–89.7	0.48	2004-06-16		
SSM000035	4.1	–82.9	27.11	2004-06-09		
SSM000037	5.95	–86.4	12.70	2004-06-22		
SSM000039	5.1	–85.7	11.70	2004-06-21		
SSM000040	3.2	–88.8	1.16	2004-06-14		
SSM000041	4.6	–82.9	4.15	2004-07-07		
SSM000042	5.3	–88.3	3.35	2004-06-17		
SSM000210	4.1	–87.7	11.31	2004-06-28		
SSM000213	4.0	–85.0	11.85	2004-07-06		
SSM000215	4.7	–88.4	6.74	2004-12-03		
SSM000217	4.9	–88.4	12.58	2004-12-02		
SSM000218	5.2	–88.5	18.93	2005-06-02		
SSM000219	5.1	–88.6	16.27	2005-06-01		
SSM000220	3.1	–85.5	13.13	2005-05-31		
SSM000221	3.1	–86.6	13.17	2005-05-30		
SSM000222	7.4	–87.6	12.79	2005-08-22		
SSM000223	12.3	–87.5	13.69	2005-08-24		
SSM000224	21.6	–88.5	6.90	2005-08-29		
SSM000225	10.1	–87.6	6.94	2005-09-14		
SSM000226	8.3	–88.6	6.97	2005-09-14		
SSM000227	2.1	–86.5	7.28	2005-09-14		
SSM000228	13.0	–87.9	13.09	2005-09-19		
SSM000229	7.3	–88.6	13.68	2005-09-20		
SSM000230	8.0	–88.4	5.10	2005-09-21		
SSM000237	5.6	–86.4	15.93	2005-10-31		
SSM000238	12.2	–90.0	0.36	2006-02-21		Manual levelling in PSM000267 with the elevation 1.56 m.a.s.l.
SSM000239	5.3	–90.0	0.56	2006-02-22		Manual levelling in PSM000268 with the elevation 1.61 m.a.s.l.
SSM000240	6.4	–90.0	0.61	2006-02-23		Manual levelling in PSM000269 with the elevation 1.44 m.a.s.l.
SSM000241	33.1	–90.0	0.34	2006-02-15		Manual levelling in PSM000270 with the elevation 1.35 m.a.s.l.
SSM000242	18.1	–90.0	2.11	2006-02-07		Manual levelling in PSM000271 with the elevation 3.21 m.a.s.l.
SSM000243	15.0	–90.0	4.28	2006-02-13		
SSM000244	17.0	–90.0	1.91	2006-02-28		
SSM000245	7.9	–90.0	27.26	2006-02-02		
SSM000246	4.1	–90.0	27.58	2006-02-02		

Borehole	Borehole length (m)	Inclination at ground (°)	Elevation at TOC (m.a.s.l)	Drilling completed	Length of casing (m)	Comment
SSM000249	6.6	–86.9	22.08	2006-01-26		
SSM000250	8.0	–87.1	16.84	2006-01-27		
SSM000252	7.7	–89.0	18.39	2006-07-13		
SSM000253	4.5	–88.8	17.96	2006-07-12		
SSM000255	10.2	–85.3	5.94	2006-05-16		
SSM000256	5.4	–88.2	3.60	2006-07-11		
SSM000257	7.0	–85.9	3.36	2006-07-10		
SSM000260	9.67	–89.8	10.80	2006-10-25		
SSM000261	15.7	–88.6	10.65	2006-10-24		
SSM000262	18.7	–86.8	11.46	2006-10-30		
SSM000263	10.32	–88.3	4.63	2006-11-02		
SSM000264	8.4	–89.3	15.89	2006-11-16		
SSM000265	7.55	–87.1	6.73	2006-11-08		
SSM000266	6.87	–84.6	6.78	2006-11-08		
SSM000267	8.85	–87.6	13.78	2006-11-07		
SSM000268	7.26	–85.7	11.21	2006-11-15		
SSM000269	4.6	–88.3	15.16	2006-11-15		
SSM000270	5.12	–88.4	14.15	2006-11-15		
SSM000271	4.74	–89.2	15.82	2006-11-14		

? = Information is not found in the Sicada database.

3 Equipment

3.1 Description

Drawings of the borehole equipment for permanent instrumentation in core boreholes and percussion boreholes are presented in Figure 3-1. Figure 3-2 shows a more detailed close-up of the standpipe in which the pressure transducer is situated in these boreholes.

In Figure 3-3 the instrumentation in soil wells is shown. In open percussion and core boreholes, as in the soil wells, a transducer or data logger is submerged in the groundwater without any other equipment.

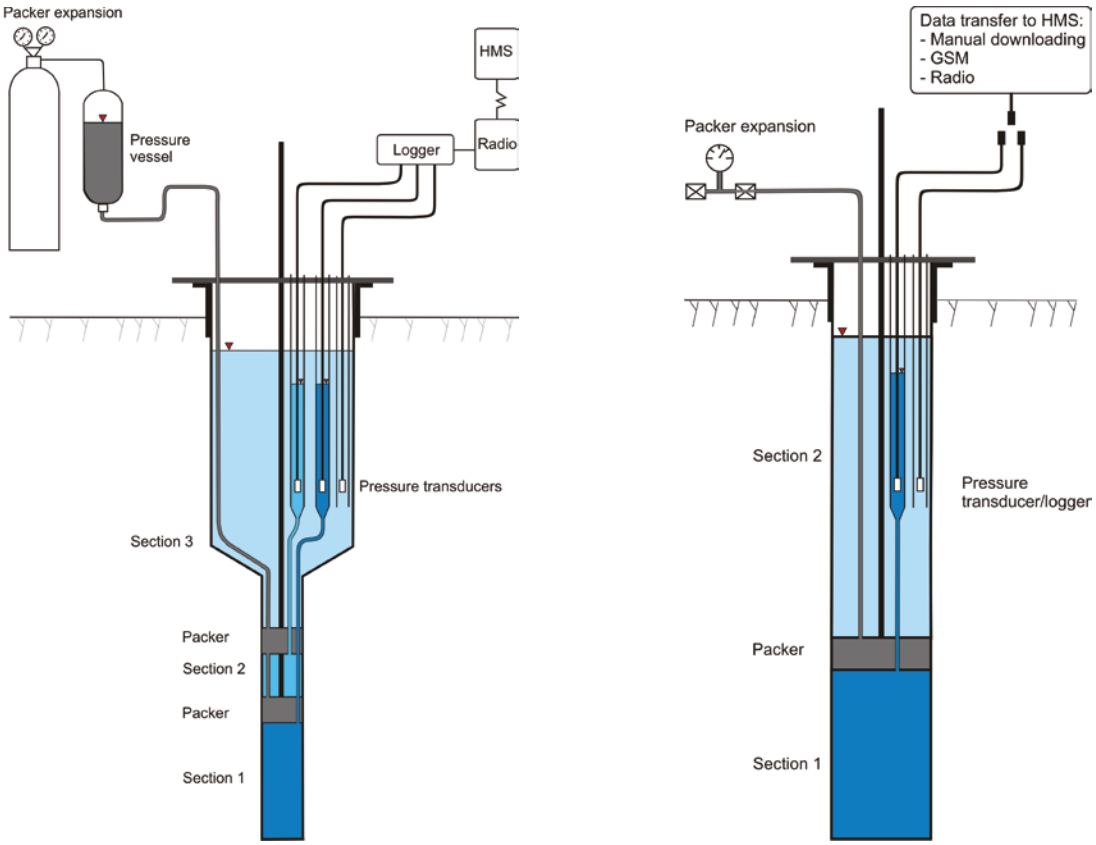


Figure 3-1. *Explanatory sketch of permanent instrumentation in core boreholes (left) and percussion boreholes (right).*

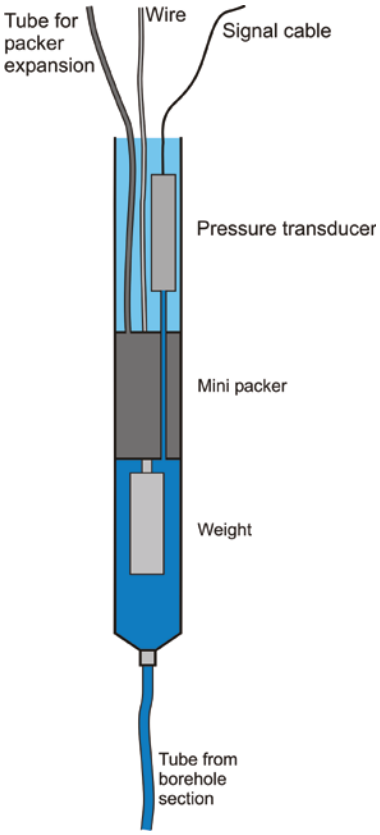


Figure 3-2. *Explanatory sketch of instrumentation in standpipes in core and percussion boreholes.*

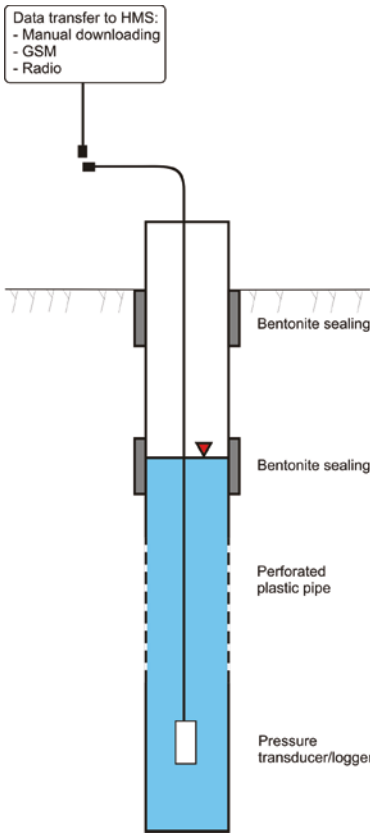


Figure 3-3. *Explanatory sketch of instrumentation in soil wells.*

3.2 Data collection

The data collecting system, which is part of the Hydro Monitoring System (HMS), consists of two measurement stations (computers). A measurement station collects data from a number of data sources, see Figure 3-4. The computers are connected to the SKB Ethernet LAN.

The on-line system is designed to be able to handle short interruptions in the communication. Data can be stored for at least a couple of hours in the loggers. All data are finally stored in the main measurement station. Tape backup is made of all data.

All data are collected by means of different types of pressure transducers connected to different types of data loggers or by manual levelling. Table 3-1 shows the monitoring equipment used in different boreholes and probing points. The following data loggers are used:

Minitroll: a single channel data logger of stand-alone type where the transducer is integrated in the logger. The logger is submerged in the groundwater and has the capacity to store 80,000 data.

Leveltroll: the successor to Minitroll, which is no longer manufactured. It is a logger that in most respects is equal to Minitroll, but has the capacity to store 350,000 data.

Mitec: a data logger connected on-line by means of GSM telephony. A pressure transducer of the type Druck PTX is connected to the logger. Only the transducer is submerged in the groundwater. The logger uses two or four channels. During monitoring in boreholes, one channel is used for monitoring of the battery voltage and the other ones can be used for pressure and temperature monitoring.

Datataker: a data logger connected on-line by means of radio or network. The logger has 42 channels and is used only for monitoring in percussion and core boreholes.

Monitored data that have been quality assured are transferred quarterly to the site characterization database, Sicada.

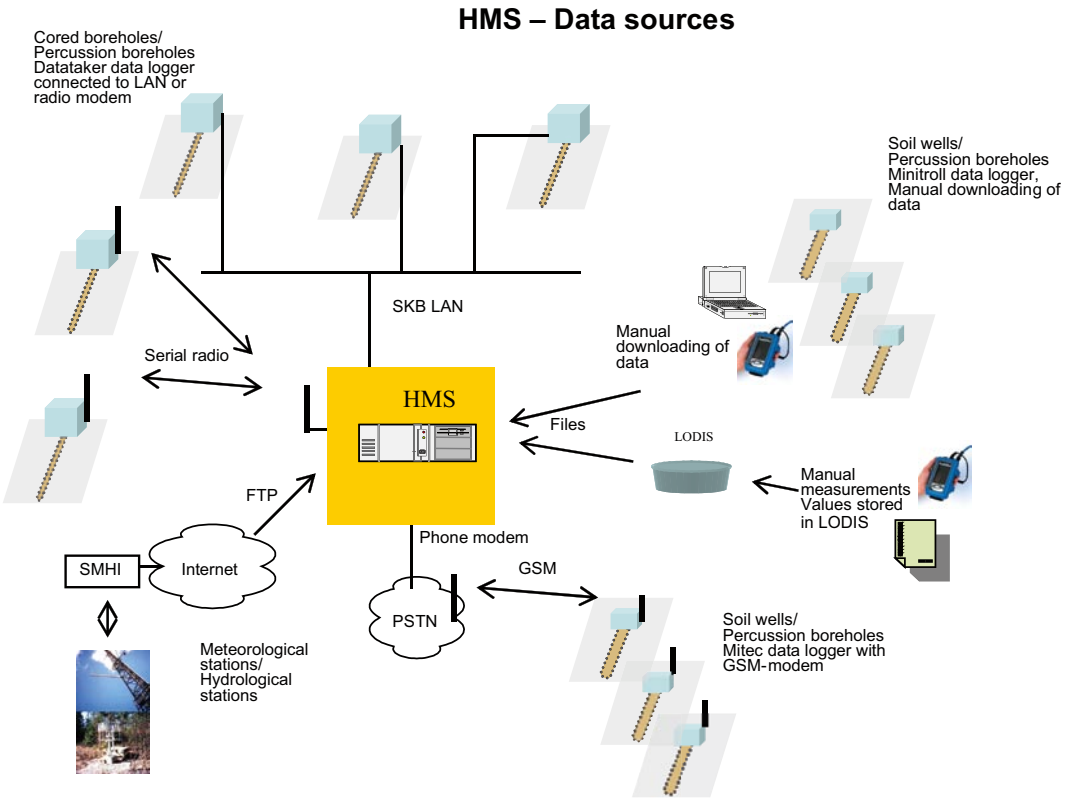


Figure 3-4. *HMS data sources.*

Table 3-1. Monitoring equipment.

Borehole	Logger	From	To
HAV02	Minitroll	2004-05	
HAV06	Mitec	2004-05	
HLX01	Minitroll	2005-09	
HLX02	Minitroll	2005-10	
HLX06	Minitroll	2005-09	
HLX07	Minitroll	2005-09	
HLX08	Mitec	2004-06	2008-01
	LevelTroll	2008-01	
HLX09	Mitec	2004-06	
HLX10	Manual levelling	2007-10	2007-12
HLX11	Minitroll	2005-10	
HLX13	Minitroll	2004-04	
HLX14	DataTaker	2007-11	
HLX15	LevelTroll	2006-08	
HLX18	Minitroll	2004-12	
HLX20	DataTaker	2008-01	
HLX21	Minitroll	2004-09	
HLX22	DataTaker	2006-11	
HLX23	Minitroll	2004-12	
HLX24	Minitroll	2004-09	
HLX25	Minitroll	2004-11	
HLX26	Minitroll	2004-11	
HLX27	DataTaker	2007-10	2008-03
HLX28	DataTaker	2007-09	
HLX30	Minitroll	2004-11	
HLX31	Minitroll	2004-12	
HLX32	DataTaker	2007-09	
HLX33	DataTaker	2007-12	
HLX34	Minitroll	2005-09	
HLX35	DataTaker	2008-03	
HLX36	Minitroll	2005-09	
HLX37	DataTaker	2007-09	
HLX38	LevelTroll	2006-11	2008-06
	DataTaker	2008-06	
HLX39	Minitroll	2006-08	2007-08
	DataTaker	2008-01	
HLX40	Minitroll	2006-05	
HLX41	Minitroll	2006-08	
HLX42	Minitroll & LevelTroll	2006-11	
HLX43	DataTaker	2008-02	
HMJ01	LevelTroll	2006-11	
HSH01	Minitroll	2004-04	
HSI04	Mitec	2004-06	
HSI13	Mitec	2005-01	
KAV01	DataTaker	2005-09	
KAV02	Mitec	2004-05	
KAV03	Minitroll	2004-07	
KAV04A	DataTaker	2005-05	
KBH03	Mitec	2004-09	
KLX01	DataTaker	2004-11	
KLX02	DataTaker	2004-04	
KLX03	DataTaker	2006-01	
KLX04	DataTaker	2005-01	
KLX05	DataTaker	2005-11	

Borehole	Logger	From	To
KLX06	DataTaker	2005-07	
KLX07A	DataTaker	2006-03	
KLX07B	DataTaker	2006-03	
KLX08	DataTaker	2007-06	
KLX09	DataTaker	2006-12	
KLX09F	Minitroll	2006-05	
KLX09G	Minitroll	2007-07	
KLX10	DataTaker	2006-08	
KLX10C	DataTaker	2007-12	
KLX11A	DataTaker	2007-10	
KLX11E	Minitroll	2006-10	
KLX12A	DataTaker	2006-11	
KLX13A	DataTaker	2008-02	
KLX14A	DataTaker	2007-09	
KLX15A	DataTaker	2007-08	
KLX16A	DataTaker	2007-10	
KLX17A	DataTaker	2008-01	
KLX18A	DataTaker	2007-02	
KLX19A	DataTaker	2007-04	
KLX20A	DataTaker	2007-08	
KLX21B	DataTaker	2008-04	
KLX23A	DataTaker	2007-10	
KLX24A	DataTaker	2007-10	
KLX26A	DataTaker	2008-02	
KLX27A	Manual levelling	2007-10	2007-11
	DataTaker	2008-06	
KLX28A	LevelTroll	2007-06	
KLX29A	LevelTroll	2007-06	
KSH01A	DataTaker	2004-10	
KSH02	DataTaker	2005-01	
KSH03A	DataTaker	2004-05	
PSM000272	Minitroll	2007-02	
PSM000273	Minitroll	2007-06	
SSM000001	Mitec	2004-06	2008-02
	LevelTroll	2008-02	
SSM000008	Mitec	2004-09	2008-02
	Minitroll	2008-02	
SSM000011	Minitroll	2004-04	
SSM000012	Mitec	2004-08	2007-10
	LevelTroll	2007-10	
SSM000014	Mitec	2004-09	
SSM000017	LevelTroll	2006-09	
SSM000018	Mitec	2004-08	2008-02
	Minitroll	2008-02	
SSM000019	LevelTroll	2006-09	
SSM000021	Minitroll	2004-08	
SSM000022	Mitec	2004-09	2007-10
	LevelTroll	2007-10	
SSM000027	Minitroll	2005-07	
SSM000028	Minitroll	2005-06	
SSM000029	Minitroll	2005-06	
SSM000030	Minitroll	2005-04	
SSM000031	Mitec	2005-04	
SSM000032	Minitroll	2005-04	
SSM000033	Minitroll	2005-04	

Borehole	Logger	From	To
SSM000034	Minitroll	2005-04	
SSM000035	Minitroll	2005-06	
SSM000037	Mitec	2005-04	
SSM000039	Mitec	2005-07	
SSM000040	Minitroll	2005-07	
SSM000041	Minitroll	2005-07	
SSM000042	Minitroll	2005-06	
SSM000210	LevelTroll	2006-09	
SSM000213	Minitroll	2004-09	
SSM000215	LevelTroll	2006-09	
SSM000217	LevelTroll	2007-04	
SSM000218	Minitroll	2005-06	
SSM000219	Minitroll	2005-06	
SSM000220	Minitroll	2005-06	
SSM000221	Minitroll	2005-06	
SSM000222	LevelTroll	2005-11	
SSM000223	LevelTroll	2005-11	
SSM000224	LevelTroll	2005-11	
SSM000225	LevelTroll	2005-11	
SSM000226	LevelTroll	2005-11	
SSM000227	LevelTroll	2005-11	
SSM000228	LevelTroll	2005-11	
SSM000229	LevelTroll	2005-11	
SSM000230	LevelTroll	2005-11	
SSM000237	Minitroll	2005-11	
SSM000238	LevelTroll	2007-01	
SSM000239	LevelTroll	2006-07	
SSM000240	LevelTroll	2006-07	
SSM000241	LevelTroll	2006-07	
SSM000242	LevelTroll	2006-07	
SSM000243	LevelTroll	2006-09	
SSM000244	LevelTroll	2006-09	
SSM000245	LevelTroll	2006-09	
SSM000246	LevelTroll	2006-09	
SSM000249	Minitroll	2006-02	
SSM000250	Minitroll	2006-02	
SSM000252	LevelTroll	2006-08	
SSM000253	LevelTroll	2006-08	
SSM000255	Minitroll	2006-06	
SSM000256	LevelTroll	2006-08	
SSM000257	LevelTroll	2006-08	
SSM000260	LevelTroll	2006-12	
SSM000261	LevelTroll	2006-12	
SSM000262	LevelTroll	2007-01	
SSM000263	LevelTroll	2007-01	
SSM000264	LevelTroll	2007-01	
SSM000265	Minitroll	2006-12	
SSM000266	Minitroll	2006-12	
SSM000267	LevelTroll	2007-01	
SSM000268	LevelTroll	2006-11	
SSM000269	LevelTroll	2006-11	
SSM000270	LevelTroll	2007-01	
SSM000271	LevelTroll	2006-11	

Note - Data not relevant for the reported period September 2007 – September 2008 are to be found in earlier reports /1/, /2/, /3/ or /4/.

4 Execution

4.1 General

Data are collected to the measurement system, HMS, as described in Chapter 3.

4.2 Field work

Manual levelling is generally performed once a month. At the same time, the equipment is checked and maintenance is performed.

All data from stand-alone type loggers are manually transferred to a portable PC or PDA and then transmitted to the measurement station.

4.3 Data handling

4.3.1 Calibration method

Manual levelling of all sections is normally made once every month, in order to calibrate the registrations from the data loggers.

The logger data is transformed to water levels by means of a linear calibration equation and also by subtracting the air pressure since all transducers give the absolute pressure. Converted logger data are then compared with results from manual levelling. If the two differs, calibration constants are adjusted until an acceptable agreement is obtained.

4.3.2 Recording interval

Measurements of the groundwater level are normally made with one-minute intervals for percussion and core boreholes and with five-minute intervals for soil wells.

Measured values are not stored unless they differ from the previously stored value by more than 0.1 m for percussion and core boreholes, and 0.05 m for soil wells. In addition to this, a value is always stored every two hours.

However, in many boreholes the recording intervals are shortened since they are located in areas of high interest.

4.4 Quality assurance

Preliminary inspection of all collected data is performed once every week. The purpose of this is to certify that all loggers are sending data and that all transducers are functioning.

All data collected are subject to a quality check once every quarter. During this Q/A, obviously erroneous data are removed and calibration constants are corrected so that the monitored data agree with the manual levelling data (see section 4.3.1). At this occasion, the status of the equipment is also checked and service might be initiated by notifying the client via e-mail.

4.5 Nonconformities

There are no nonconformities with respect to the activity plan or the method description.

5 Results

5.1 General

Original data from the reported activity are stored in the primary database Sicada. Data are traceable in Sicada by the Activity Plan number (AP PS 400-06-159 and AP PS 400-07-069). Only data in databases are accepted for further interpretation and modelling. The data presented in this report are regarded as copies of the original data. Data in the databases may be revised, if needed. However, such revision of the database will not necessarily result in a revision of this report, although the normal procedure is that major data revisions entail a revision of P-reports. Minor data revisions are normally presented as supplements, available at www.skb.se.

5.2 Groundwater levels

Diagrams of groundwater levels are presented in Appendix 1. All levels in the diagrams are given as meters above sea level in the national elevation system (RT90-RHB70).

In the diagrams, daily values are presented for each section. The data point shown is the first stored data point after midnight. When registrations are missing, manually levelled data, if available, are inserted.

A list of monitored borehole sections is presented in Table 5-1, where the lengths along the boreholes to top and bottom of each section are given. When packers have been installed in percussion or cored boreholes, the dates for installation/removal of the packers are given. In open boreholes (except soil wells), the dates for installation/removal of pressure transducer/logger are given together with a comment. No information about periods between packer removal and re-installation or between measurement periods is given. For the soil wells, the dates refer to when drilling was completed.

Table 5-1. Monitored sections.

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
HAV02	1	2004-05-17		16.0	163.0	
	2	2004-05-17		0.0	15.0	Not monitored
HAV06	1	2004-05-04		17.0	100.0	
	2	2004-05-04		0.0	16.0	
HLX01	1	2005-09-23		16.0	100.0	
	2	2005-09-23		0.0	15.0	Not monitored
HLX02	1	2005-09-23		0.0	132.0	Measurement start date
HLX06	1	2005-09-23		0.0	100.0	Measurement start date
HLX07	1	2005-09-23		16.0	100.0	
	2	2005-09-23		0.0	15.0	Not monitored
HLX08	1	2004-06-21		0.0	40.0	Measurement start date
HLX09	1	2004-05-05		17.0	151.0	
	2	2004-05-05		0.0	16.0	
HLX10	1	2004-03		0.0	85.0	Measurement start date
HLX11	1	2004-05-05		14.0	70.0	
	2	2004-05-05		0.0	13.0	
HLX13	1	2004-04-27		0.0	202.2	Measurement start date

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
HLX14	1	2007-08-08		96.0	115.9	
	2	2007-08-08		0.0	95.0	
HLX15	1	2006-02-15		5.0	151.9	
	2	2006-02-15		0.0	4.0	Not monitored
HLX18	1	2004-12-20		91.0	181.2	
	2	2004-12-20		0.0	90.0	
HLX20	1	2007-05-30		81.0	202.2	
	2	2007-05-30		70.0	80.0	
	3	2007-05-30		0.0	69.0	
HLX21	1	2006-07-13		73.0	150.3	
	2	2006-07-13		0.0	72.0	
HLX22	1	2006-12-15		0.0	163.2	Measurement start date
HLX23	1	2005-07-05		61.0	160.2	
	2	2005-07-05		0.0	60.0	
HLX24	1	2004-12-10		41.0	175.2	
	2	2004-12-10		0.0	40.0	
HLX25	1	2004-11-17		61.0	202.5	
	2	2004-11-17		0.0	60.0	
HLX26	1	2004-11-04		11.0	151.2	
	2	2004-11-04		0.0	10.0	Not monitored
HLX27	1	2007-09-18	2008-03-12	149.5	164.7	
	2	2007-09-18	2008-03-12	96.5	148.5	
	3	2007-09-18	2008-03-12	0.0	95.5	
HLX28	1	2007-09-12	2008-06-09	91.0	154.2	
	2	2007-09-12	2008-06-09	70.0	90.0	
	3	2007-09-12	2008-06-09	7.5	69.0	
	4	2007-09-12	2008-06-09	0.0	6.5	
	1	2008-06-09		0.0	154.2	
HLX30	1	2005-09-14		101.0	164.4	
	2	2005-09-14		0.0	100.0	
HLX31	1	2005-10-17		0.0	133.5	
HLX32	1	2007-06-28		31.0	162.6	
	2	2007-06-28		20.0	30.0	
	3	2007-06-28		0.0	19.0	
HLX33	1	2007-06-05		50.0	202.1	
	2	2007-06-05		0.0	49.0	
HLX34	1	2005-09-27		0.0	151.8	Measurement start date
HLX35	1	2007-08-23		136.0	151.8	
	2	2007-08-23		120.0	135.0	
	3	2007-08-23		0.0	119.0	
HLX36	1	2006-11-13		50.0	199.8	
	2	2006-11-13		0.0	49.0	
HLX37	1	2007-05-08	2008-03-31	150.0	199.8	
	2	2007-05-08	2008-03-31	111.0	149.0	
	3	2007-05-08	2008-03-31	94.0	110.0	
	4	2007-05-08	2008-03-31	0.0	93.0	
	1	2008-04-15		150.0	199.8	
	2	2008-04-15		111.0	149.0	
	3	2008-04-15		94.0	110.0	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
	4	2008-04-15		13.25	93.0	
HLX38	1	2006-09-06	2008-06-02	0.0	199.5	Measurement start/stop date
	1	2008-06-12		81.0	199.5	
	2	2008-06-12		41.0	80.0	
	3	2008-06-12		28.0	40.0	
	4	2008-06-12		0.0	27.0	
HLX39	1	2007-09-12		187.0	199.3	
	2	2007-09-12		51.0	186.0	
	3	2007-09-12		0.0	50.0	
HLX40	1	2006-08-03		40.0	199.5	
	2	2006-08-03		0.0	39.0	Not monitored
HLX41	1	2006-08-03		0.0	199.5	Measurement start date
HLX42	1	2007-05-28		30.0	152.6	
	2	2007-05-28		0.0	29.0	
HLX43	1	2007-06-14		135.0	147.0	
	2	2007-06-14		75.0	134.0	
	3	2007-06-14		30.0	74.0	
	4	2007-06-14		0.0	29.0	
HMJ01	1	2006-09-07		32.9	46.0	
	2	2006-09-07		0.0	31.9	
HSH01	1	2004-04-01		25.0	200.0	
	2	2004-04-01		0.0	24.0	
HSI04	1	2004-06-23		0.0	37.0	Measurement start date
HSI13	1	2004-06-23		0.0	4.0	Measurement start date
KAV01	1	2005-09-06		582.93	757.93	
	2	2005-09-06		434.93	581.93	
	3	2005-09-06		390.93	433.93	
	4	2005-09-06		108.93	306.93	
	5	2005-09-06		0.0	107.93	
KAV02	1	2005-01-14		0.0	97.1	
KAV03	1	2004-05-11		16.0	248.4	
	2	2004-05-11		0.0	15.0	Not monitored
KAV04A	1	2005-04-27		675.0	993.49	
	2	2005-04-27		440.0	674.0	
	3	2005-04-27		214.0	439.0	
	4	2005-04-27		0.0	213.0	
KBH03	1	2004-06-23		0.0	100.43	Measurement start date
KLX01	1	2004-10-26		705.0	1,077.99	
	2	2004-10-26		191.0	704.0	
	3	2004-10-26		171.0	190.0	
	4	2004-10-26		0.0	170.0	
KLX02	1	2004-11-15		1,165.0	1,700.0	
	2	2004-11-15		1,145.0	1,164.0	
	3	2004-11-15		718.0	1,144.0	
	4	2004-11-15		495.0	717.0	
	5	2004-11-15		452.0	494.0	
	6	2004-11-15		348.0	451.0	
	7	2004-11-15		208.0	347.0	
	8	2004-11-15		0.0	207.0	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
KLX03	1	2006-01-16		965.5	971.5	
	2	2006-01-16		830.5	964.5	
	3	2006-01-16		752.5	829.5	
	4	2006-01-16		729.5	751.5	
	5	2006-01-16		652.5	728.5	
	6	2006-01-16		465.5	651.5	
	7	2006-01-16		349.5	464.5	
	8	2006-01-16		199.5	348.5	
	9	2006-01-16		193.5	198.5	
	10	2006-01-16		0.0	192.5	
KLX04	1	2005-01-29		898.0	1,000.0	
	2	2005-01-29		870.0	897.0	
	3	2005-01-29		686.0	869.0	
	4	2005-01-29		531.0	685.0	
	5	2005-01-29		507.0	530.0	
	6	2005-01-29		231.0	506.0	
	7	2005-01-29		163.0	230.0	
	8	2005-01-29		0.0	162.0	
KLX05	1	2005-11-03		721.0	1,000.0	
	2	2005-11-03		634.0	720.0	
	3	2005-11-03		625.0	633.0	
	4	2005-11-03		501.0	624.0	
	5	2005-11-03		361.0	500.0	
	6	2005-11-03		256.0	360.0	
	7	2005-11-03		241.0	255.0	
	8	2005-11-03		220.0	240.0	
	9	2005-11-03		128.0	219.0	
	10	2005-11-03		0.0	127.0	
KLX06	1	2005-07-05		761.0	994.94	
	2	2005-07-05		571.0	760.0	
	3	2005-07-05		554.0	570.0	
	4	2005-07-05		411.0	553.0	
	5	2005-07-05		276.0	410.0	
	6	2005-07-05		256.0	275.0	
	7	2005-07-05		146.0	255.0	
	8	2005-07-05		0.0	145.0	
KLX07A	1	2006-02-21		781.0	844.73	
	2	2006-02-21		753.0	780.0	
	3	2006-02-21		612.0	752.0	
	4	2006-02-21		457.0	611.0	
	5	2006-02-21		333.0	456.0	
	6	2006-02-21		204.0	332.0	
	7	2006-02-21		104.0	203.0	
	8	2006-02-21		0.0	103.0	
KLX07B	1	2006-03-01		95.0	200.0	
	2	2006-03-01		0.0	94.0	
KLX08	1	2007-05-01		840.0	1,000.41	
	2	2007-05-01		684.0	839.0	
	3	2007-05-01		626.0	683.0	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
	4	2007-05-01		594.0	625.0	
	5	2007-05-01		497.0	593.0	
	6	2007-05-01		355.0	496.0	
	7	2007-05-01		243.0	354.0	
	8	2007-05-01		160.0	242.0	
	9	2007-05-01		102.0	159.0	
	10	2007-05-01		0.0	101.0	
KLX09	1	2006-11-20		564.0	880.38	
	2	2006-11-20		470.0	563.0	
	3	2006-11-20		199.0	469.0	
	4	2006-11-20		104.0	198.0	
	5	2006-11-20		0.0	103.0	
KLX09F	1	2006-05-18		0.0	152.3	Measurement start date
KLX09G	1	2007-07-03		0.0	100.1	Measurement start date
KLX10	1	2006-07-05		711.0	1,001.0	
	2	2006-07-05		689.0	710.0	
	3	2006-07-05		465.0	688.0	
	4	2006-07-05		369.0	464.0	
	5	2006-07-05		351.0	368.0	
	6	2006-07-05		291.0	350.0	
	7	2006-07-05		131.0	290.0	
	8	2006-07-05		0.0	130.0	
KLX10C	1	2007-10-29		66.0	146.25	
	2	2007-10-29		32.0	65.0	
	3	2007-10-29		0.0	31.0	
KLX11A	1	2007-10-07		703.0	992.29	
	2	2007-10-07		587.0	702.0	
	3	2007-10-07		573.0	586.0	
	4	2007-10-07		495.0	572.0	
	5	2007-10-07		315.0	494.0	
	6	2007-10-07		273.0	314.0	
	7	2007-10-07		256.0	272.0	
	8	2007-10-07		180.0	255.0	
	9	2007-10-07		103.0	179.0	
	10	2007-10-07		0.0	102.0	
KLX11E	1	2006-04-25		0.0	121.3	Measurement start date
KLX12A	1	2006-11-06		546.0	602.3	
	2	2006-11-06		535.0	545.0	
	3	2006-11-06		426.0	534.0	
	4	2006-11-06		386.0	425.0	
	5	2006-11-06		291.0	385.0	
	6	2006-11-06		160.0	290.0	
	7	2006-11-06		142.0	159.0	
	8	2006-11-06		104.0	141.0	
	9	2006-11-06		0.0	103.0	
KLX13A	1	2008-01-29		508.0	595.85	
	2	2008-01-29		490.0	507.0	
	3	2008-01-29		341.0	489.0	
	4	2008-01-29		244.0	340.0	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
	5	2008-01-29		131.0	243.0	
	6	2008-01-29		0.0	130.0	
KLX14A	1	2007-08-08		123.0	176.27	
	2	2007-08-08		77.0	122.0	
	3	2007-08-08		0.0	76.0	
KLX15A	1	2007-08-28		902.0	1,000.43	
	2	2007-08-28		641.0	901.0	
	3	2007-08-28		623.0	640.0	
	4	2007-08-28		481.0	622.0	
	5	2007-08-28		273.0	480.0	
	6	2007-08-28		260.0	272.0	
	7	2007-08-28		191.0	259.0	
	8	2007-08-28		79.0	190.0	
	9	2007-08-28		0.0	78.0	
KLX16A	1	2007-10-17		327.0	433.55	
	2	2007-10-17		86.0	326.0	
	3	2007-10-17		0.0	85.0	
KLX17A	1	2007-12-11		435.0	701.08	
	2	2007-12-11		419.0	434.0	
	3	2007-12-11		343.0	418.0	
	4	2007-12-11		314.0	342.0	
	5	2007-12-11		220.0	313.0	
	6	2007-12-11		180.0	219.0	
	7	2007-12-11		70.0	179.0	
	8	2007-12-11		0.0	69.0	
KLX18A	1	2007-02-05		571.0	611.28	
	2	2007-02-05		490.0	570.0	
	3	2007-02-05		472.0	489.0	
	4	2007-02-05		315.0	471.0	
	5	2007-02-05		155.0	314.0	
	6	2007-02-05		104.0	154.0	
	7	2007-02-05		0.0	103.0	
KLX19A	1	2007-03-06		661.0	800.07	
	2	2007-03-06		518.0	660.0	
	3	2007-03-06		509.0	517.0	
	4	2007-03-06		481.5	508.0	
	5	2007-03-06		311.0	480.5	
	6	2007-03-06		291.0	310.0	
	7	2007-03-06		136.0	290.0	
	8	2007-03-06		0.0	135.0	
KLX20A	1	2007-06-26		294.0	457.92	
	2	2007-06-26		260.0	293.0	
	3	2007-06-26		181.0	259.0	
	4	2007-06-26		145.0	180.0	
	5	2007-06-26		103.0	144.0	
	6	2007-06-26		0.0	102.0	
KLX21B	1	2008-02-29		720.0	858.78	
	2	2008-02-29		573.0	719.0	
	3	2008-02-29		558.0	572.0	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
	4	2008-02-29		441.0	557.0	
	5	2008-02-29		281.0	440.0	
	6	2008-02-29		171.0	280.0	
	7	2008-02-29		102.5	170.0	
	8	2008-02-29		0.0	101.5	
KLX23A	1	2007-08-15		49.0	100.15	
	2	2007-08-15		0.0	48.0	
KLX24A	1	2007-08-15		69.0	100.17	
	2	2007-08-15		41.0	68.0	
	3	2007-08-15		0.0	40.0	
KLX26A	1	2007-10-01		48.0	101.14	
	2	2007-10-01		22.0	47.0	
	3	2007-10-01		0.0	21.0	
KLX27A	1	2007-10-07	2007-11-27	0.0	650.56	Manual levelling during drilling
	1	2008-06-25		640.0	650.56	
	2	2008-06-25		580.0	639.0	
	3	2008-06-25		490.0	579.0	
	4	2008-06-25		380.0	489.0	
	5	2008-06-25		260.0	379.0	
	6	2008-06-25		220.0	259.0	
	7	2008-06-25		115.0	219.0	
	8	2008-06-25		80.0	114.0	
	9	2008-06-25		0.0	79.0	
KLX28A	1	2007-06-26		0.0	80.23	Measurement start date
KLX29A	1	2007-06-26		0.0	60.25	Measurement start date
KSH01A	1	2004-10-07		800.0	1,003.0	
	2	2004-10-07		671.0	799.0	
	3	2004-10-07		573.0	670.0	
	4	2004-10-07		532.0	572.0	
	5	2004-10-07		331.0	531.0	
	6	2004-10-07		278.0	330.0	
	7	2004-10-07		238.0	277.0	
	8	2004-10-07		181.0	237.0	
	9	2004-10-07		0.0	180.0	
KSH02	1	2004-12-16		955.0	963.0	
	2	2004-12-16		649.0	954.0	
	3	2004-12-16		440.0	648.0	
	4	2004-12-16		411.0	439.0	
	5	2004-12-16		111.0	410.0	
	6	2004-12-16		91.0	110.0	
	7	2004-12-16		0.0	90.0	
KSH03A	1	2004-06-03		281.15	1,000.7	
	2	2004-06-03		180.65	280.15	
	3	2004-06-03		0.0	179.65	
SSM000001	1	2002-10-08		0.0	3.1*	
	screen			2.0	3.0	
SSM000008	1	2003-12-08		0.0	5.1*	
	screen			3.0	5.0	
SSM000011	1	2004-01-29		0.0	3.1*	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
	screen			1.0	3.0	
SSM000012	1	2004-01-22		0.0	6.1*	
	screen			5.0	6.0	
SSM000014	1	2003-12-09		0.0	3.1*	
	screen			2.0	3.0	
SSM000017	1	2004-05-04		0.0	2.1*	
	screen			1.0	2.0	
SSM000018	1	2003-12-11		0.0	3.1*	
	screen			2.0	3.0	
SSM000019	1	2004-05-04		0.0	3.1*	
	screen			2.0	3.0	
SSM000021	1	2004-05-04		0.0	4.1*	
	screen			3.0	4.0	
SSM000022	1	2004-01-12		0.0	7.1*	
	screen			5.0	7.0	
SSM000027	1	2004-06-28		0.0	5.1*	
	screen			3.0	5.0	
SSM000028	1	2004-06-09		0.0	3.1*	
	screen			2.0	3.0	
SSM000029	1	2004-06-08		0.0	7.1*	
	screen			5.0	7.0	
SSM000030	1	2004-09-10		0.0	5.1*	
	screen			4.0	5.0	
SSM000031	1	2004-06-10		0.0	4.1*	
	screen			3.0	4.0	
SSM000032	1	2004-06-15		0.0	4.1*	
	screen			3.0	4.0	
SSM000033	1	2004-06-15		0.0	2.1*	
	screen			1.0	2.0	
SSM000034	1	2004-06-16		0.0	4.1*	
	screen			3.0	4.0	
SSM000035	1	2004-06-09		0.0	4.1*	
	screen			3.0	4.0	
SSM000037	1	2004-06-22		0.0	4.1*	
	screen			3.0	4.0	
SSM000039	1	2004-06-21		0.0	5.1*	
	screen			3.0	5.0	
SSM000040	1	2004-06-14		0.0	3.1*	
	screen			2.0	3.0	
SSM000041	1	2004-07-07		0.0	4.1*	
	screen			2.0	4.0	
SSM000042	1	2004-06-17		0.0	5.1*	
	screen			3.0	5.0	
SSM000210	1	2004-06-28		0.0	4.1*	
	screen			2.0	4.0	
SSM000213	1	2004-07-06		0.0	2.1*	
	screen			1.0	2.0	
SSM000215	1	2004-12-03		0.0	4.1*	
	screen			2.0	4.0	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
SSM000217	1	2004-12-02		0.0	4.1*	
	screen			2.0	4.0	
SSM000218	1	2005-06-02		0.0	3.1*	
	screen			2.0	3.0	
SSM000219	1	2005-06-01		0.0	5.1*	
	screen			4.0	5.0	
SSM000220	1	2005-05-31		0.0	3.1*	
	screen			2.0	3.0	
SSM000221	1	2005-05-30		0.0	3.1*	
	screen			2.0	3.0	
SSM000222	1	2005-08-22		0.0	5.1*	
	screen			4.0	5.0	
SSM000223	1	2005-08-24		0.0	8.1*	
	screen			6.0	8.0	
SSM000224	1	2005-08-29		0.0	17.1*	
	screen			16.0	17.0	
SSM000225	1	2005-09-14		0.0	10.1*	
	screen			9.0	10.0	
SSM000226	1	2005-09-14		0.0	5.1*	
	screen			4.0	5.0	
SSM000227	1	2005-09-14		0.0	2.1*	
	screen			1.0	2.0	
SSM000228	1	2005-09-19		0.0	7.1*	
	screen			6.0	7.0	
SSM000229	1	2005-09-20		0.0	4.1*	
	screen			3.0	4.0	
SSM000230	1	2005-09-21		0.0	5.1*	
	screen			4.0	5.0	
SSM000237	1	2005-10-31		0.0	3.1*	
	screen			2.0	3.0	
SSM000238	1	2006-02-21		0.0	12.1*	
	screen			11.0	12.0	
SSM000239	1	2006-02-22		0.0	5.1*	
	screen			4.0	5.0	
SSM000240	1	2006-02-23		0.0	6.1*	
	screen			5.0	6.0	
SSM000241	1	2006-02-15		0.0	33.1*	
	screen			32.0	33.0	
SSM000242	1	2006-02-07		0.0	18.1*	
	screen			17.0	18.0	
SSM000243	1	2006-02-13		0.0	12.1*	
	screen			11.0	12.0	
SSM000244	1	2006-02-28		0.0	12.1*	
	screen			11.0	12.0	
SSM000245	1	2006-02-02		0.0	5.1*	
	screen			4.0	5.0	
SSM000246	1	2006-02-02		0.0	4.1*	
	screen			3.0	4.0	
SSM000249	1	2006-01-26		0.0	3.1*	

Borehole	Section No	Section installed From	To	Borehole length ** From (m)	To (m)	Comment
	screen			2.0	3.0	
SSM000250	1	2006-01-27		0.0	4.1*	
	screen			2.0	4.0	
SSM000252	1	2006-07-13		0.0	7.7*	
	screen			5.0	7.0	
SSM000253	1	2006-07-12		0.0	4.1*	
	screen			3.0	4.0	
SSM000255	1	2006-05-16		0.0	6.1*	
	screen			4.0	6.0	
SSM000256	1	2006-07-11		0.0	5.1*	
	screen			3.0	5.0	
SSM000257	1	2006-07-10		0.0	4.1*	
	screen			3.0	4.0	
SSM000260	1	2006-10-25		0.0	9.65*	
	screen			7.45	9.45	
SSM000261	1	2006-10-24		0.0	10.5*	
	screen			9.2	10.2	
SSM000262	1	2006-10-30		0.0	15.0*	
	screen			11.7	14.7	
SSM000263	1	2006-11-02		0.0	8.6*	
	screen			6.3	8.3	
SSM000264	1	2006-11-16		0.0	8.0*	
	screen			3.0	5.0	
SSM000265	1	2006-11-08		0.0	5.88*	
	screen			3.58	5.58	
SSM000266	1	2006-11-08		0.0	4.31*	
	screen			3.01	4.01	
SSM000267	1	2006-11-07		0.0	6.3*	
	screen			4.0	6.0	
SSM000268	1	2006-11-15		0.0	4.33*	
	screen			3.03	4.03	
SSM000269	1	2006-11-15		0.0	?	
	screen			1.0	1.8	
SSM000270	1	2006-11-15		0.0	3.2*	
	screen			2.0	3.0	
SSM000271	1	2006-11-14		0.0	1.5*	
	screen			0.99	1.49	
Water level in the stream Ekerumsån						
PSM000272		2007-02-07				Measurement start date
PSM000273		2007-06-08				Measurement start date

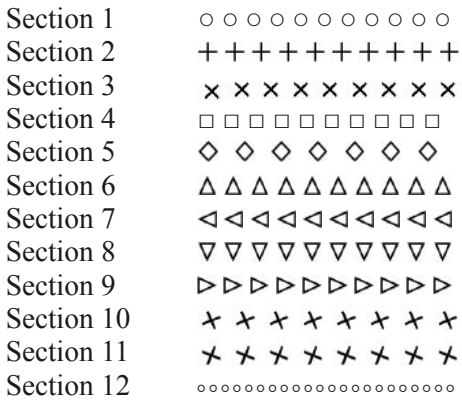
Note – Data not relevant for the reported period September 2007–September 2008 are to be found in earlier reports /1/, /2/, /3/ or /4/.
* For the soil wells (SSM-boreholes), the bottom of the section refers to the bottom of the plastic pipe installed in the borehole. The plastic pipe is screened.
** Borehole length is set to 0.0 at centre of top of casing. If there is only one section in the borehole and the given borehole length is from 0.0 m it implies that no packers are installed and that it is an open borehole.

5.2.1 General comments

Results from the measurements in surface boreholes are presented in diagrams. Level data from all sections in each borehole are presented in diagrams for the period of September 2007 until September 2008.

The symbols used in the diagrams are:

The lowest section =



Sometimes it is difficult to differentiate registrations from individual sections in the diagrams. However, since the main purpose of this report is to present an overall view of the long-term changes, it was not found to be advantageous to show more detailed diagrams from individual sections. More detailed diagrams during test periods are presented in reports from the different tests.

Due to failures in the mechanical or electronic equipment, data is sometimes missing for longer or shorter periods. This is not commented on below. For more comments on the diagrams, see Site investigation Internal Reports.

Remarks are given when the registration for some reason has a deviating appearance. When registrations are missing, manually levelled data, if available, are inserted.

In many boreholes, the groundwater level shows large and rapid variations. This is often due to nearby drilling. Also, many borehole sections are influenced by other activities such as pumping, water sampling, tracer tests etc.

Packers may deflate due to leakage, which can be difficult to discover. If a section in a borehole suddenly shows a pressure that is close to the pressure in a neighbouring section, the reason might be deflated packers.

5.2.2 Comments on some of the diagrams

HLX02: The groundwater level in this borehole responds quickly to rain/snowmelt.

HLX10: The borehole was used as water supply during drilling of borehole KLX27A in October–November 2007.

HLX42: The borehole packer was deflated during a period of a few days in the middle of September 2008.

HLX37: Section 4 was artesian from the middle of November 2007 until the re-instrumentation in April 2008.

KLX01: The higher level that occurred for shorter periods in section 4 is due to precipitation/ snowmelt.

KLX03:1, KLX27A:4 and KSH01A:1: The deviating appearance for these three sections is probably caused by the very low transmissivity in the section (or poor communication between the standpipe and the section). The mini-packer is released when manual levelling is performed and a sudden jump in the level occurs. Thereafter, when the mini-packer is inflated again, the level is slowly approaching the actual level in the borehole section.

SSM000217: Data have been removed from the end of August to the middle of November 2007 and also from the beginning of June to the beginning of August 2008 because the borehole was reported to be dry during those periods.

SSM000218: Data have been removed from the beginning of June to the beginning of July 2008 when the borehole was reported to be dry.

SSM000271: Most of the data from the end of May to the beginning of August 2008 have been removed when the borehole was reported to be dry.

References

/1/ **Nyberg G, Wass E, Askling P, 2005.** Oskarshamn site investigation. Groundwater monitoring program. Report for December 2002 – October 2004. SKB P-05-205, Svensk Kärnbränslehantering AB.

/2/ **Nyberg G, Wass E, 2005.** Oskarshamn site investigation. Groundwater monitoring program. Report for November 2004 – June 2005. SKB P-05-282, Svensk Kärnbränslehantering AB.

/3/ **Nyberg G, Wass E, 2007.** Oskarshamn site investigation. Groundwater monitoring program. Report for July 2005 – December 2006. SKB P-07-219, Svensk Kärnbränslehantering AB.

/4/ **Nyberg G, Wass E, 2007.** Oskarshamn site investigation. Groundwater monitoring program. Report for January – August 2007. SKB P-08-28, Svensk Kärnbränslehantering AB.

Appendix 1

Groundwater level

Percussion boreholes

HAV02
HAV06
HLX01
HLX02
HLX06 - HLX11
HLX13 – HLX15
HLX18
HLX20 – HLX28
HLX30 – HLX43
HMJ01
HSH01
HSI04
HSI13

Core boreholes

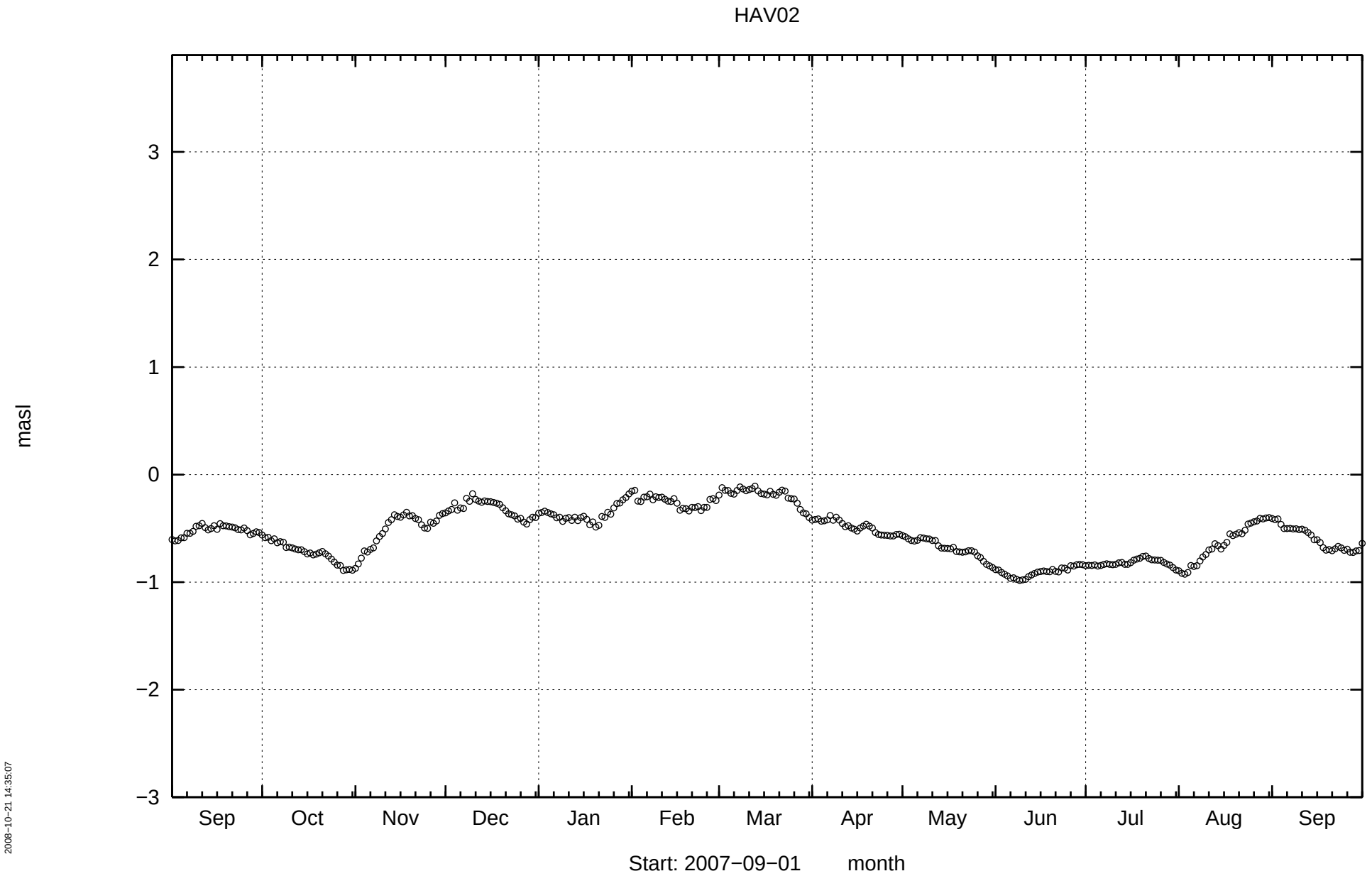
KAV01 – KAV03
KAV04A
KBH03
KLX01 – KLX06
KLX07A, –B
KLX08
KLX09, –F, –G
KLX10, –C
KLX11A, –E
KLX12A
KLX13A
KLX14A
KLX15A
KLX16A
KLX17A
KLX18A
KLX19A
KLX20A
KLX21B
KLX23A
KLX24A
KLX26A
KLX27A
KLX28A
KLX29A
KSH01A
KSH02
KSH03A

Water level in streams

PSM000272
PSM000273

Soil wells

SSM000001
SSM000008
SSM000011
SSM000012
SSM000014
SSM000017 – SSM000019
SSM000021
SSM000022
SSM000027 – SSM000035
SSM000037
SSM000039 – SSM000042
SSM000210
SSM000213
SSM000215
SSM000217 – SSM000230
SSM000237 – SSM000246
SSM000249
SSM000250
SSM000252
SSM000253
SSM000255 – SSM000257
SSM000260 – SSM000271


HAV02
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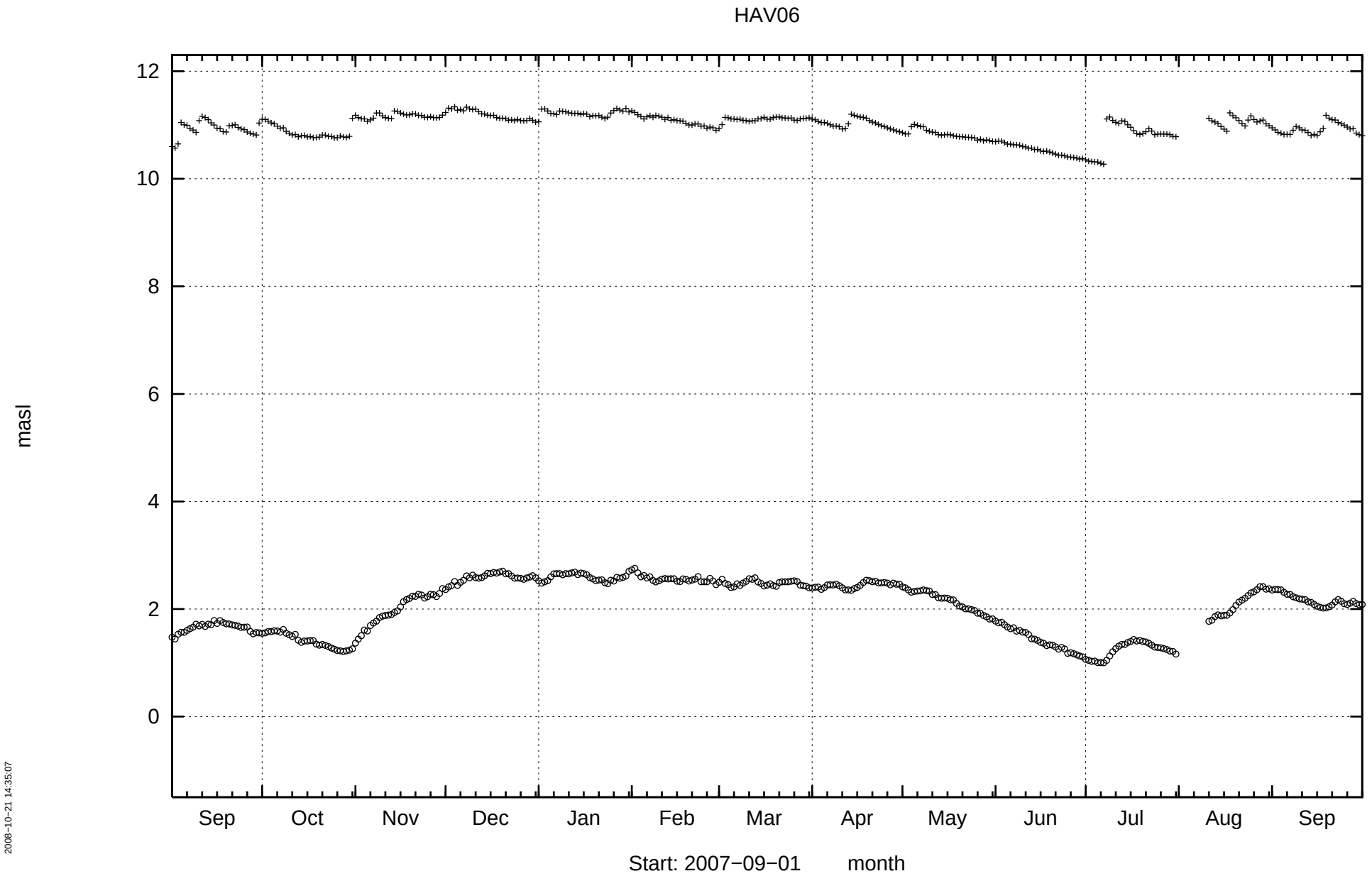
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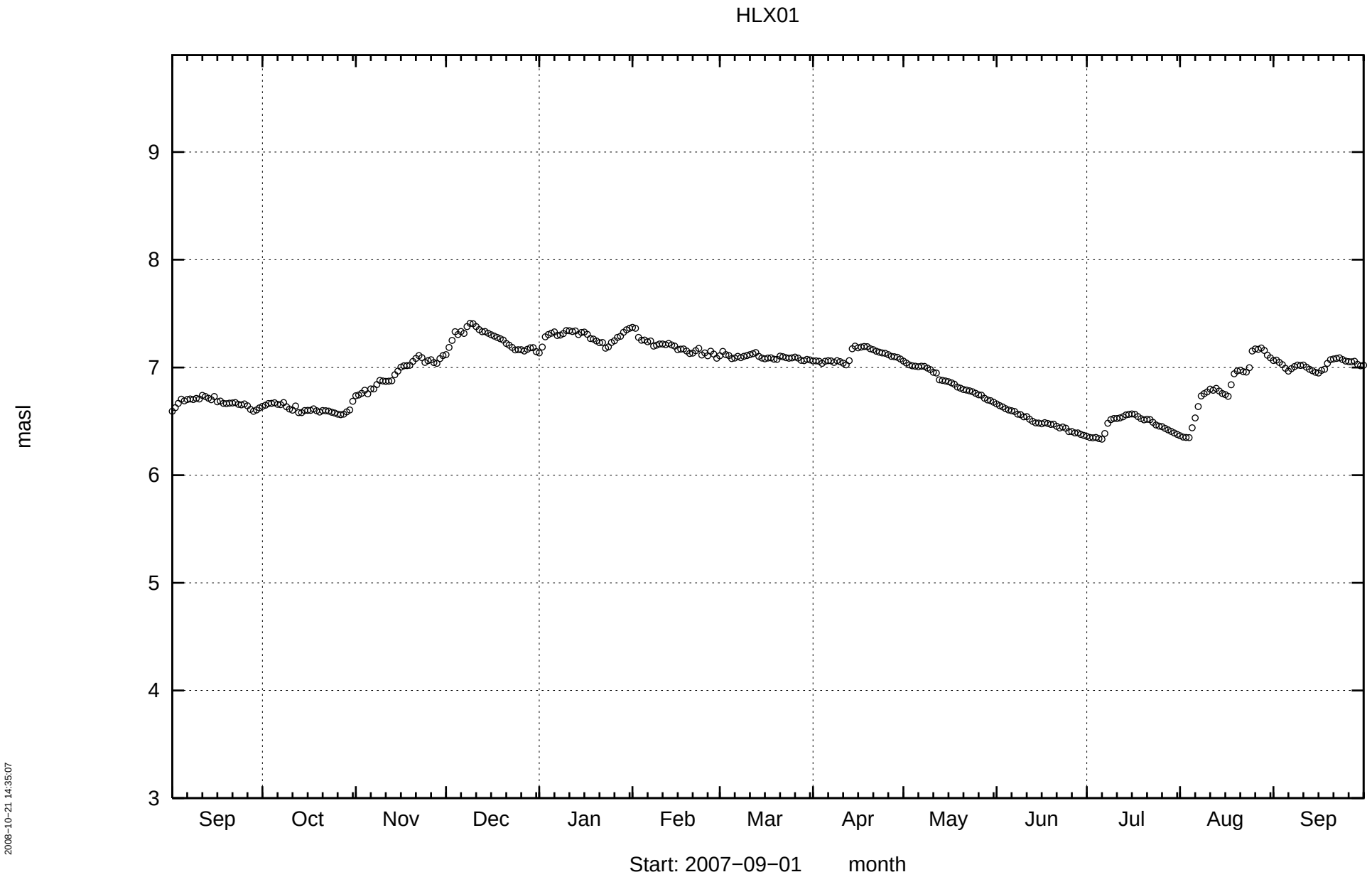
HLX01
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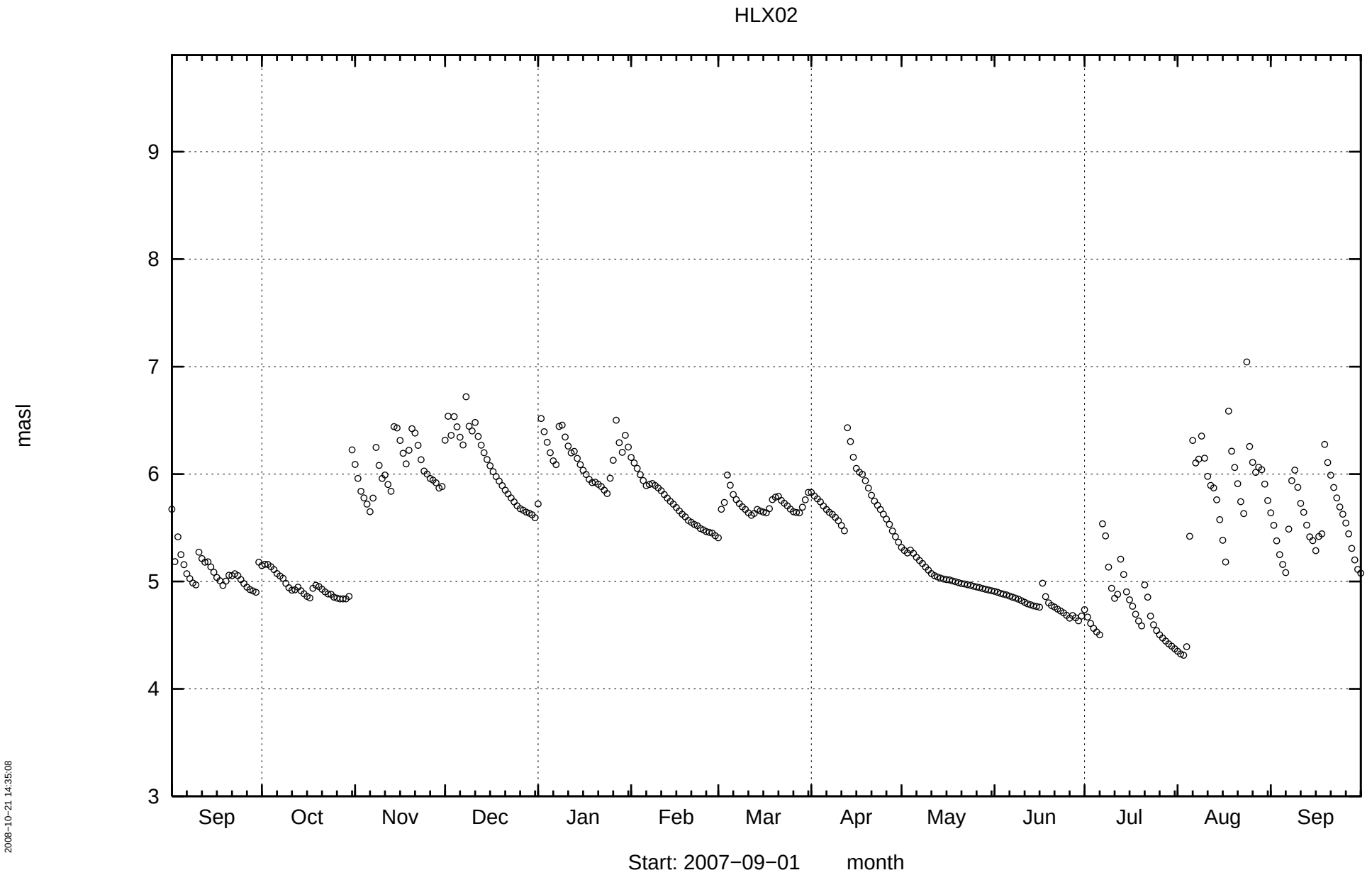
HLX02
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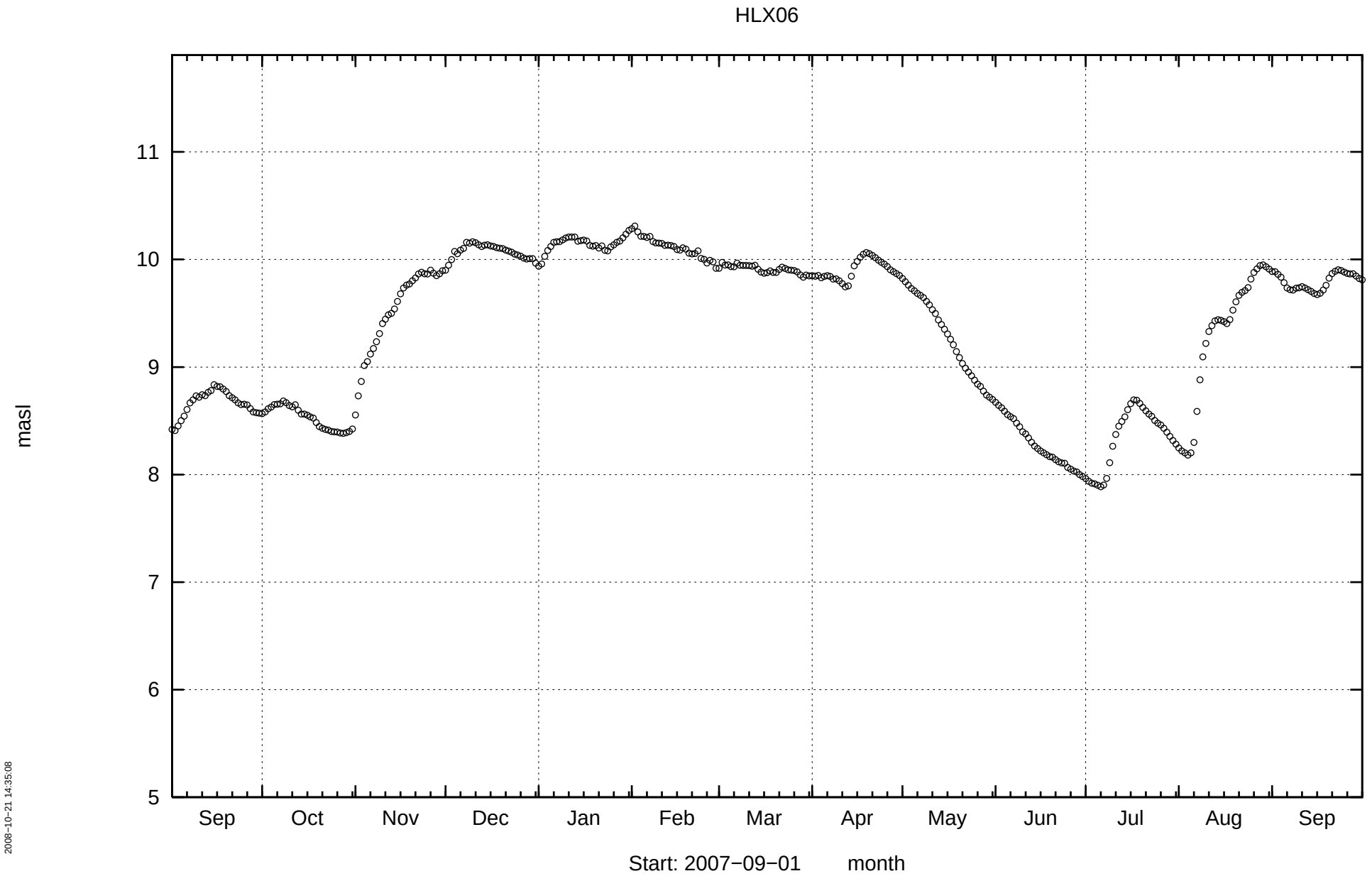
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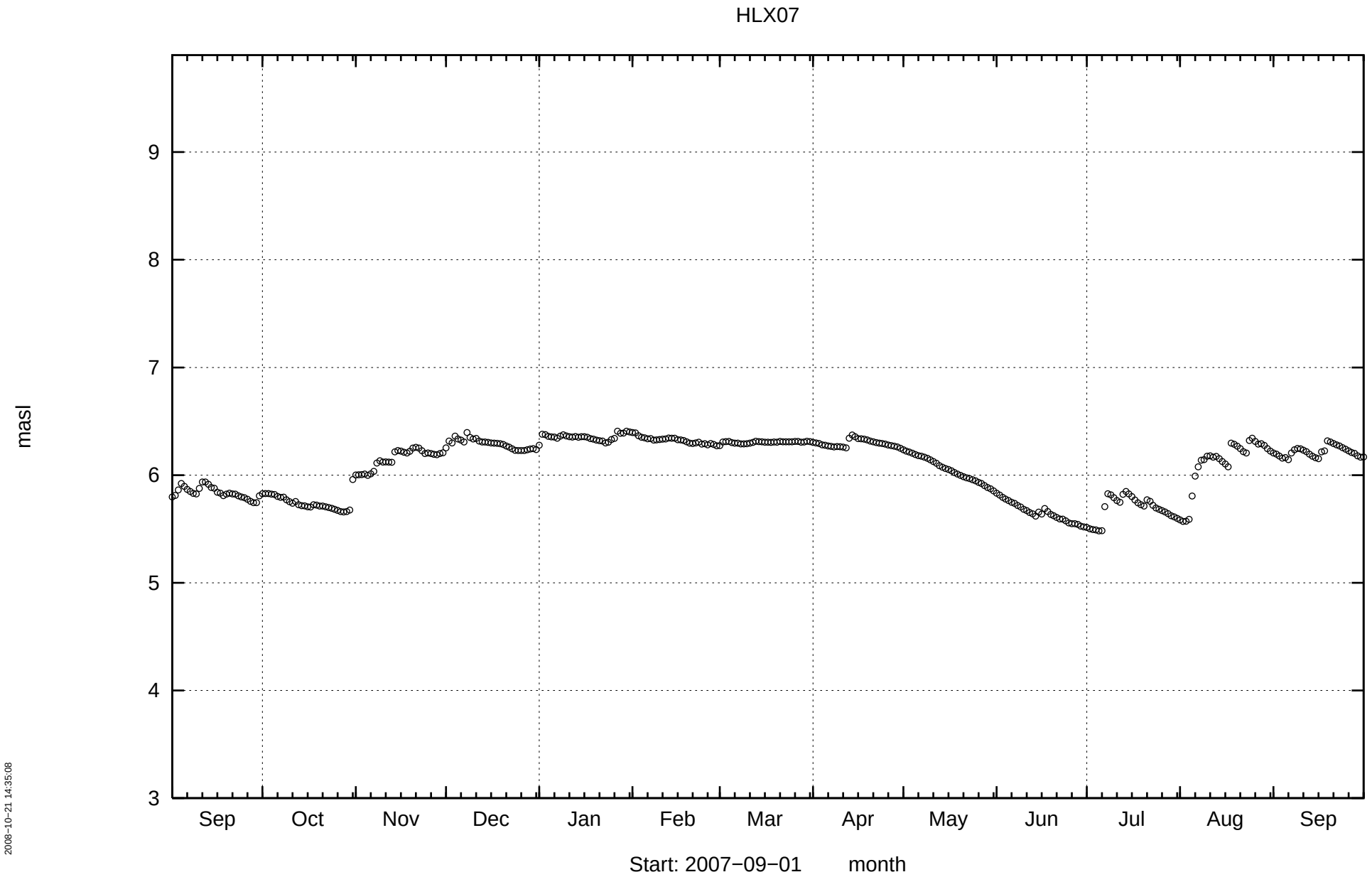
HLX07
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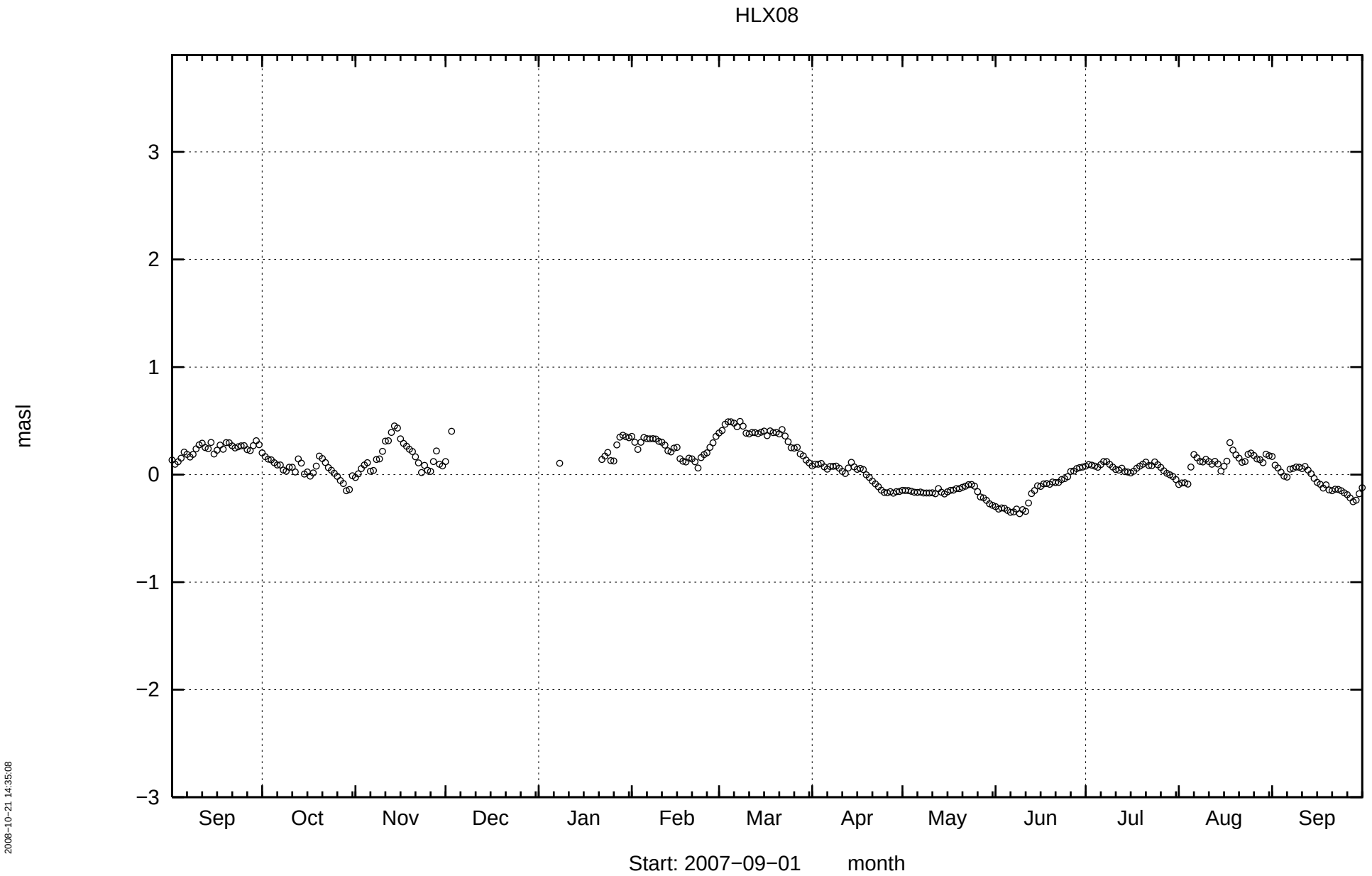
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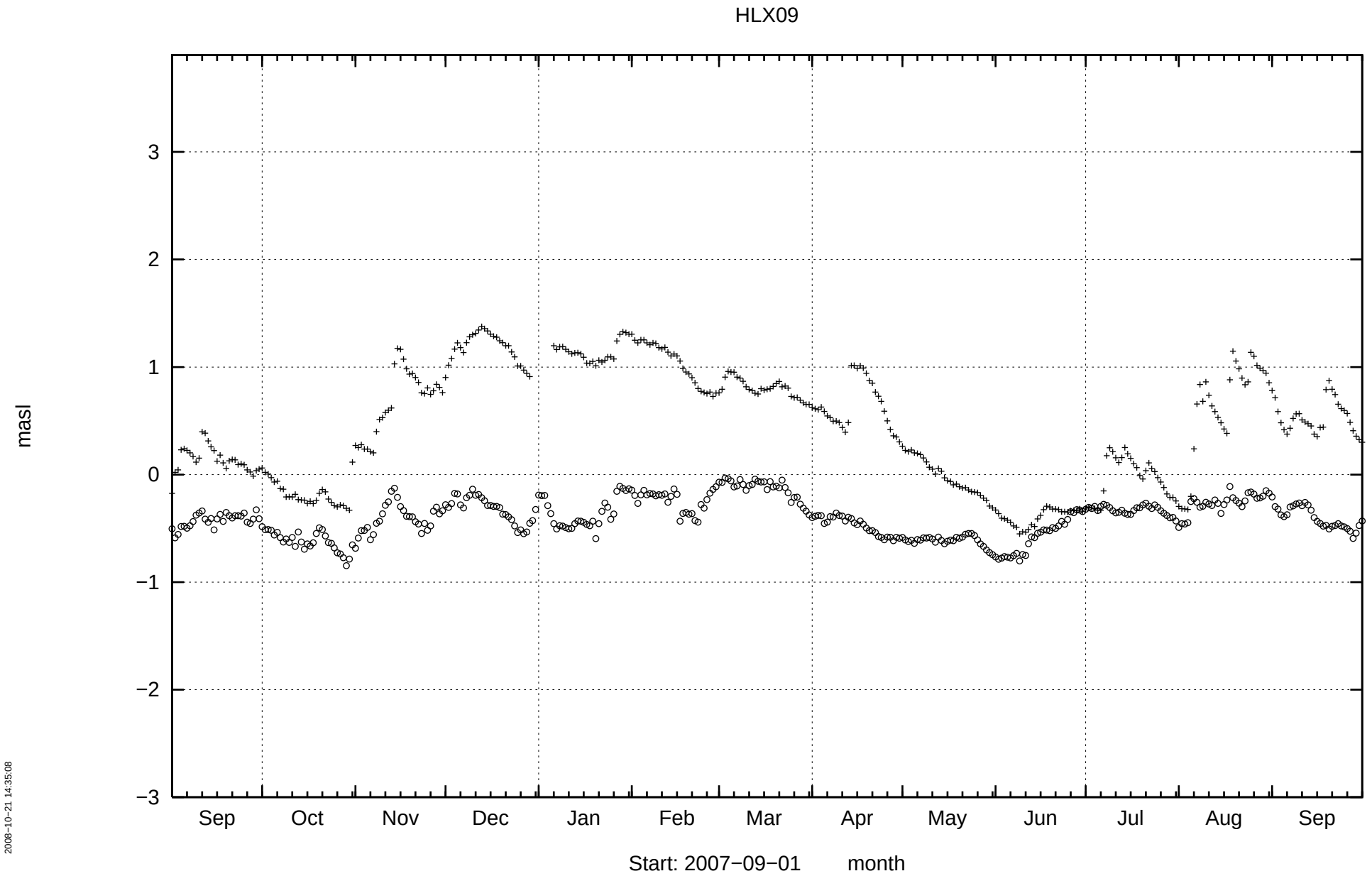
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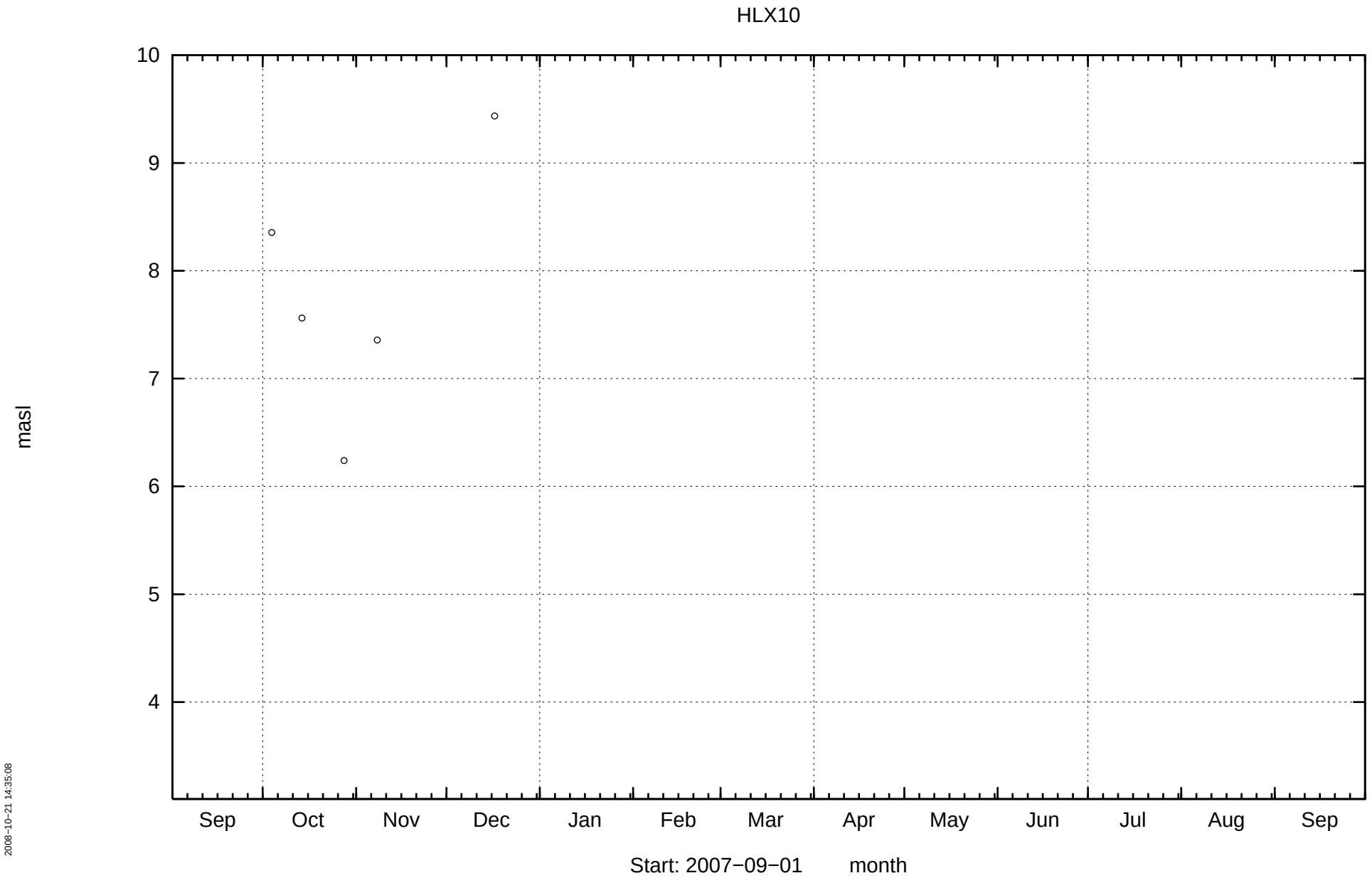
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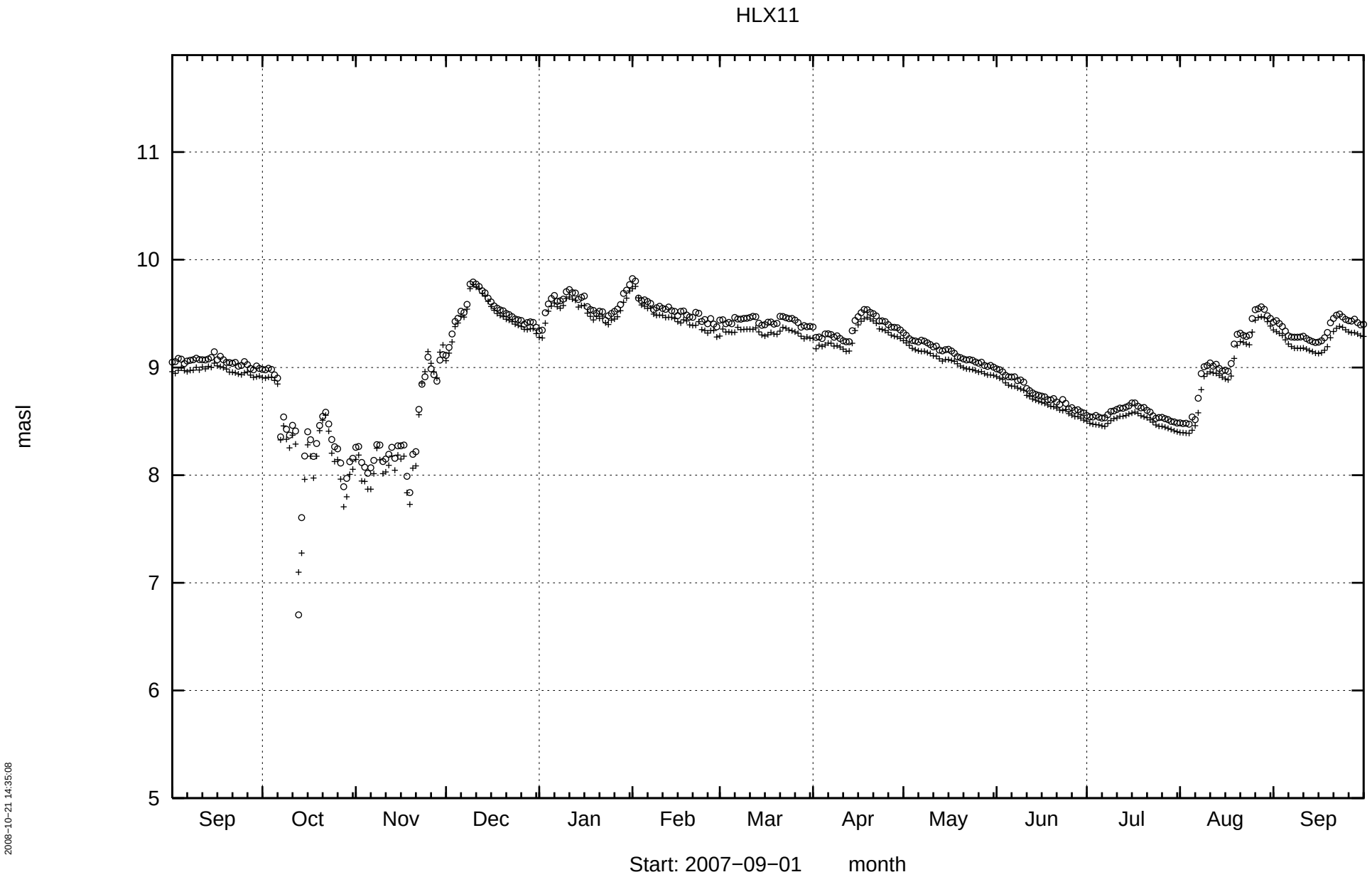
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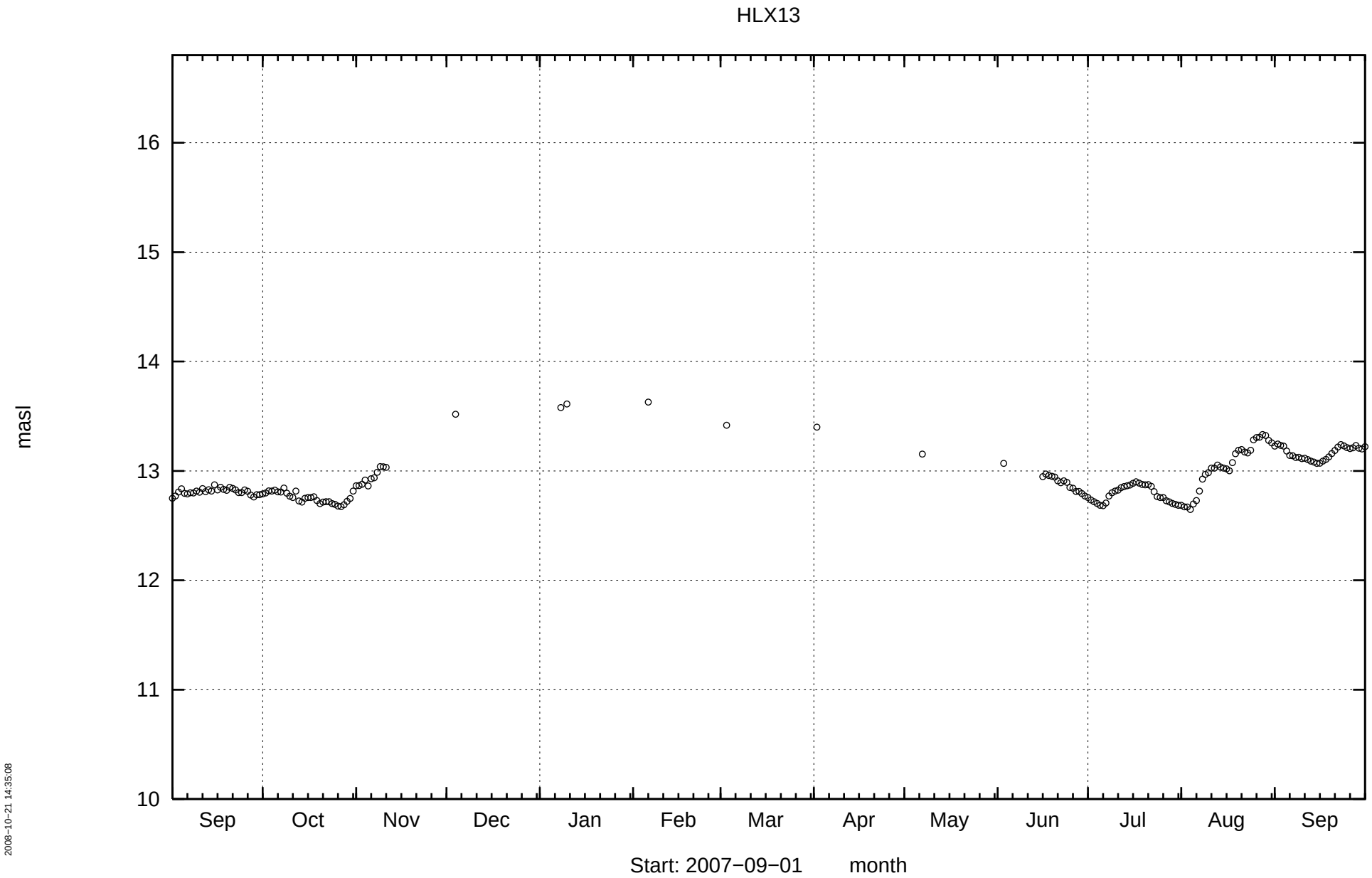
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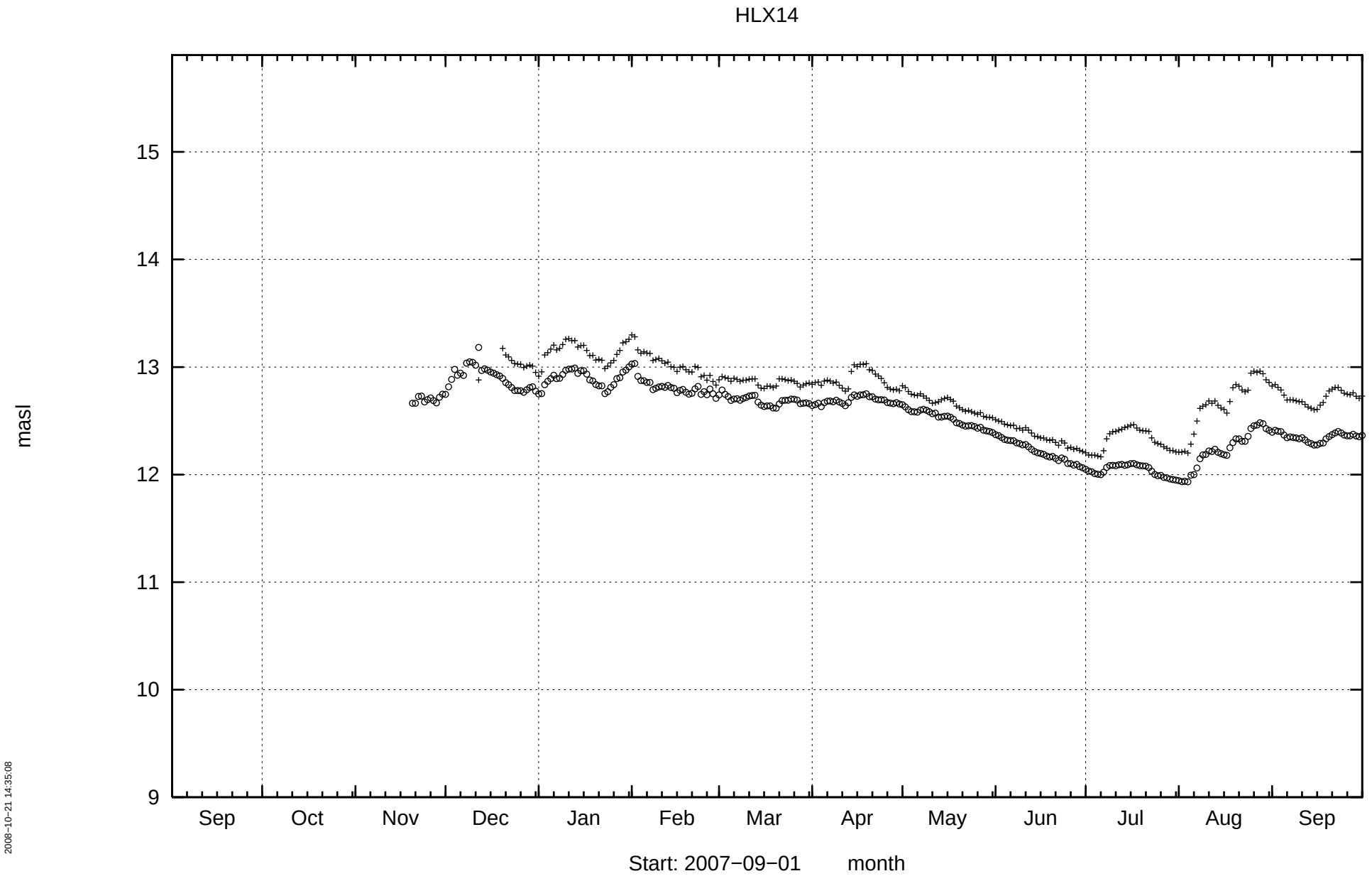
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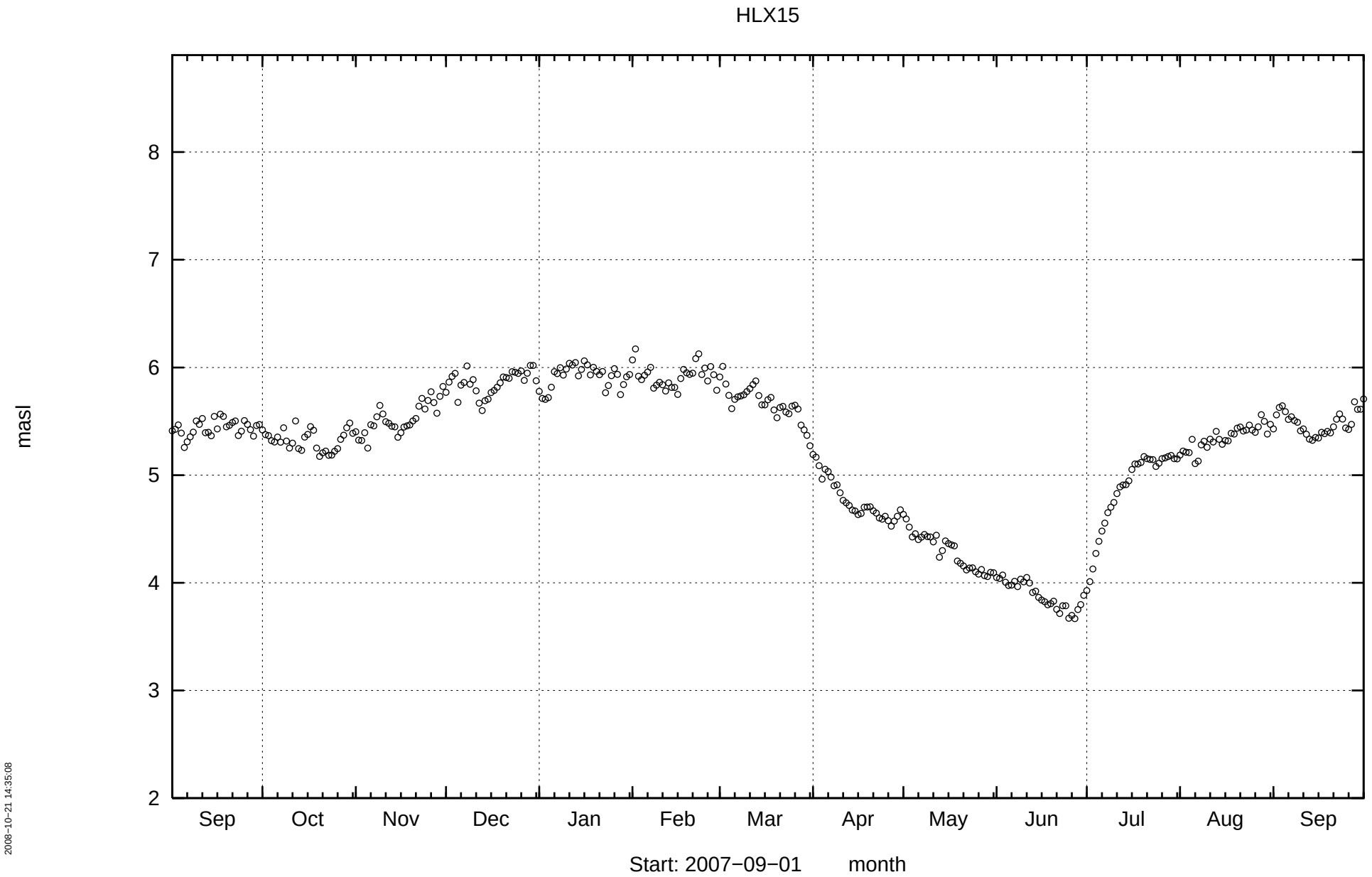
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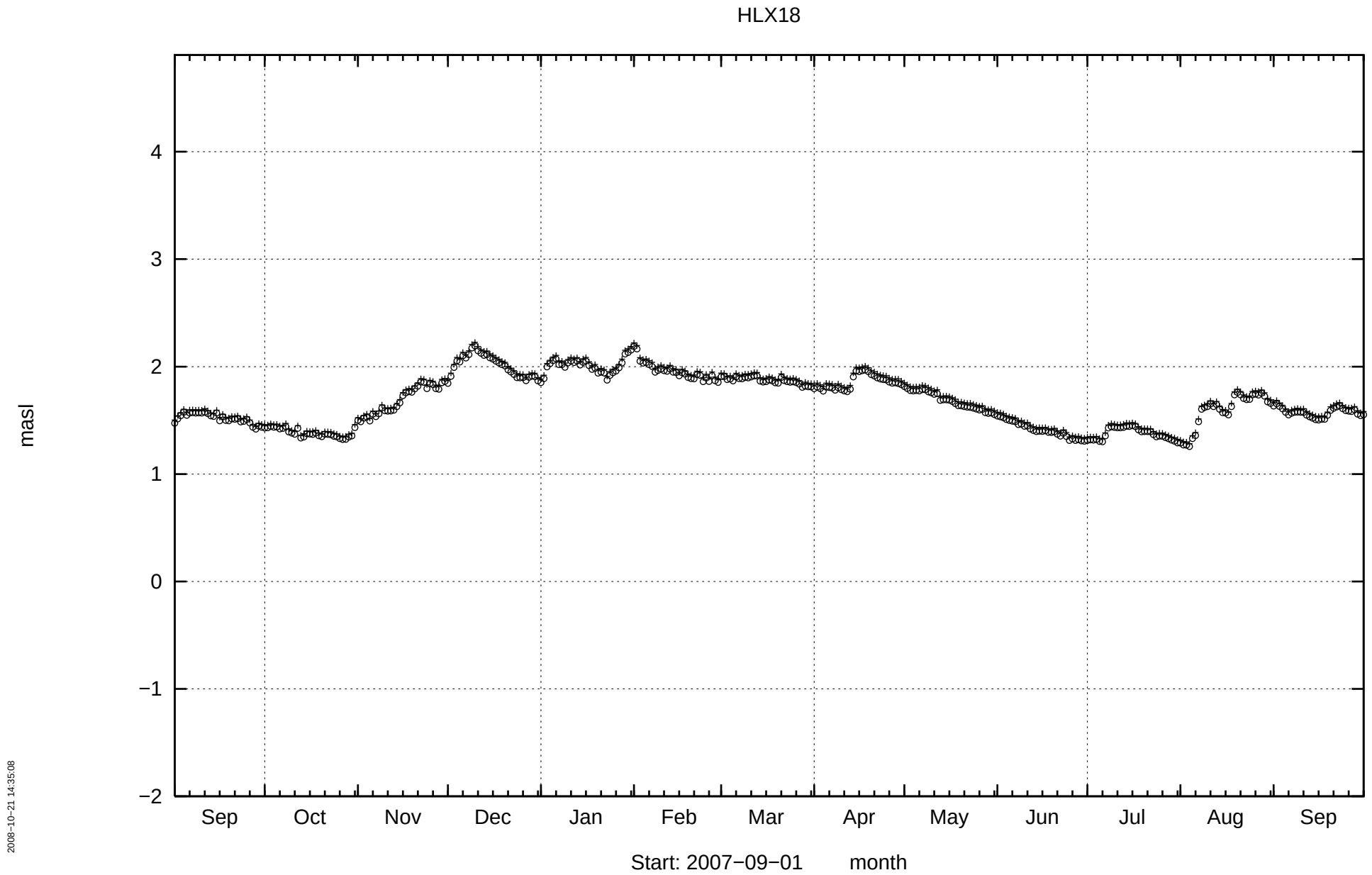
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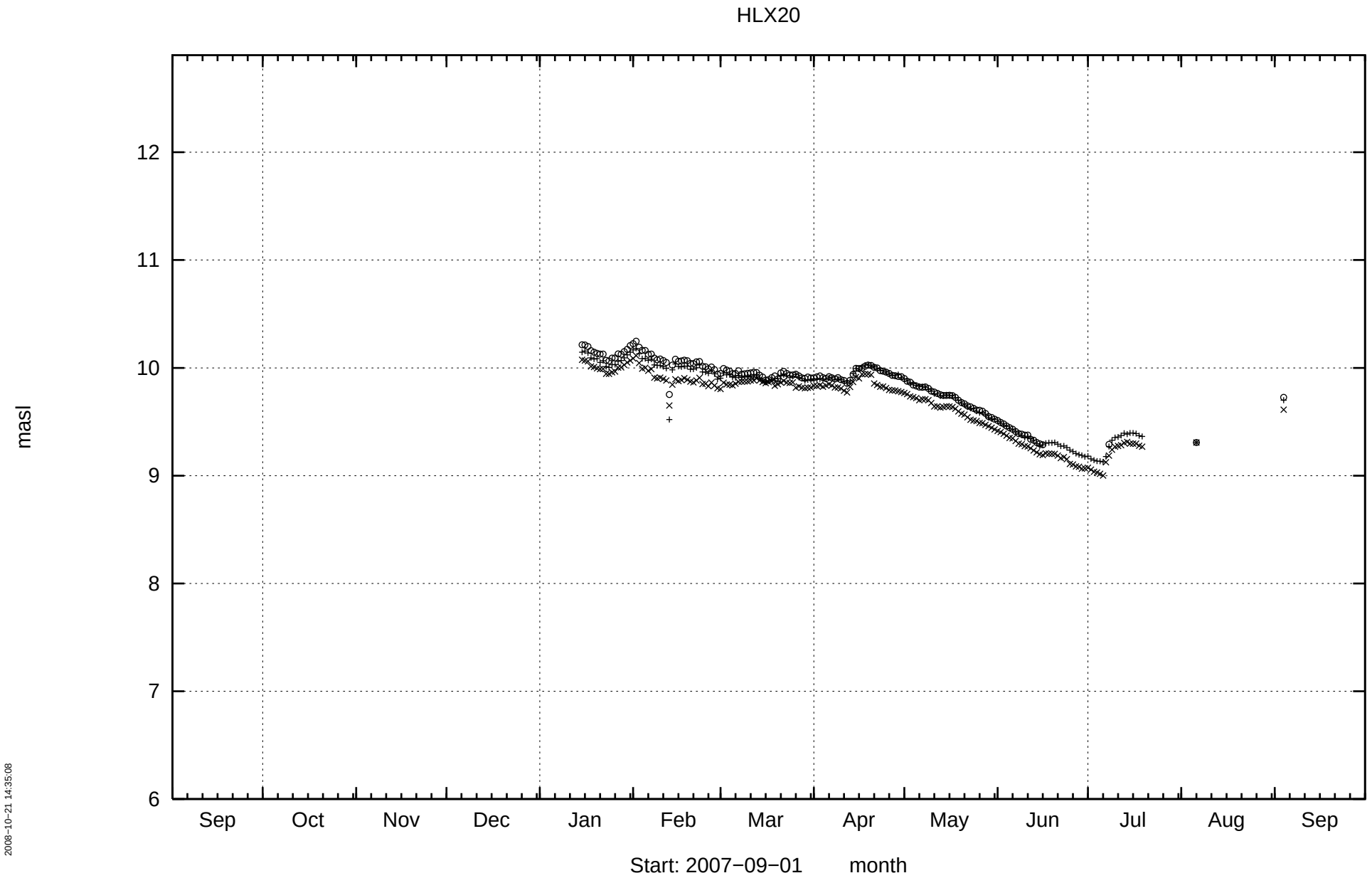
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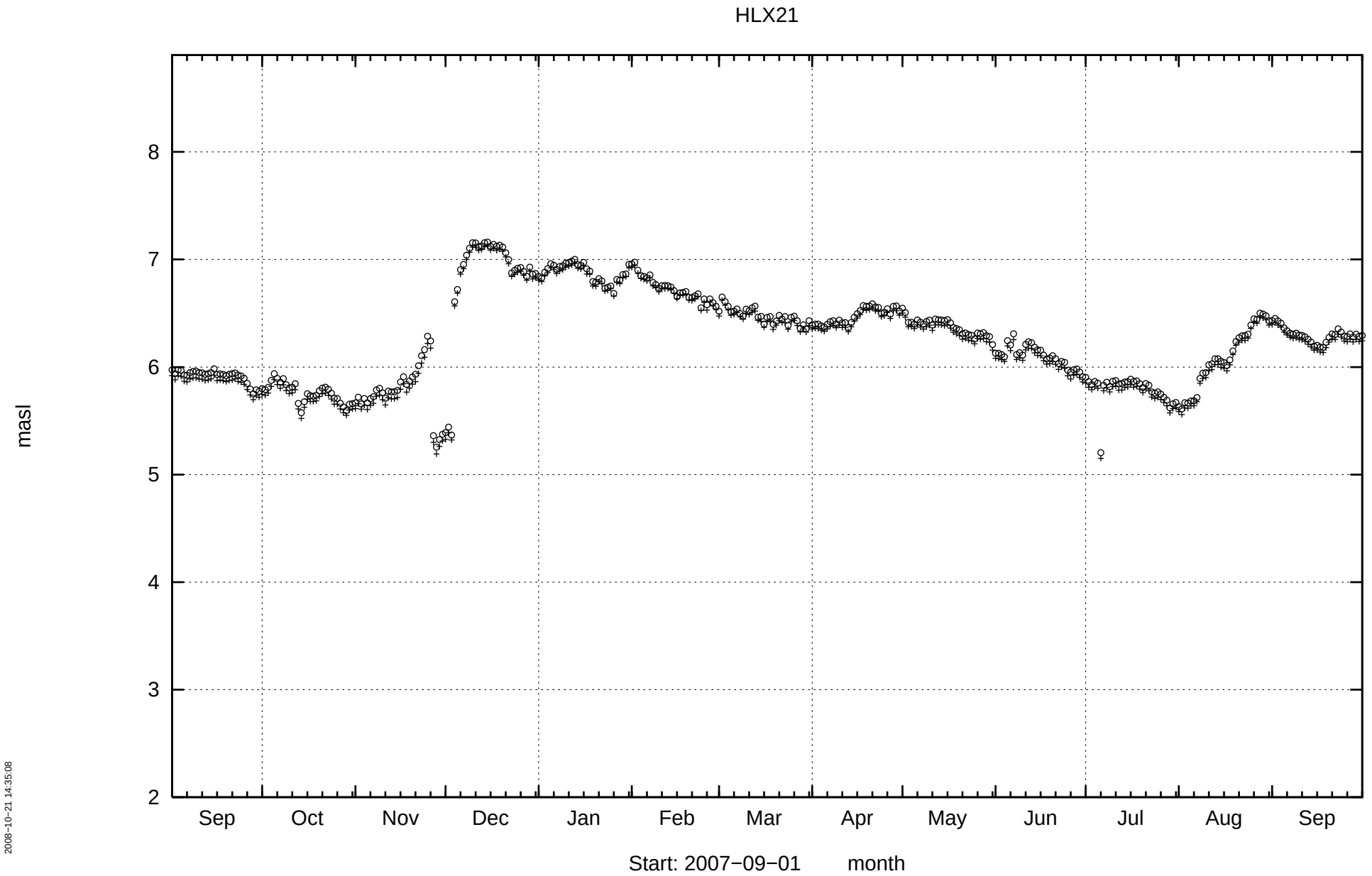
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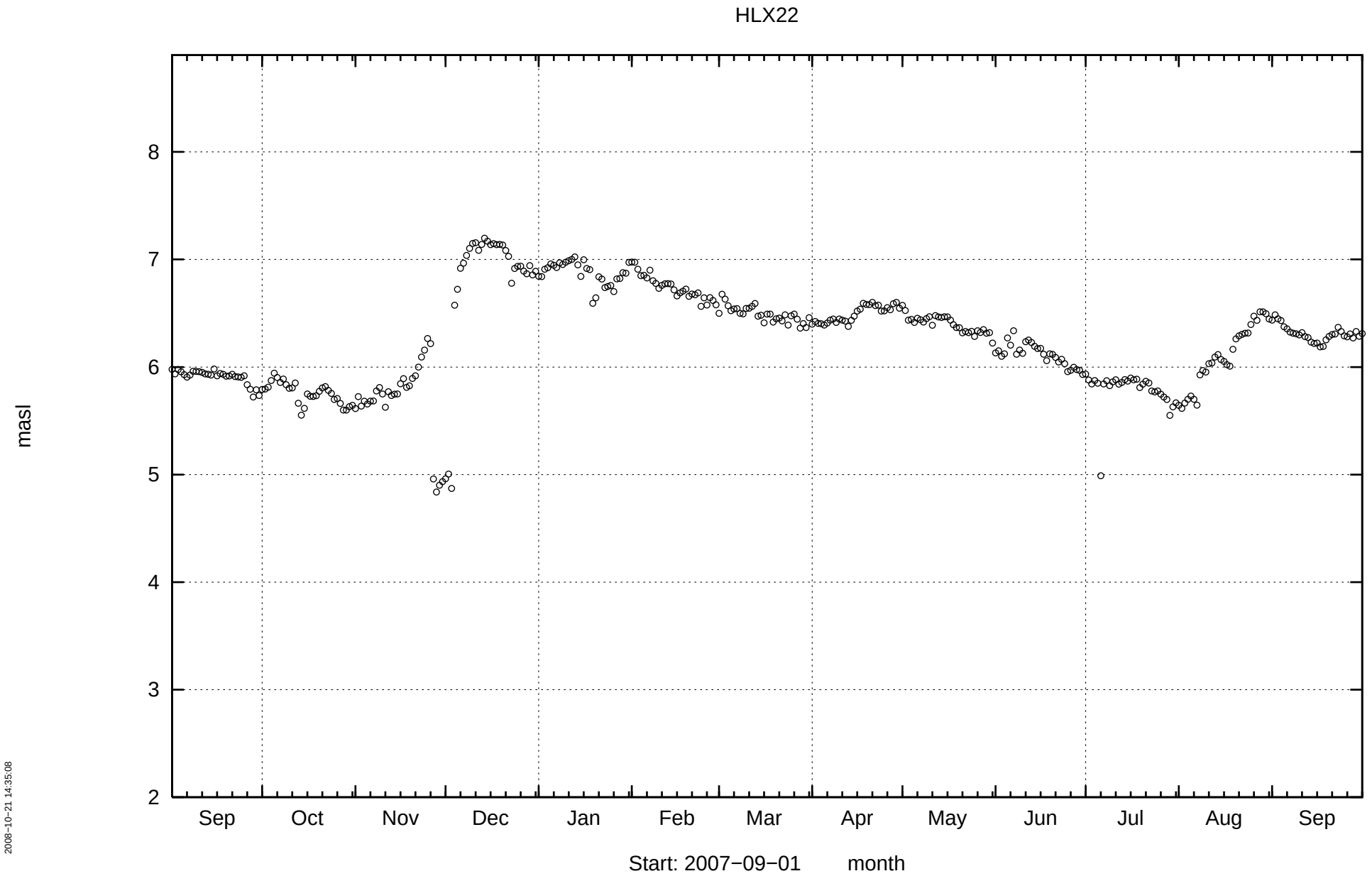
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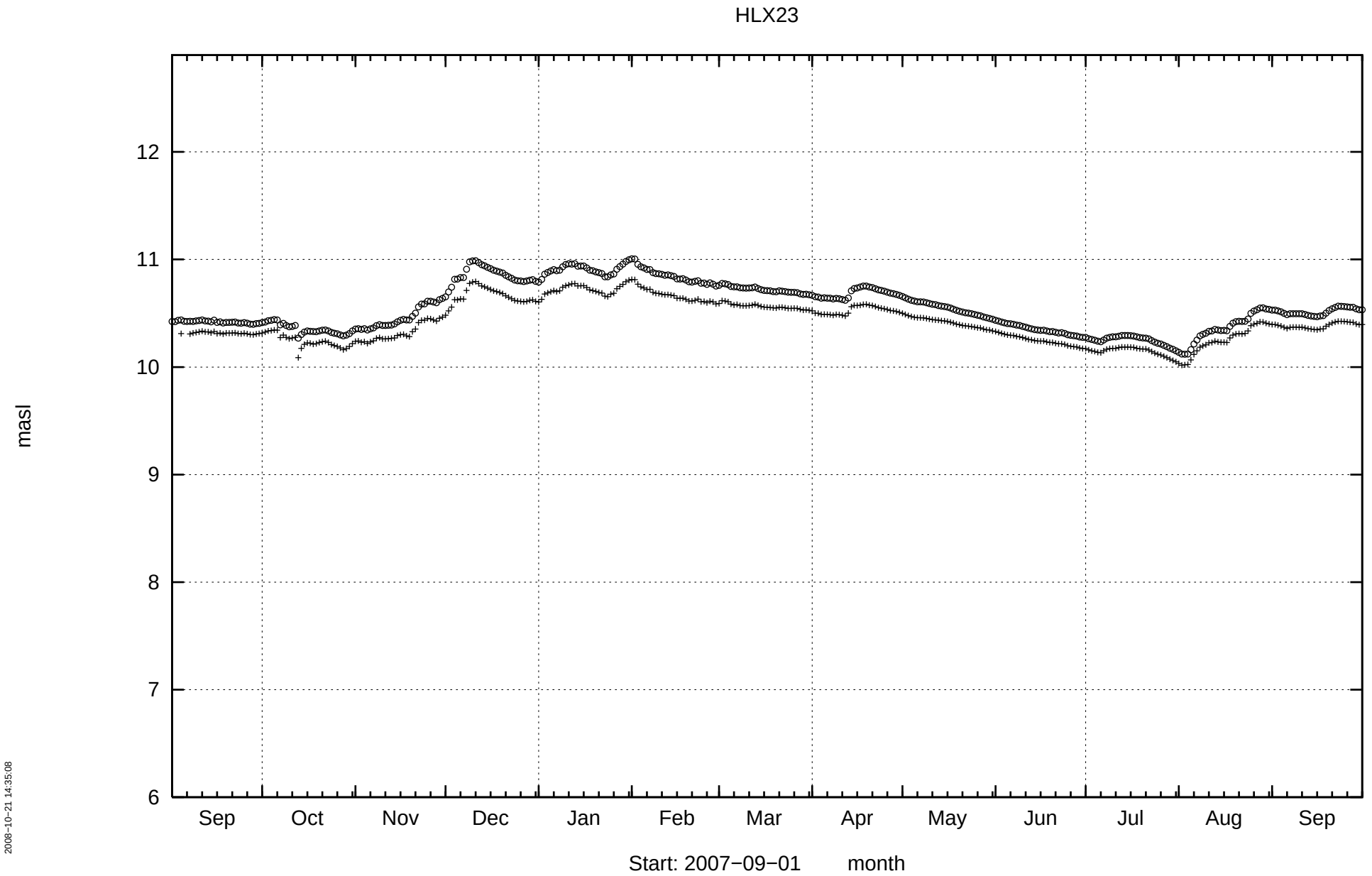
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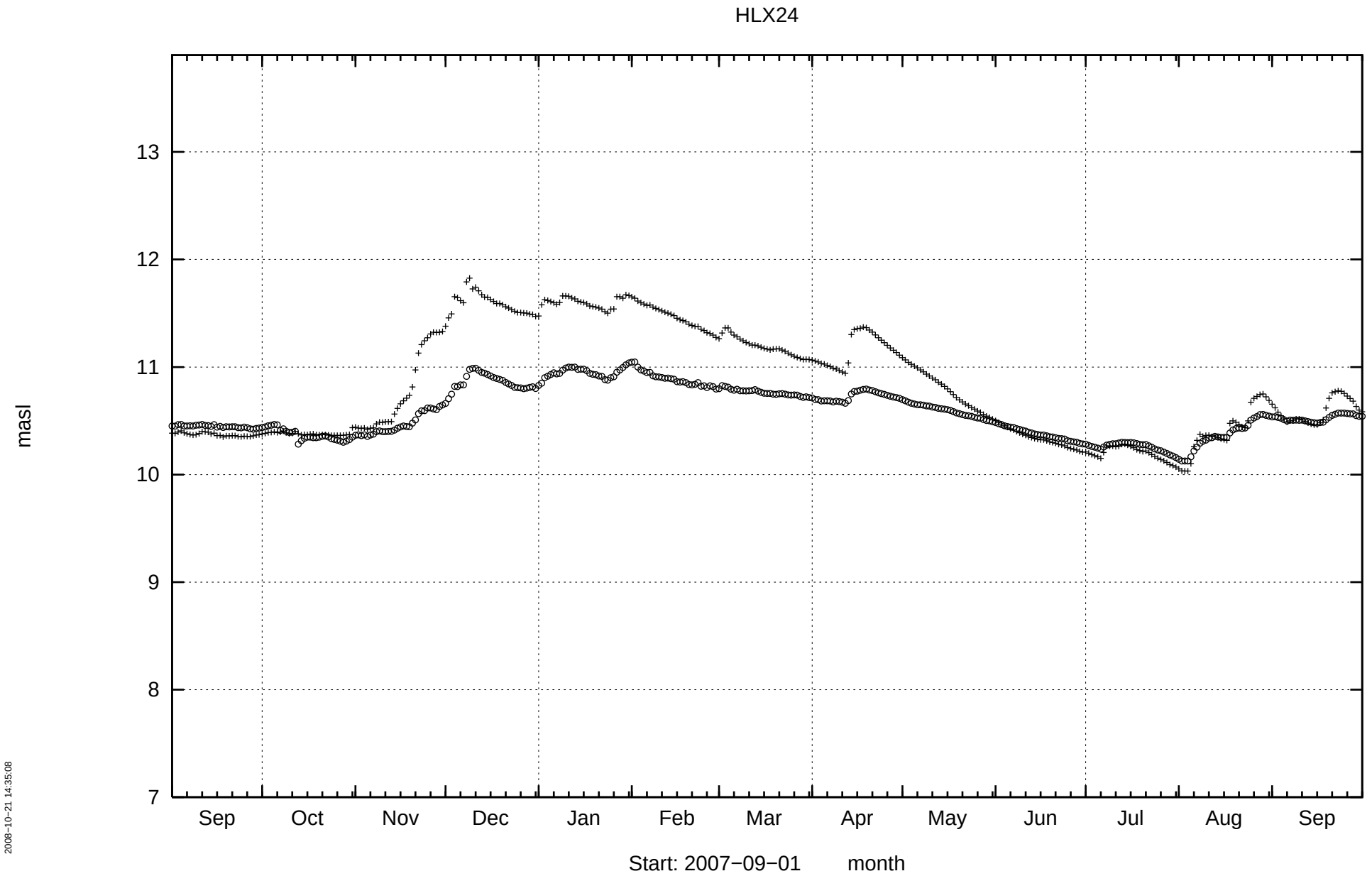
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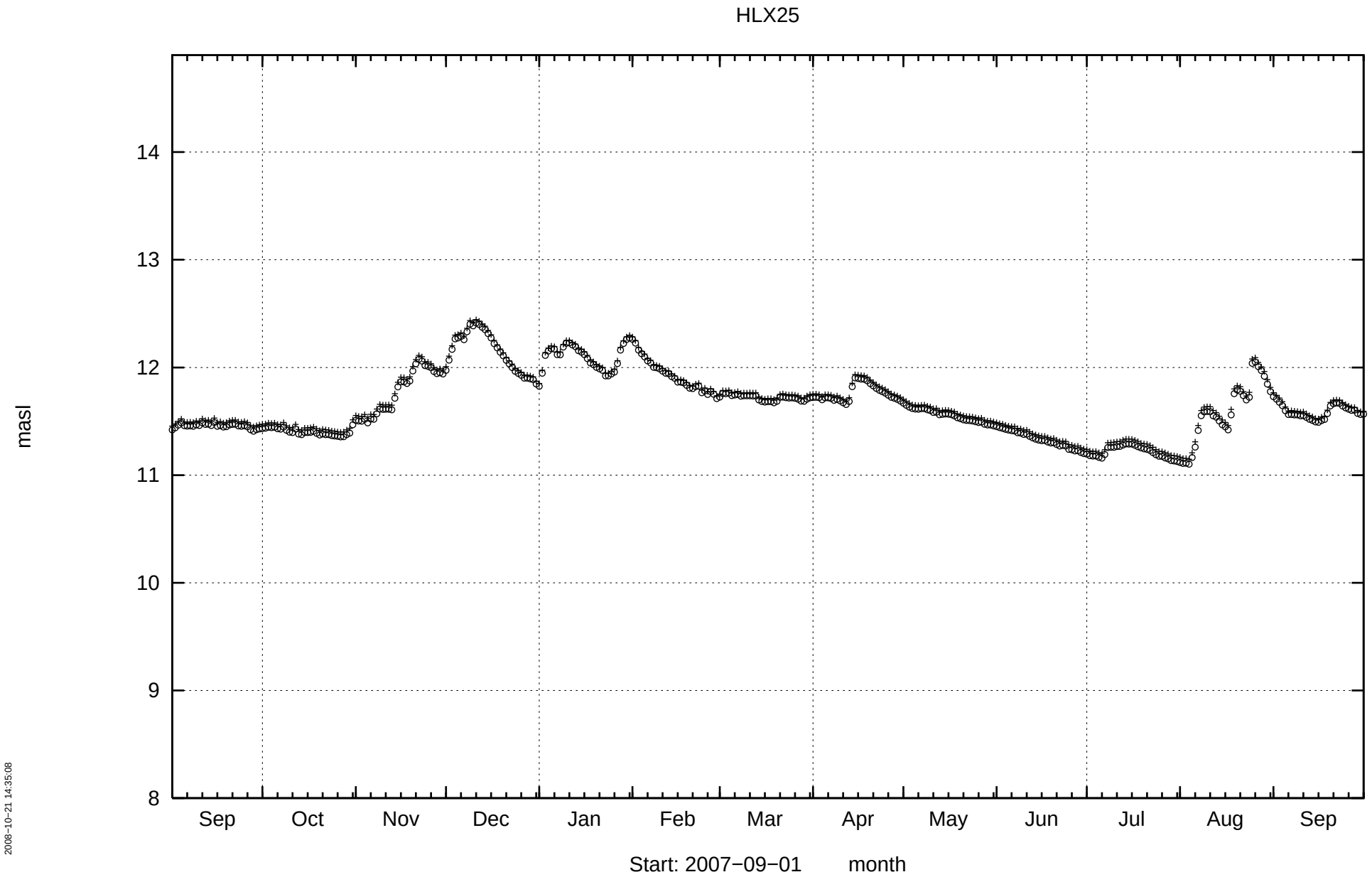
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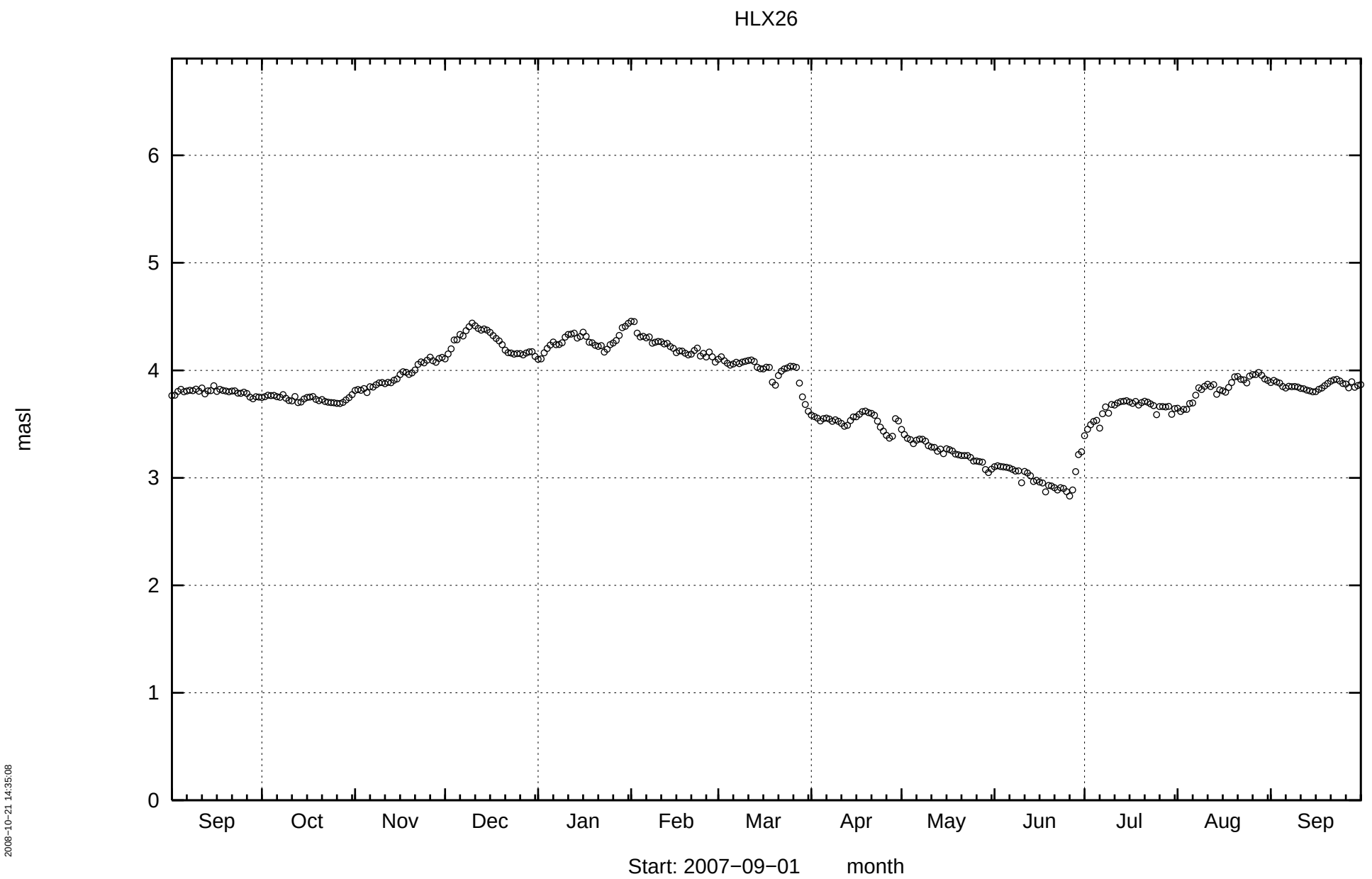
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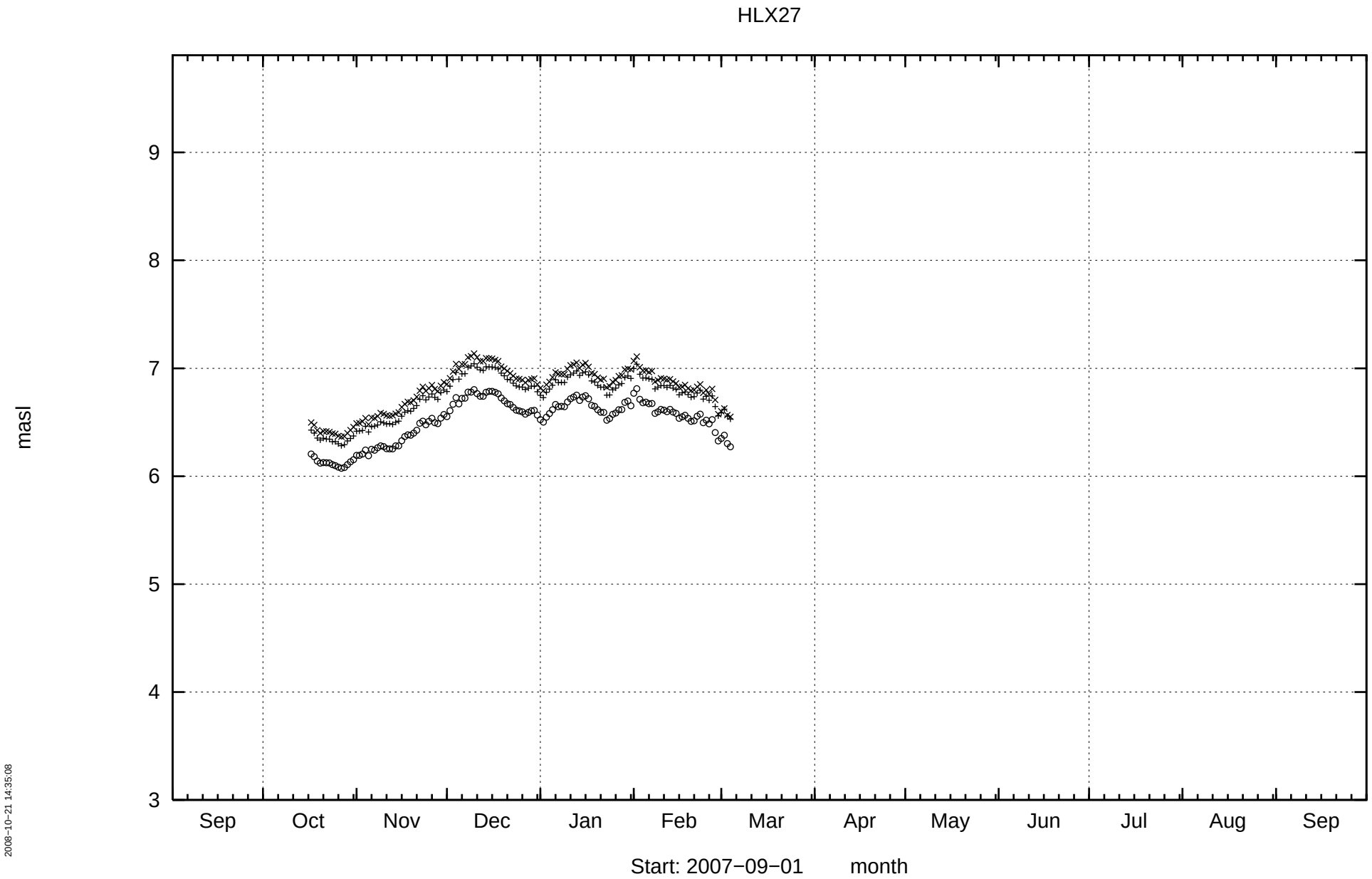
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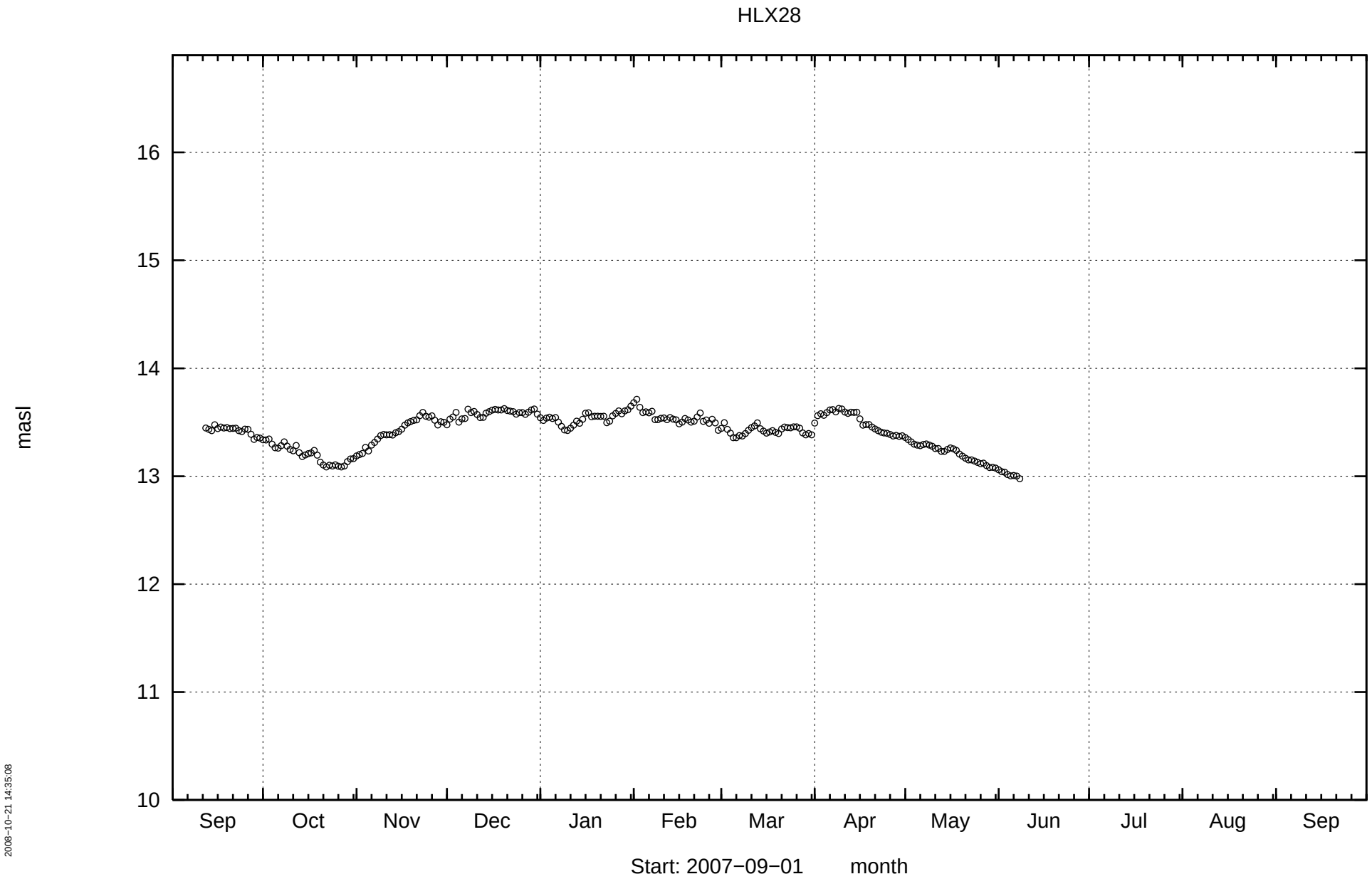
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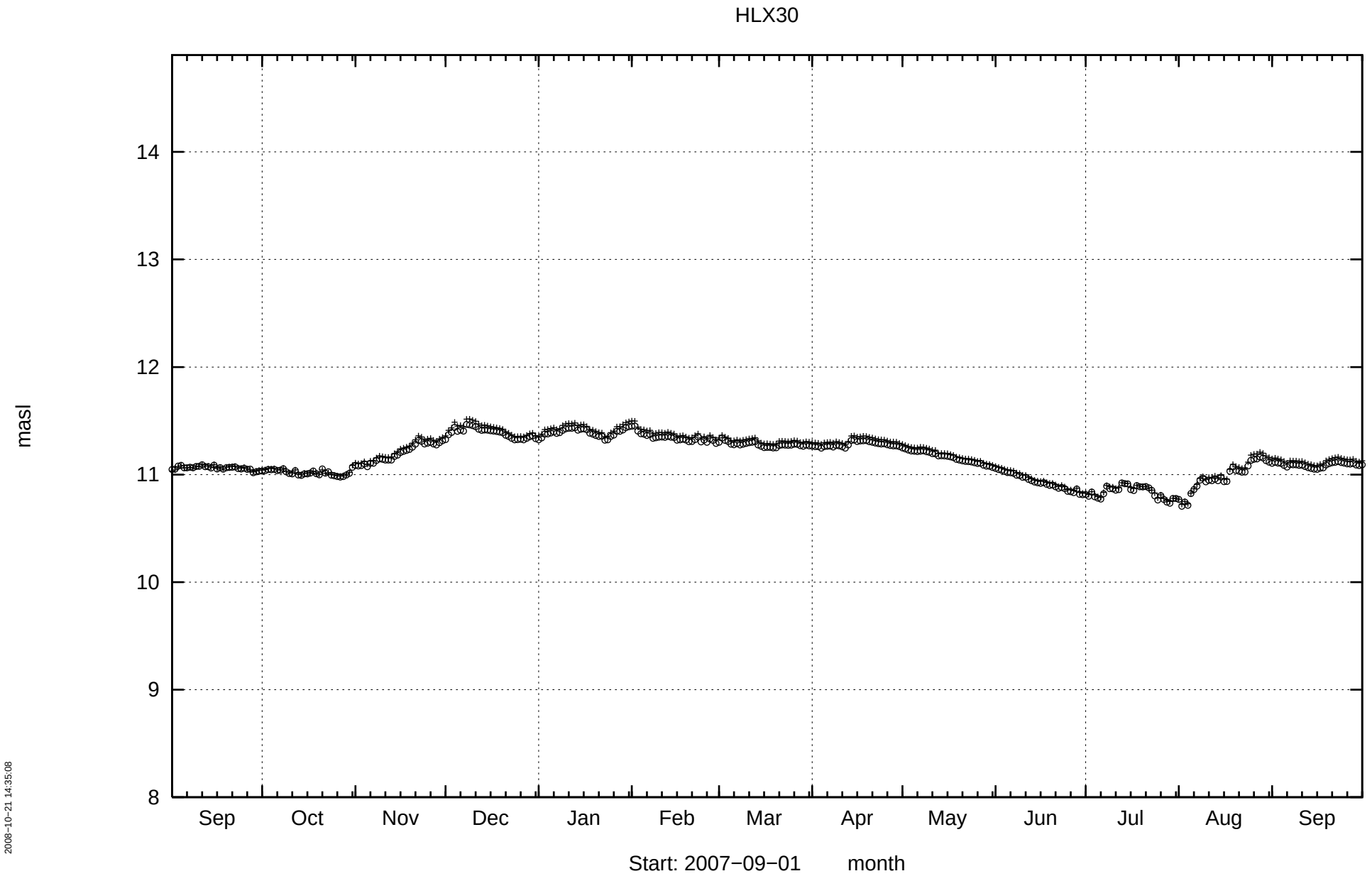
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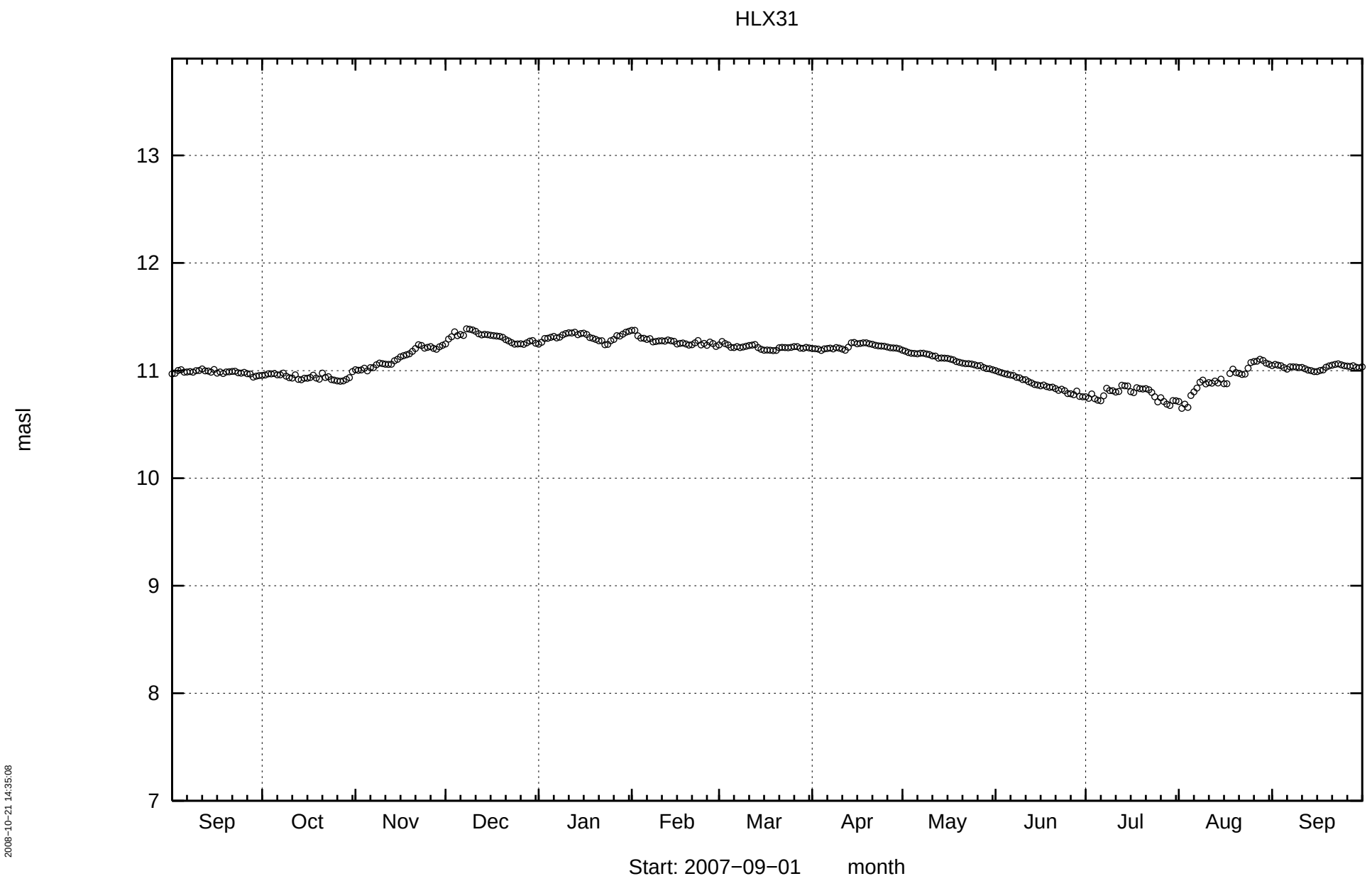
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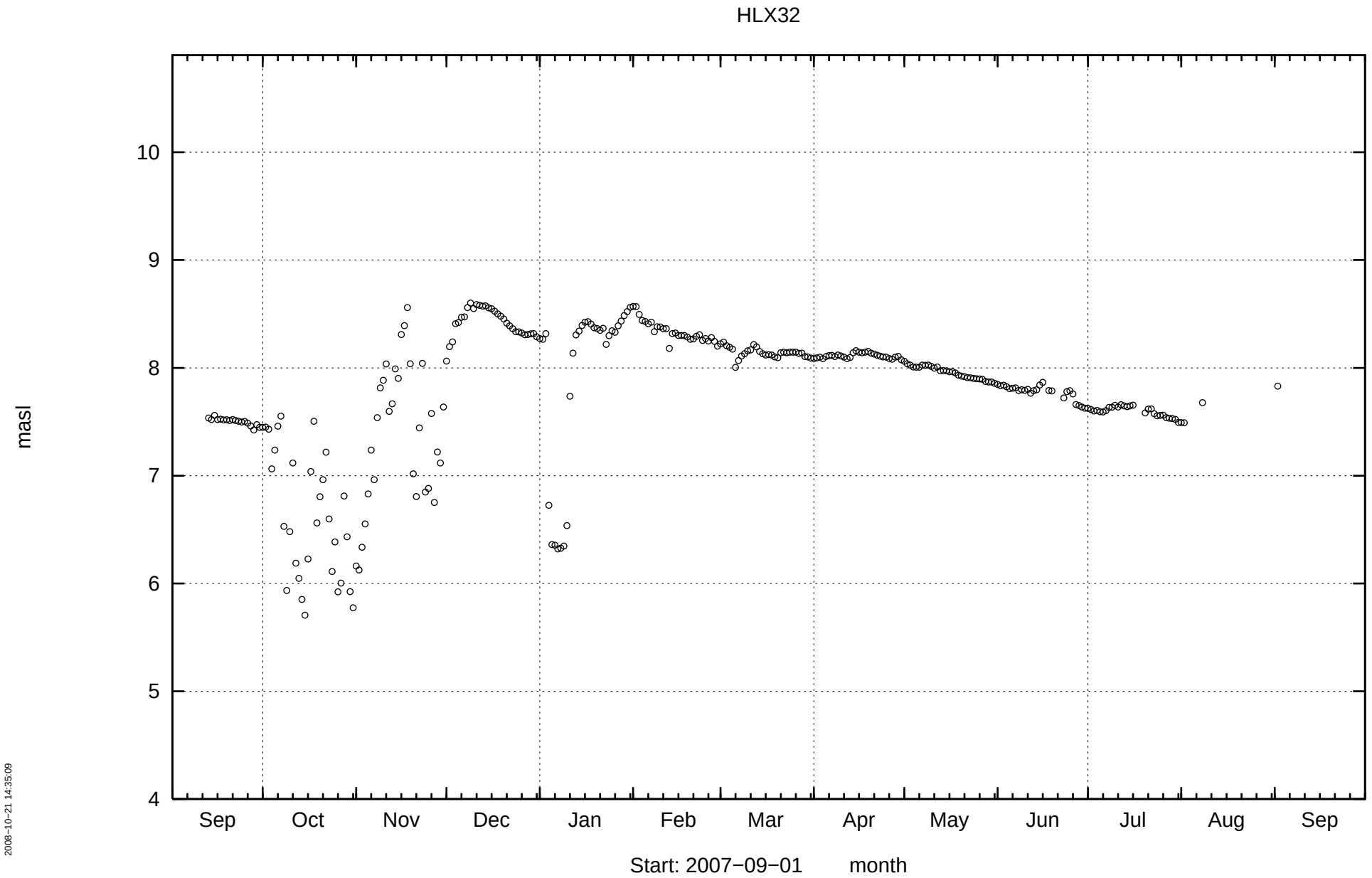
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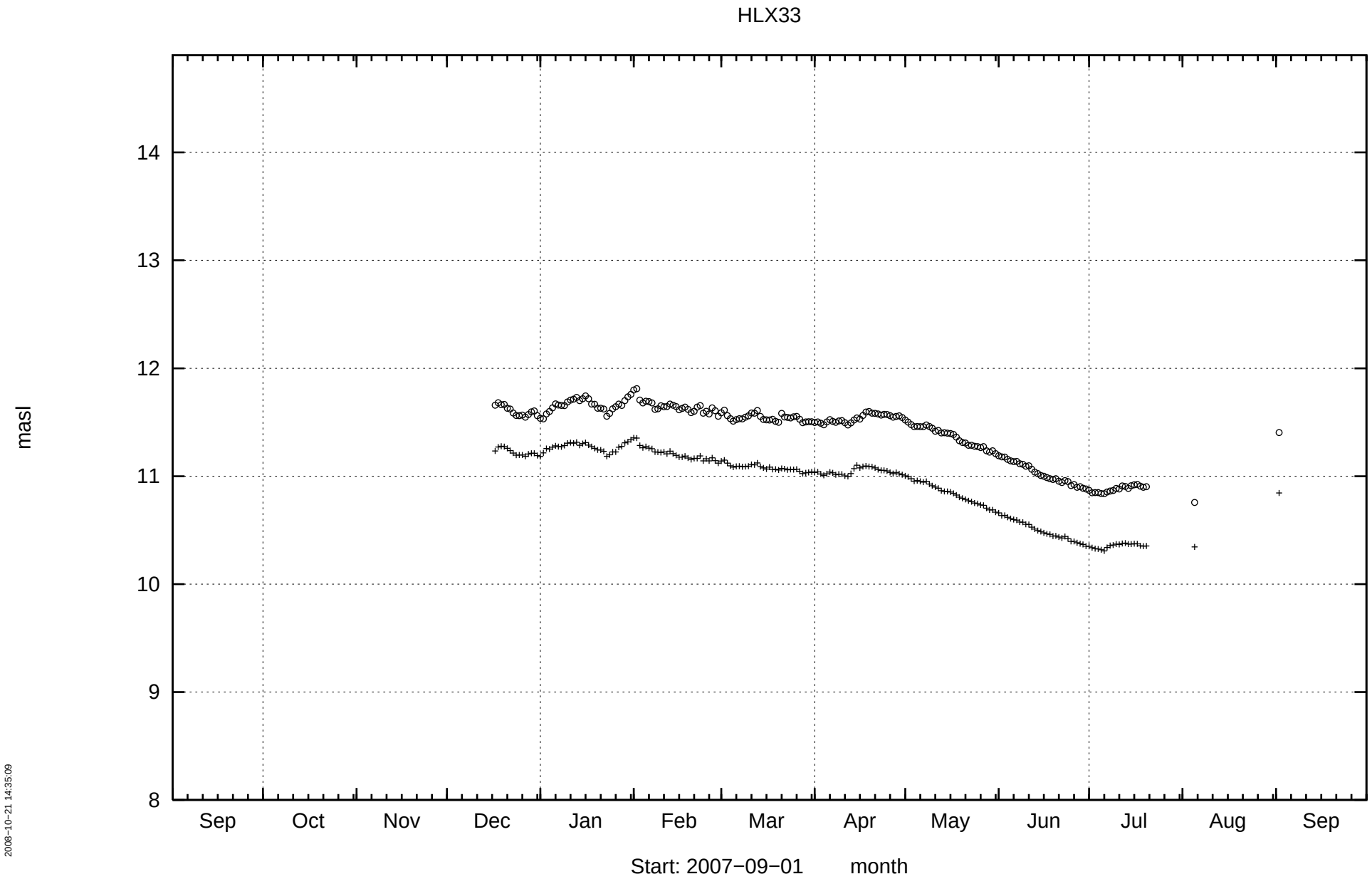
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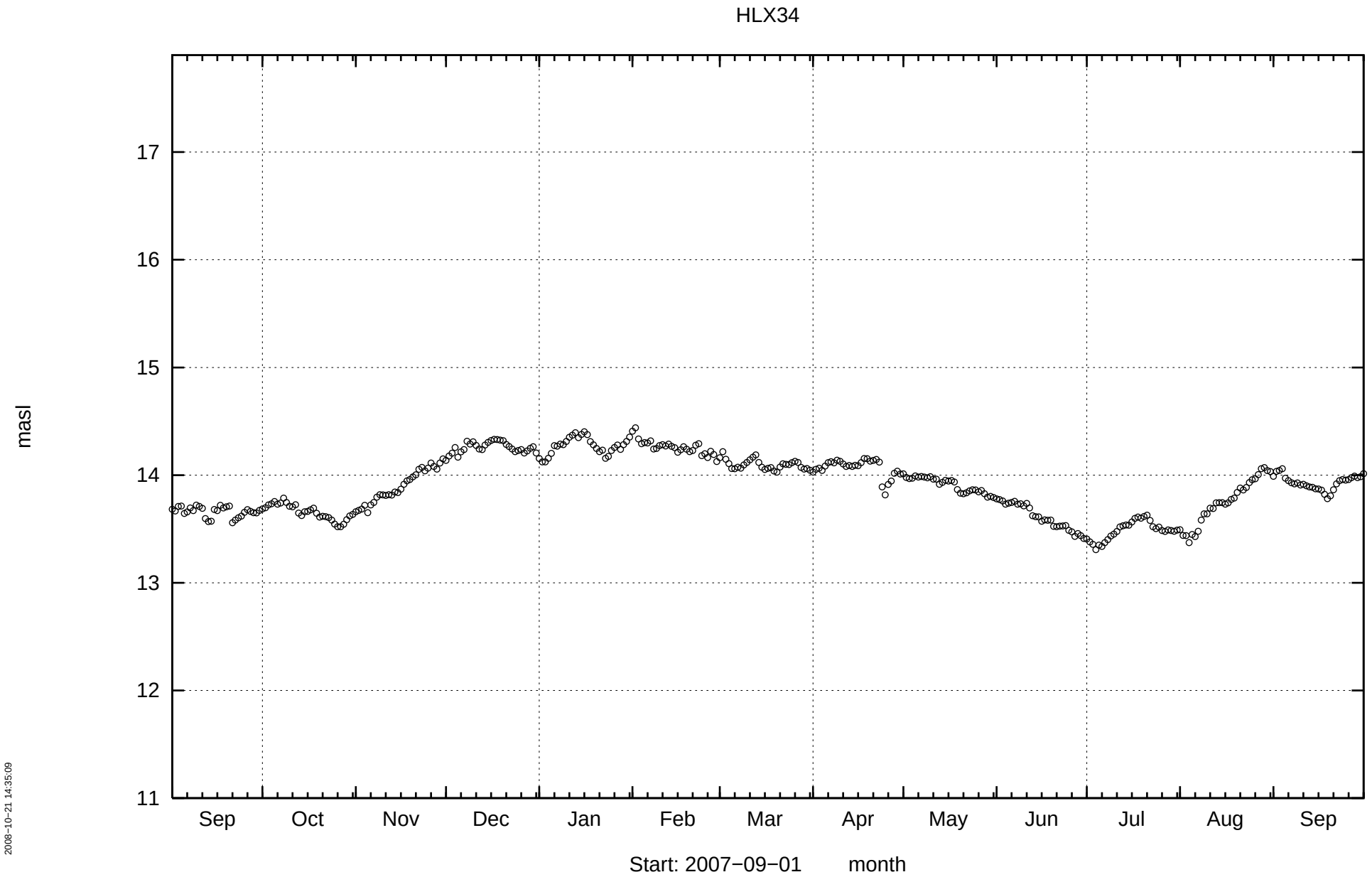
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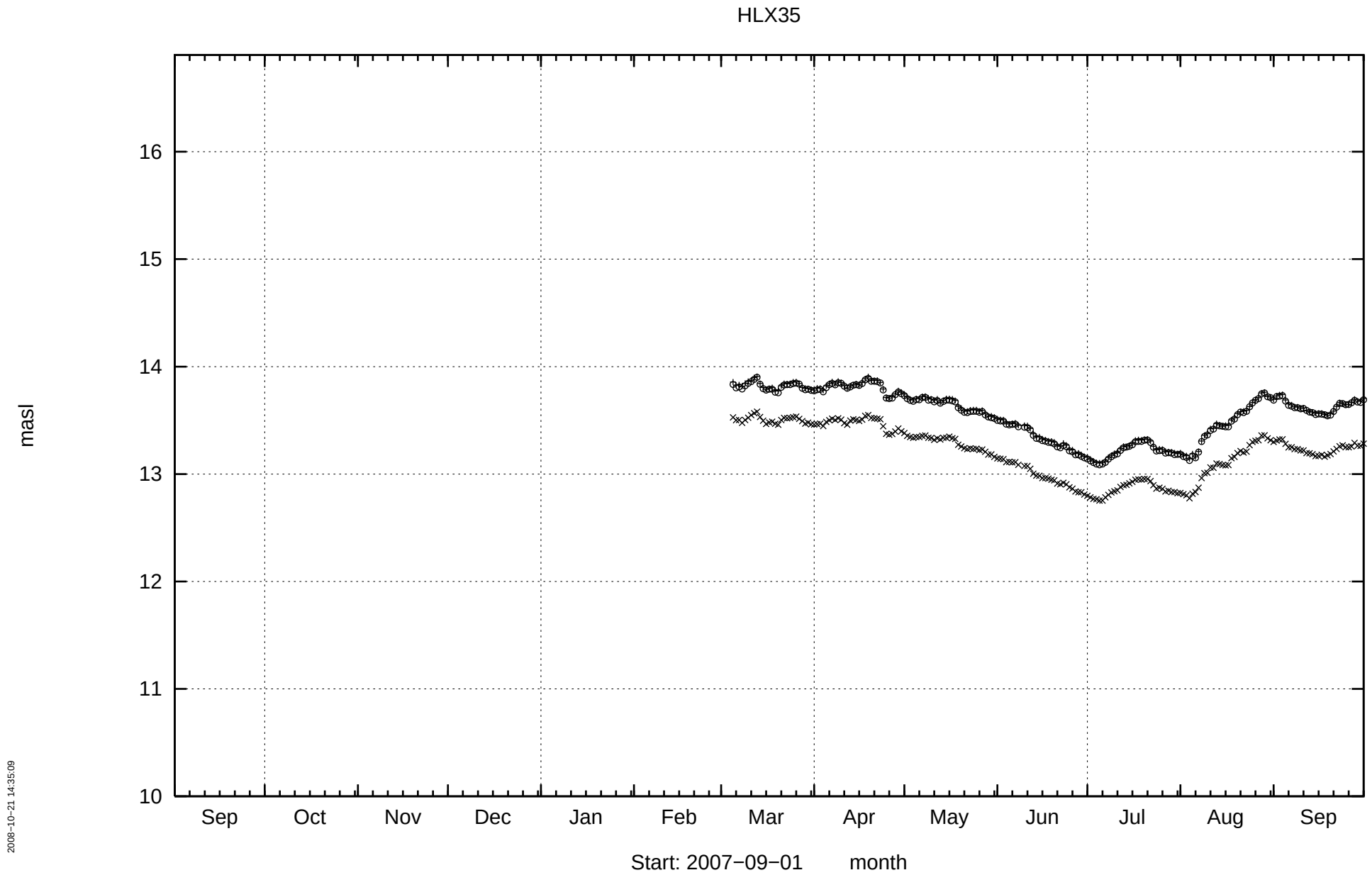
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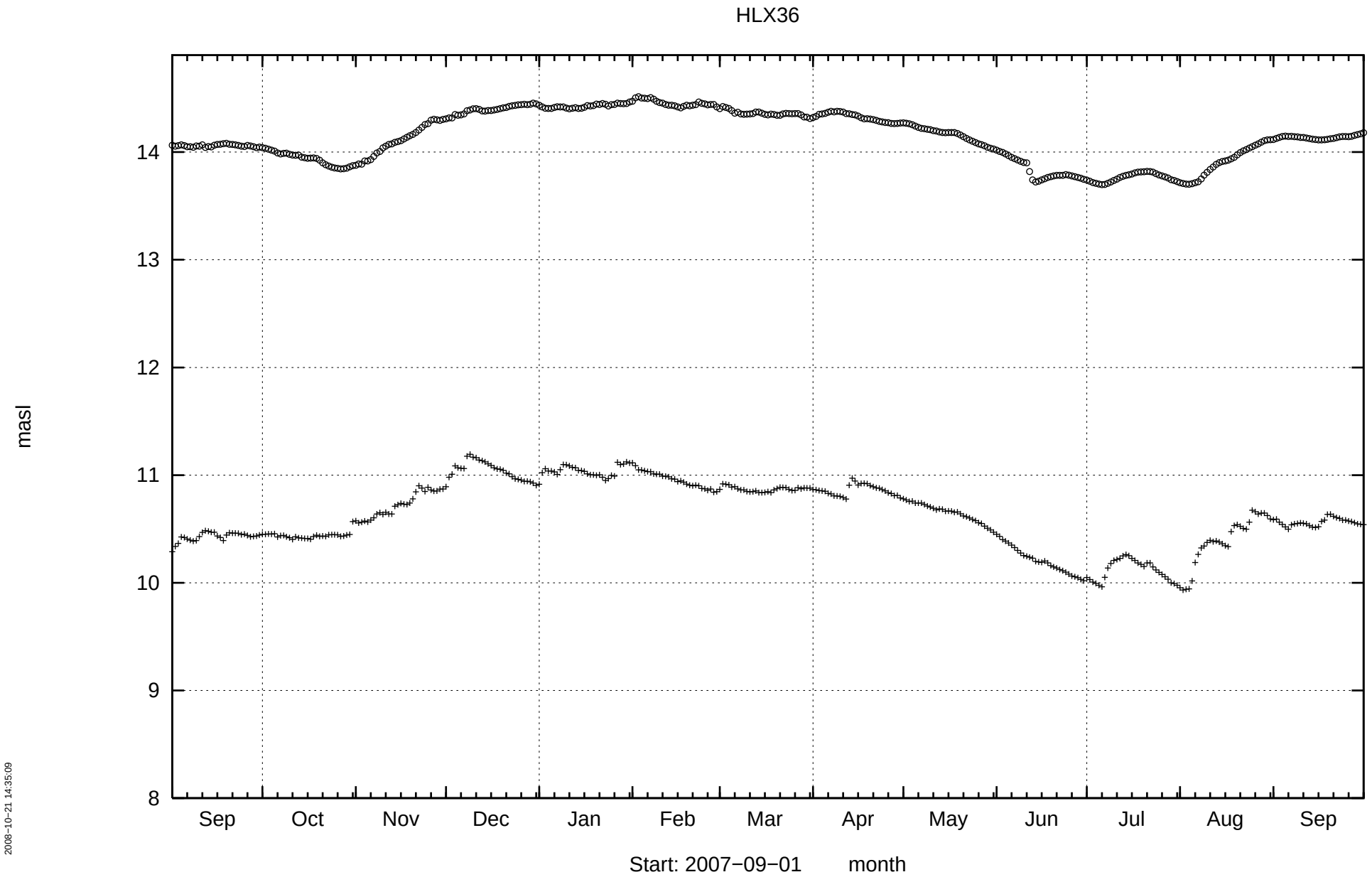
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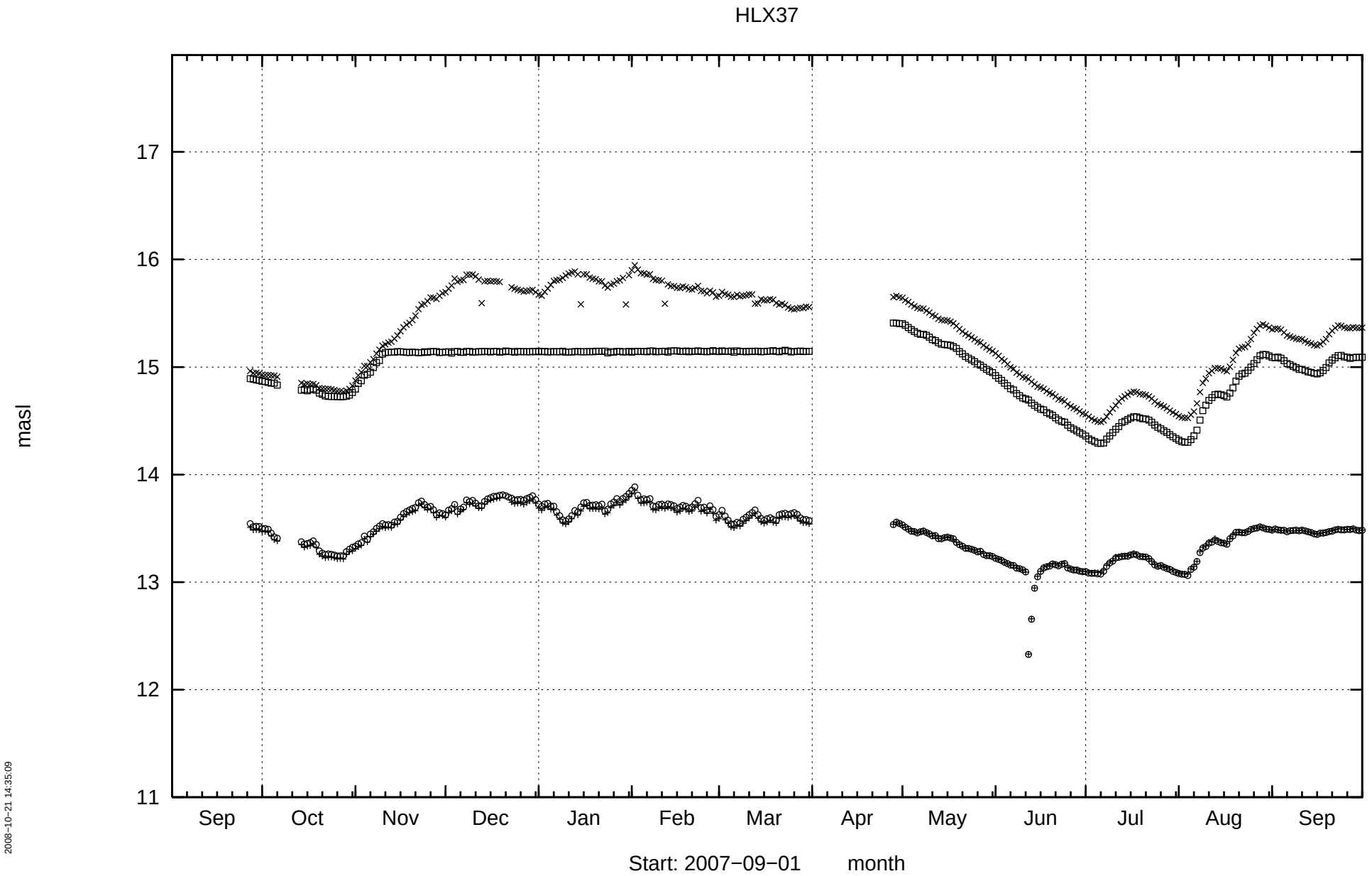
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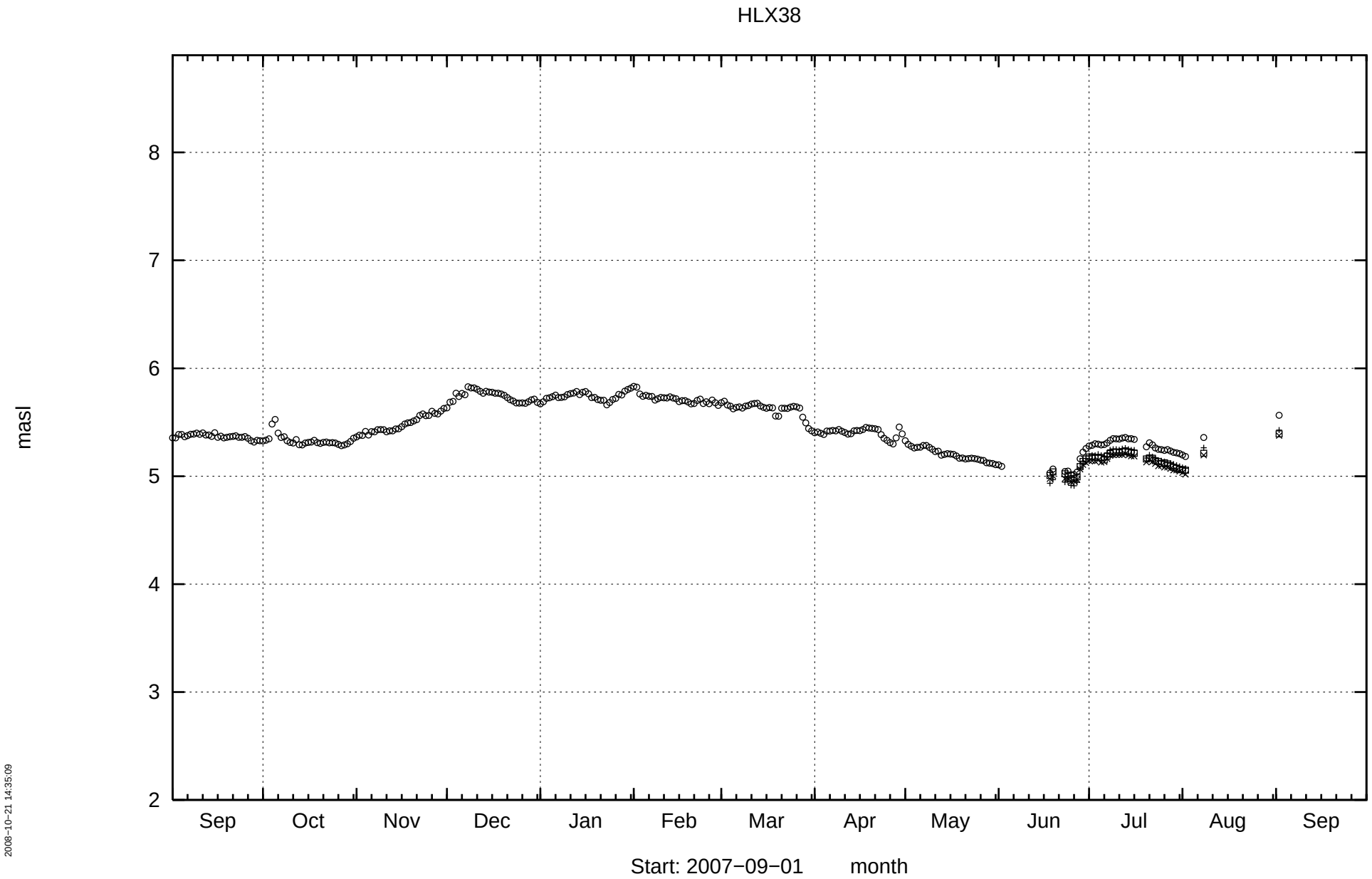
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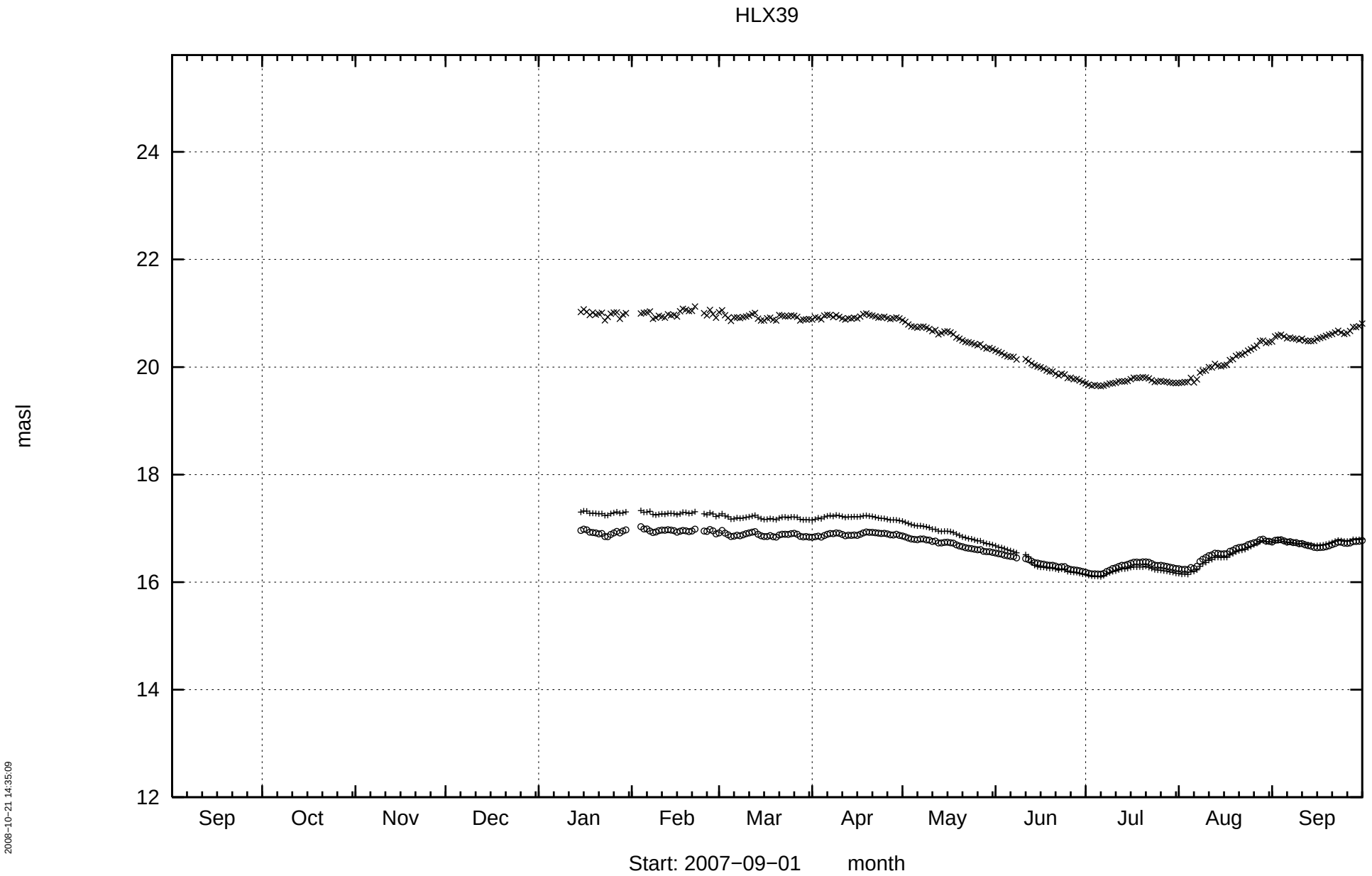
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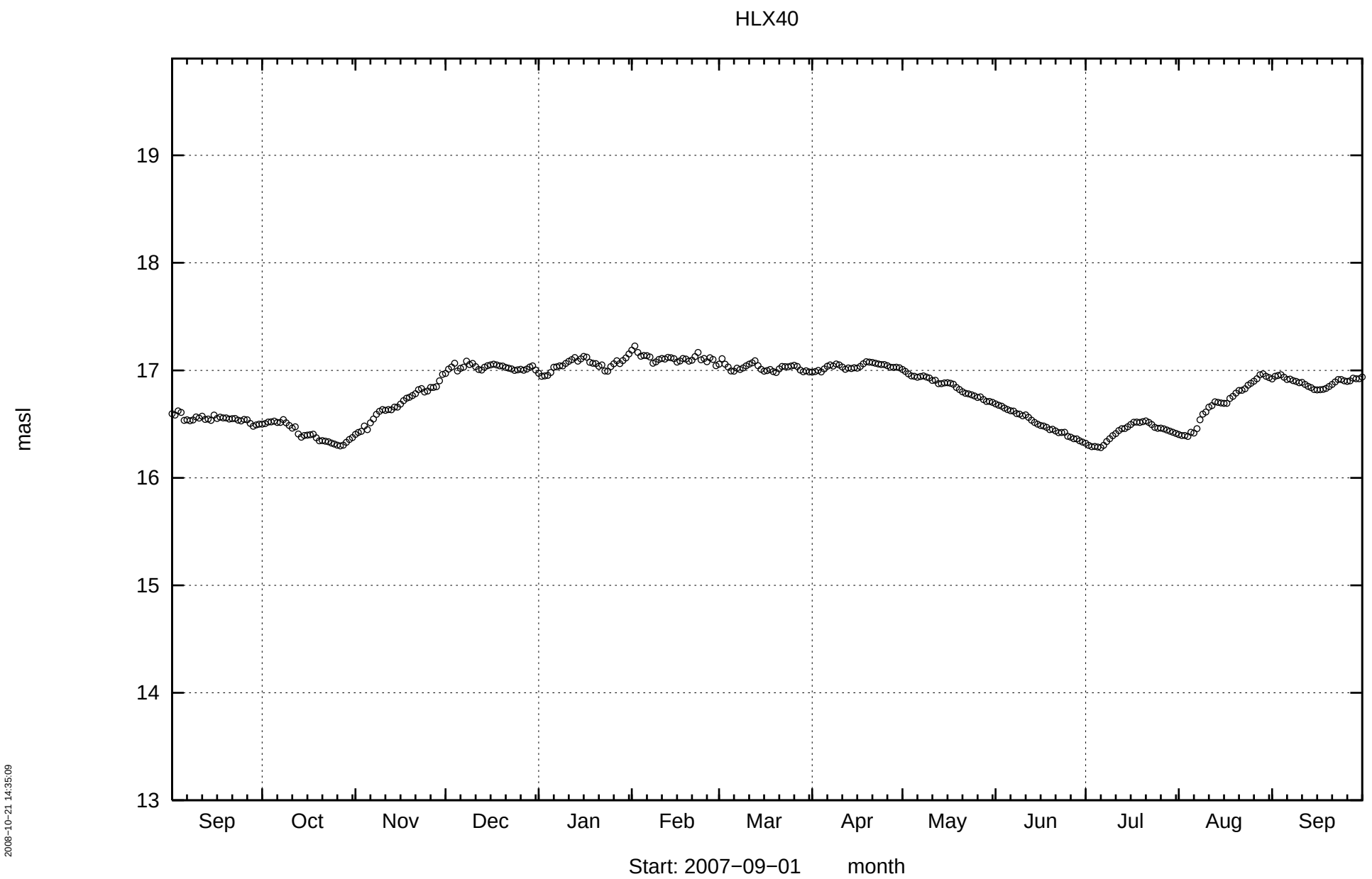
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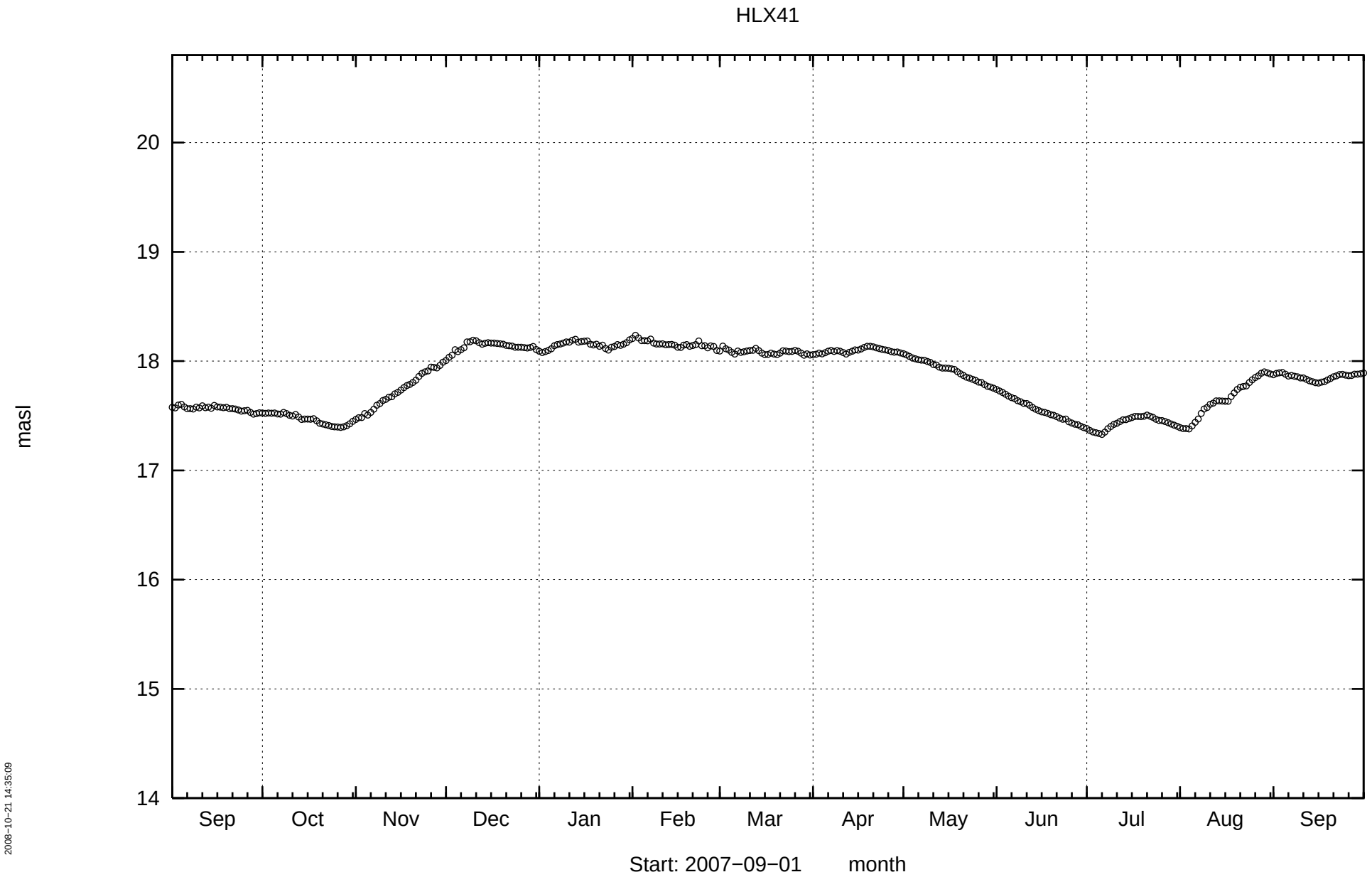
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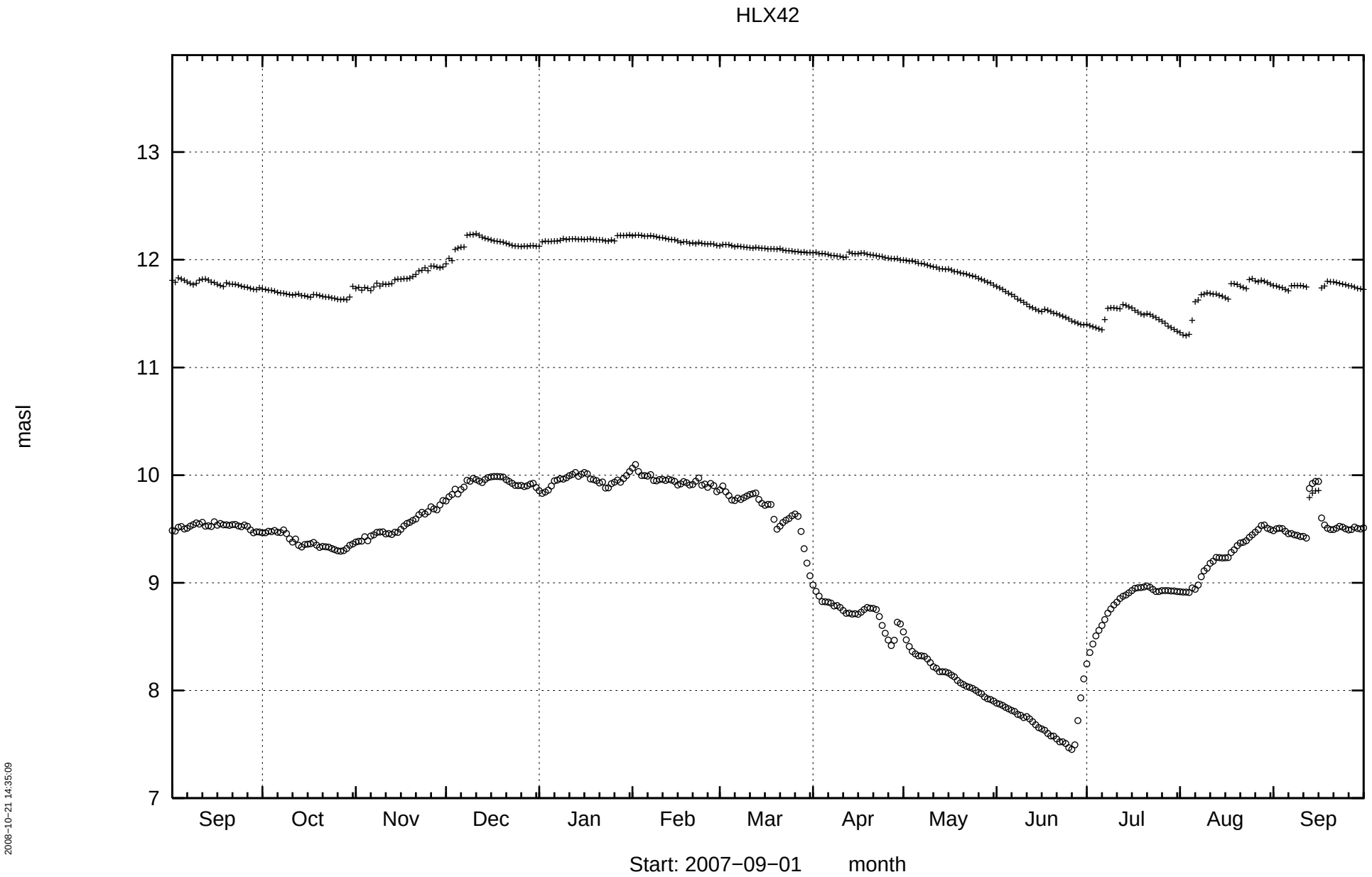
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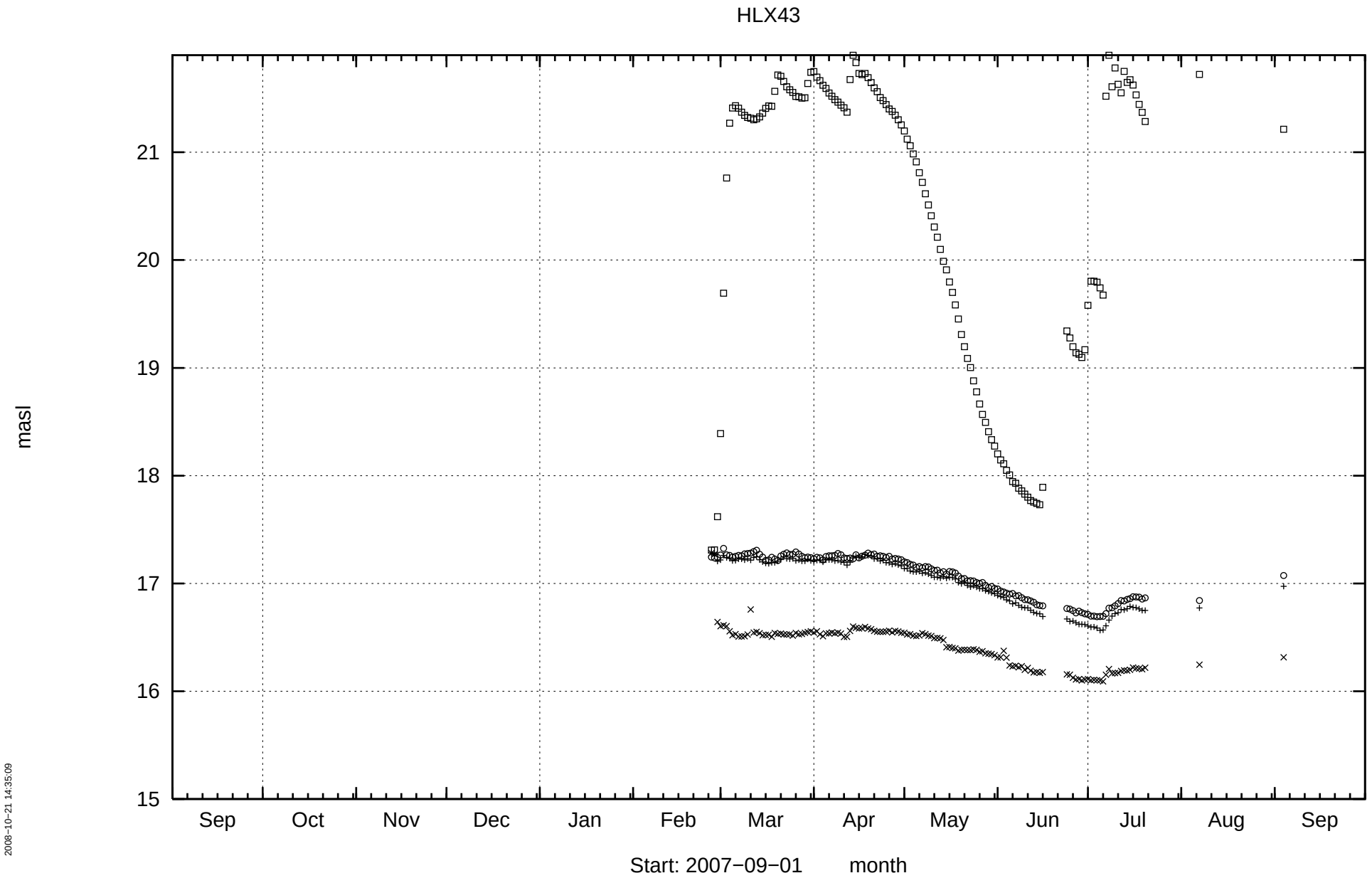
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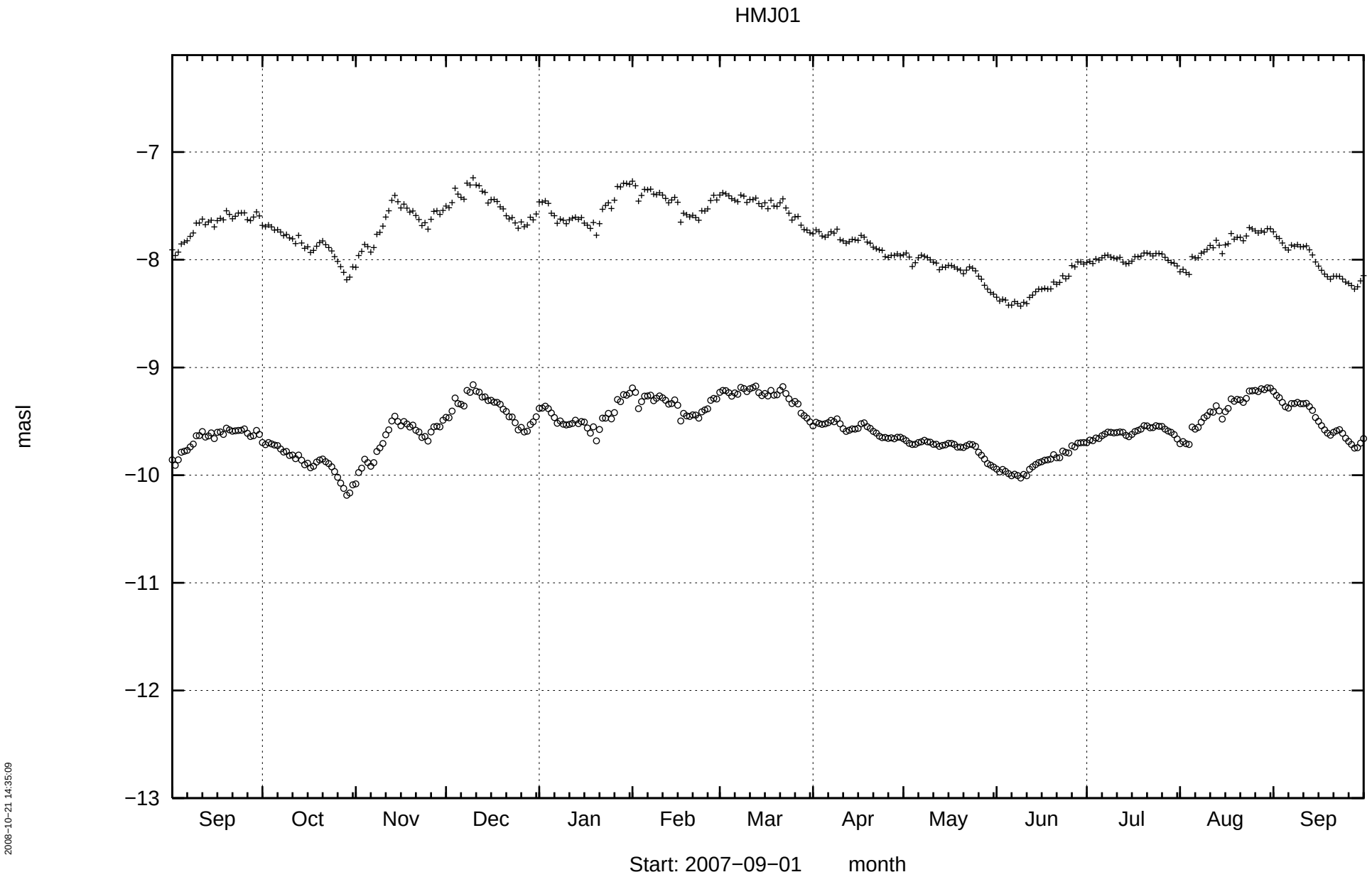
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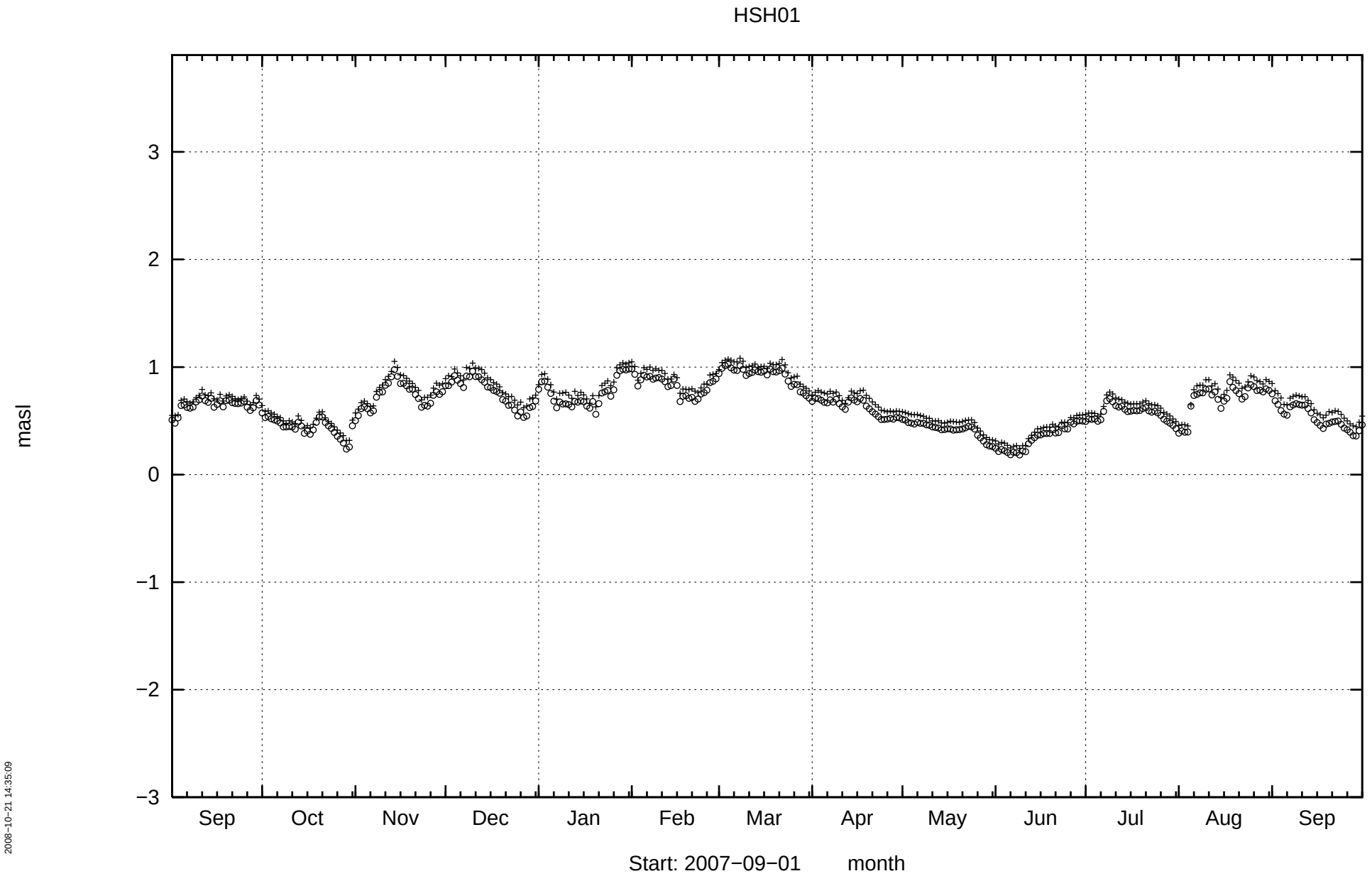
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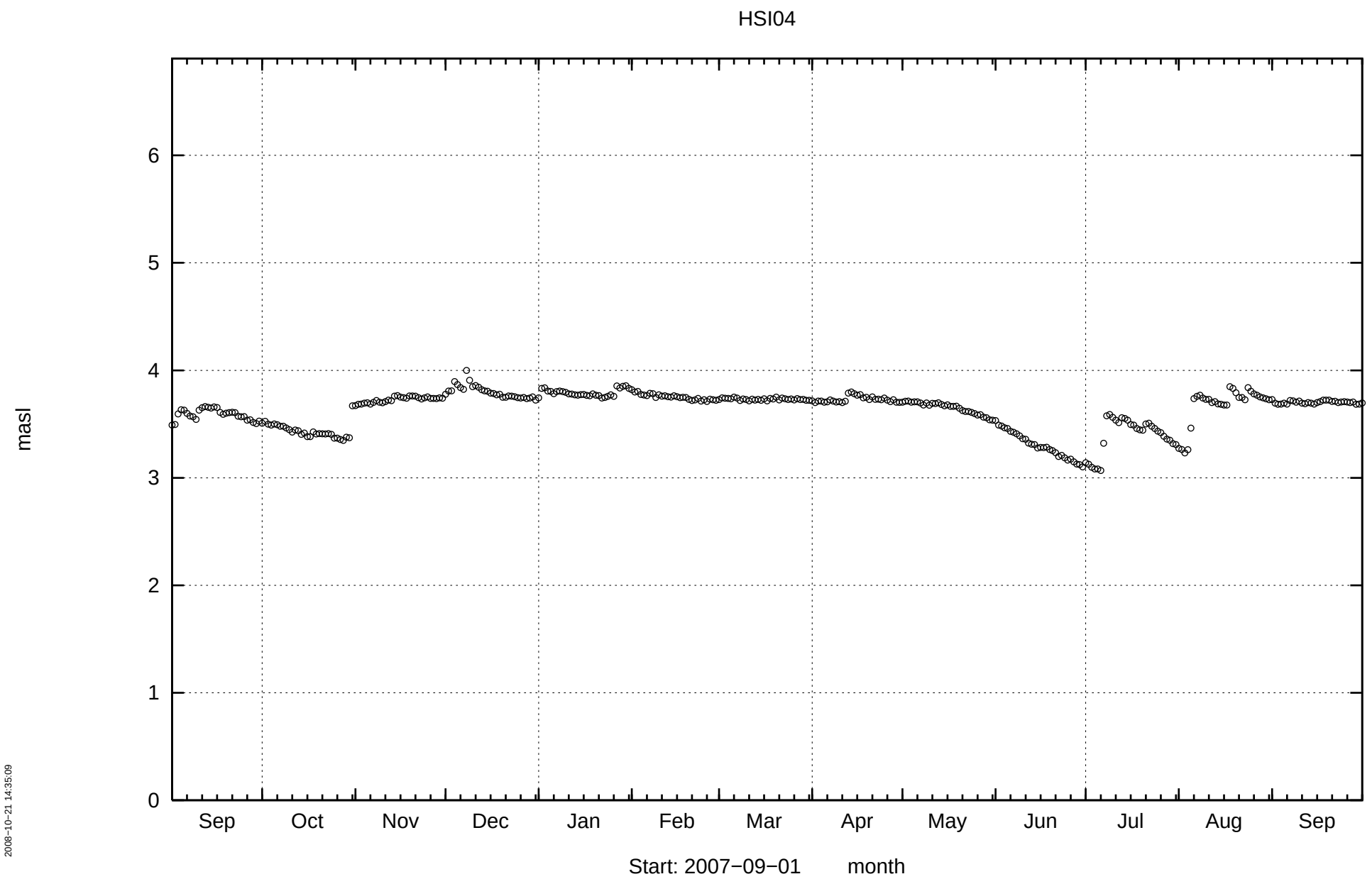
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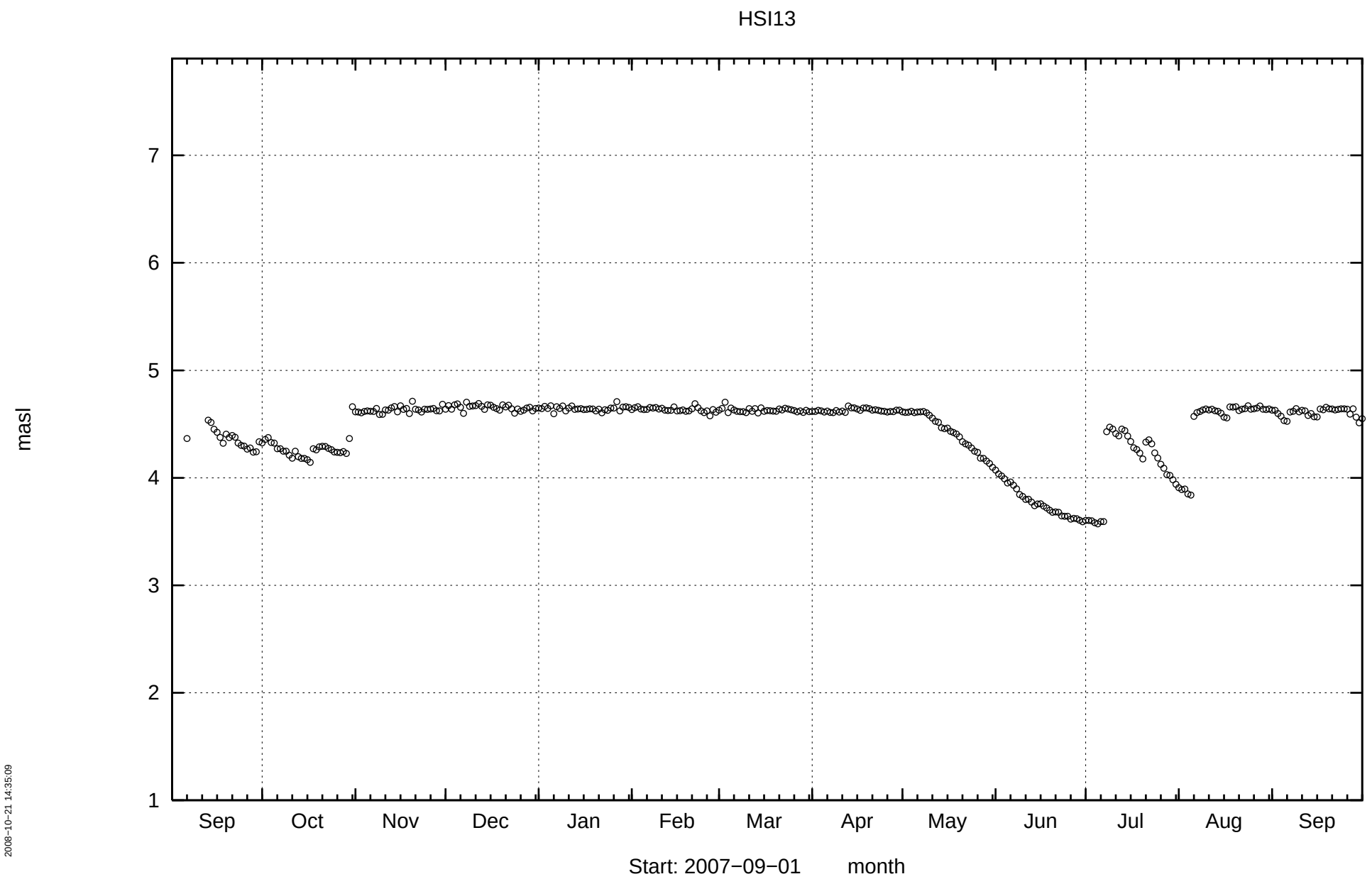
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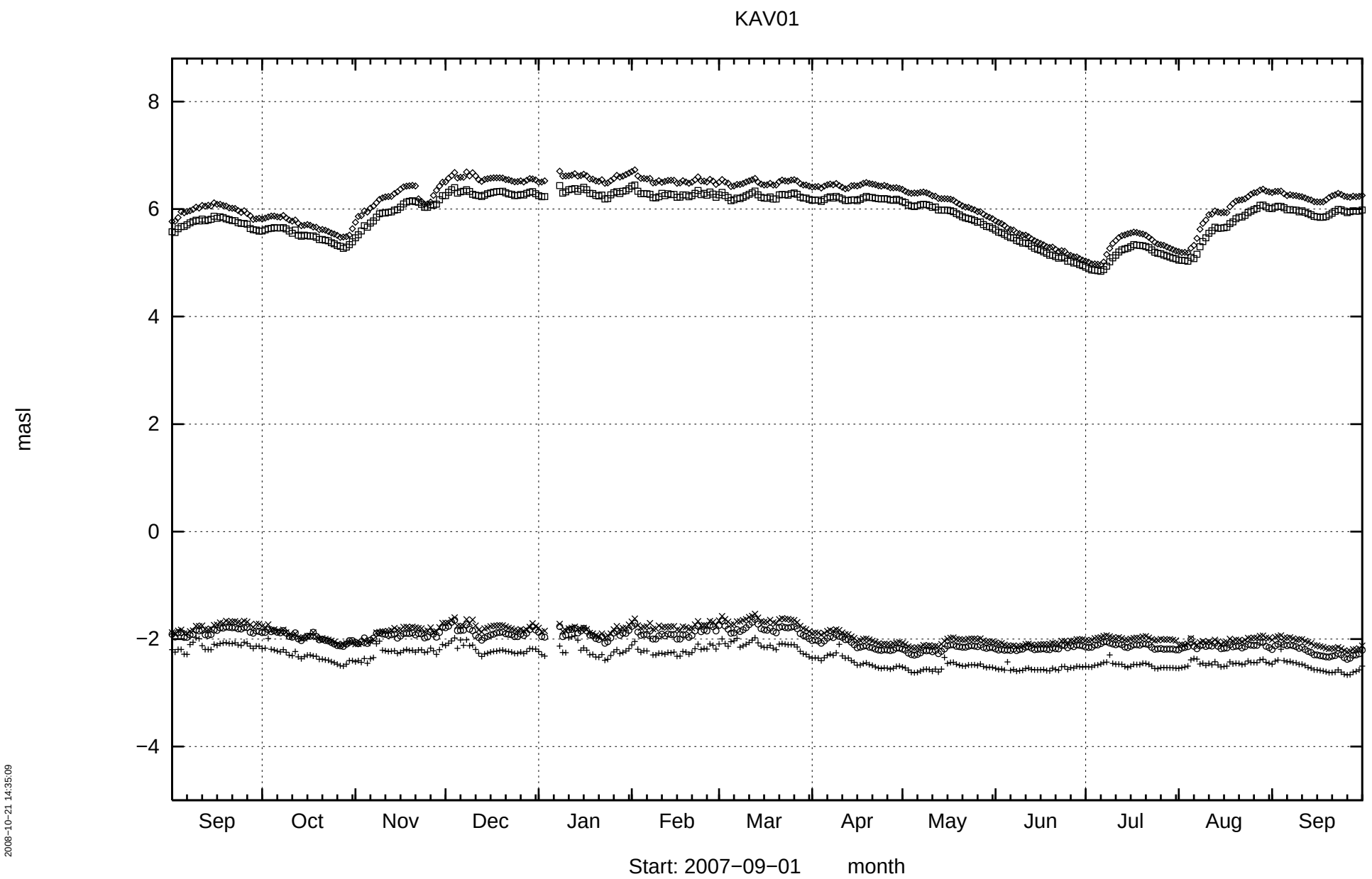
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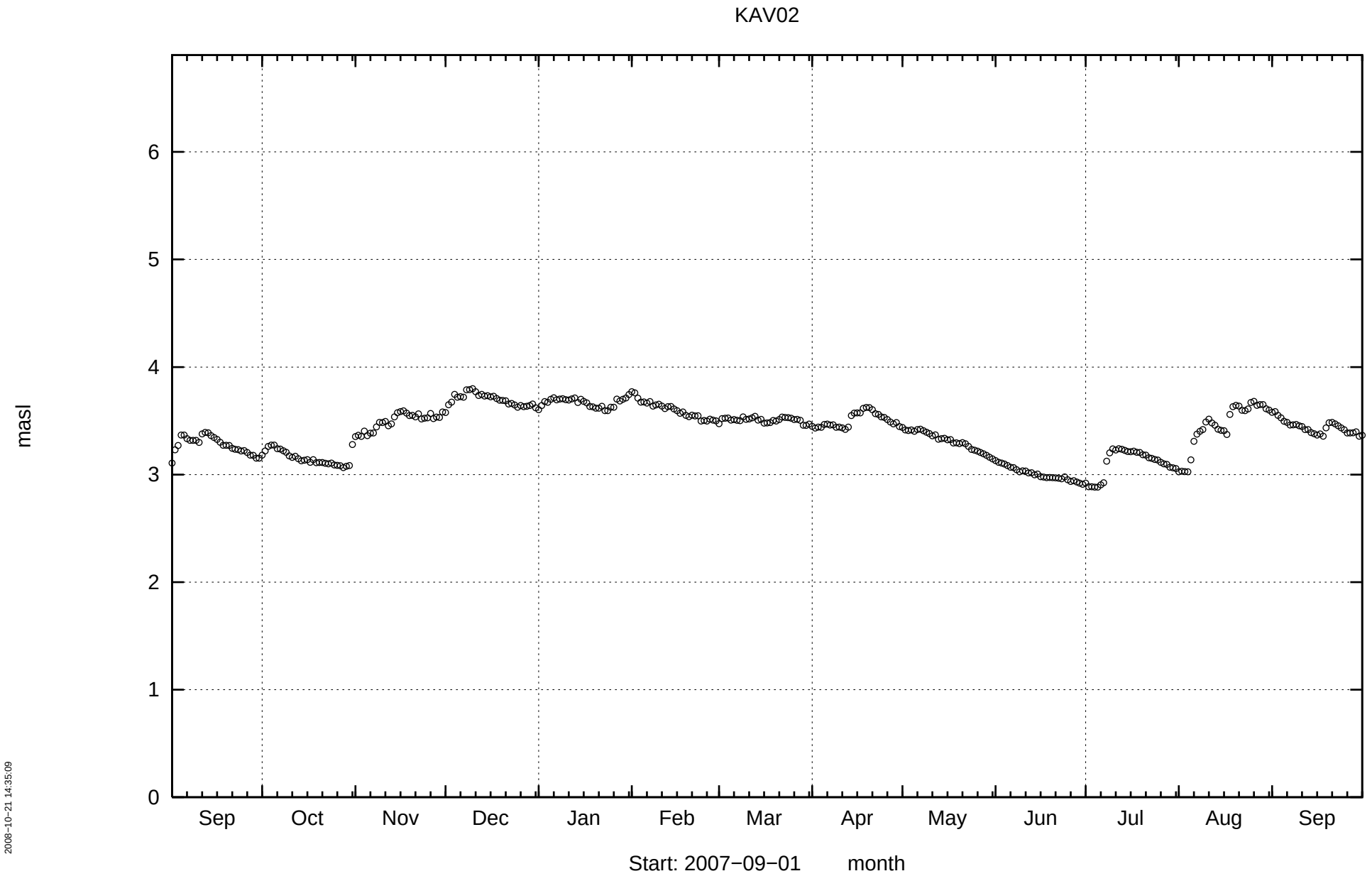
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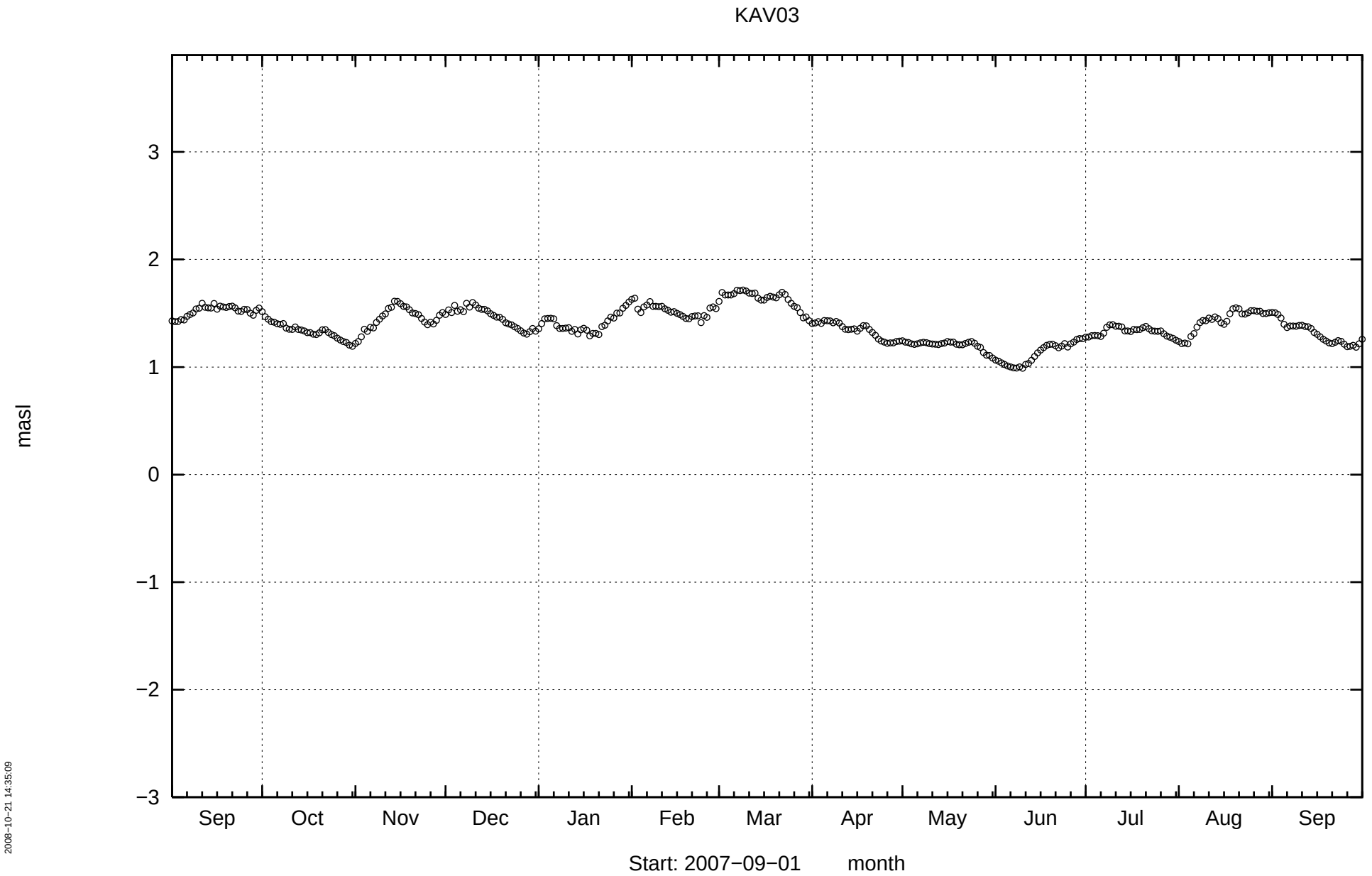
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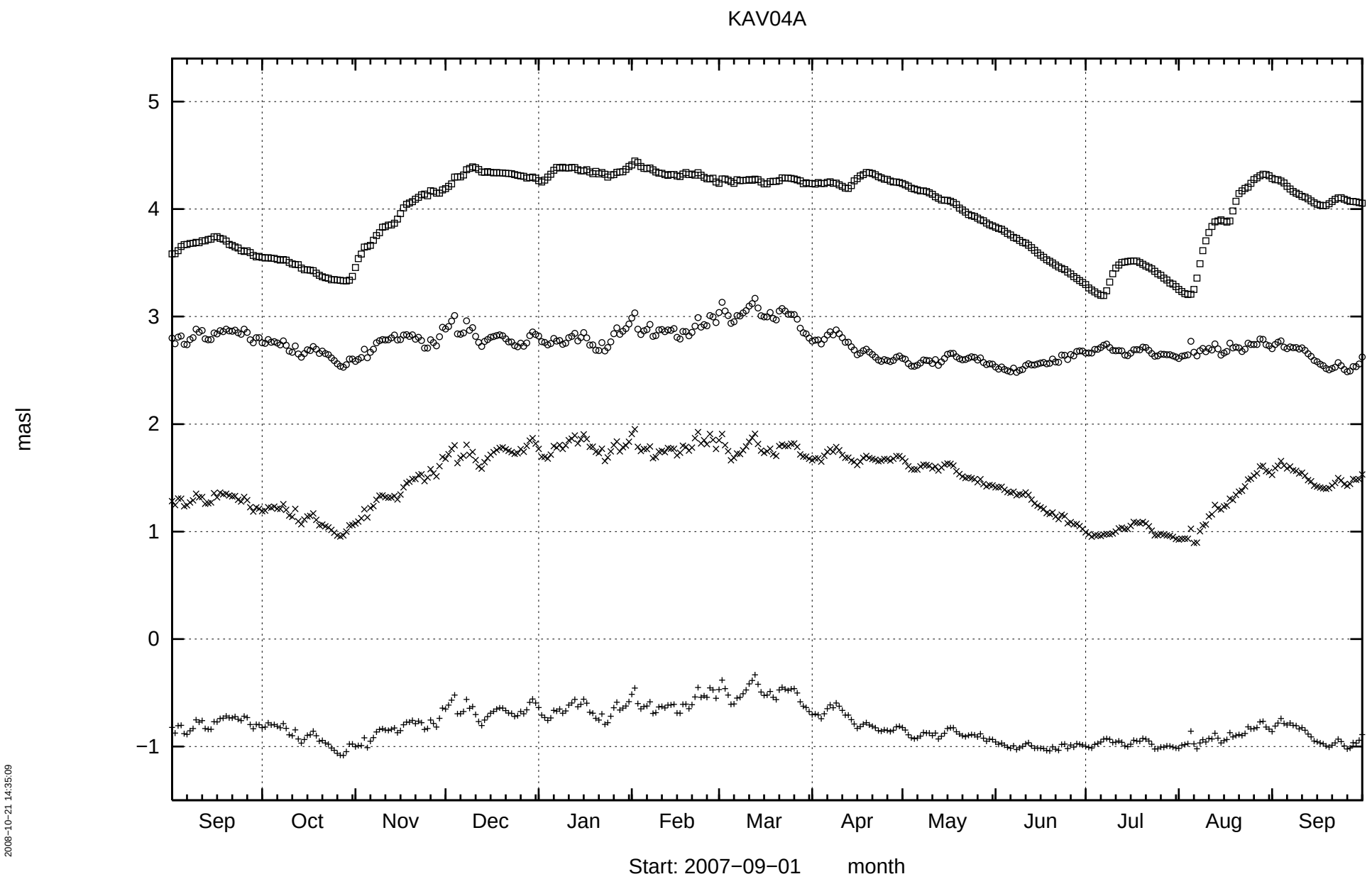
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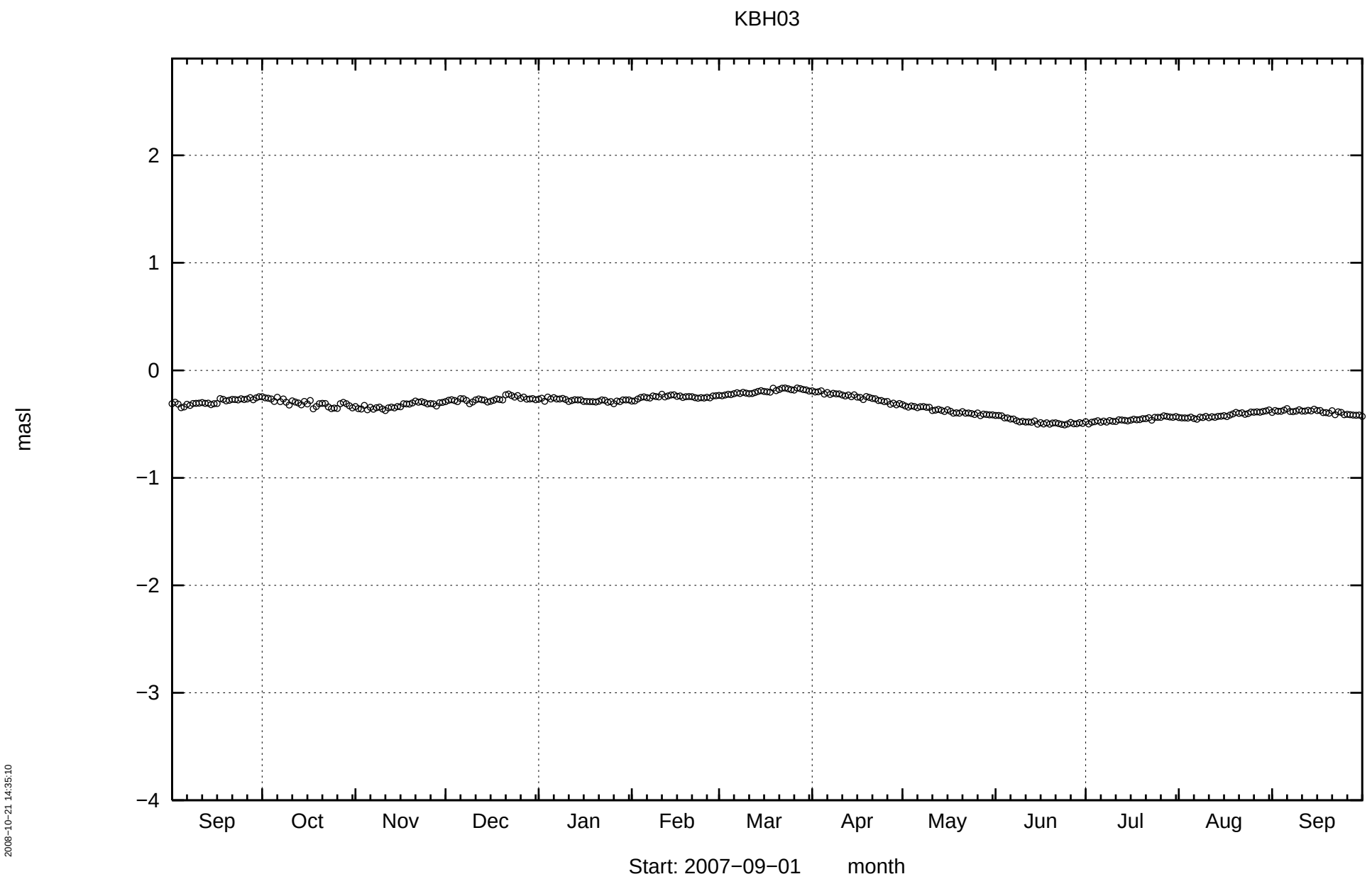
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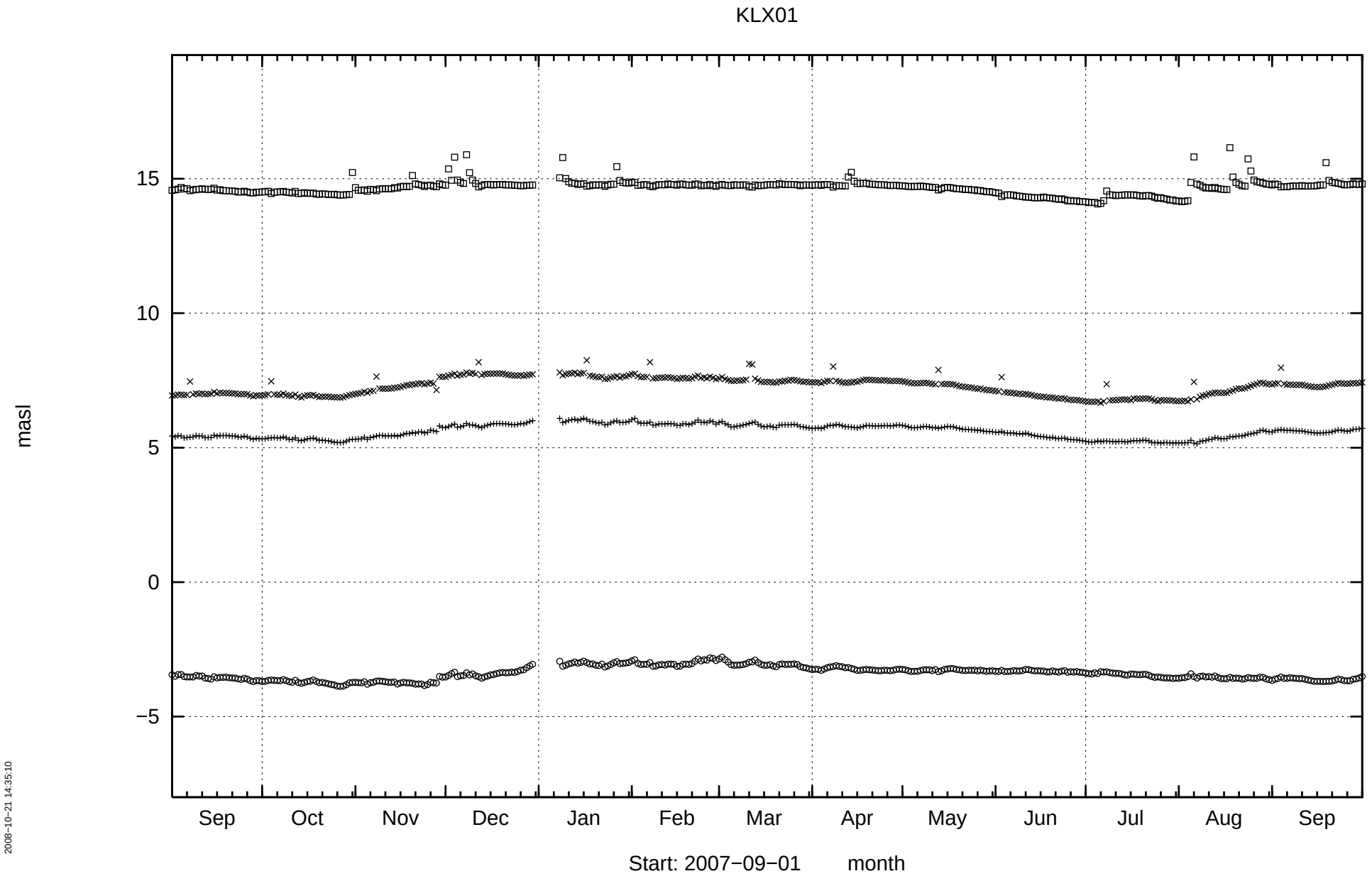
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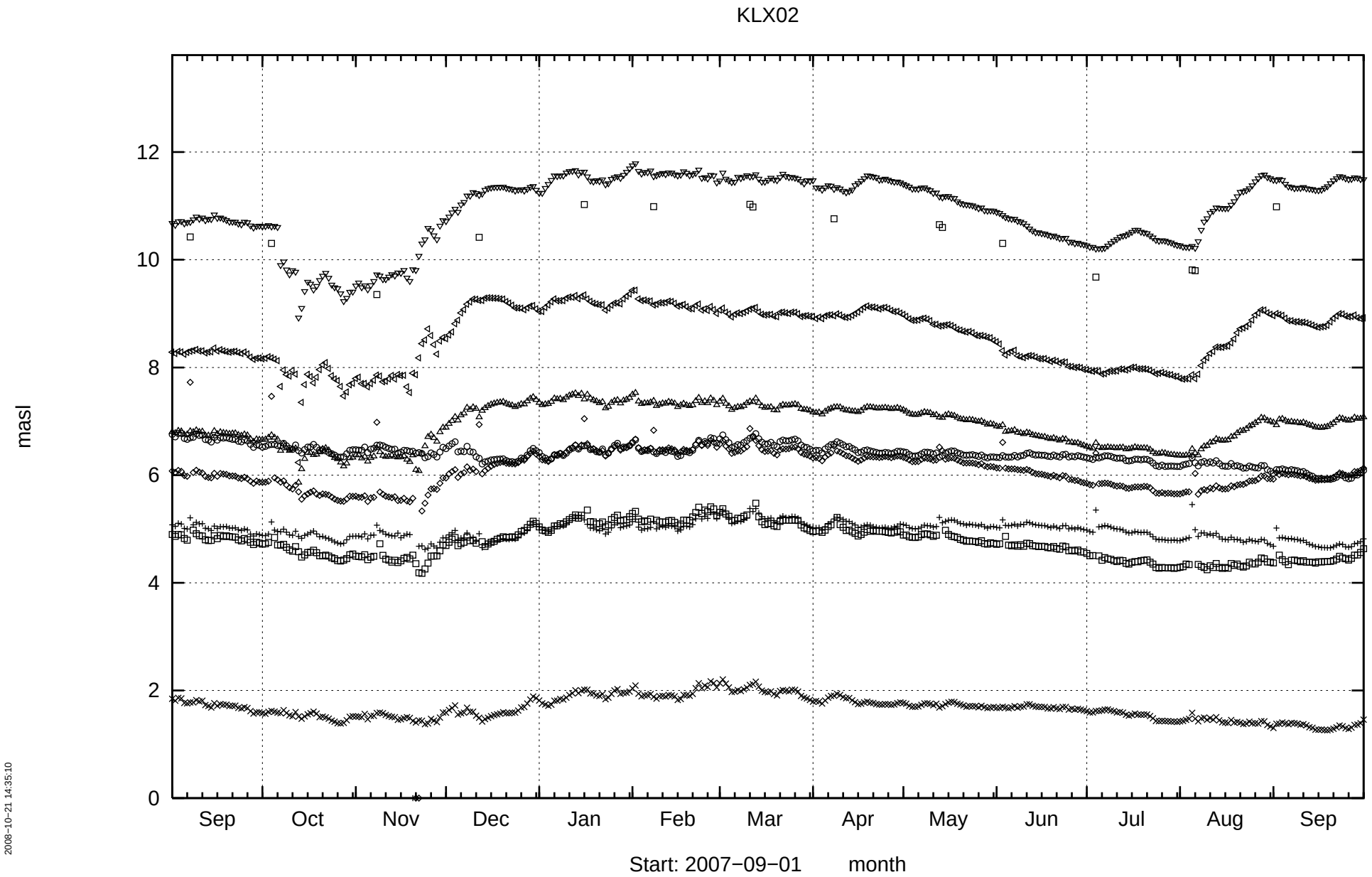
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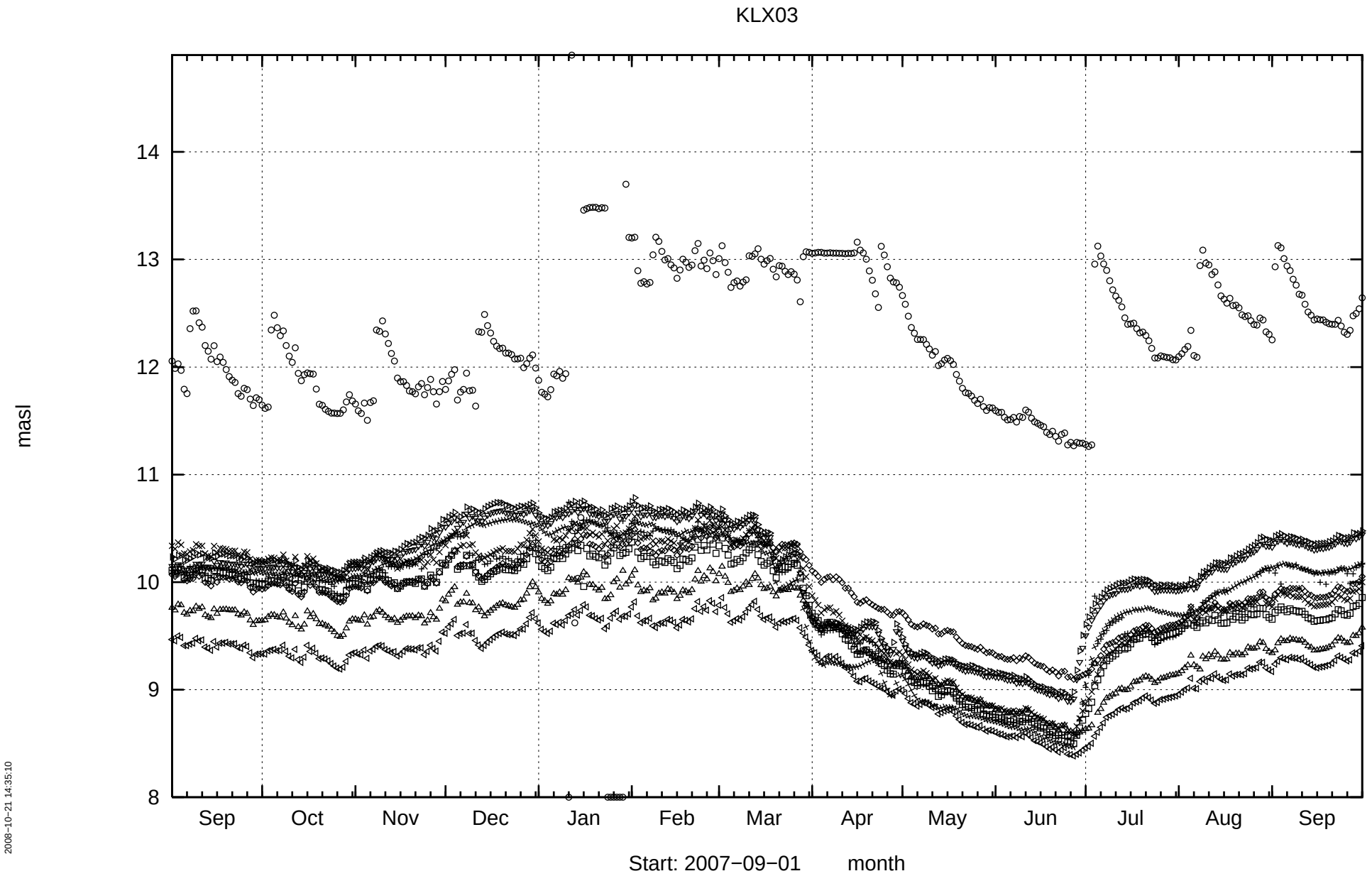
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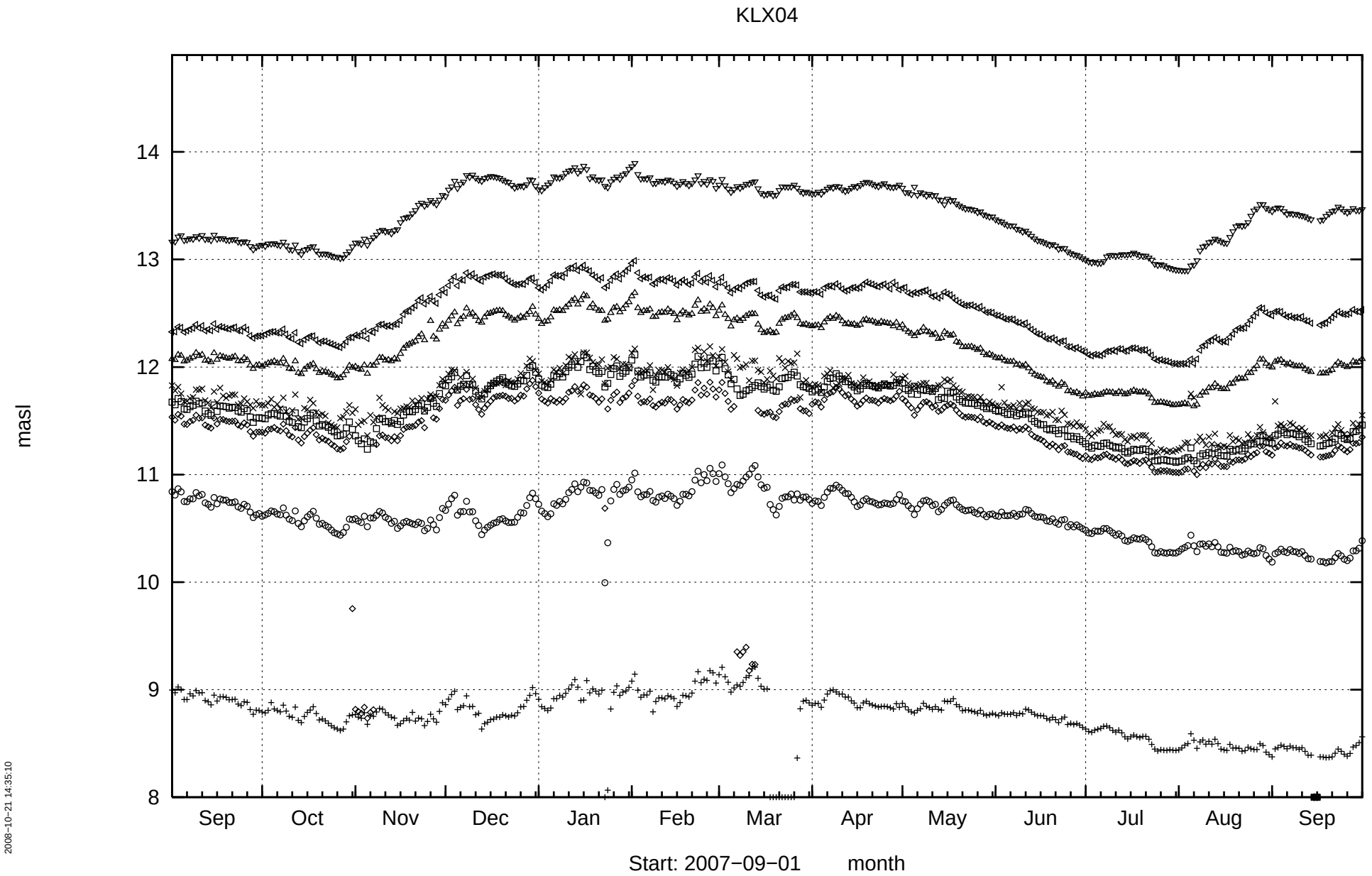
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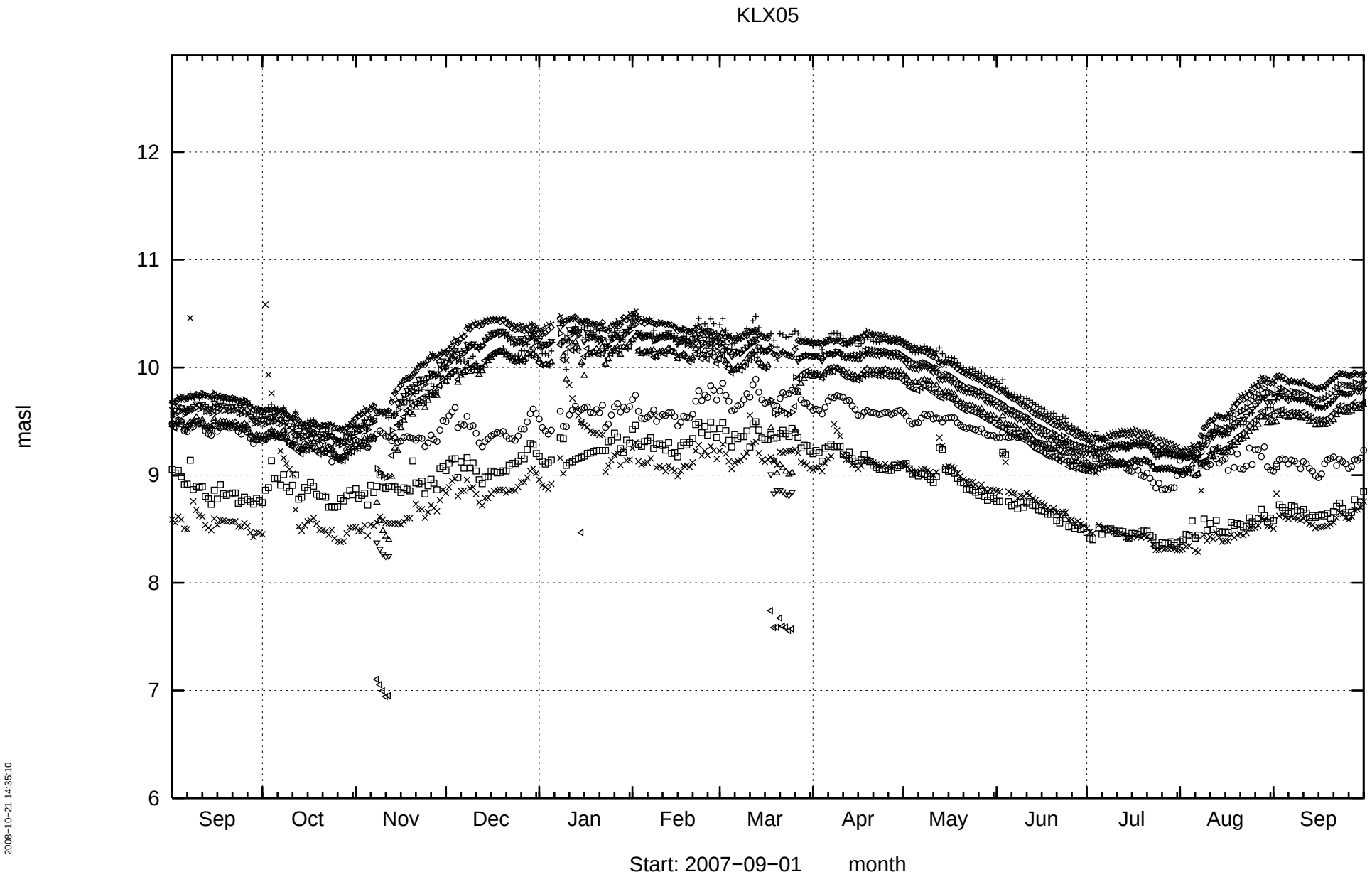
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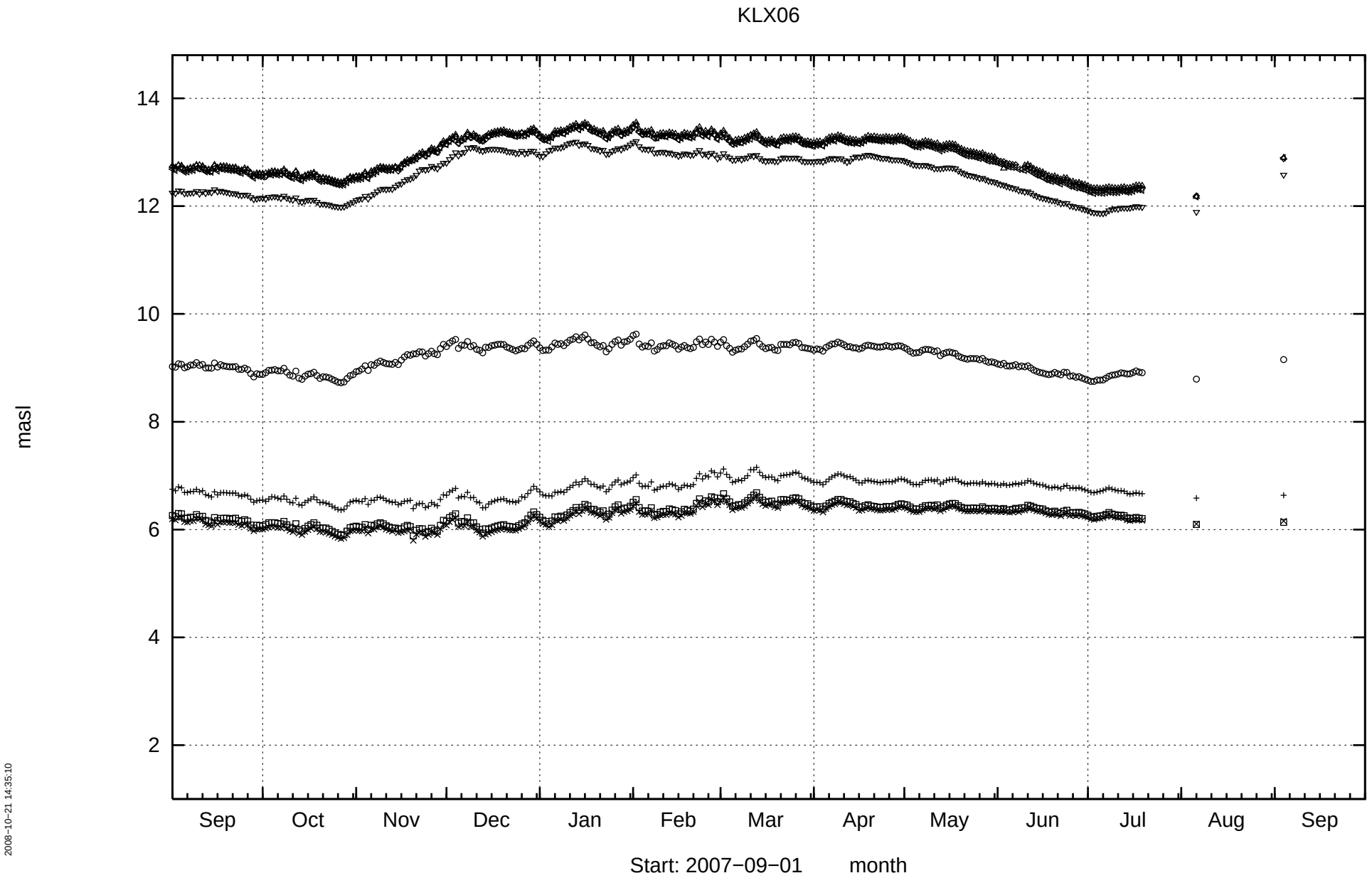
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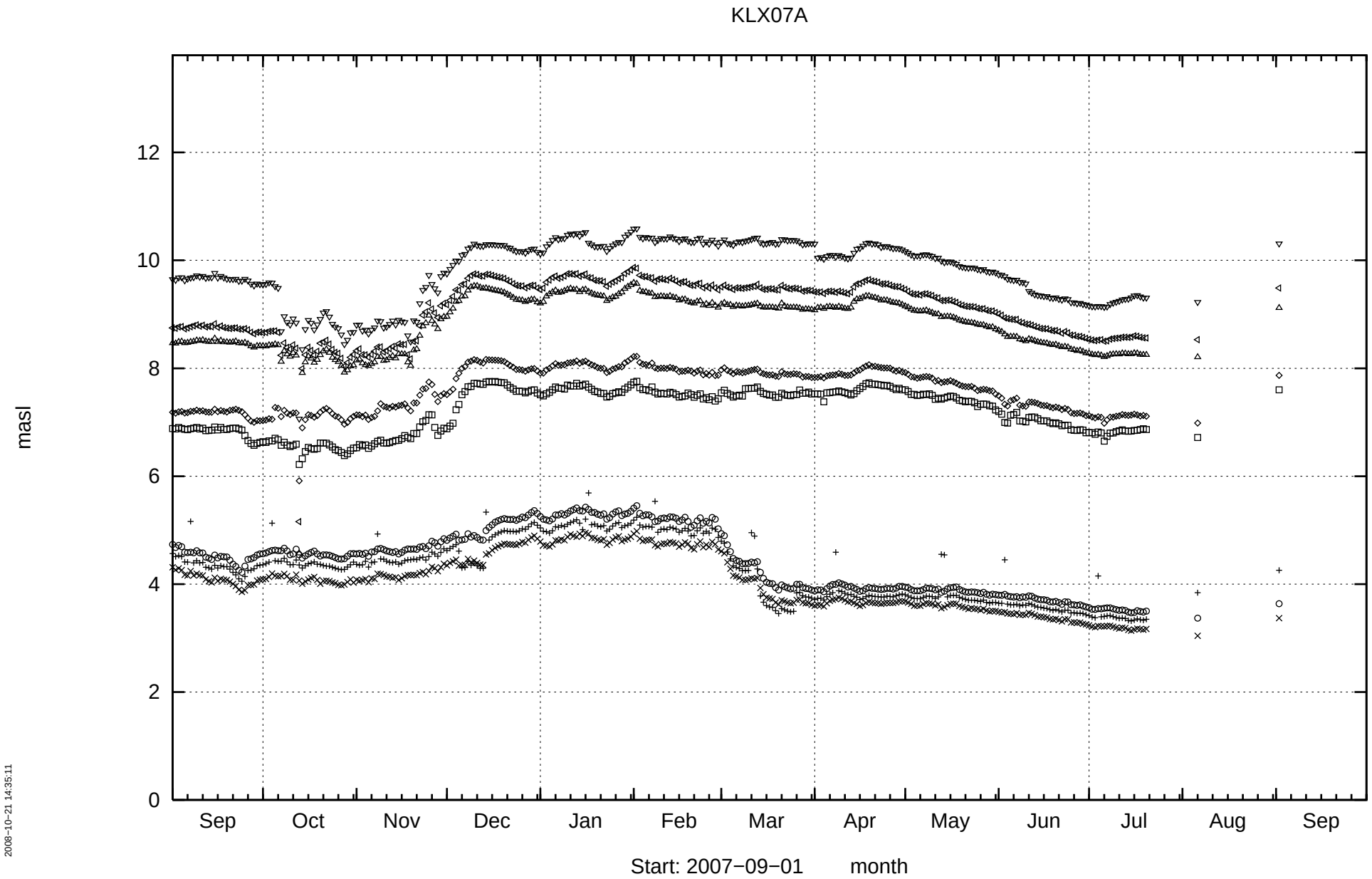
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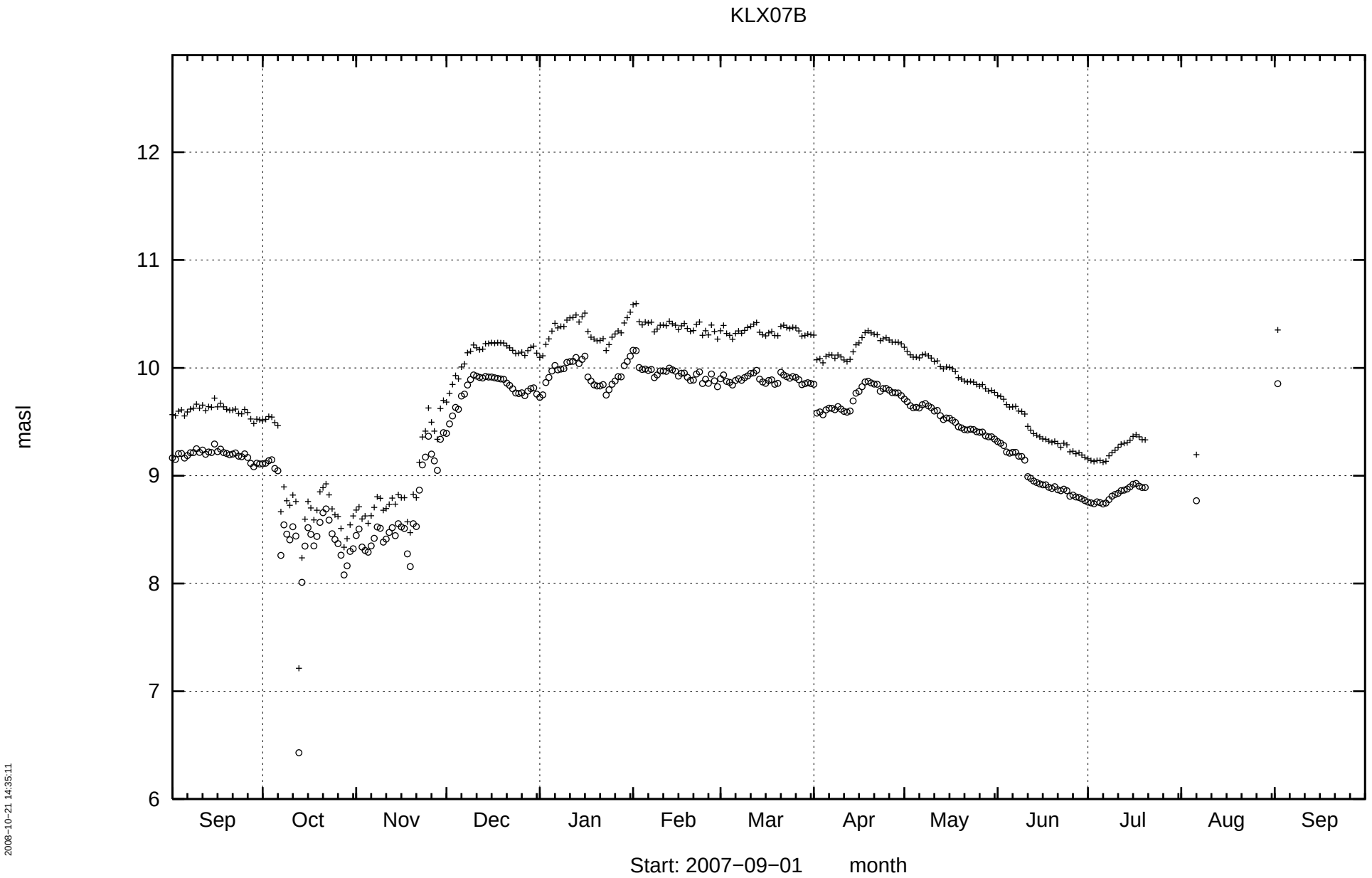
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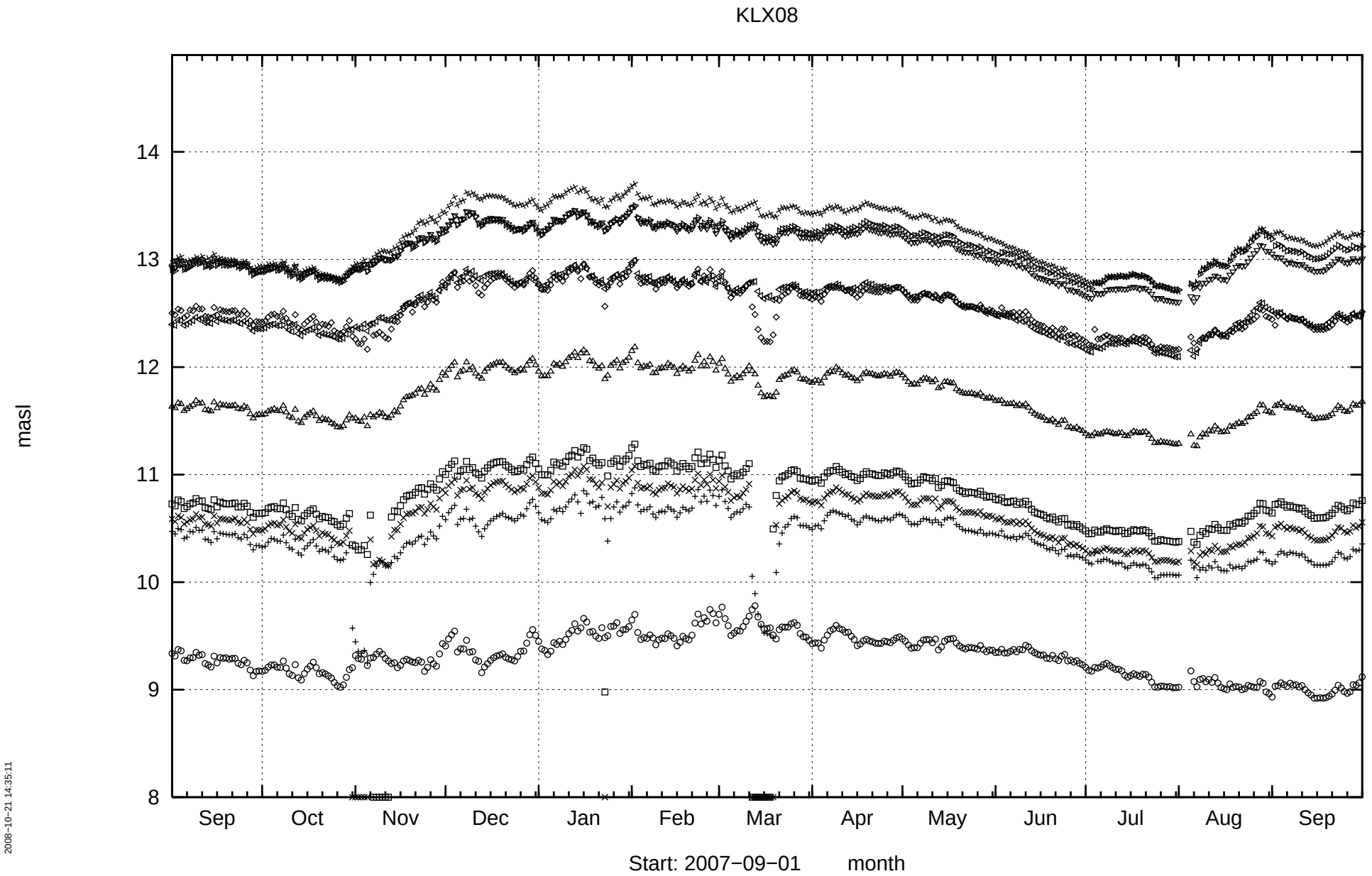
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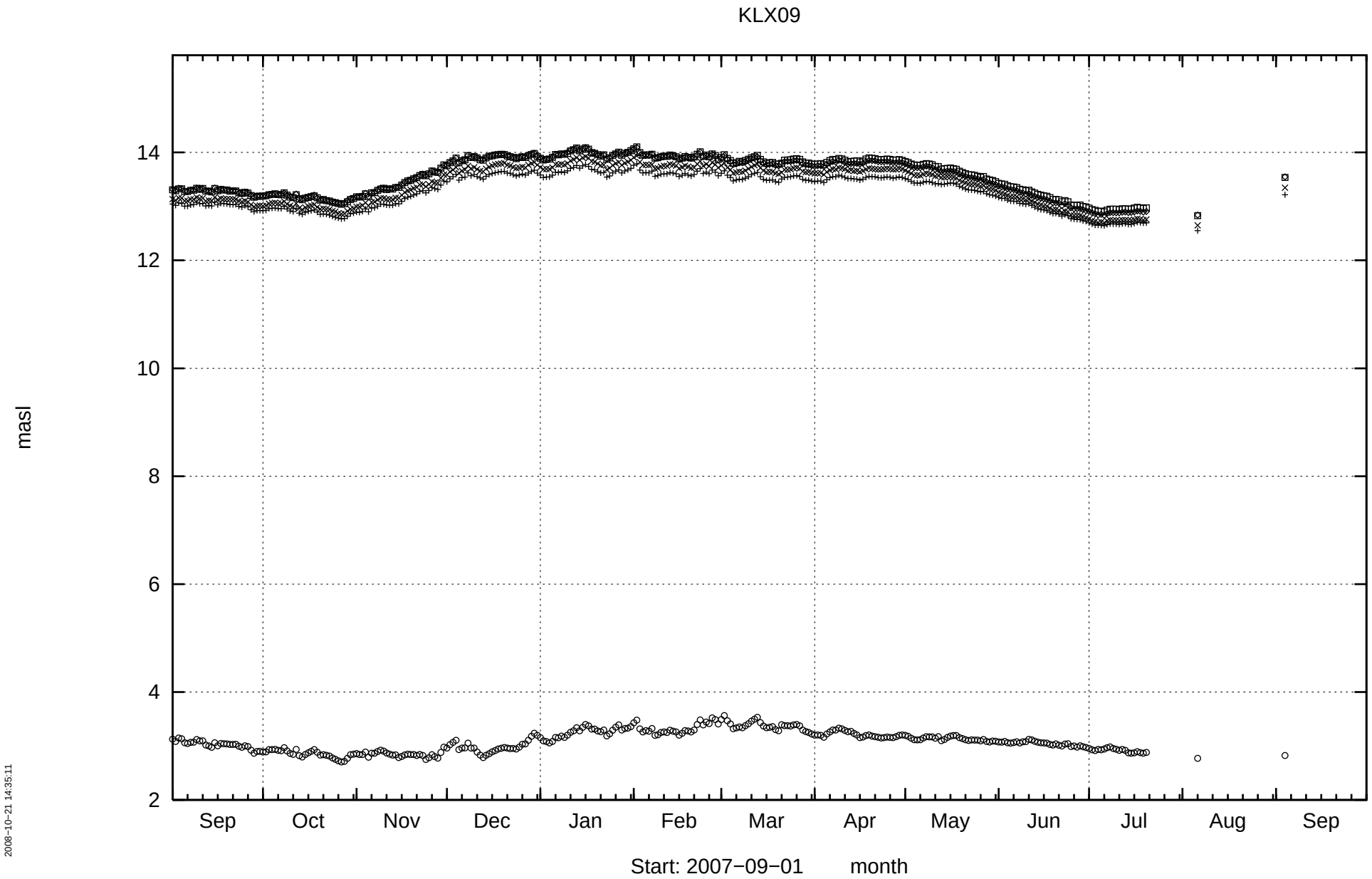
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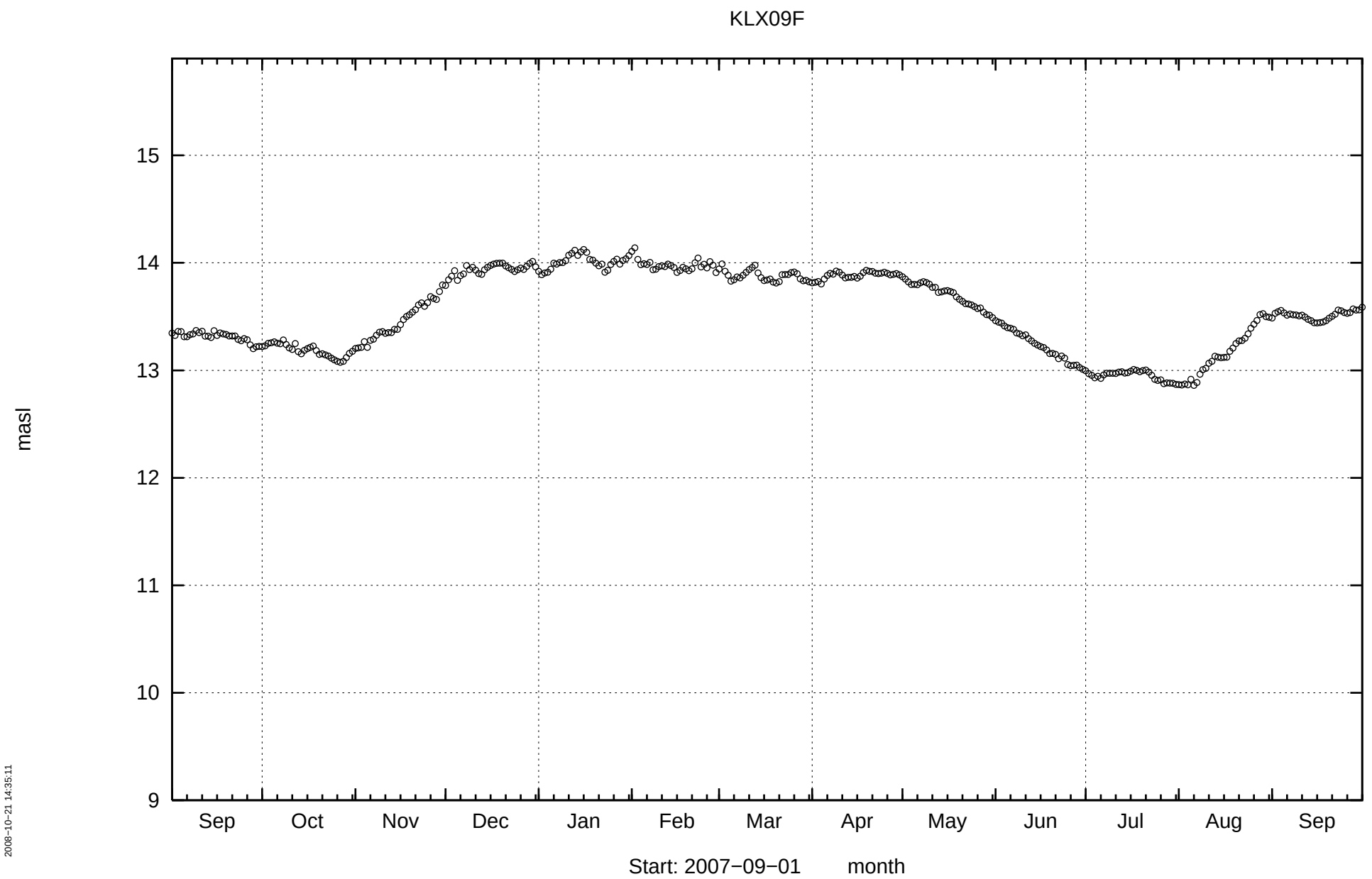
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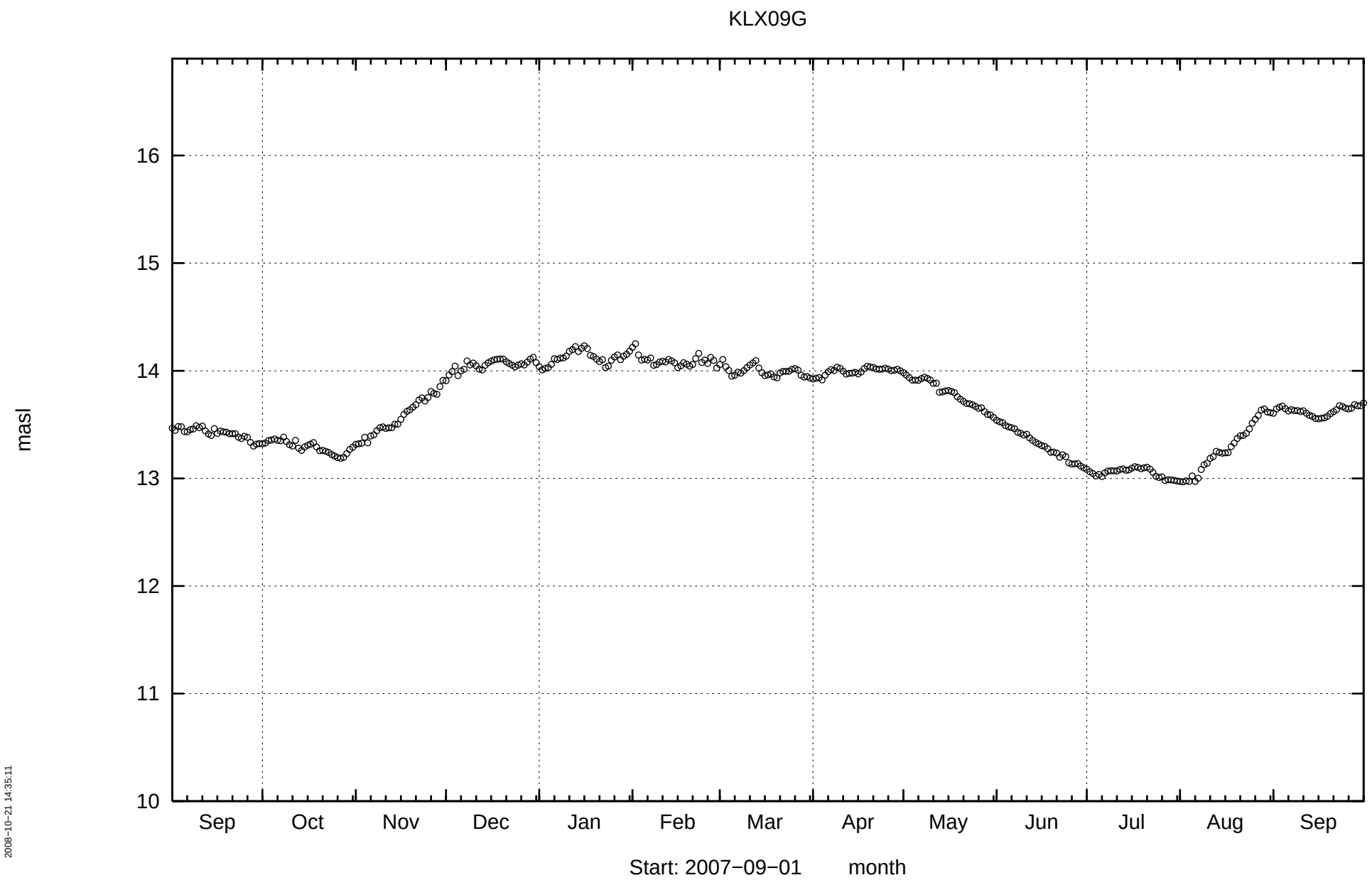
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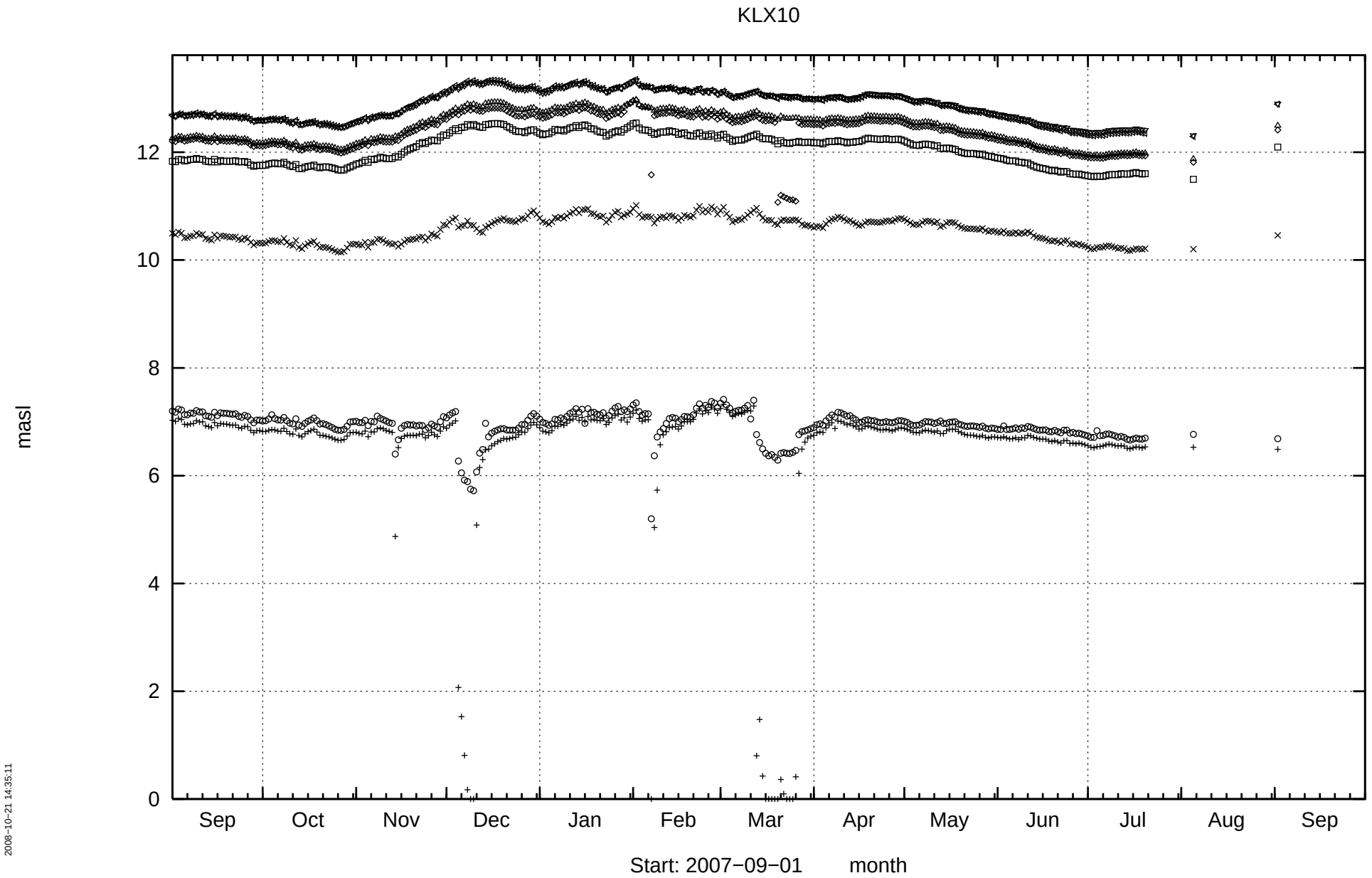
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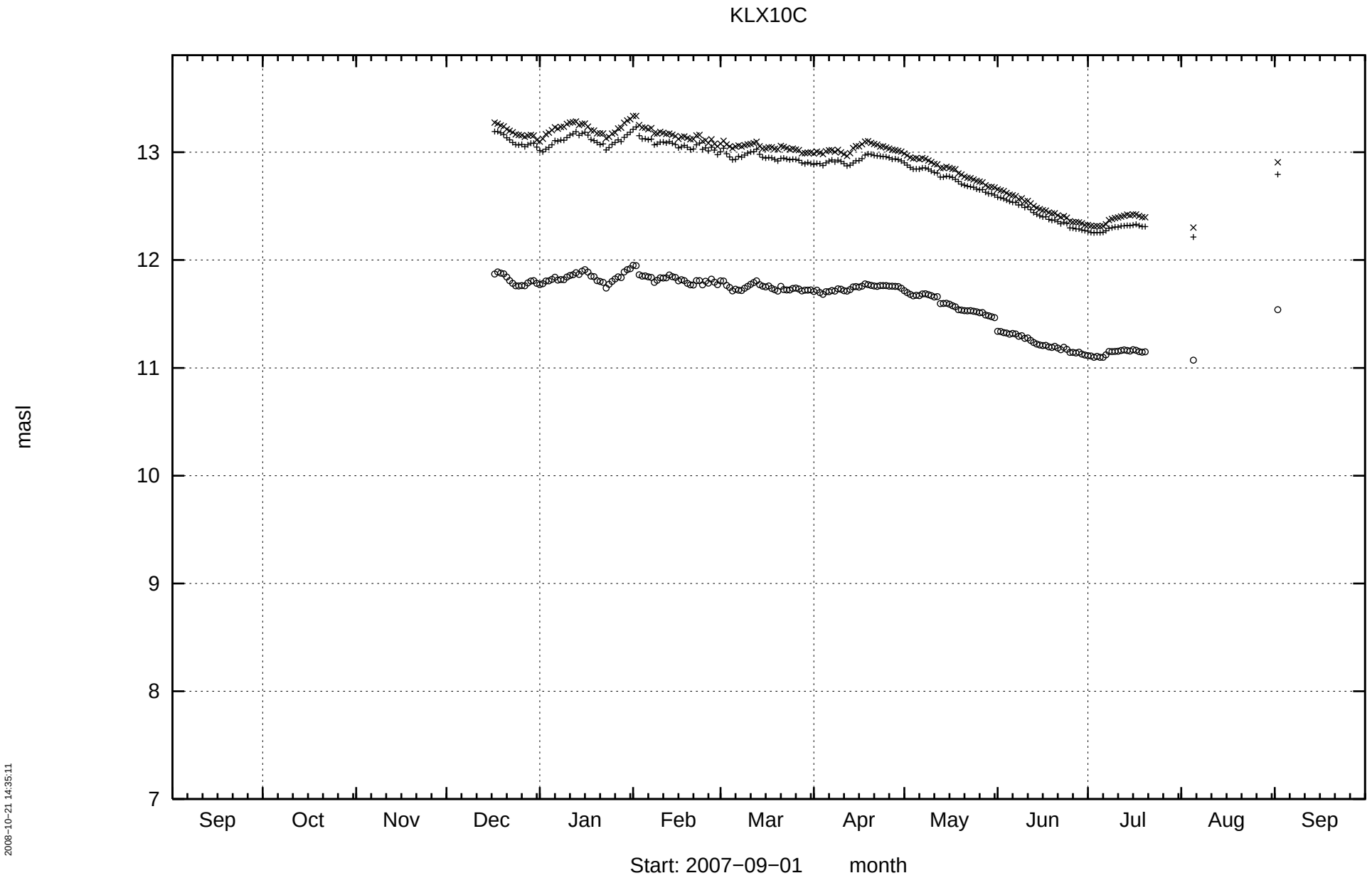
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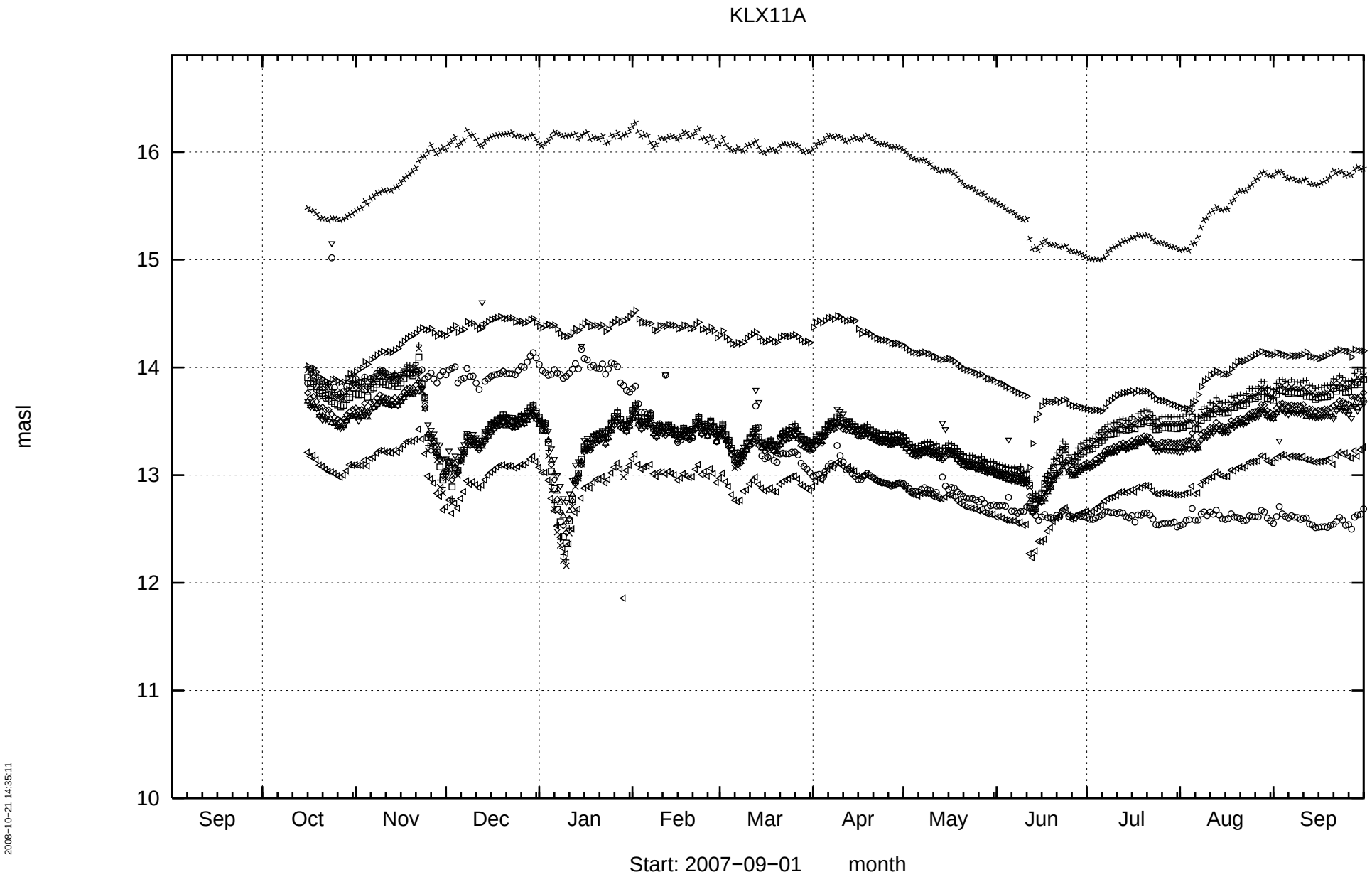
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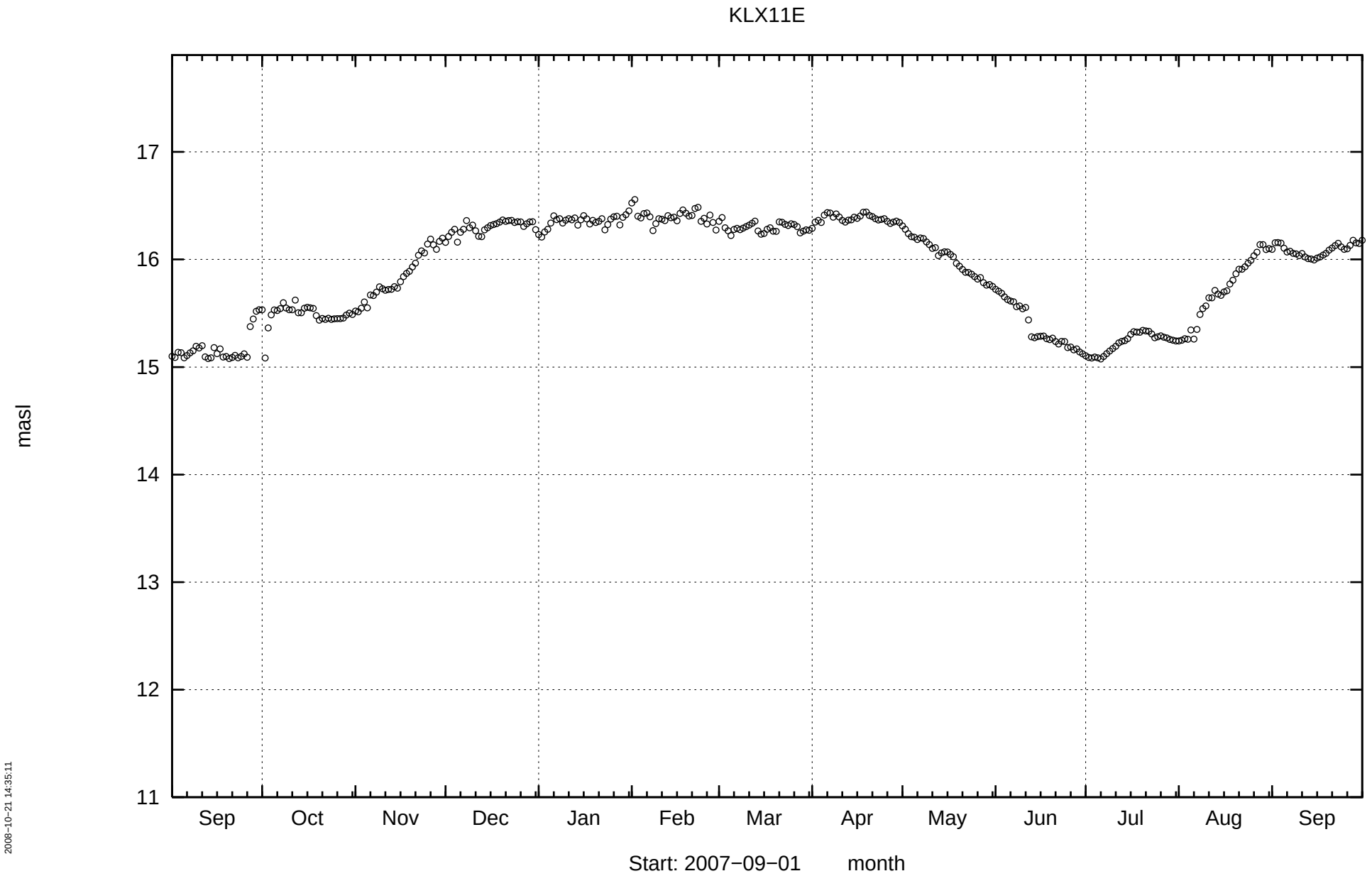
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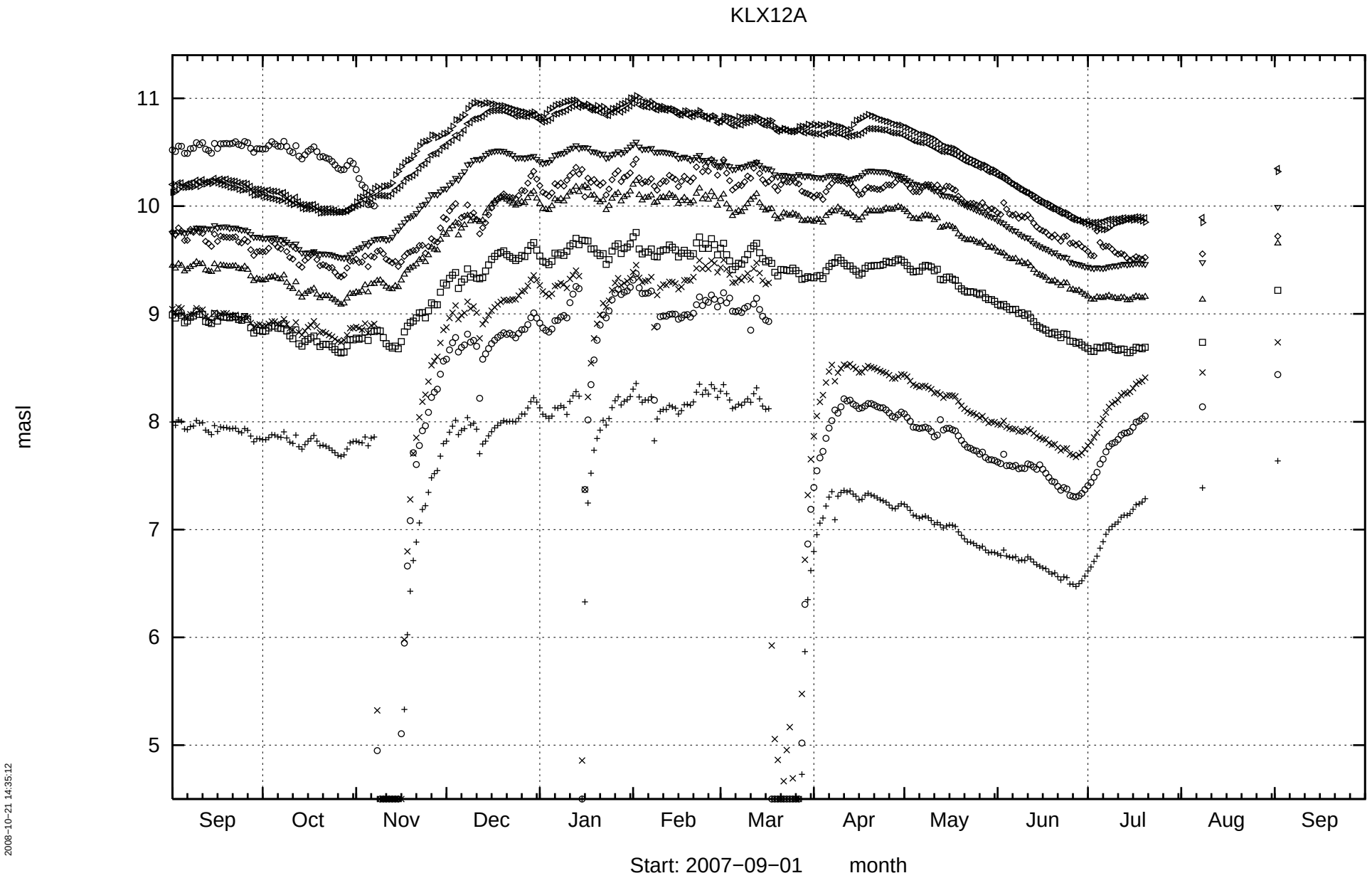
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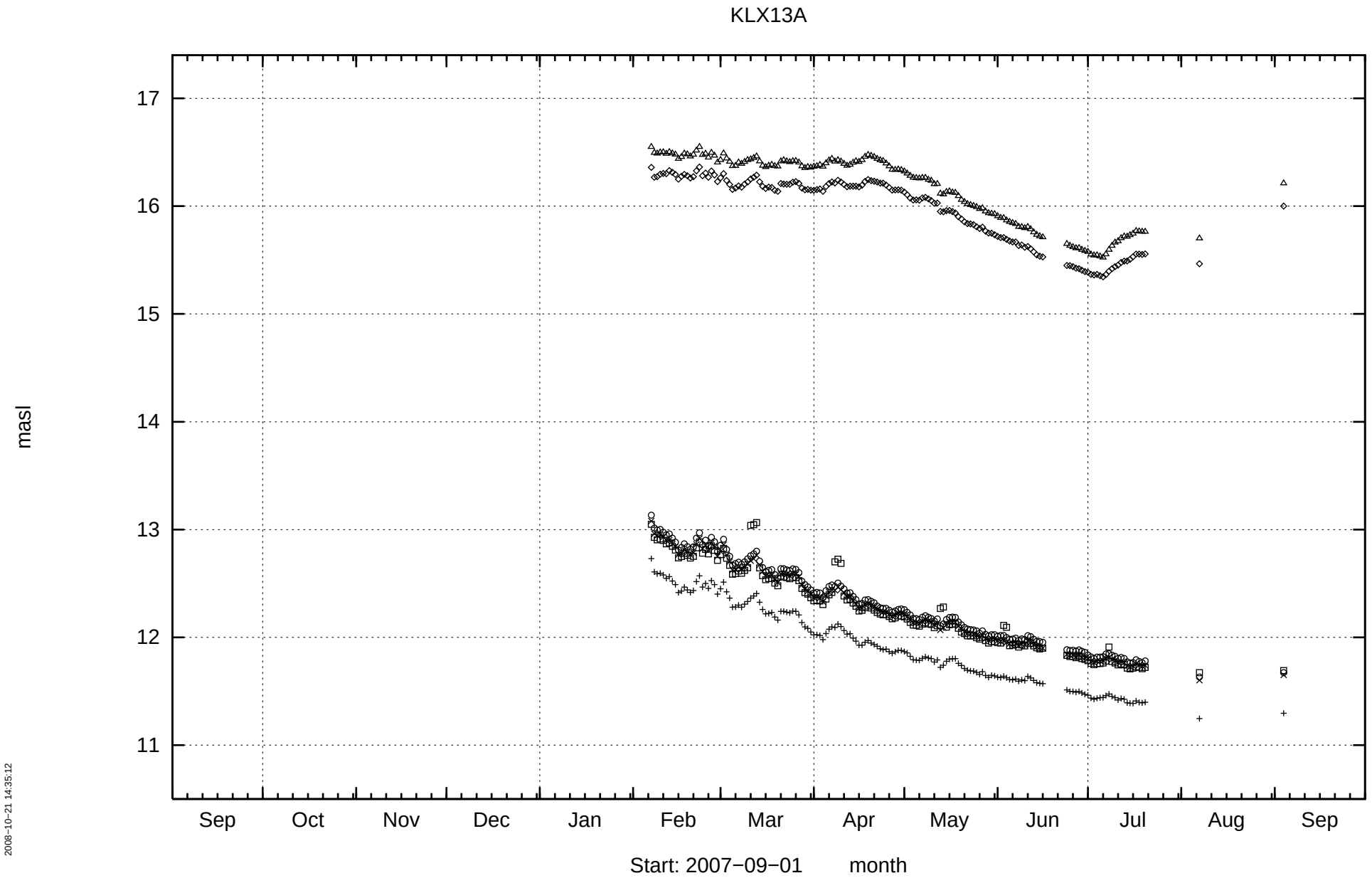
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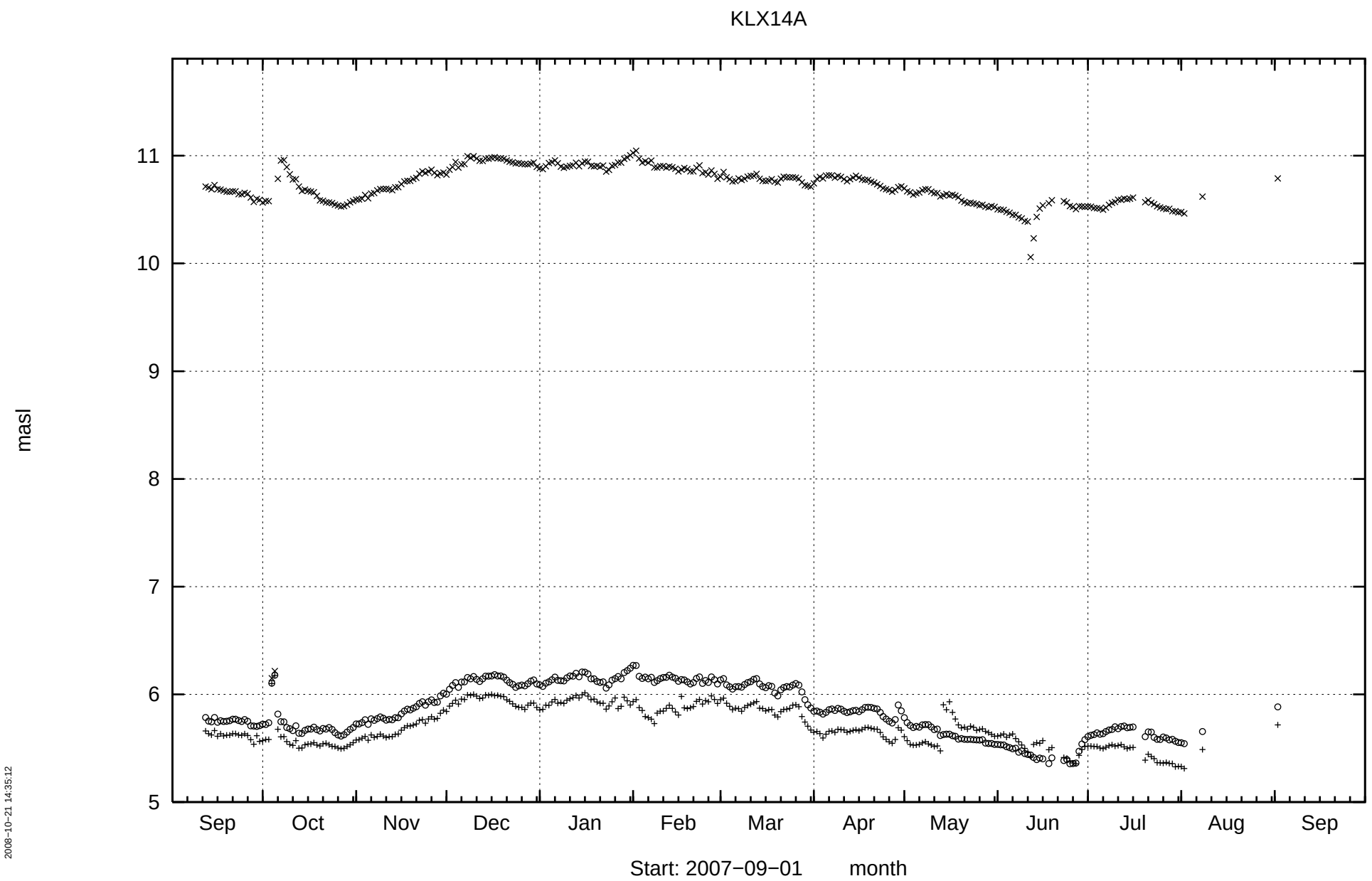
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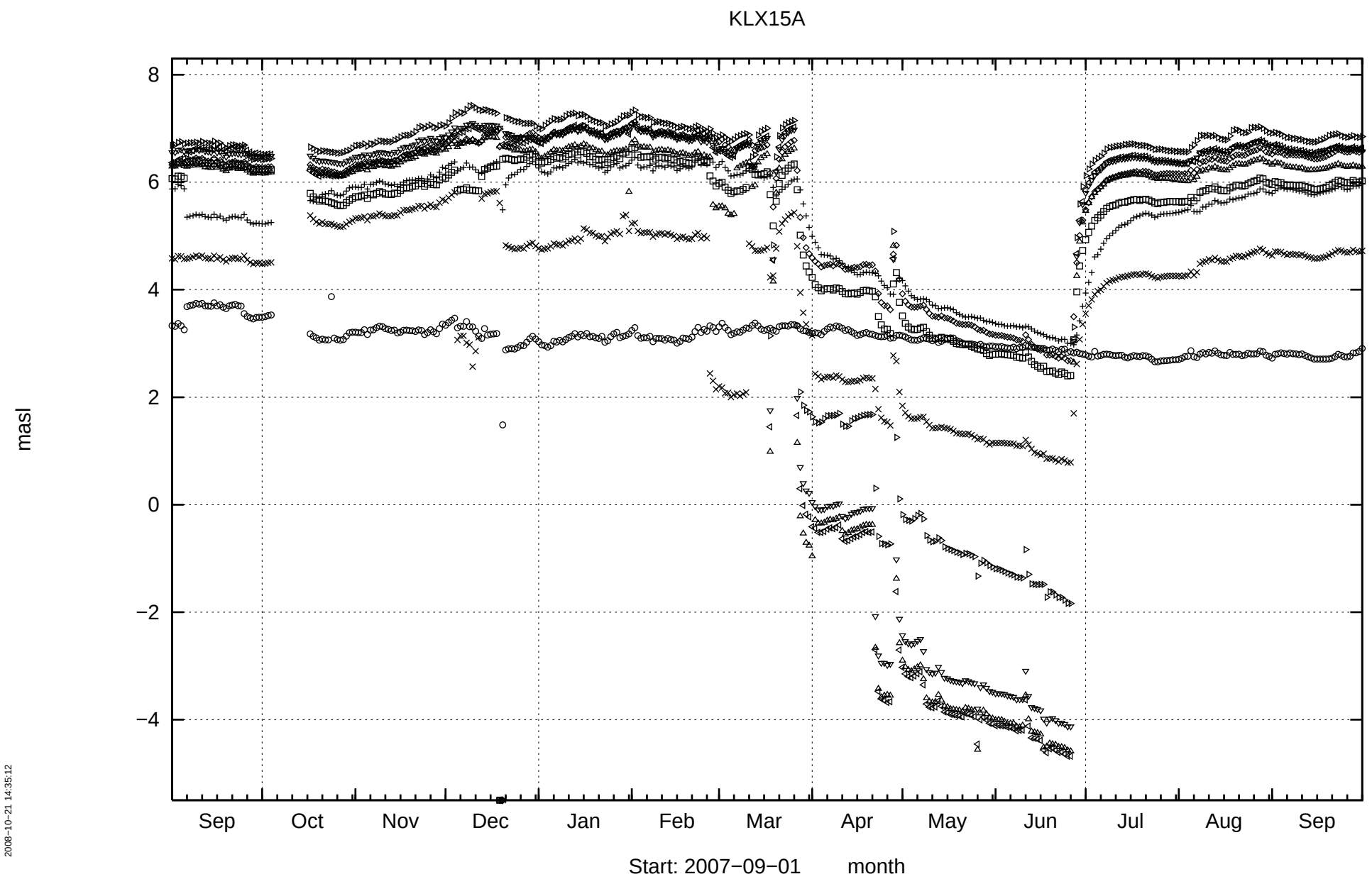
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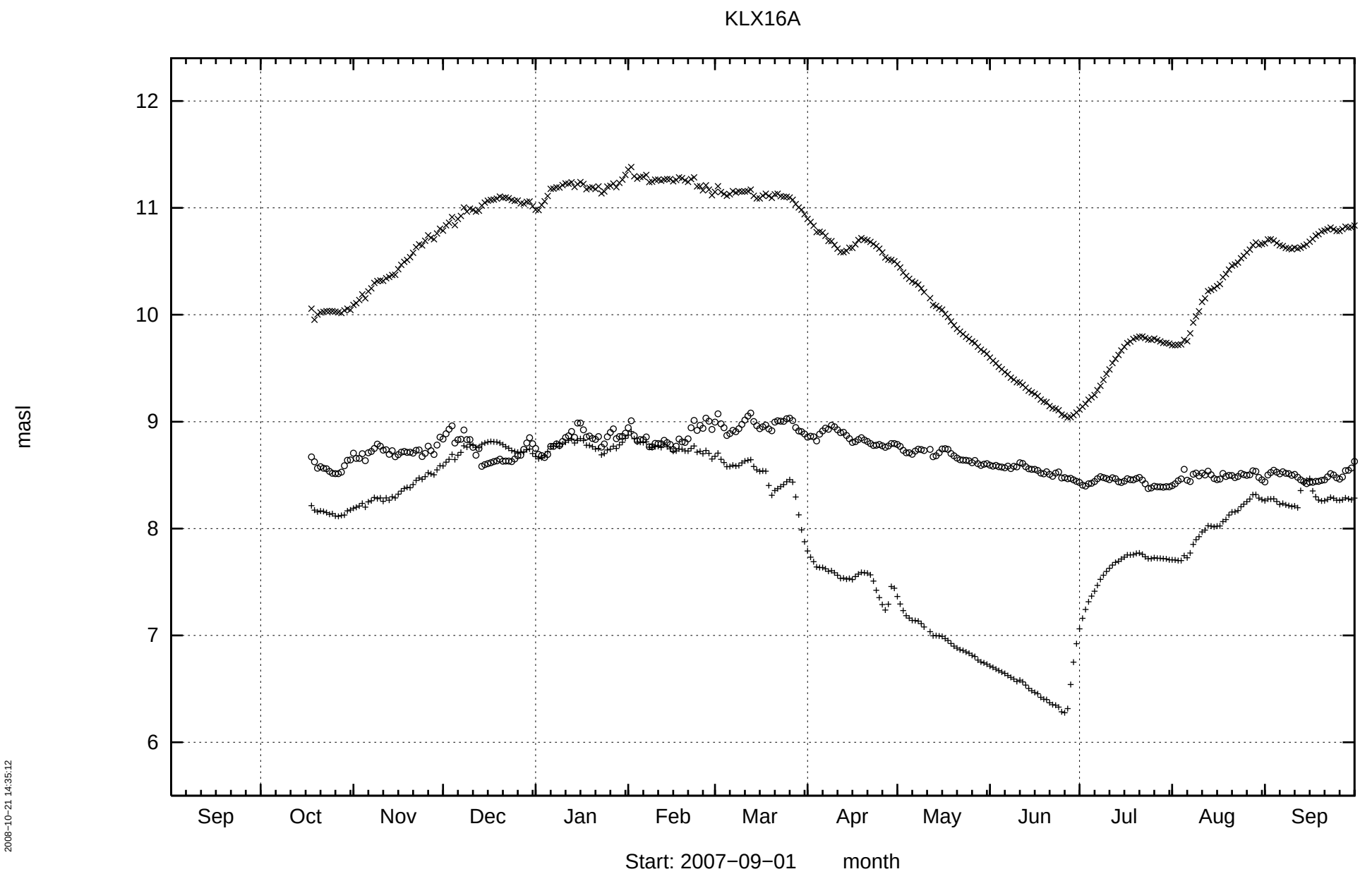
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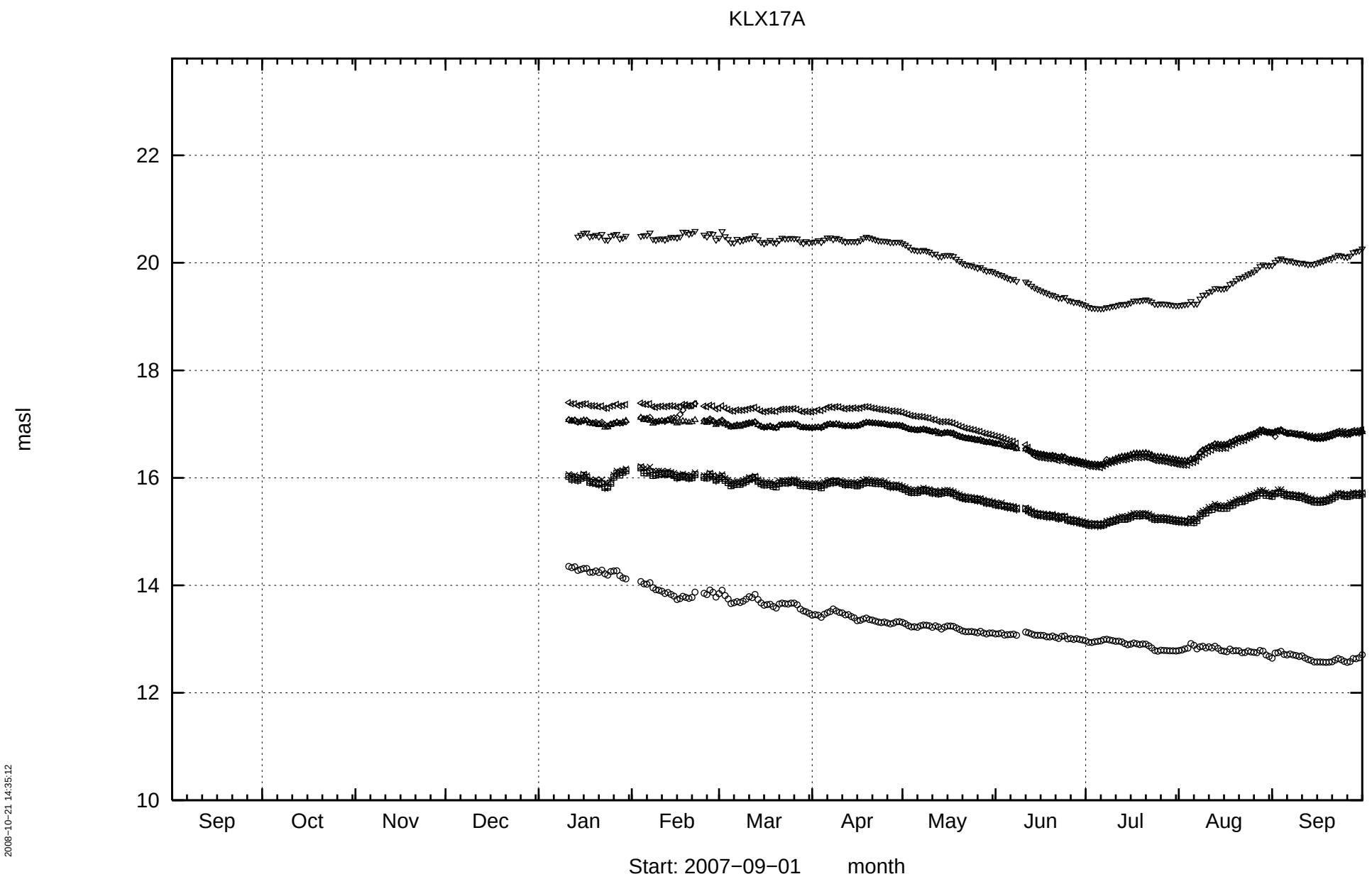
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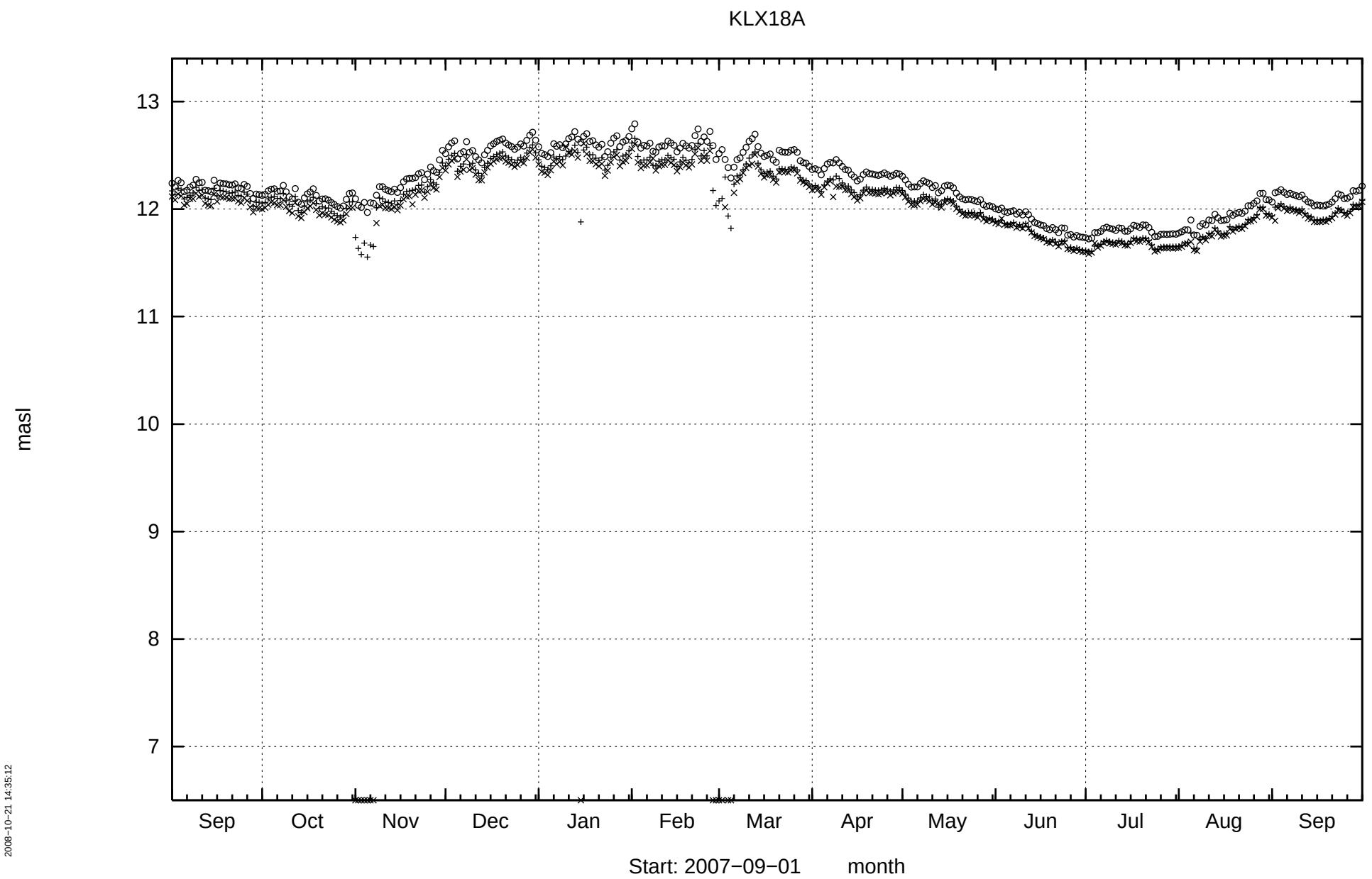
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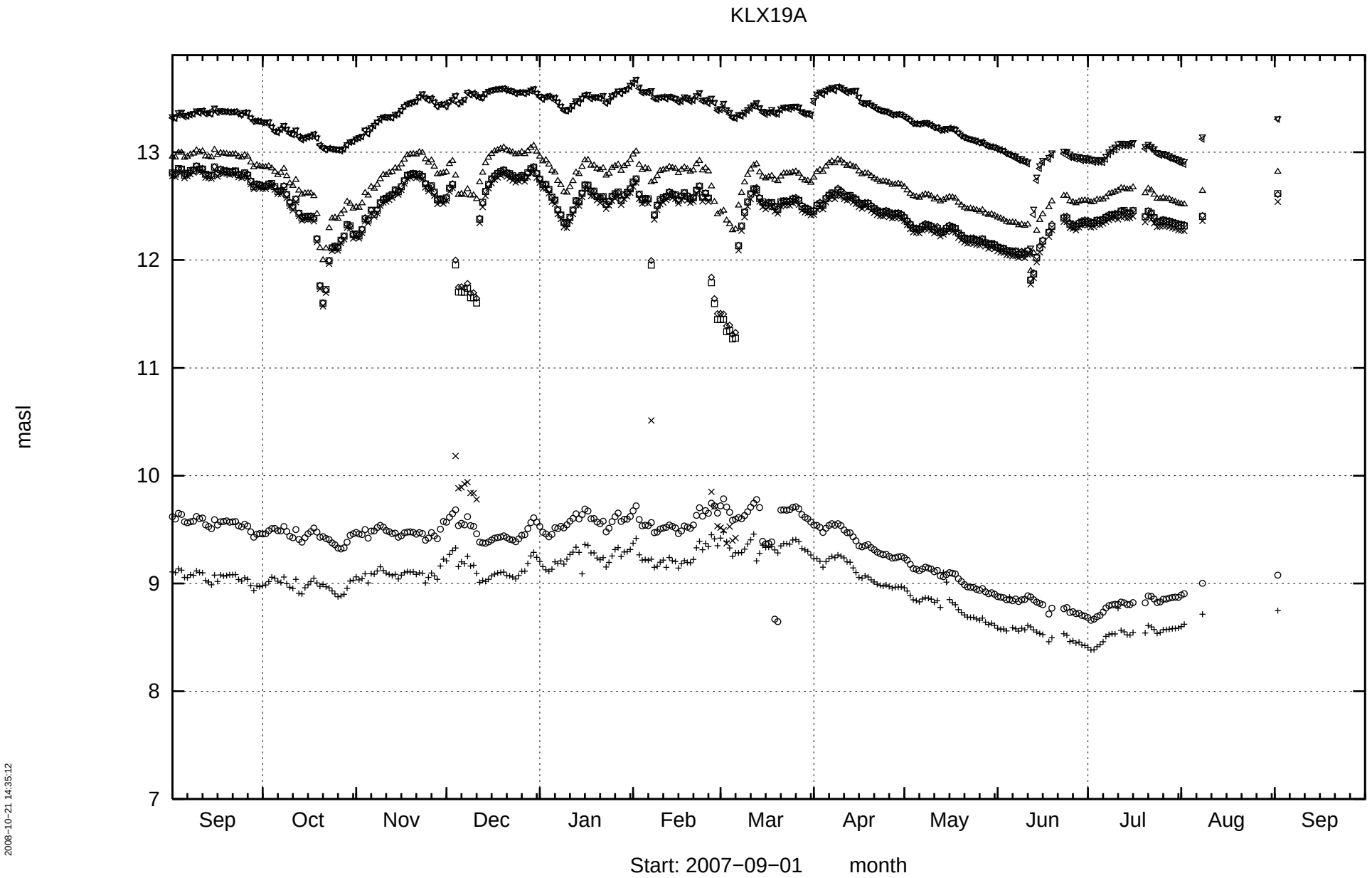
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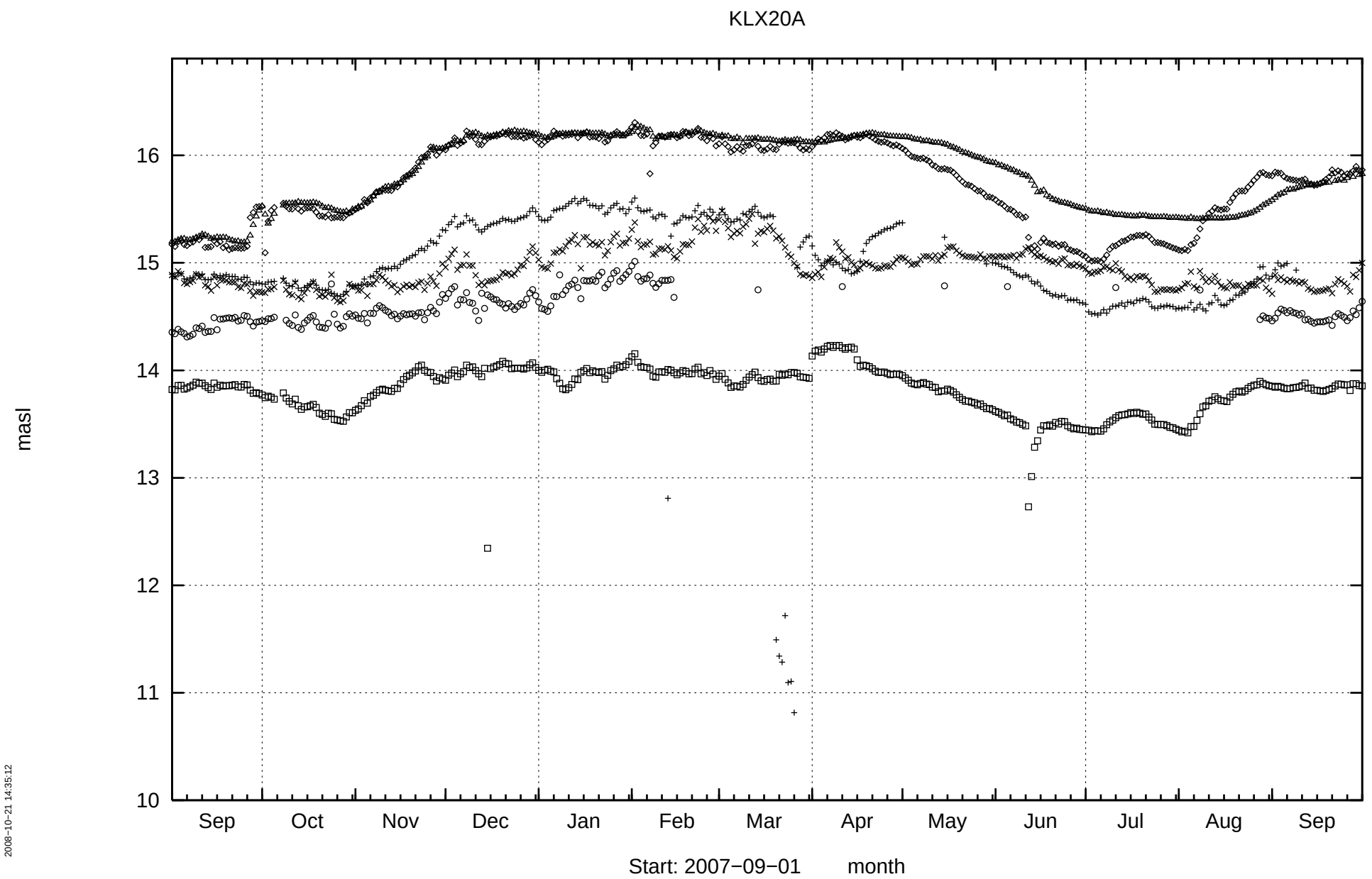
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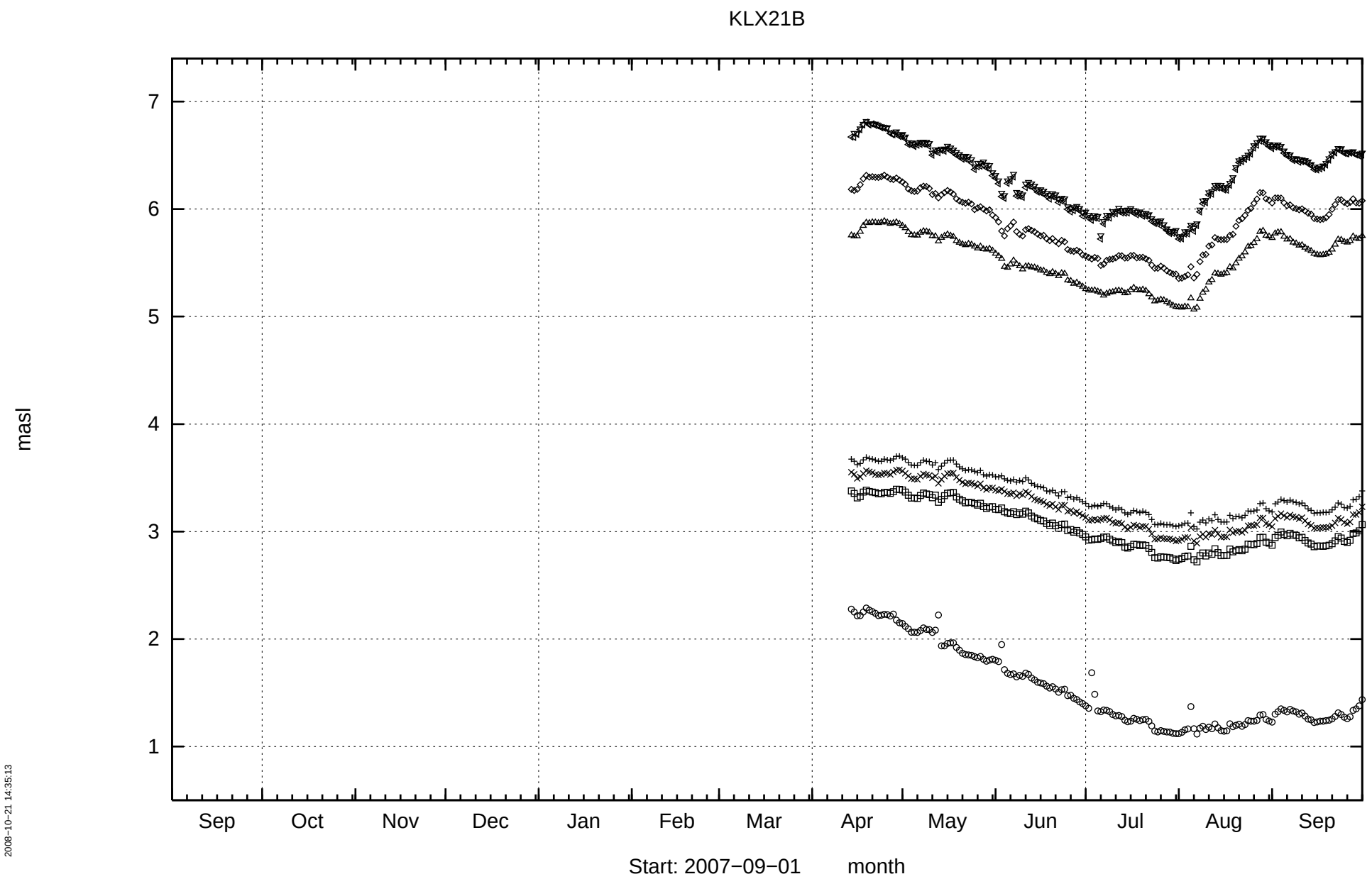
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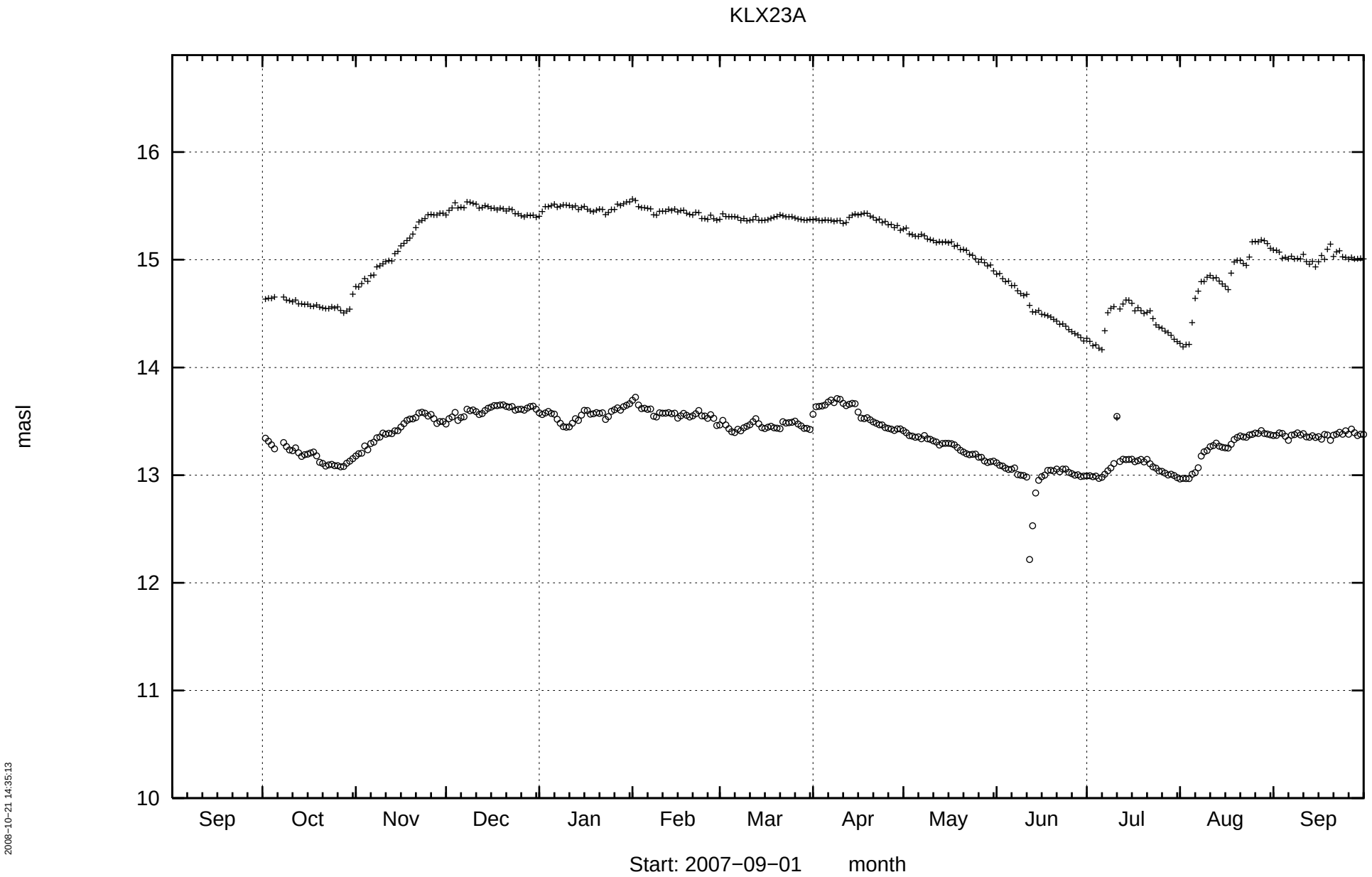
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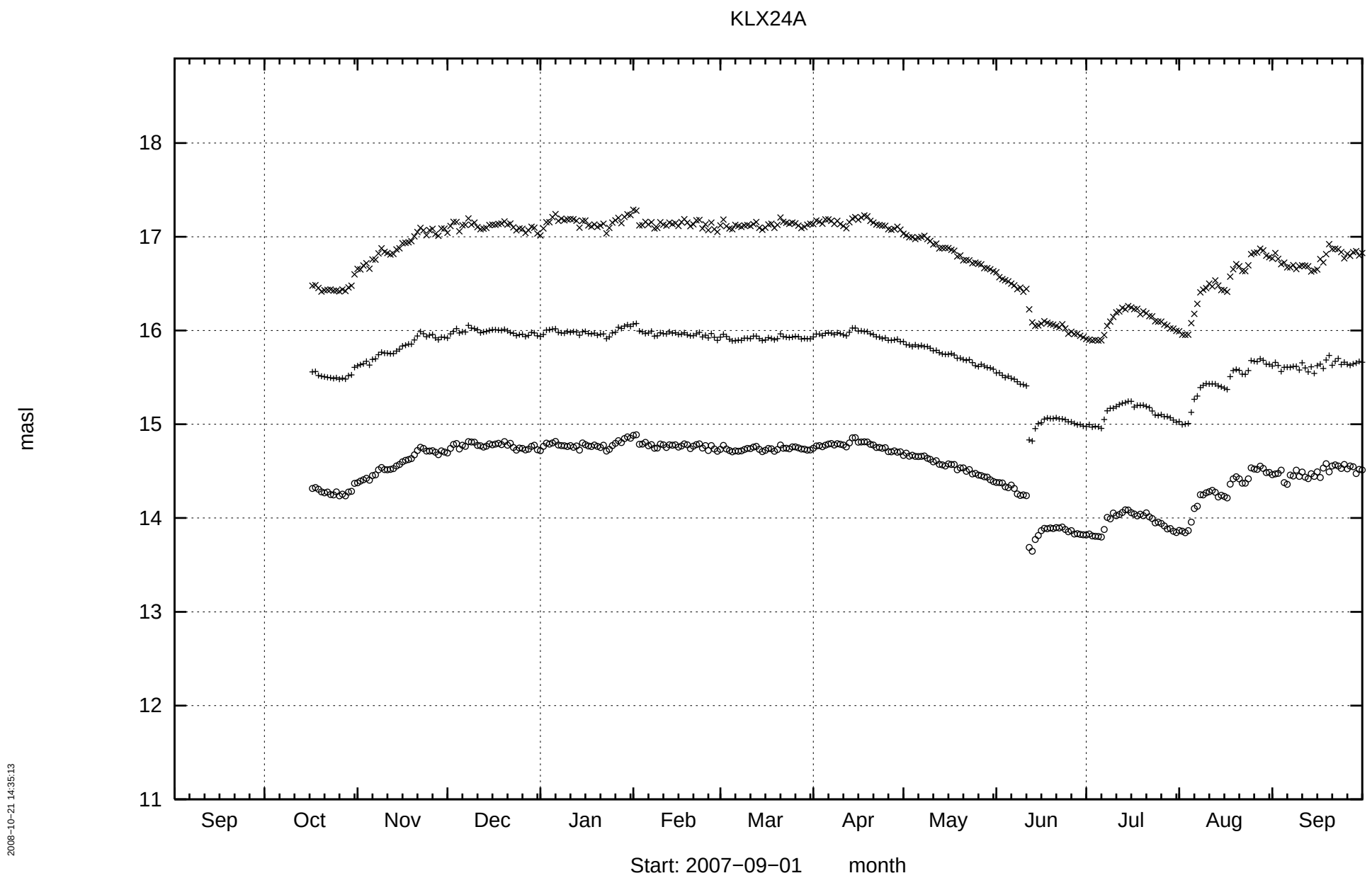
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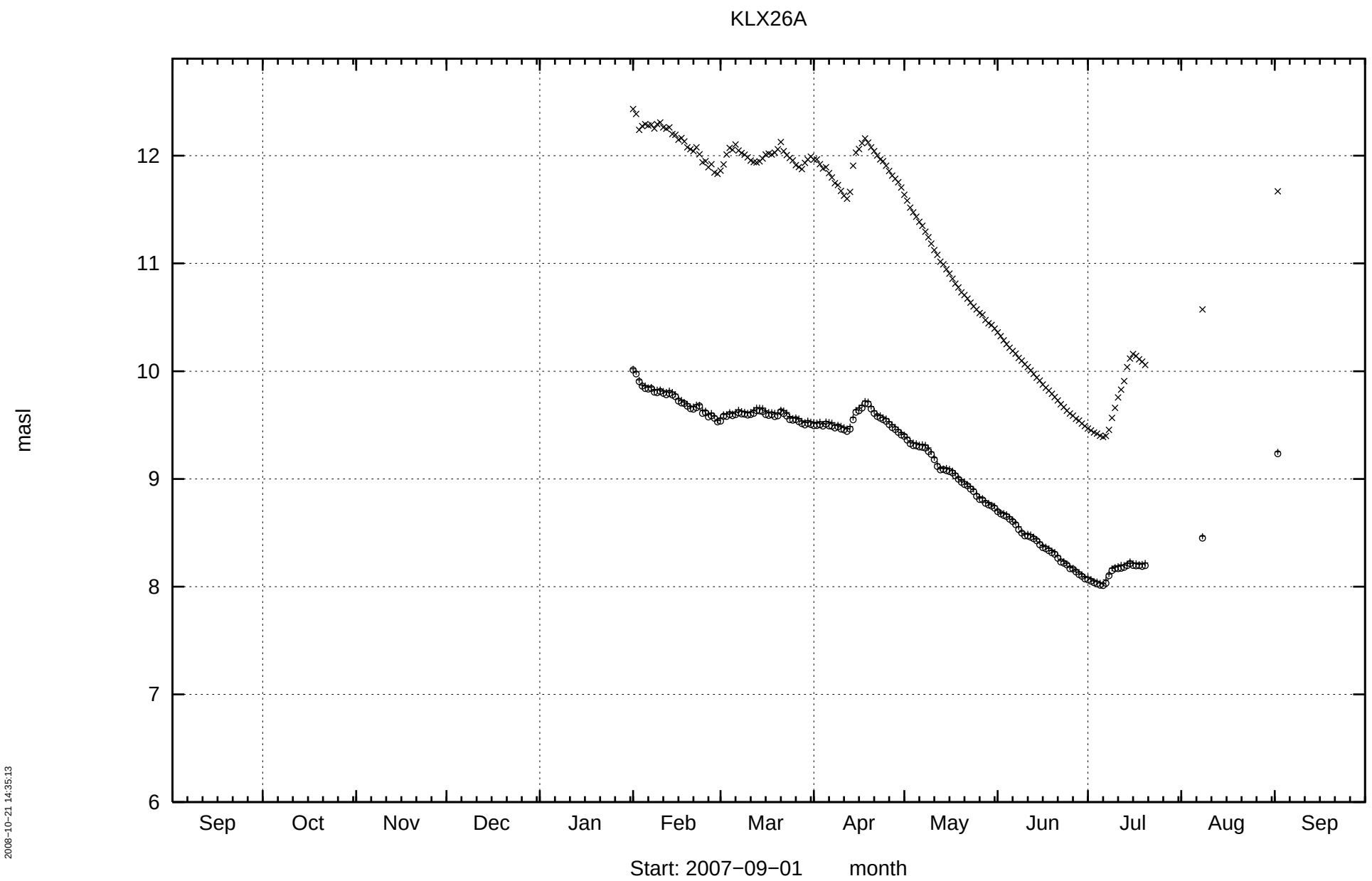
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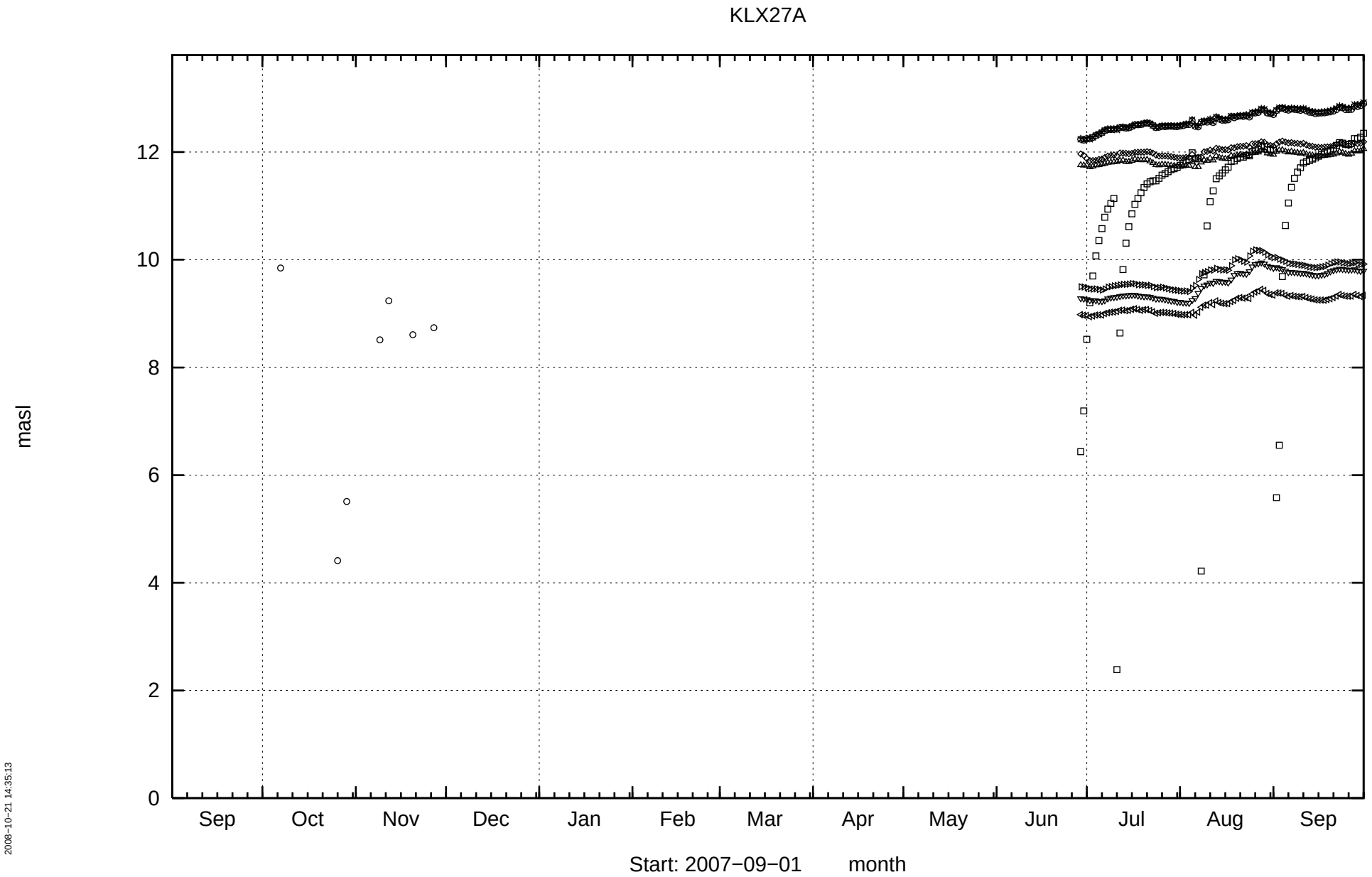
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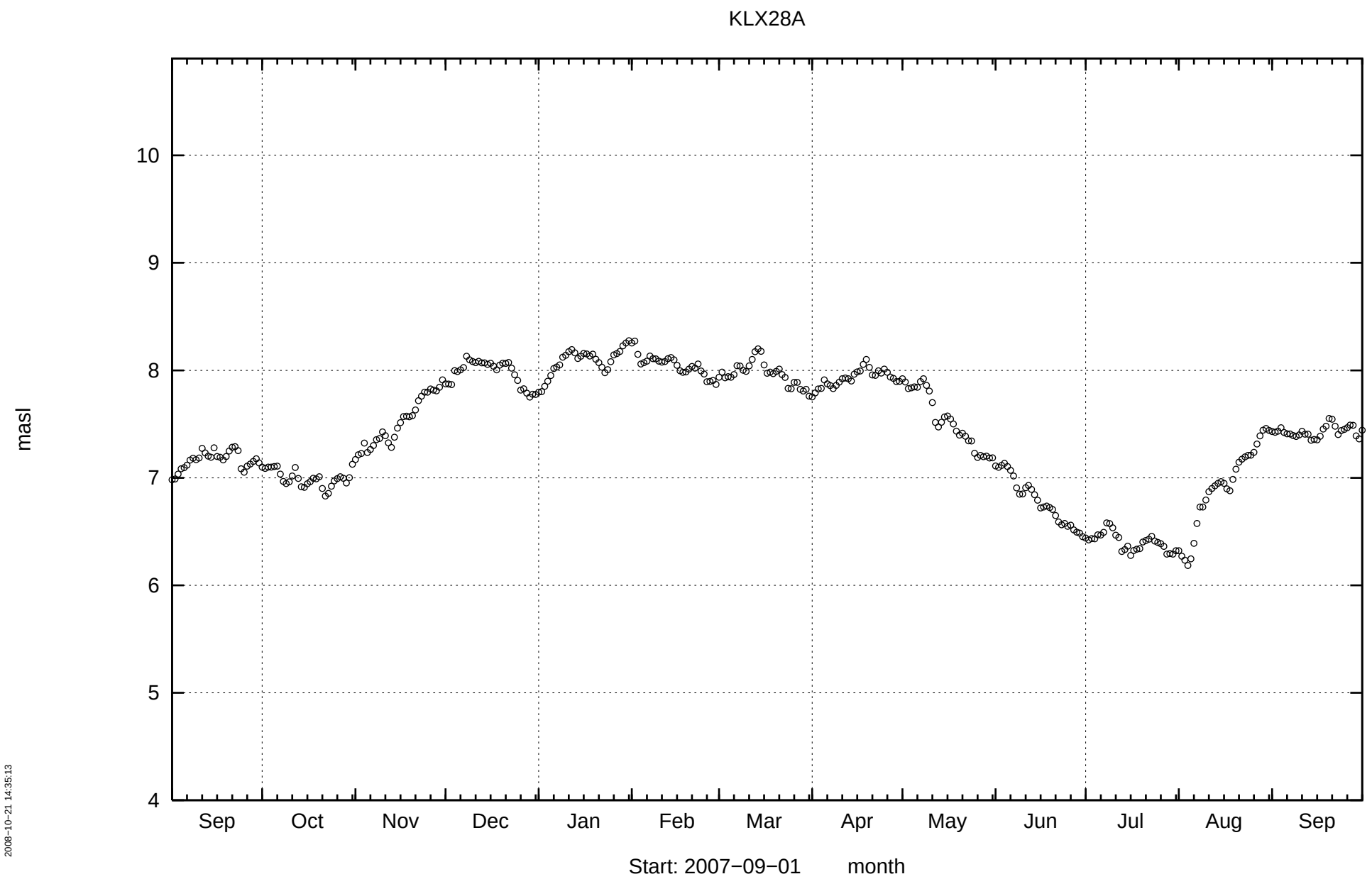
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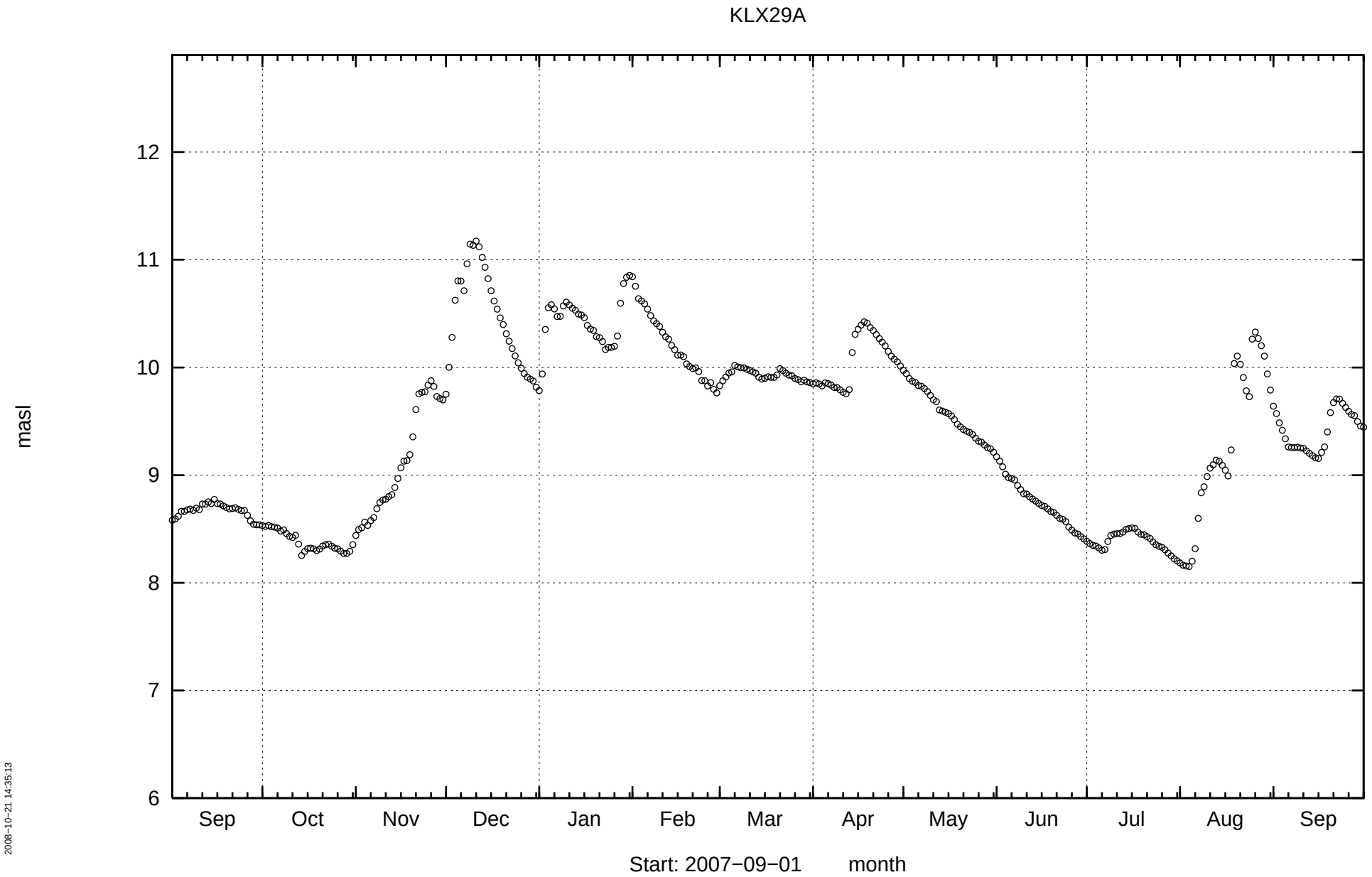
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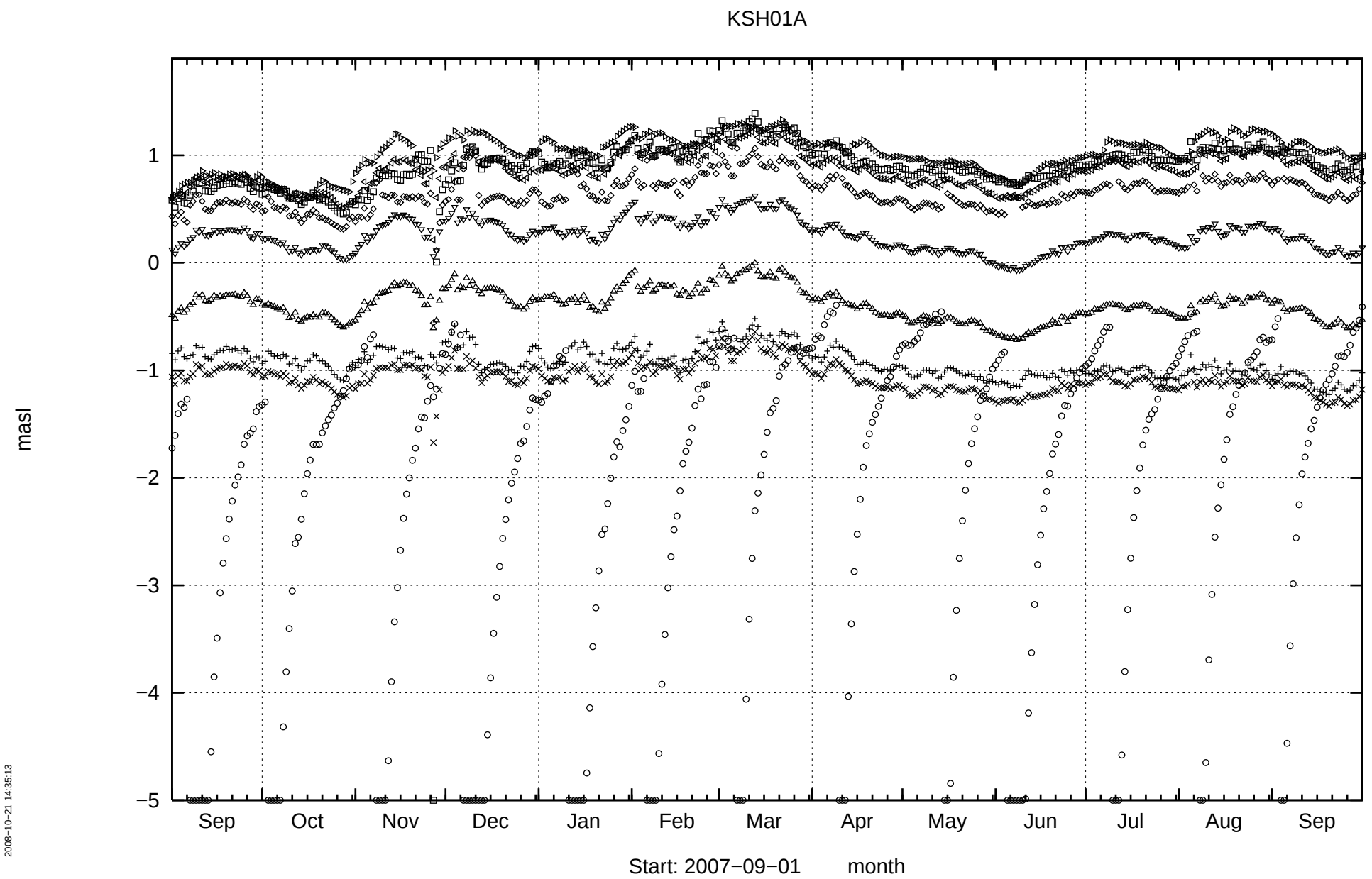
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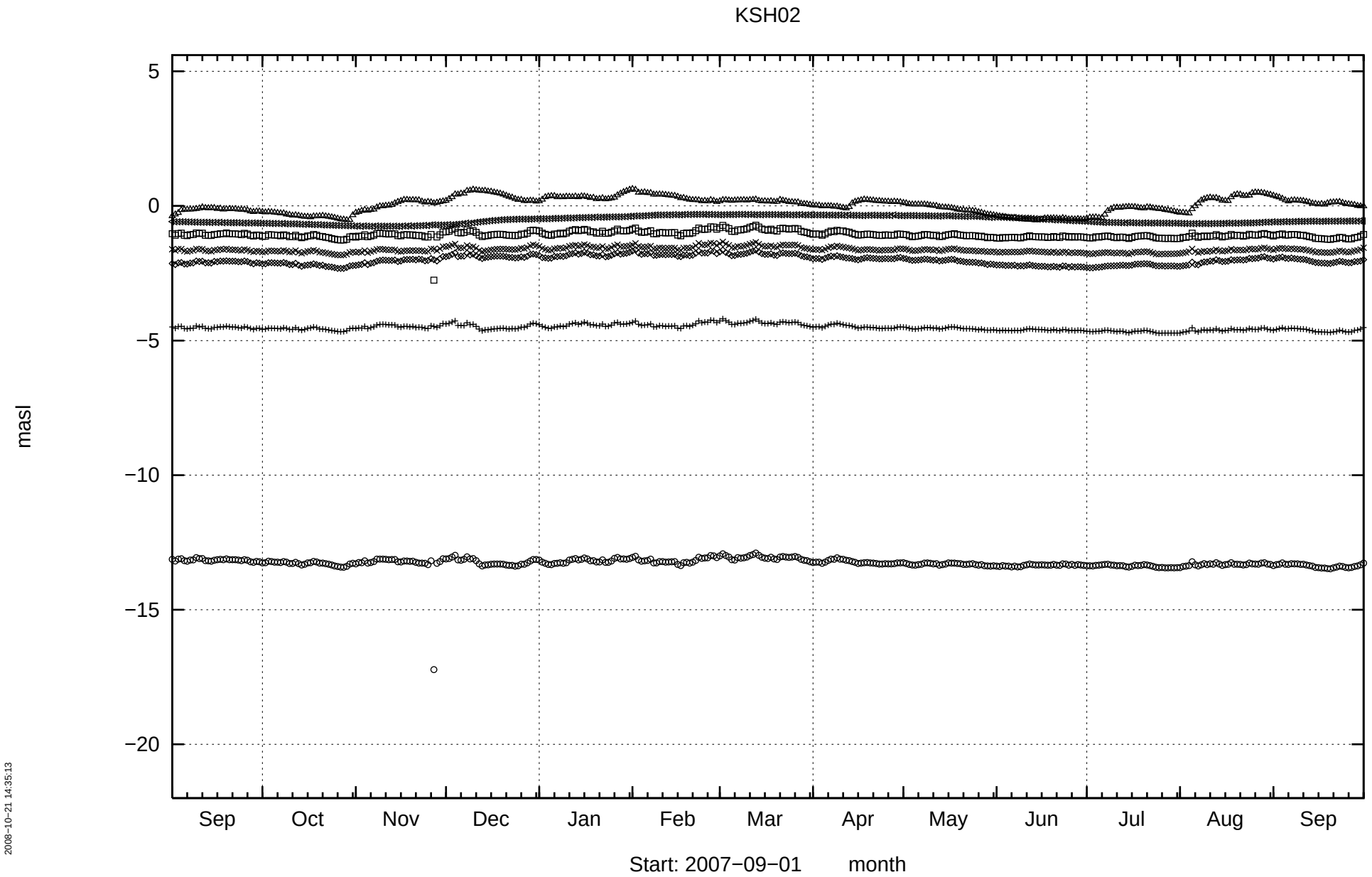
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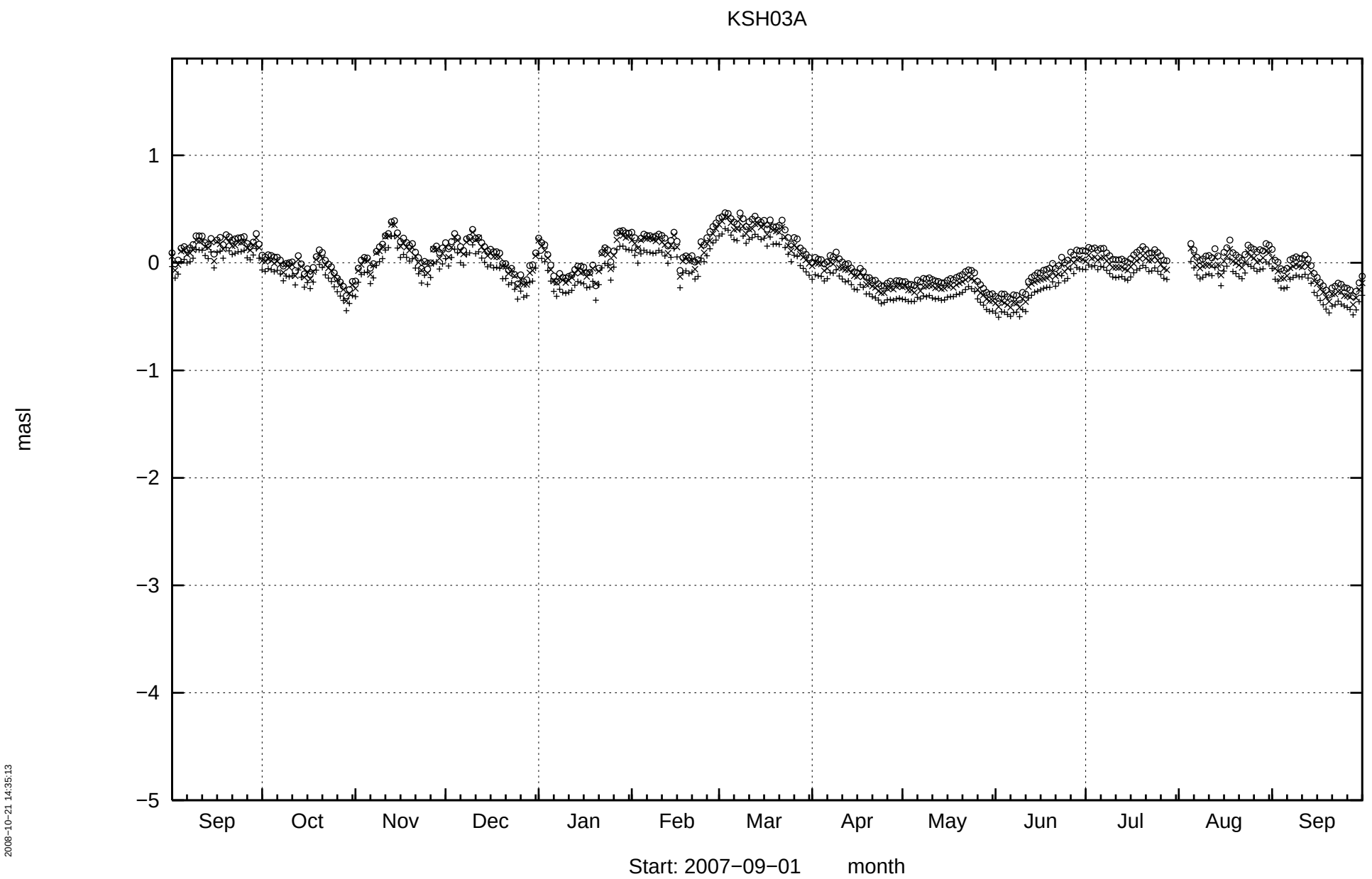
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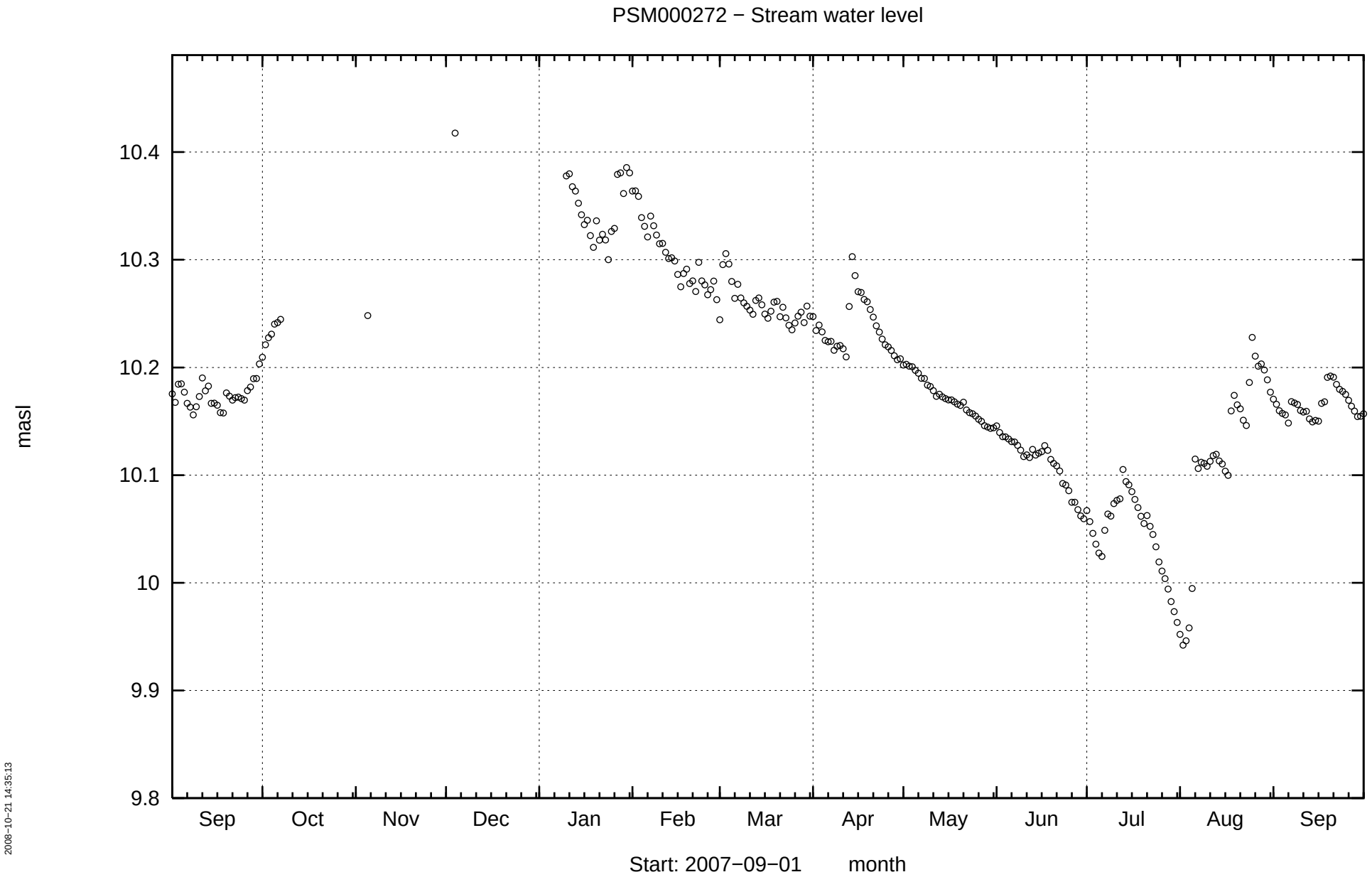
PSM000272 − Stream water level
masl
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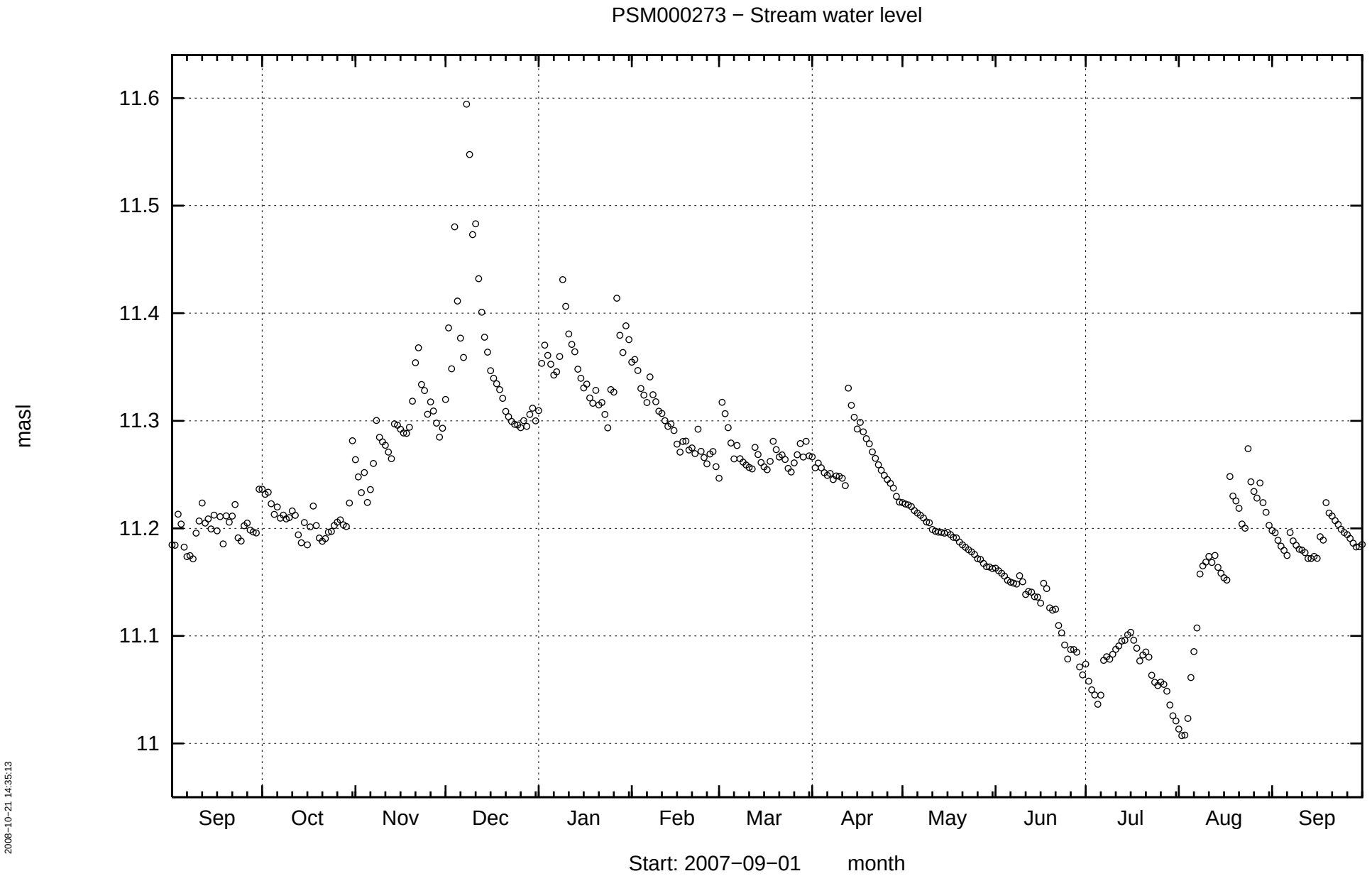
PSM000273 − Stream water level
masl
11.6
11.5
11.4
11.3
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11.1
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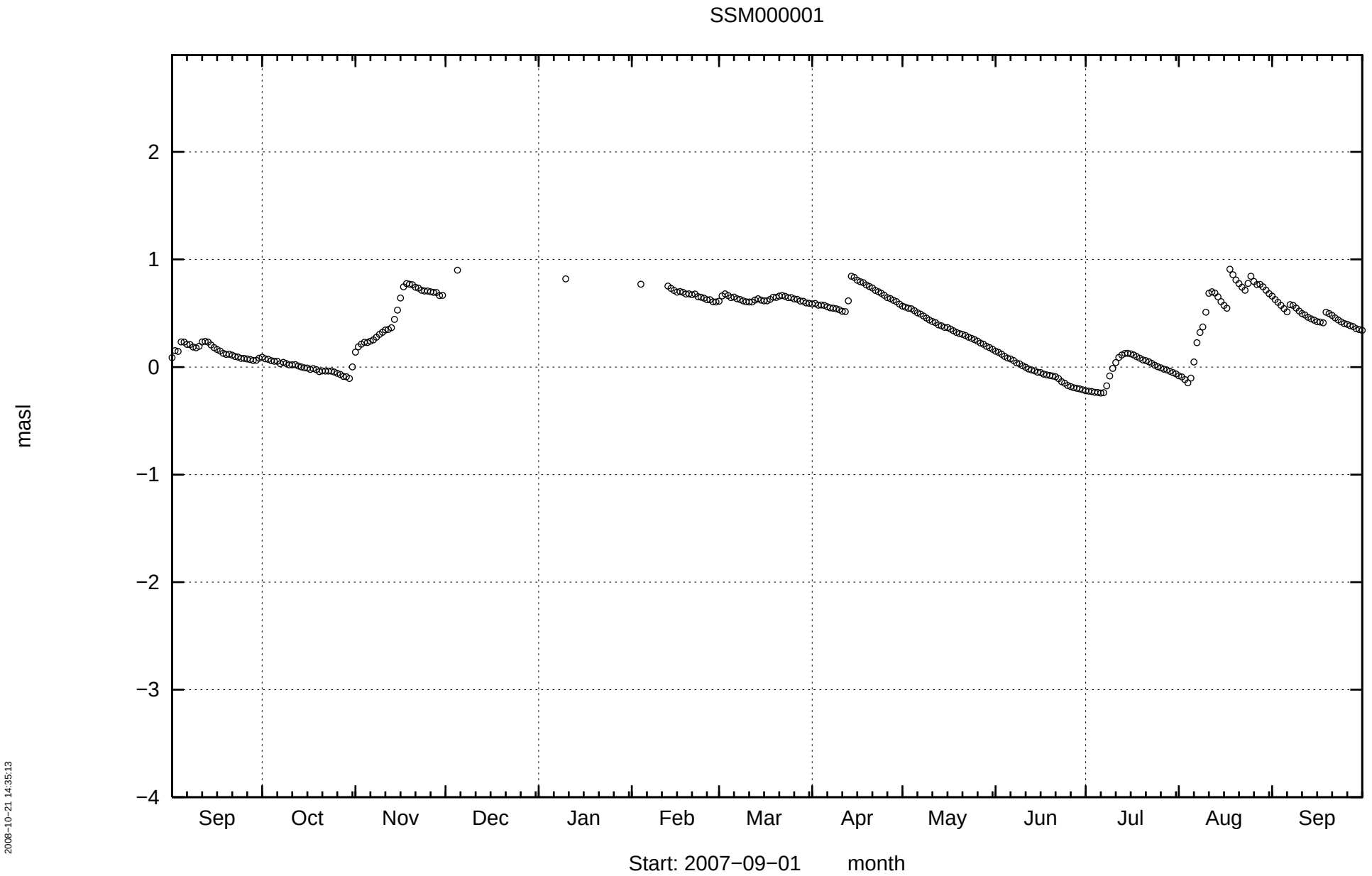
SSM000001
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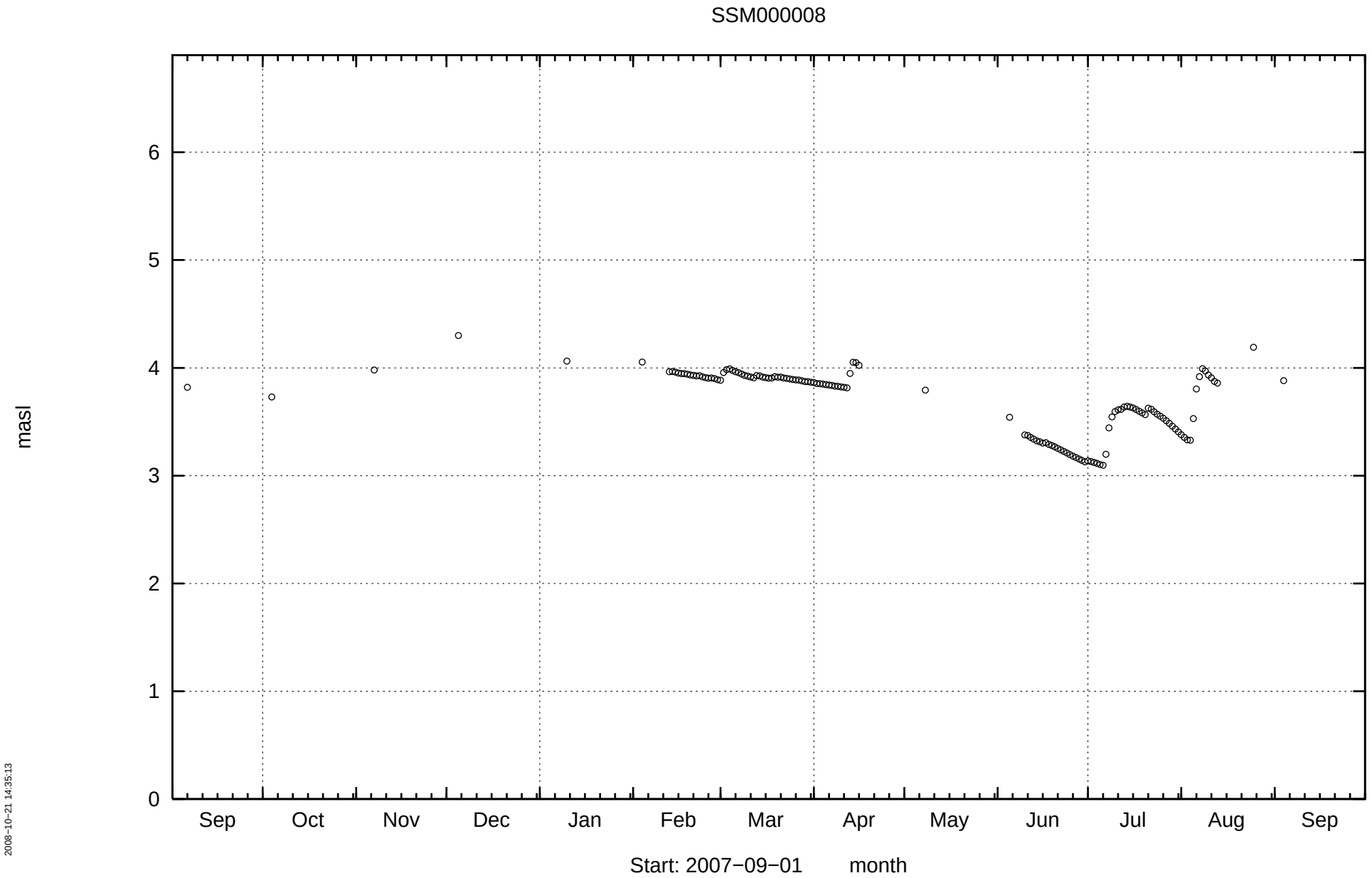
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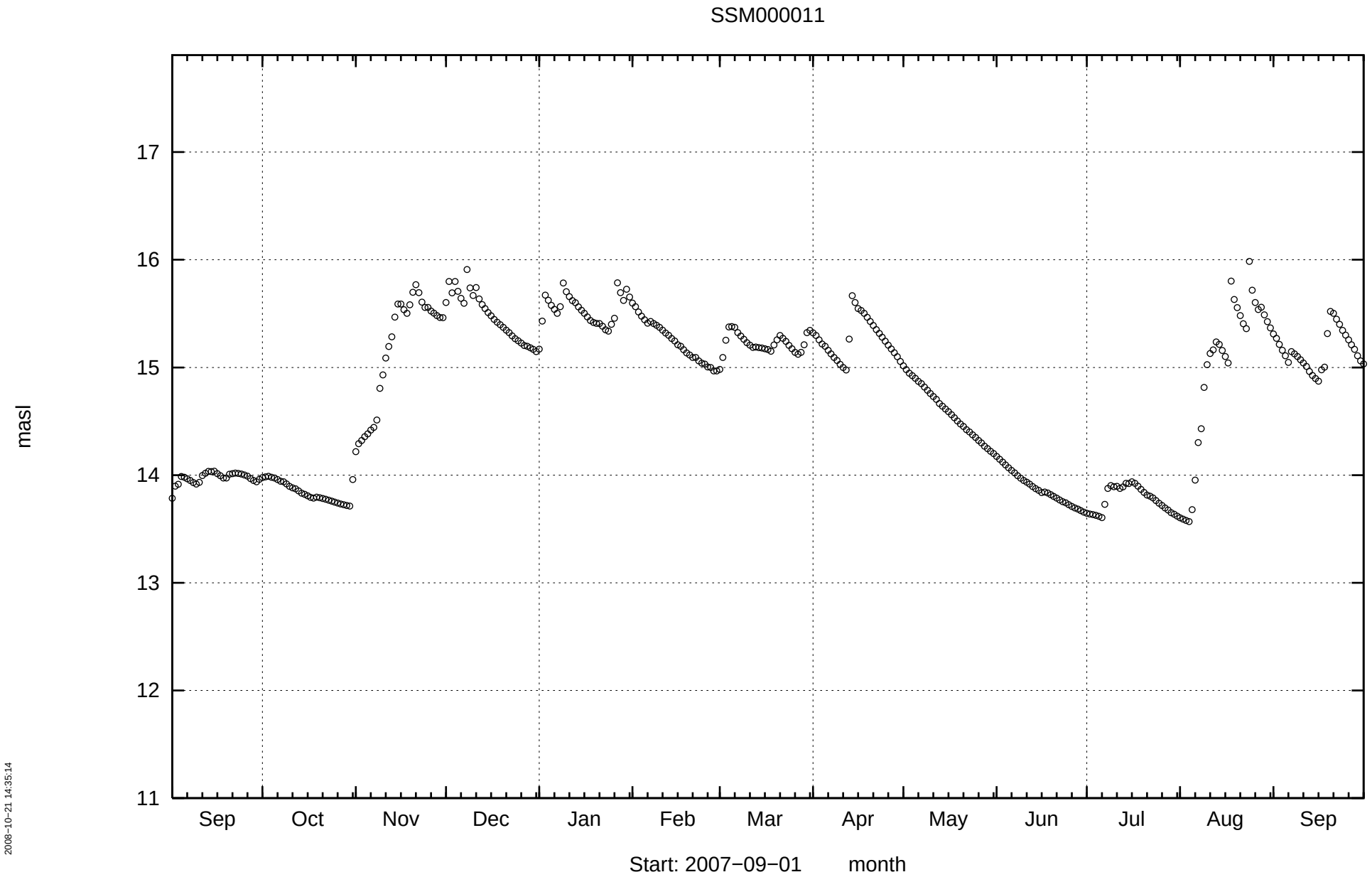
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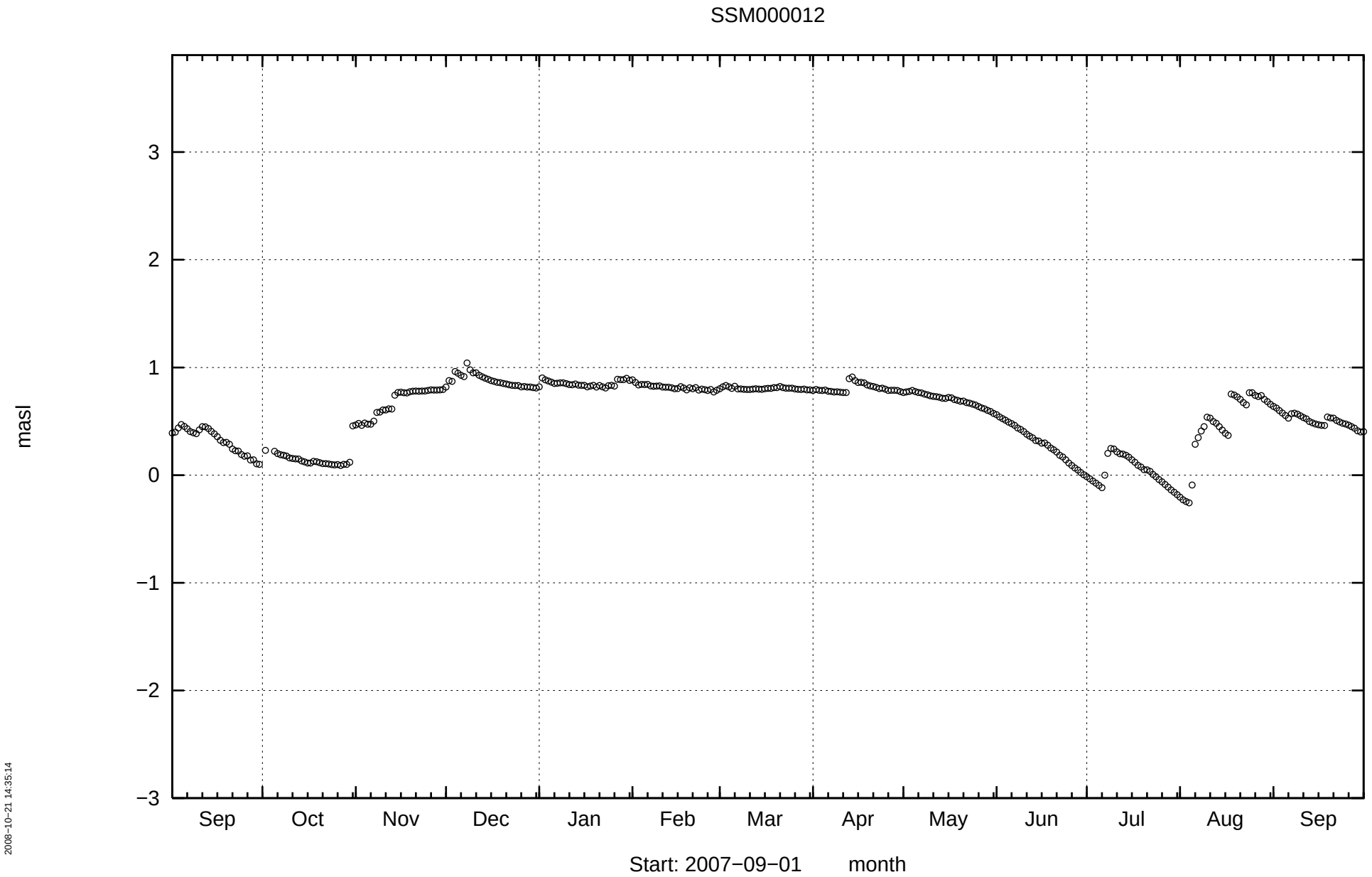
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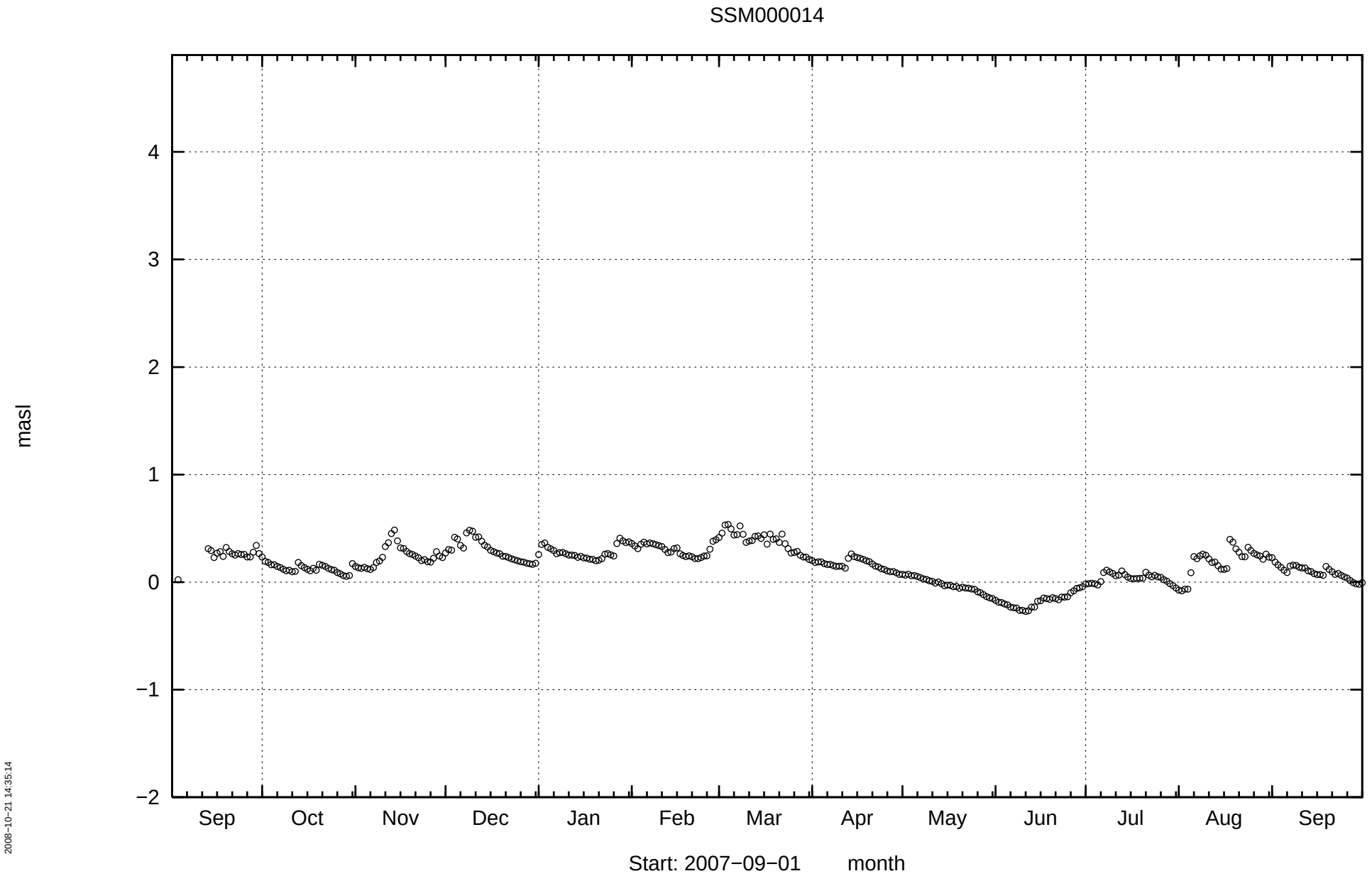
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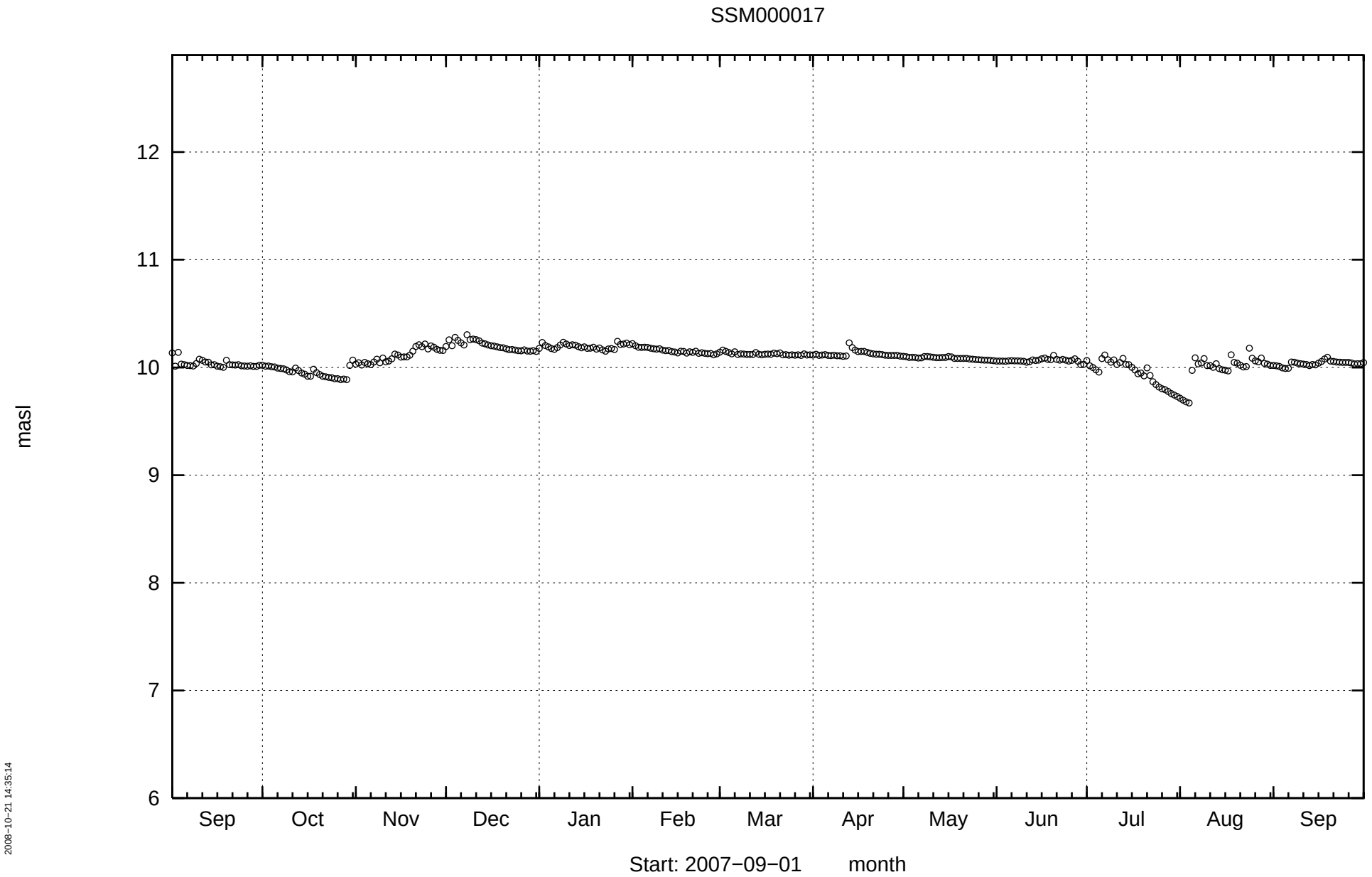
SSM000017
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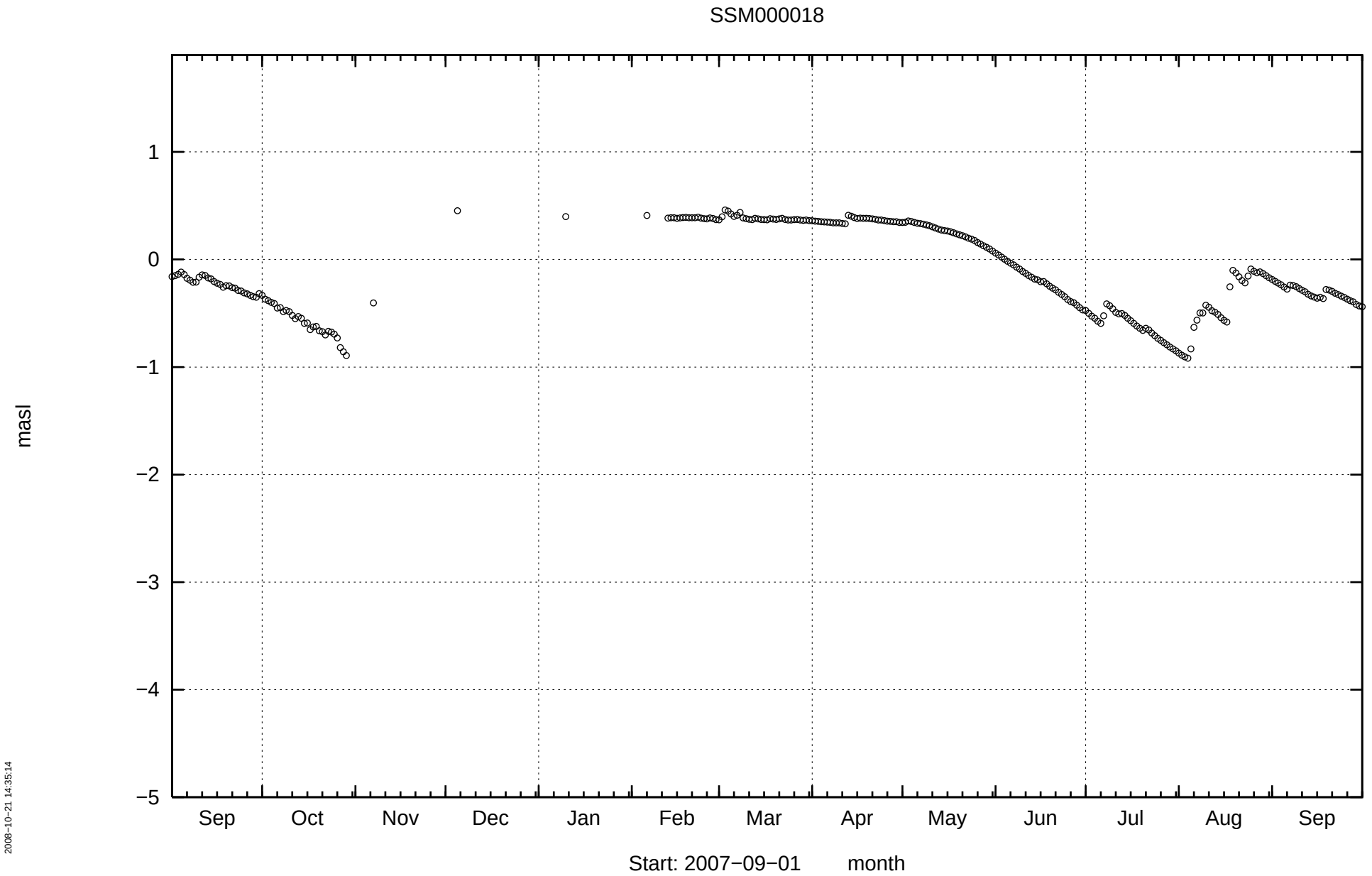
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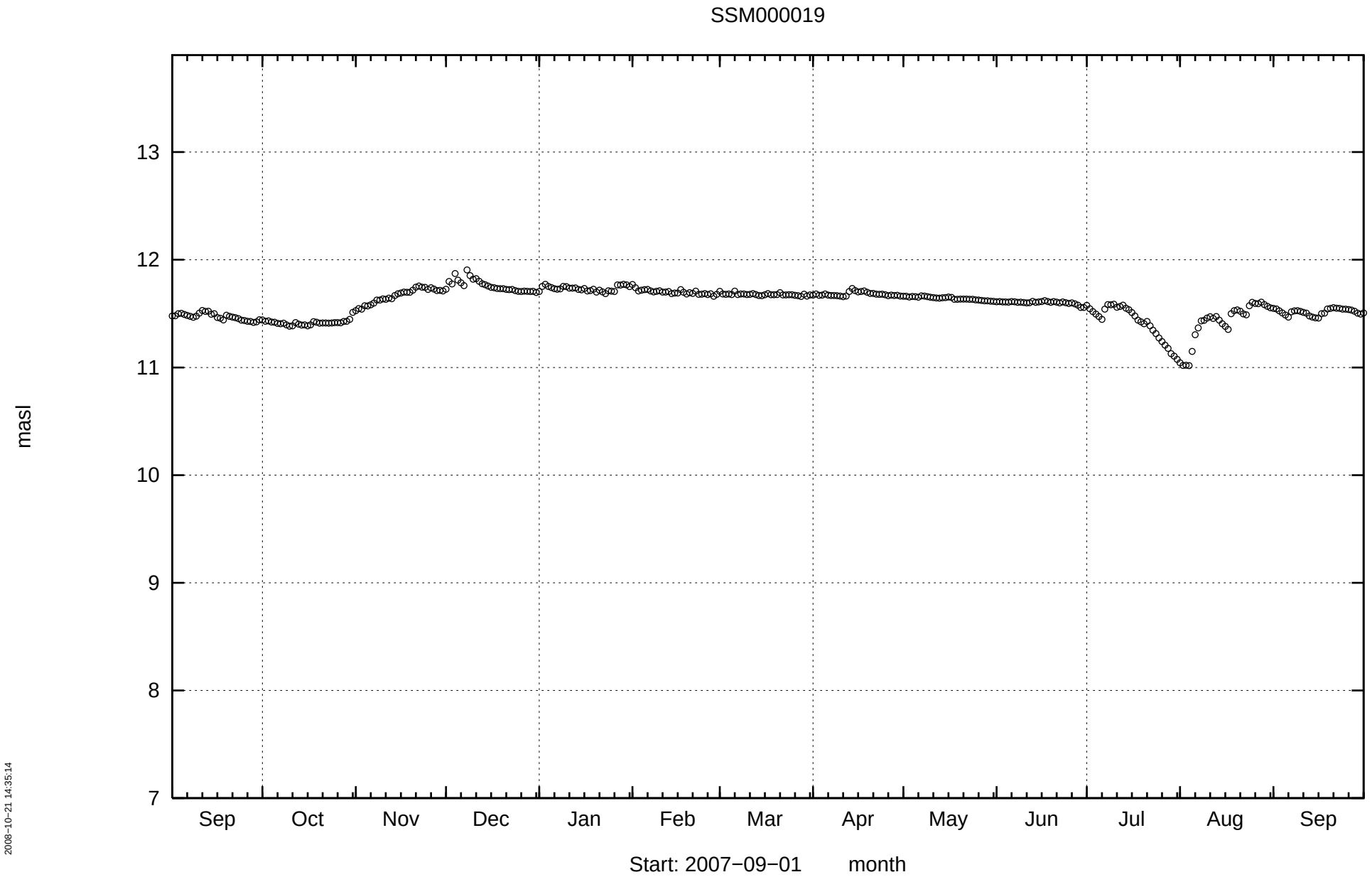
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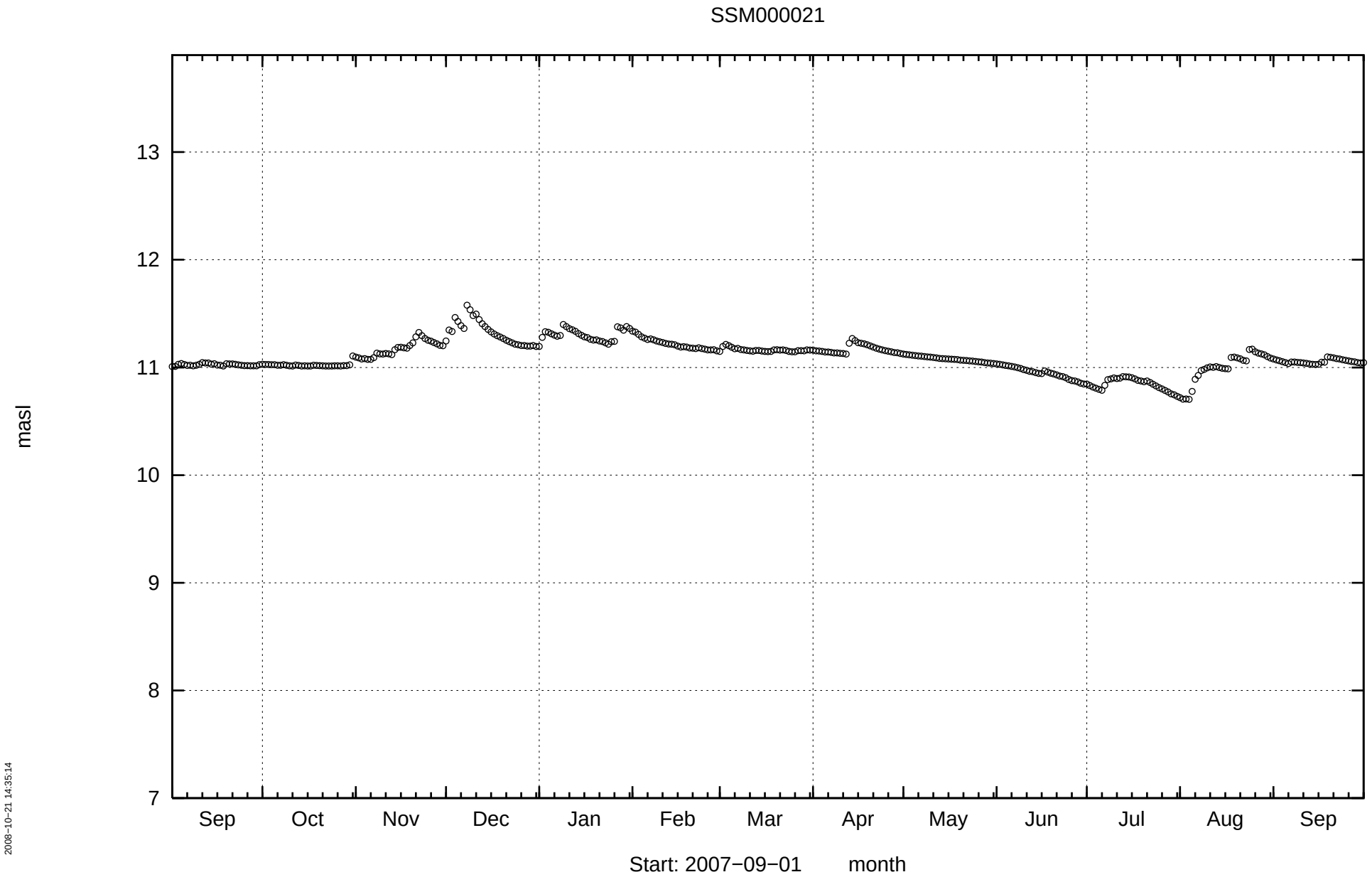
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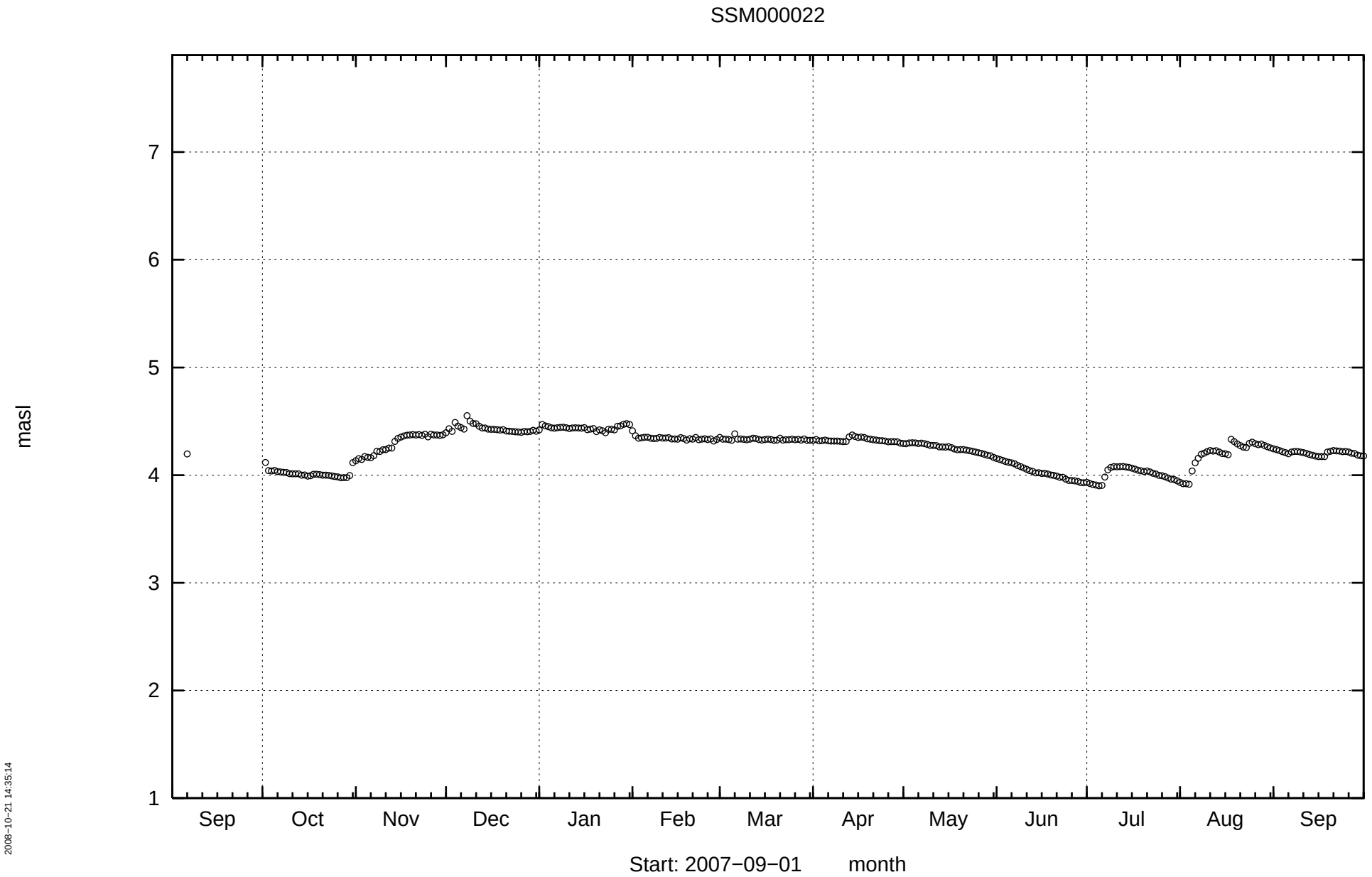
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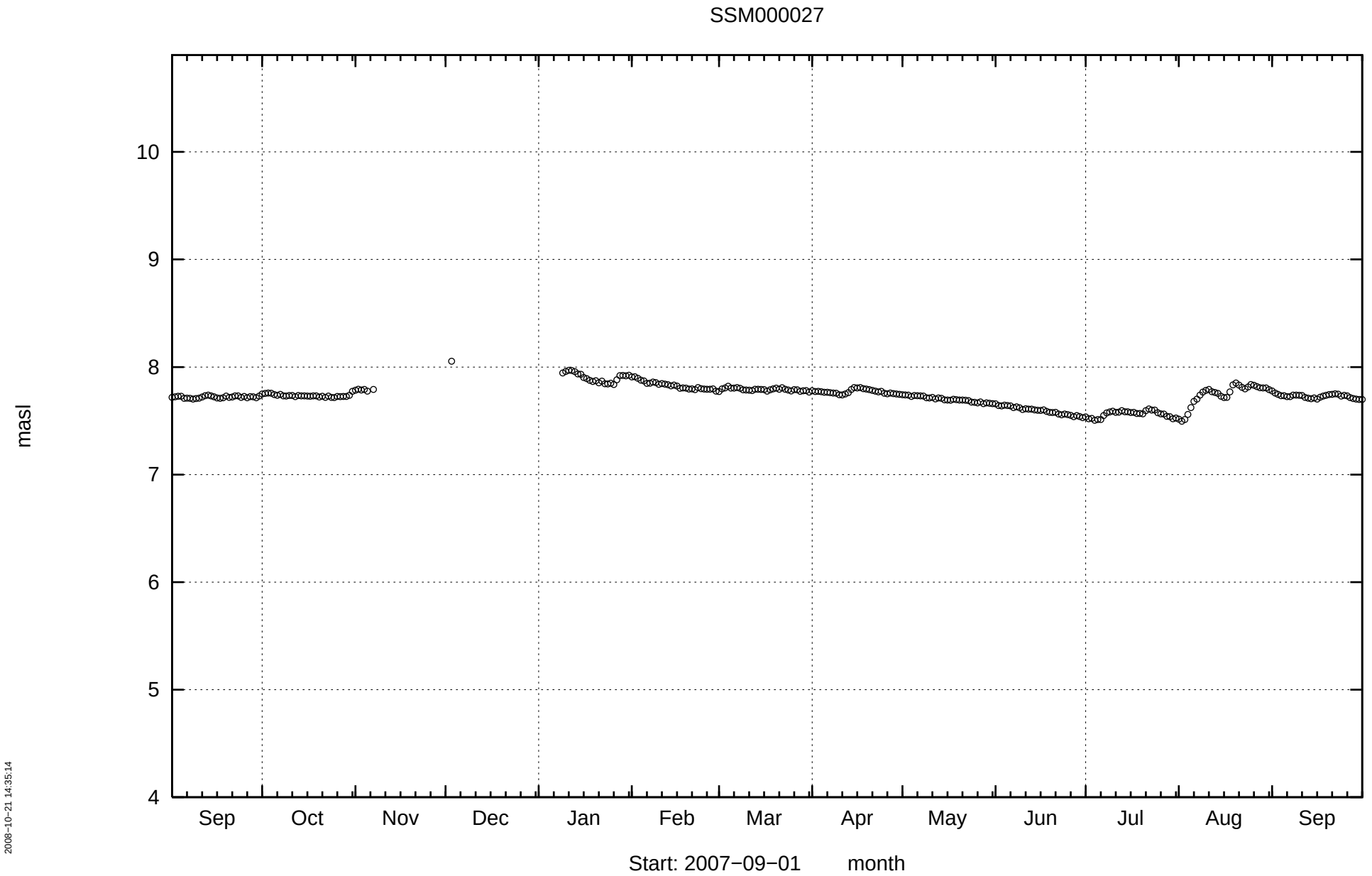
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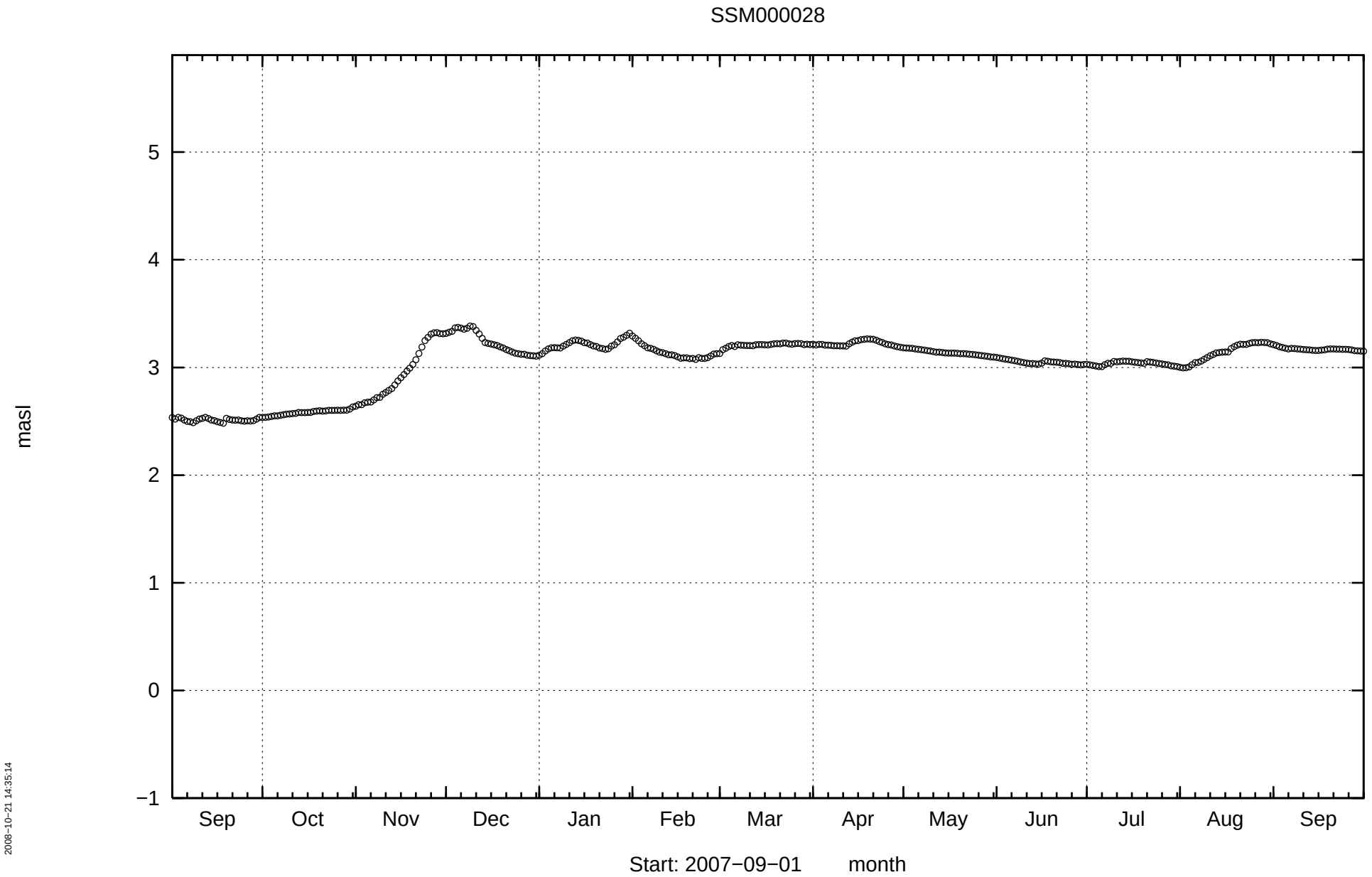
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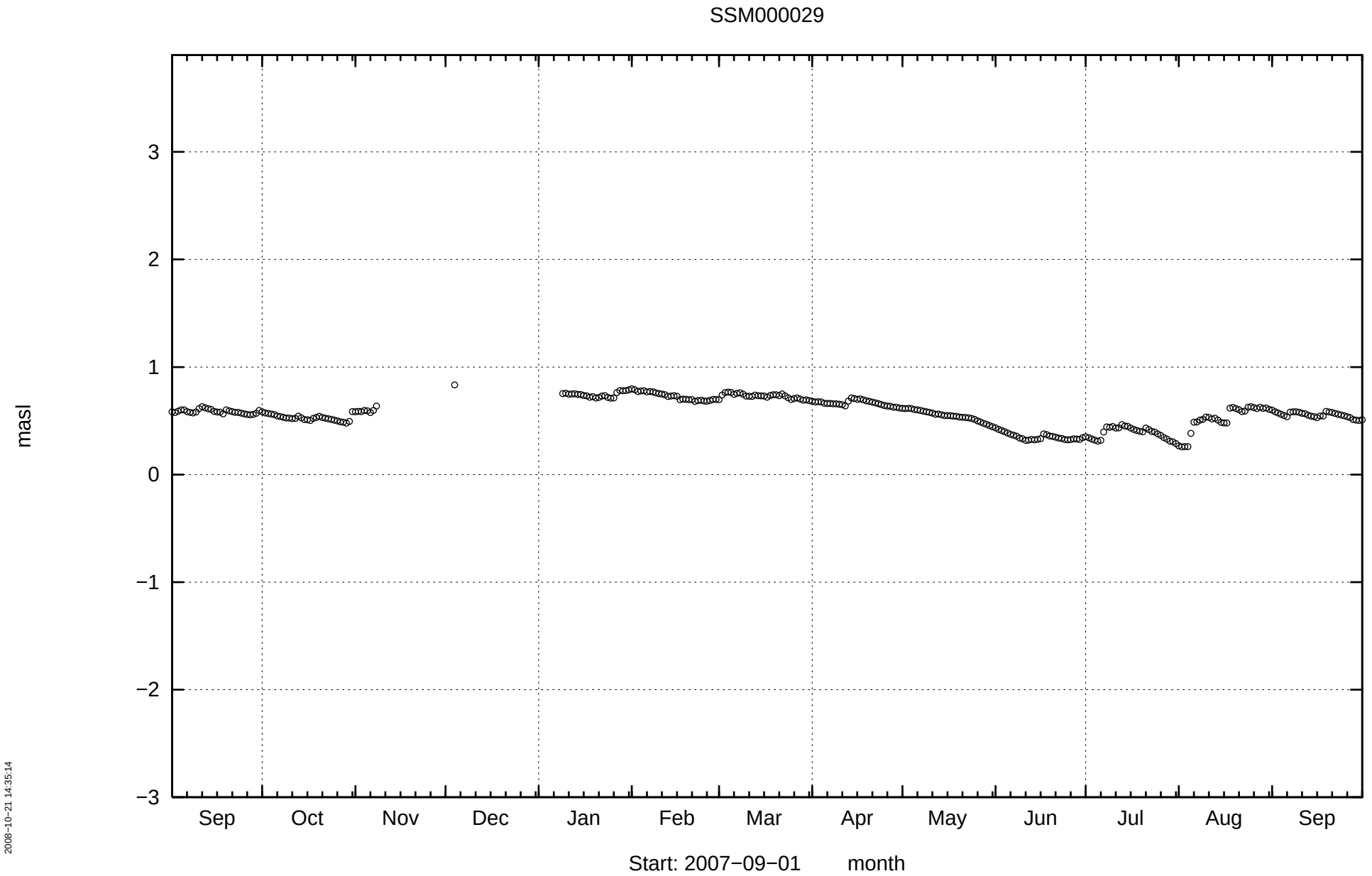
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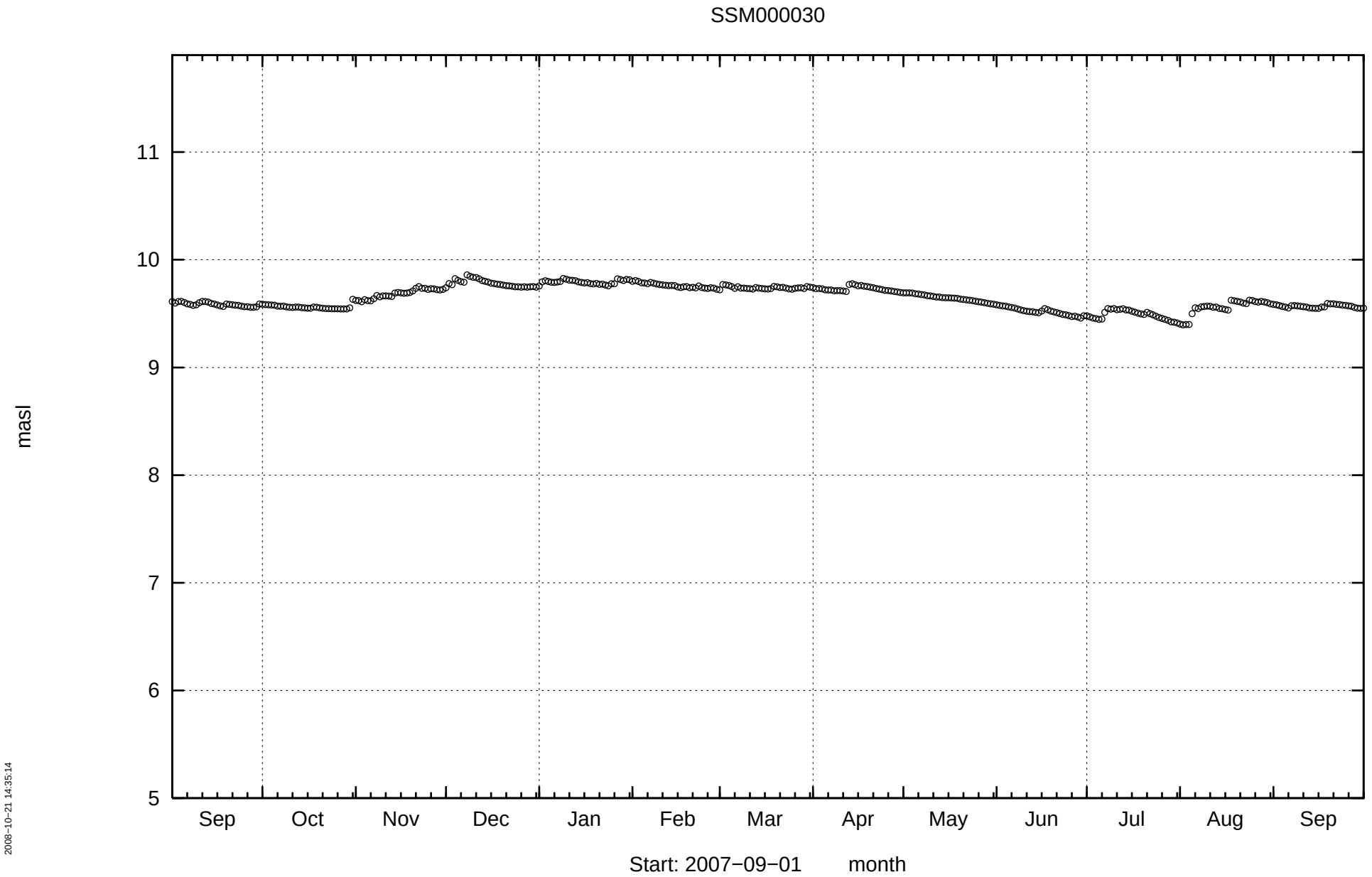
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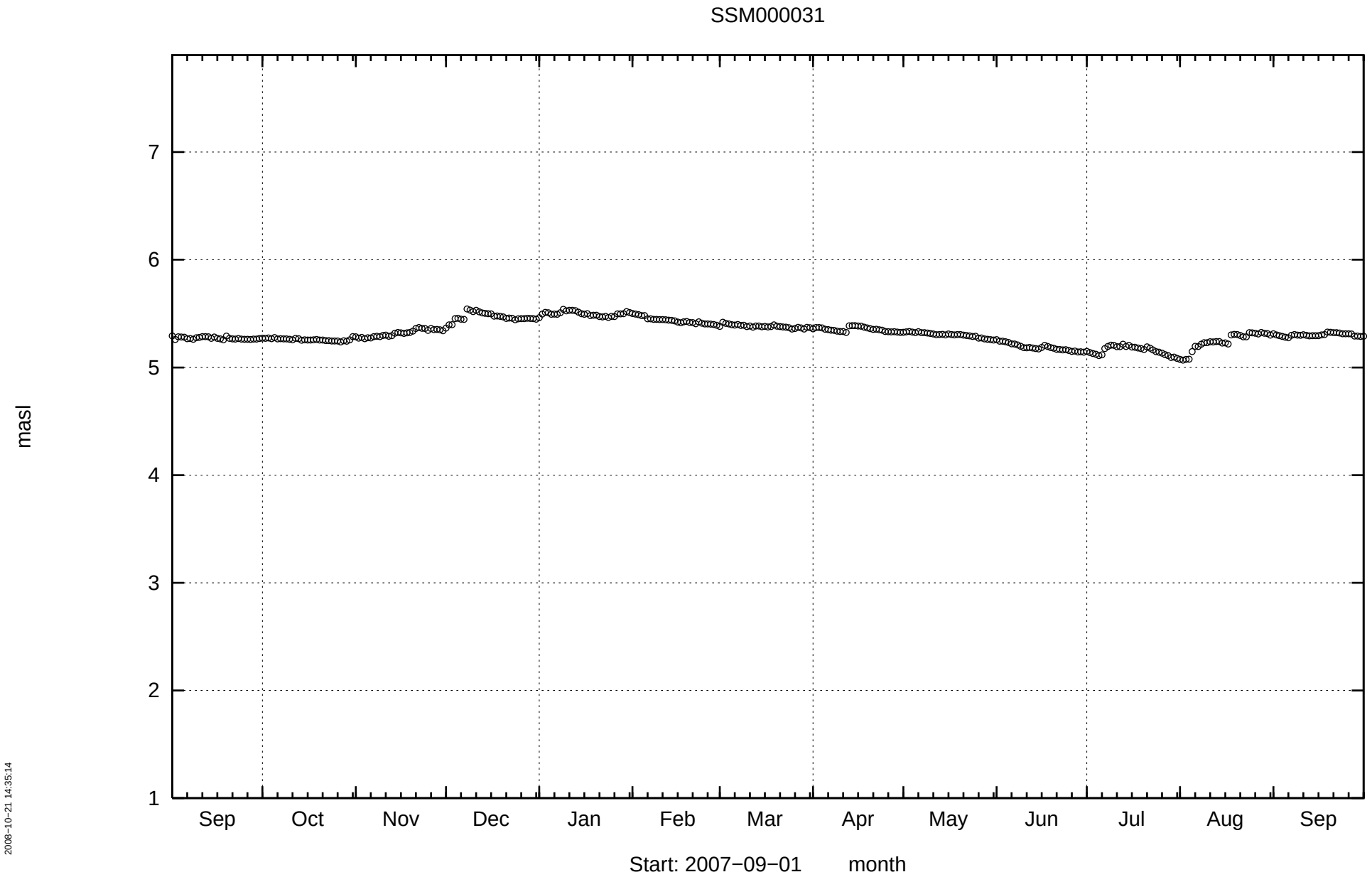
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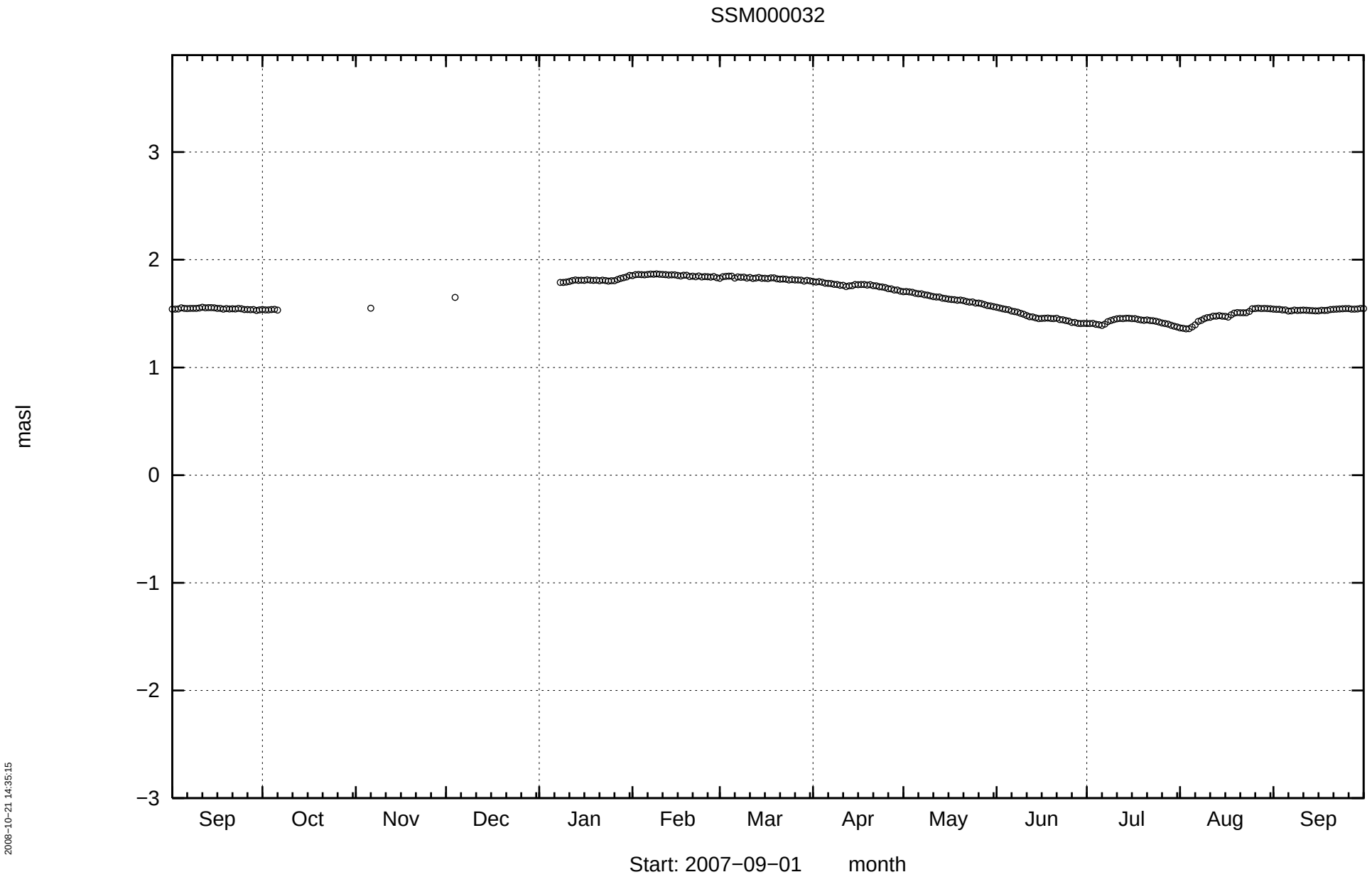
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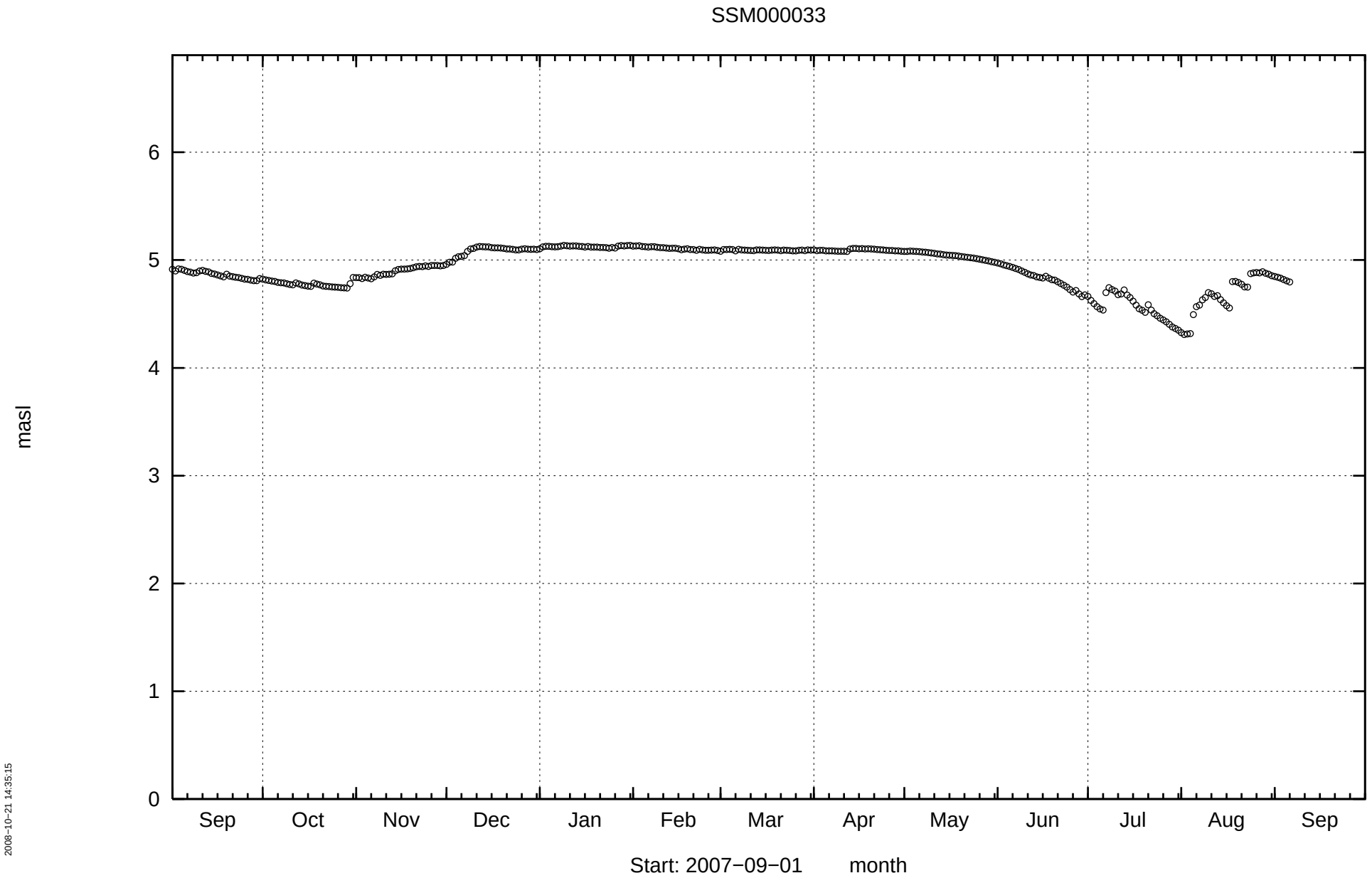
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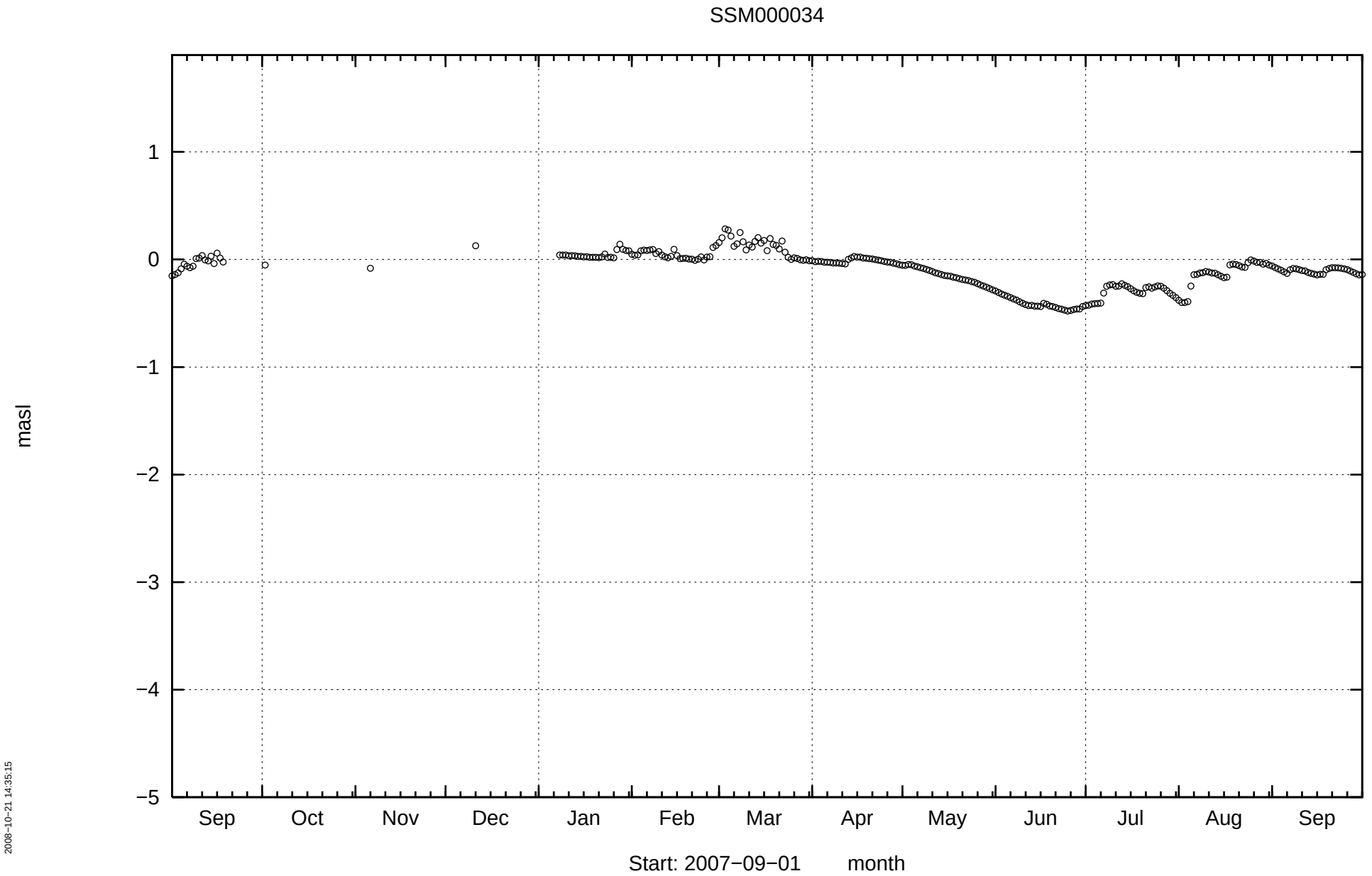
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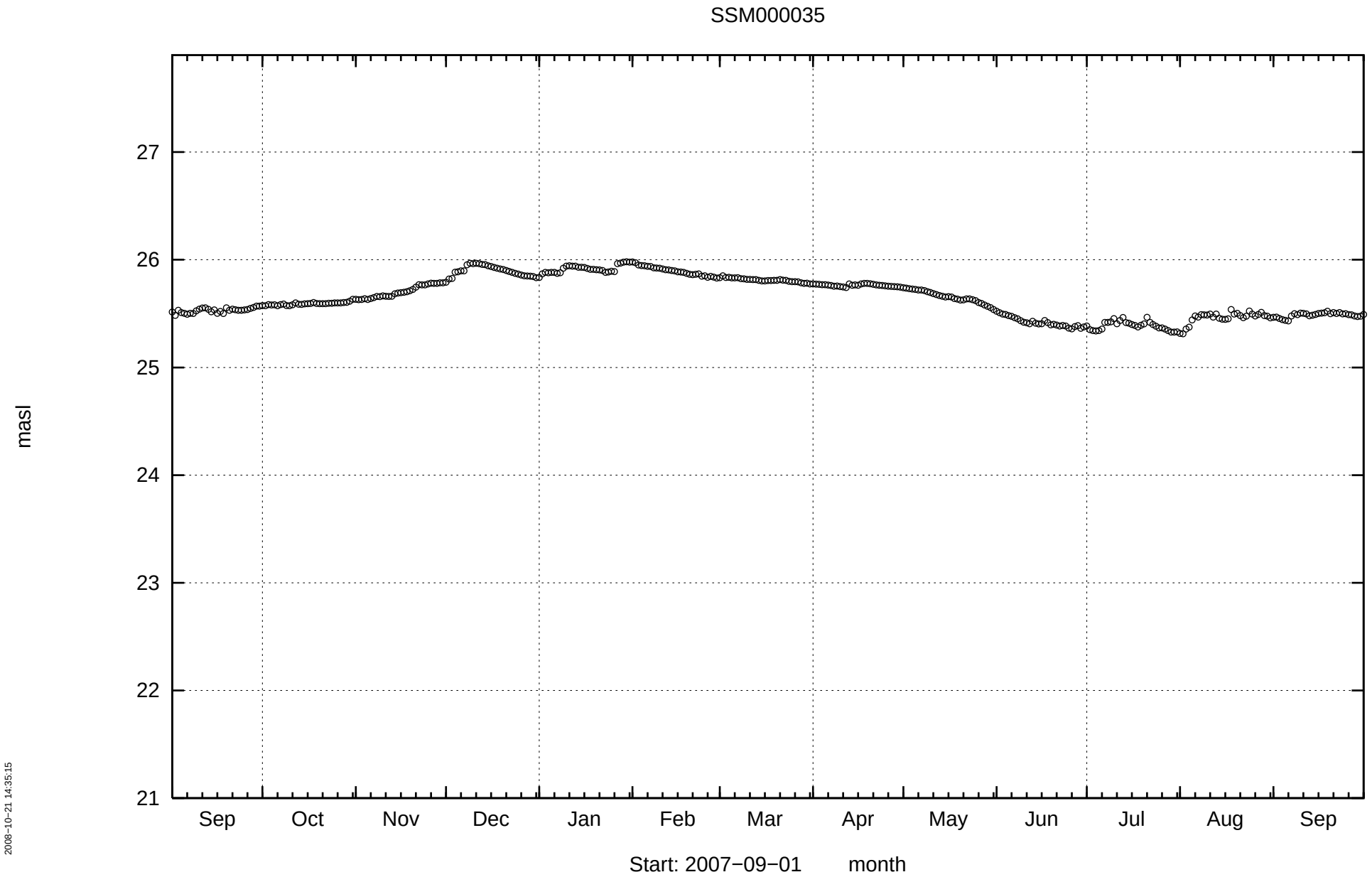
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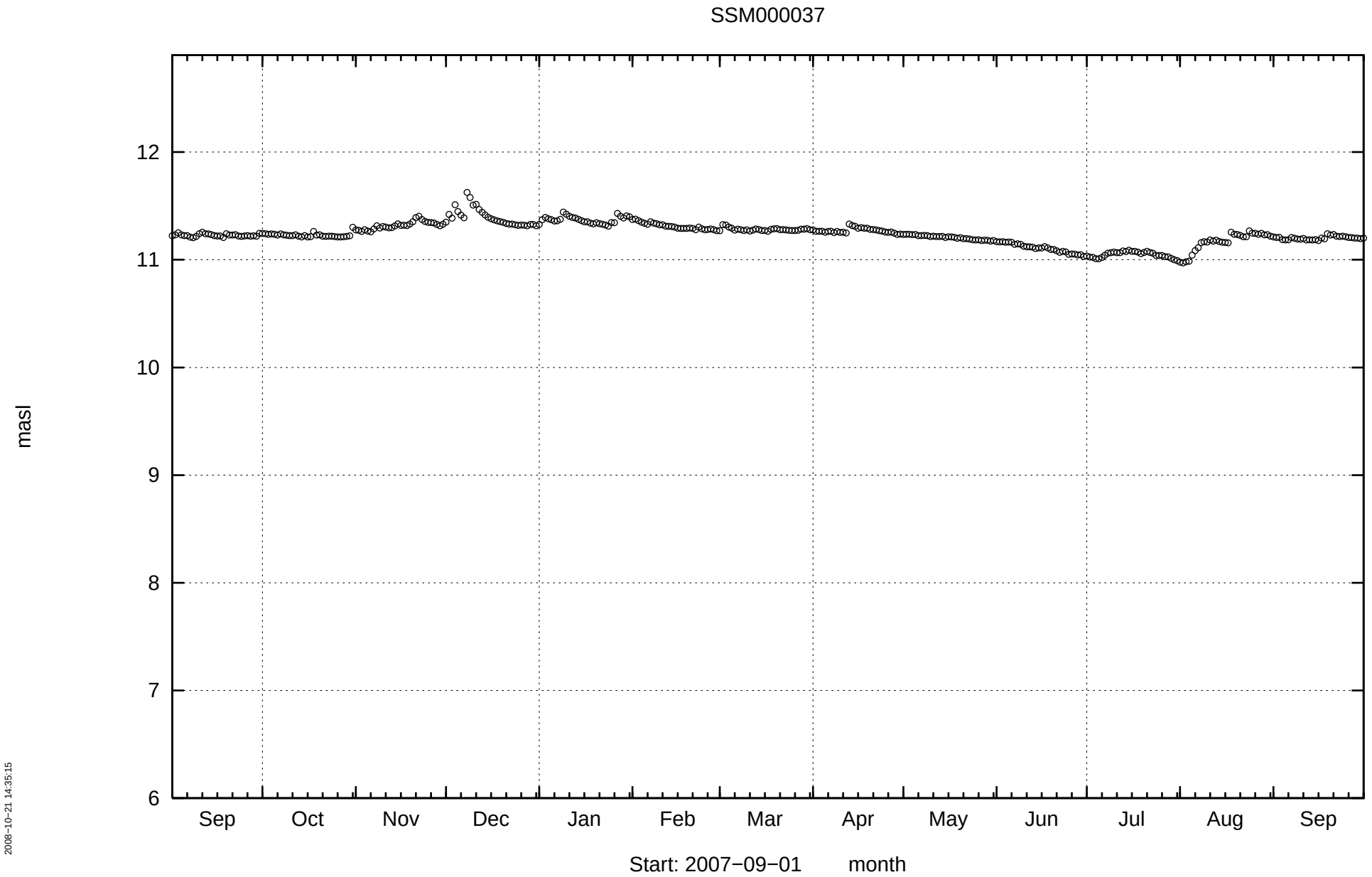
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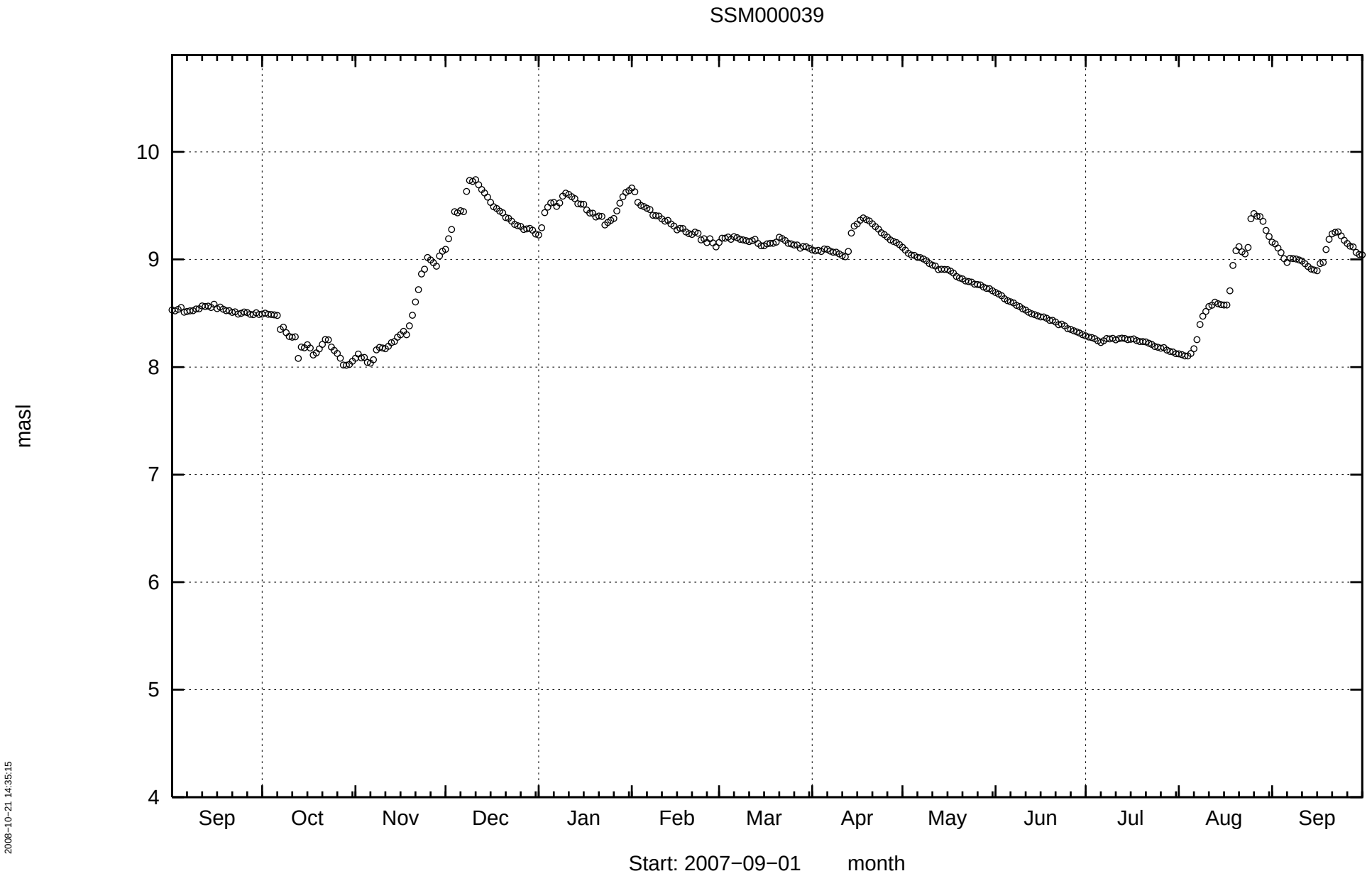
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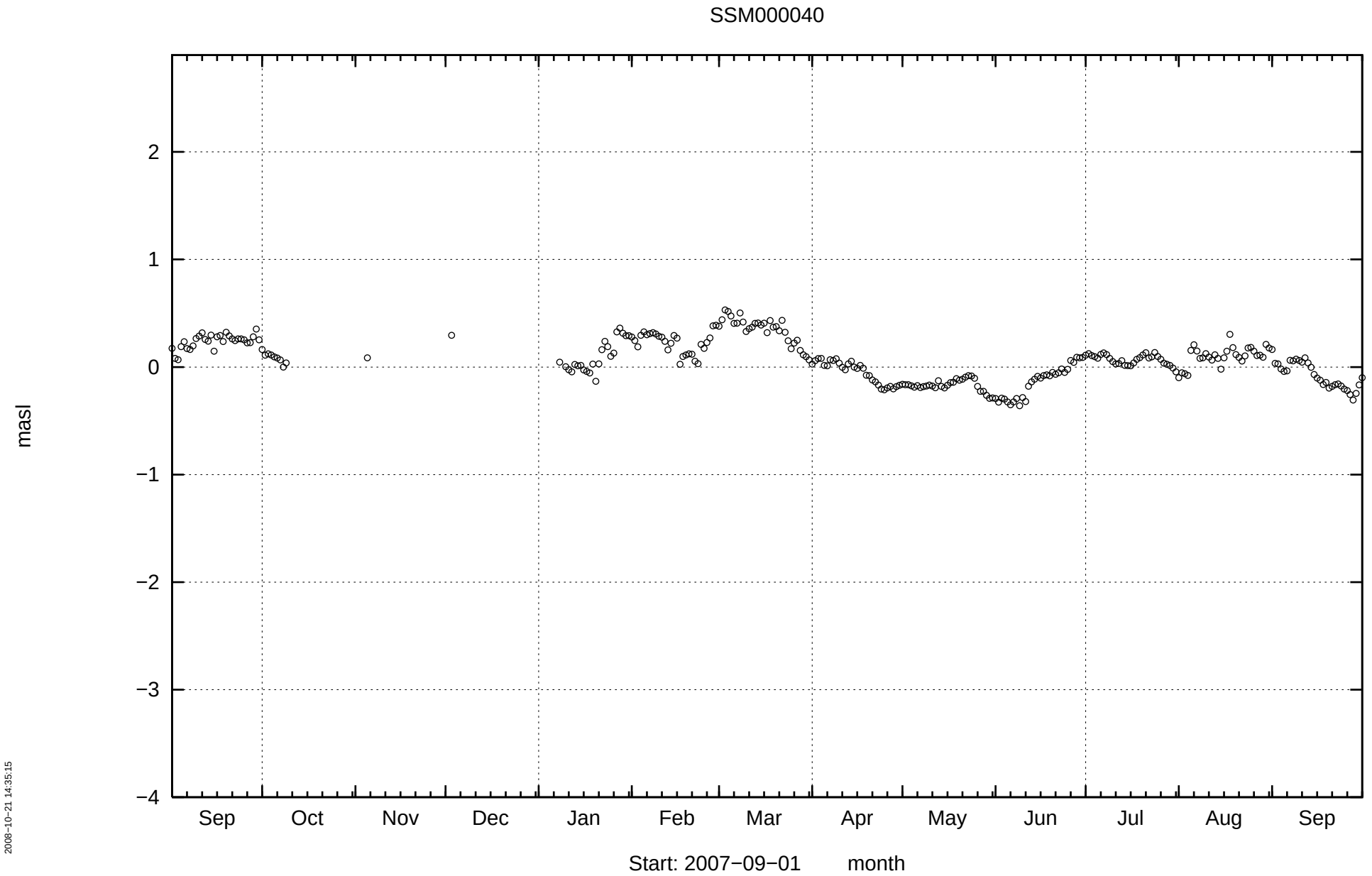
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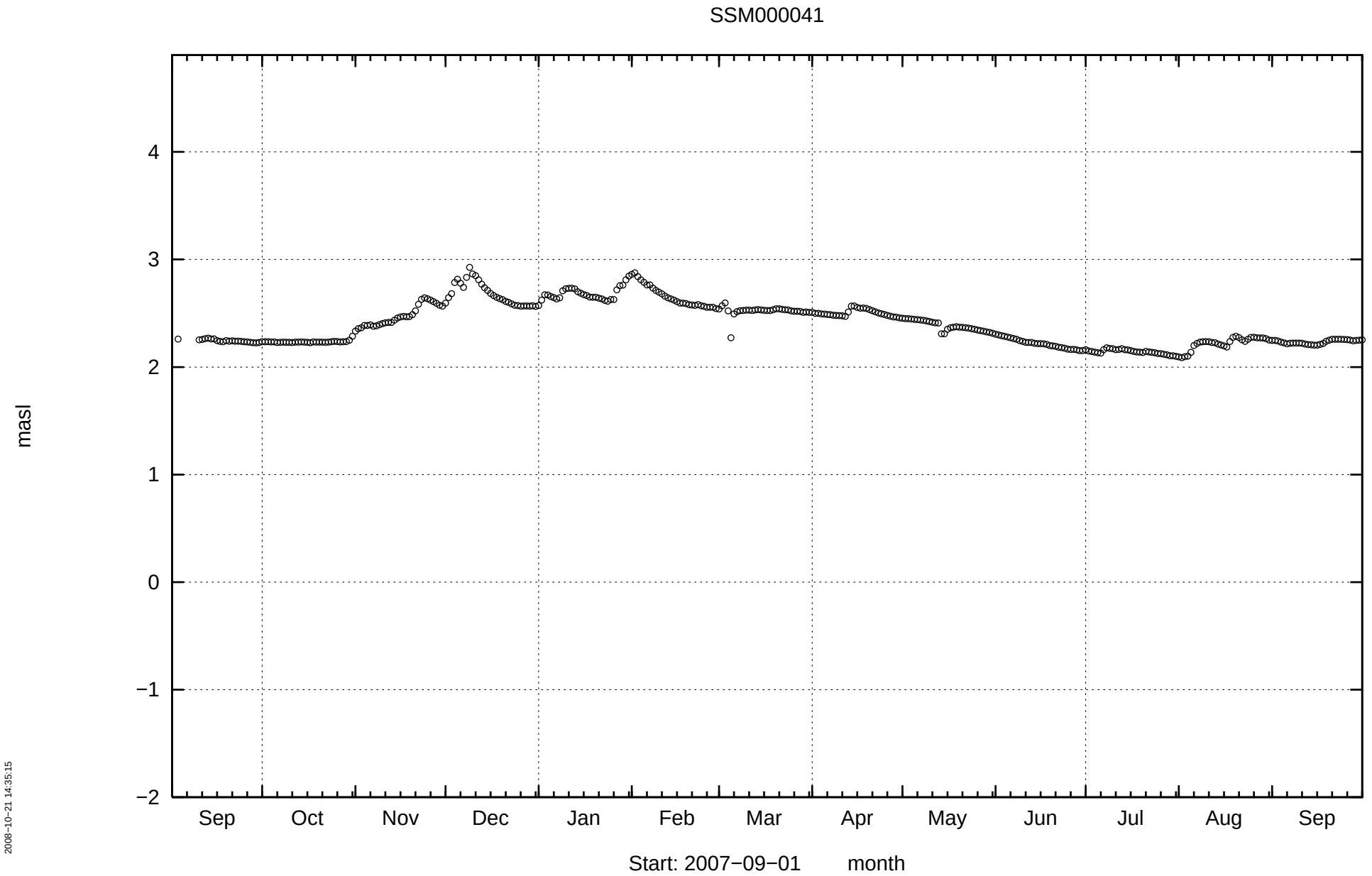
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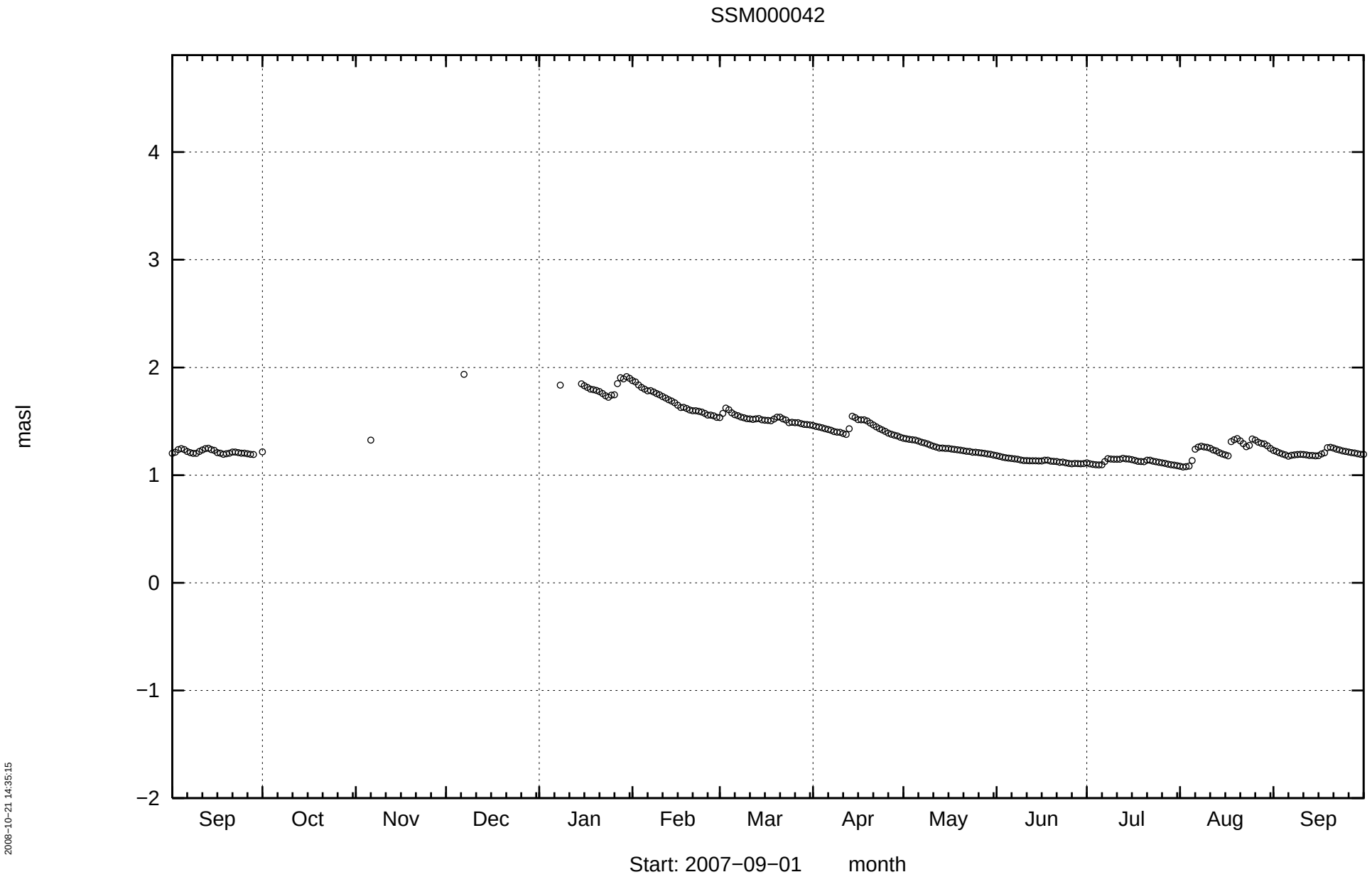
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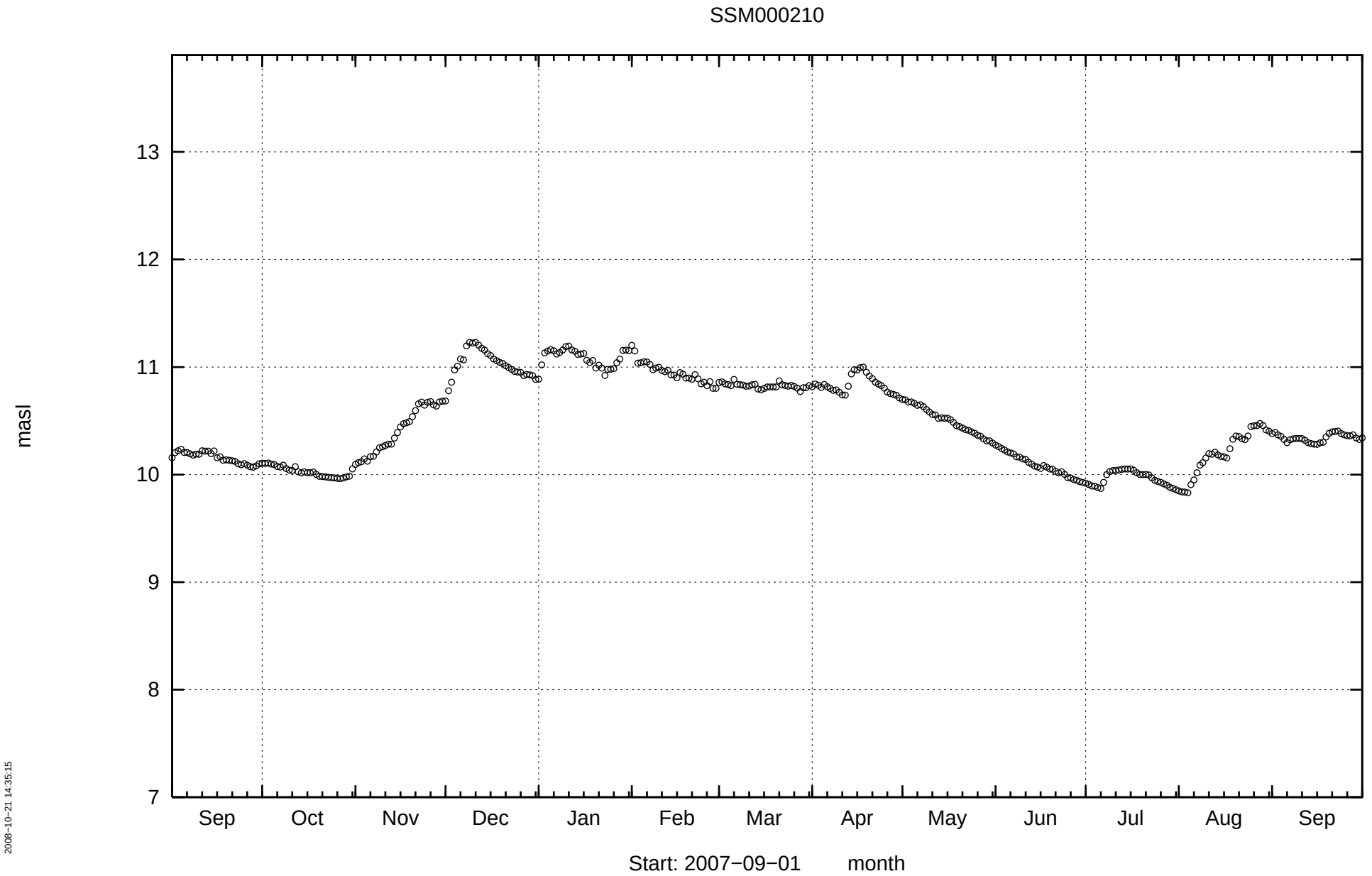
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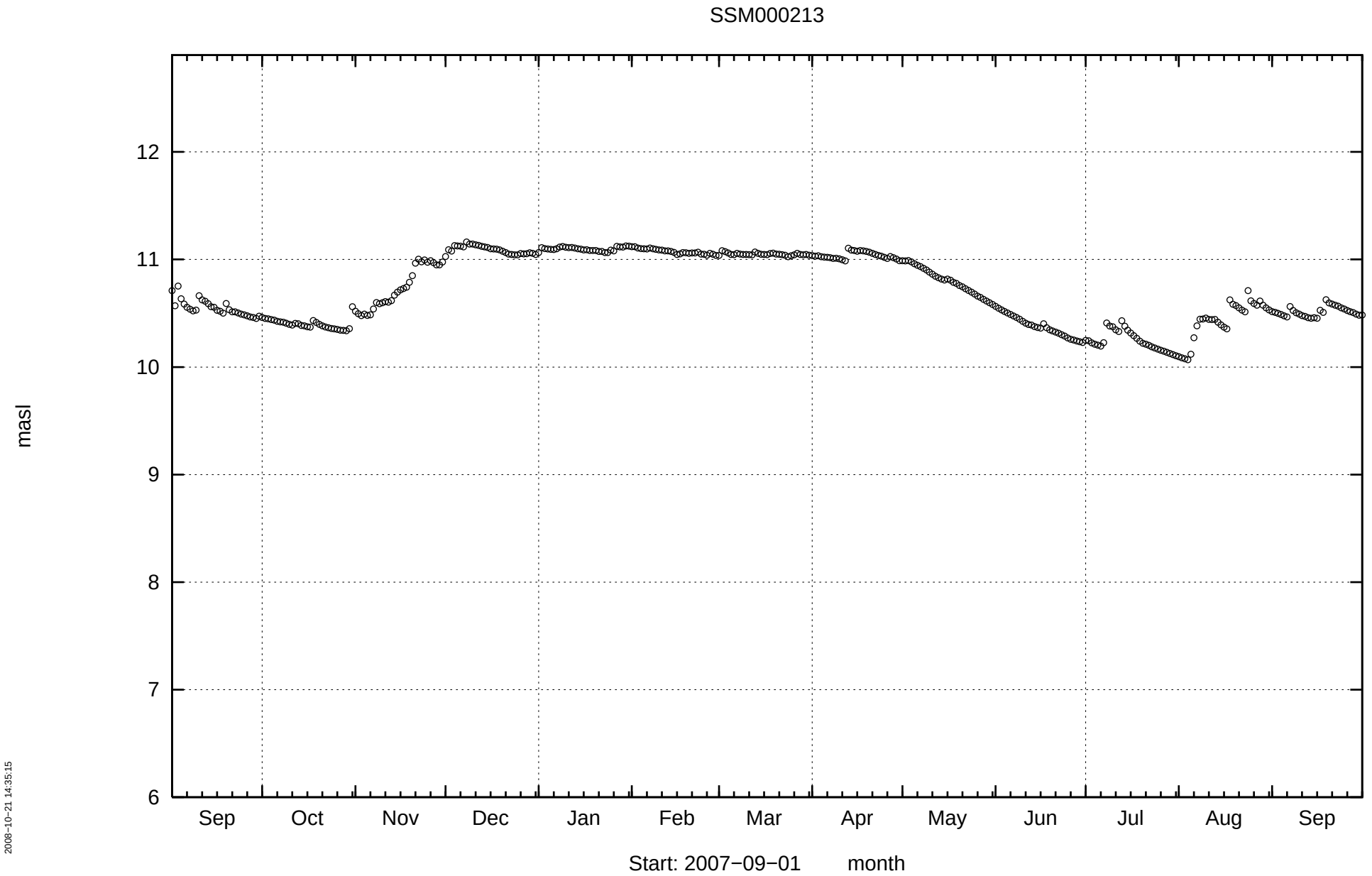
SSM000213
masl
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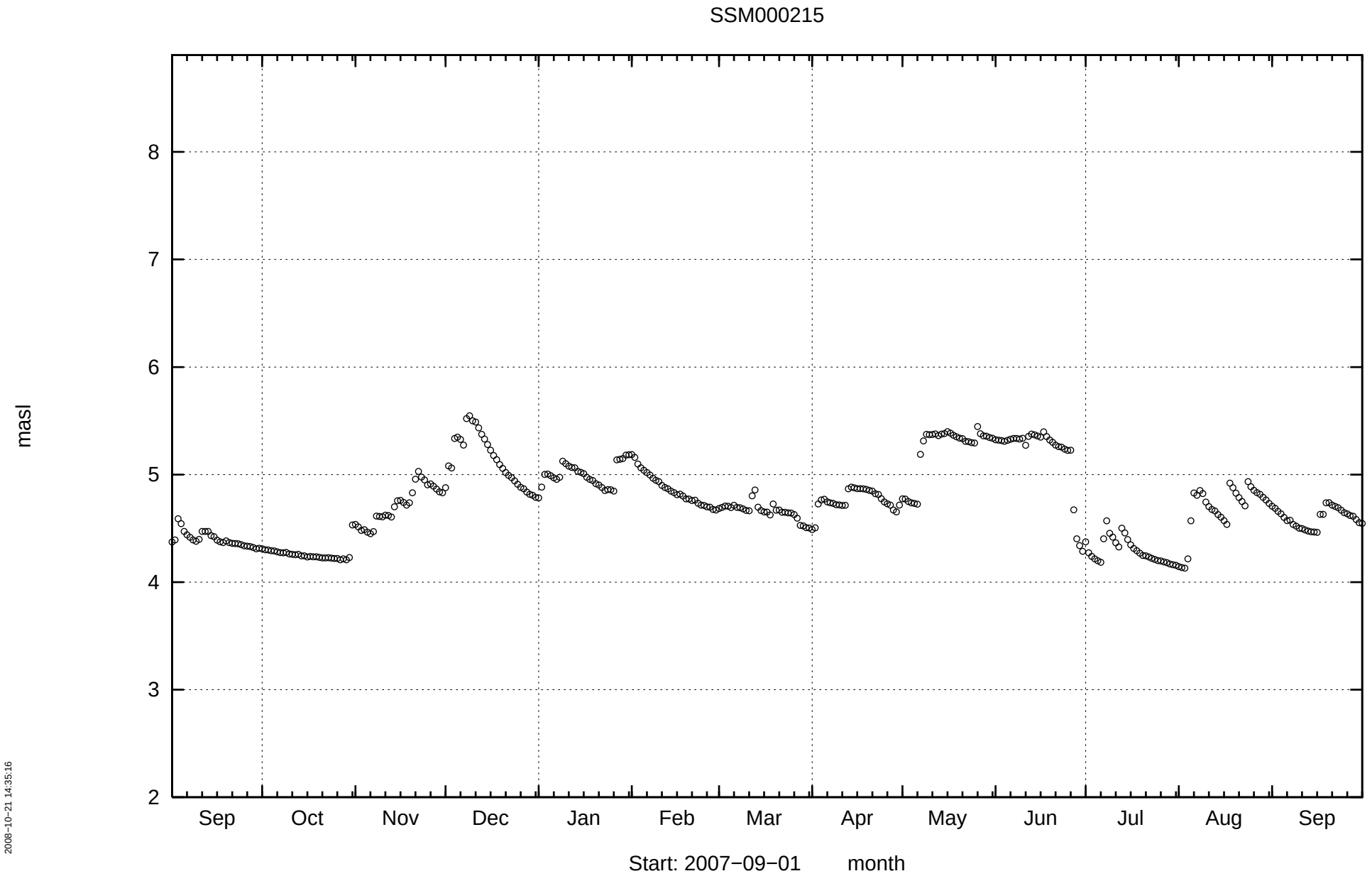
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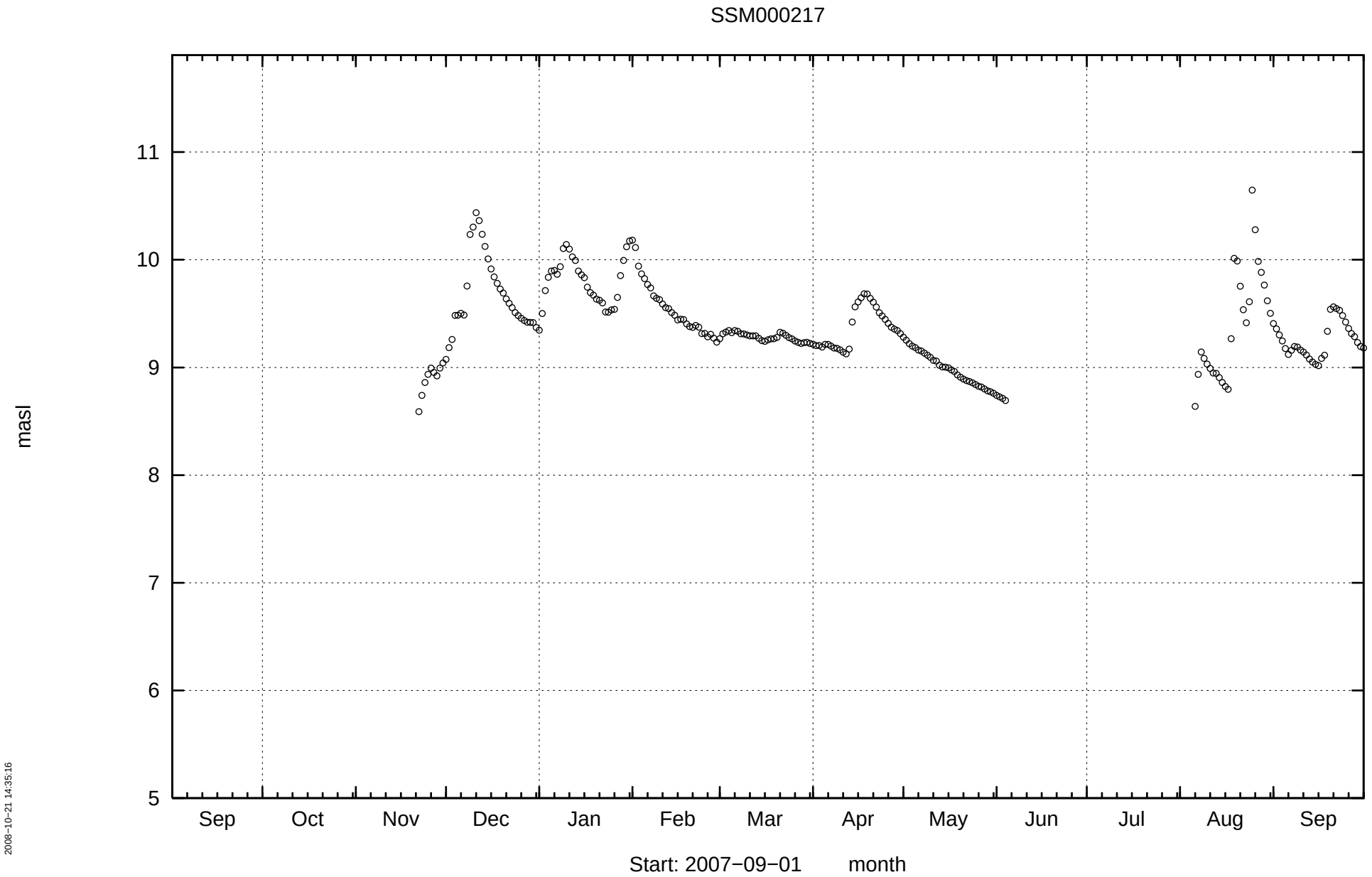
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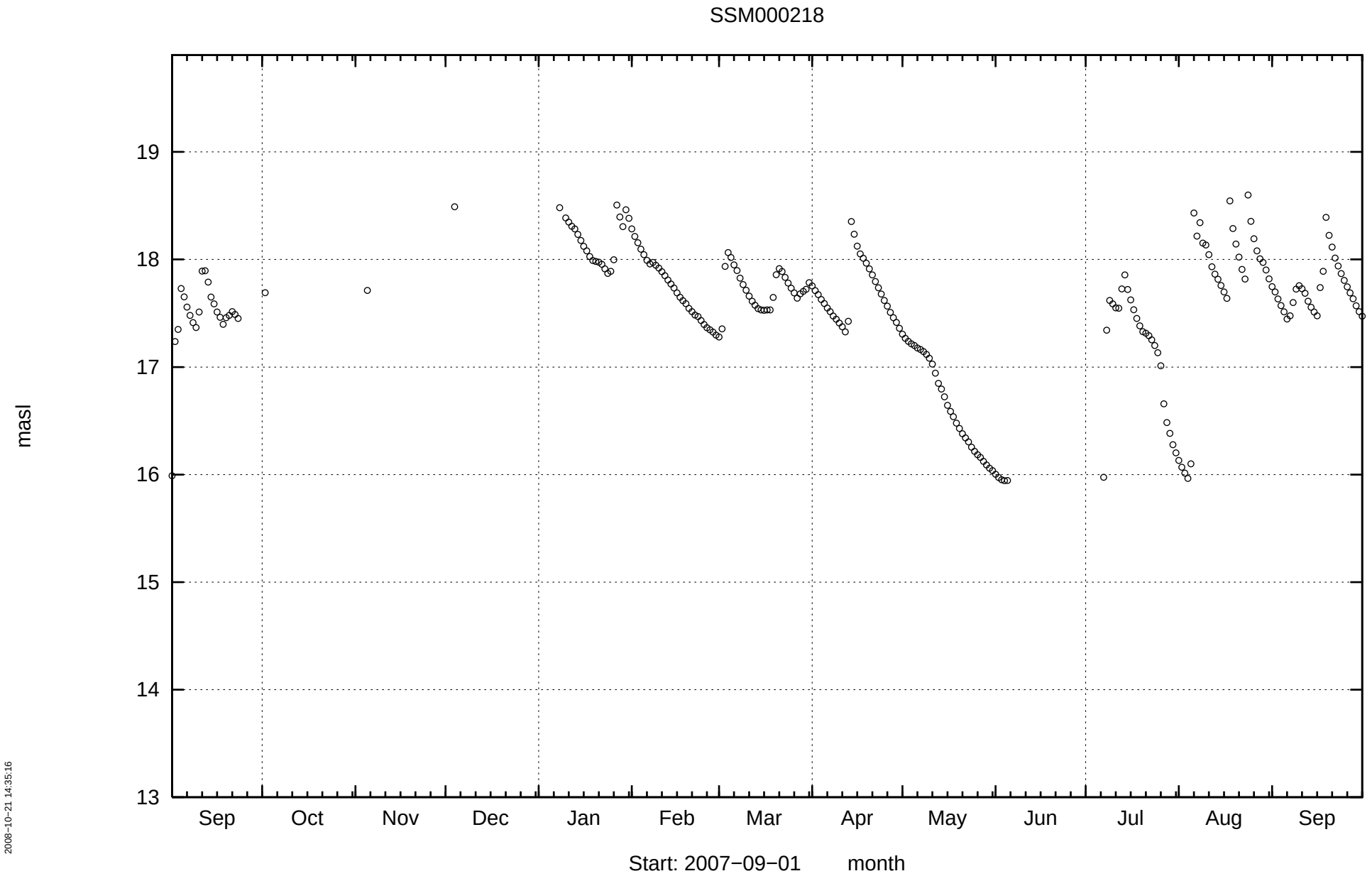
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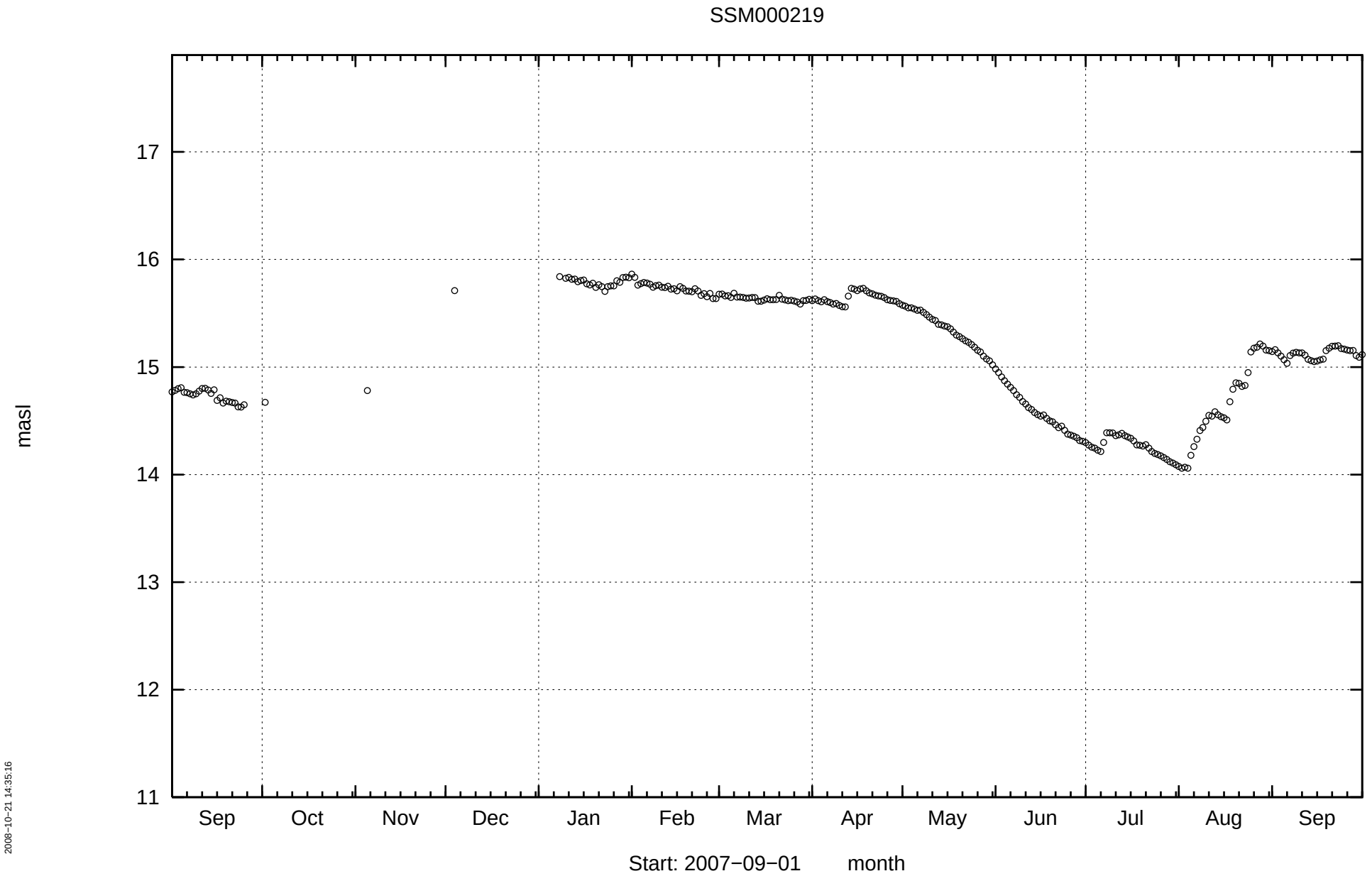
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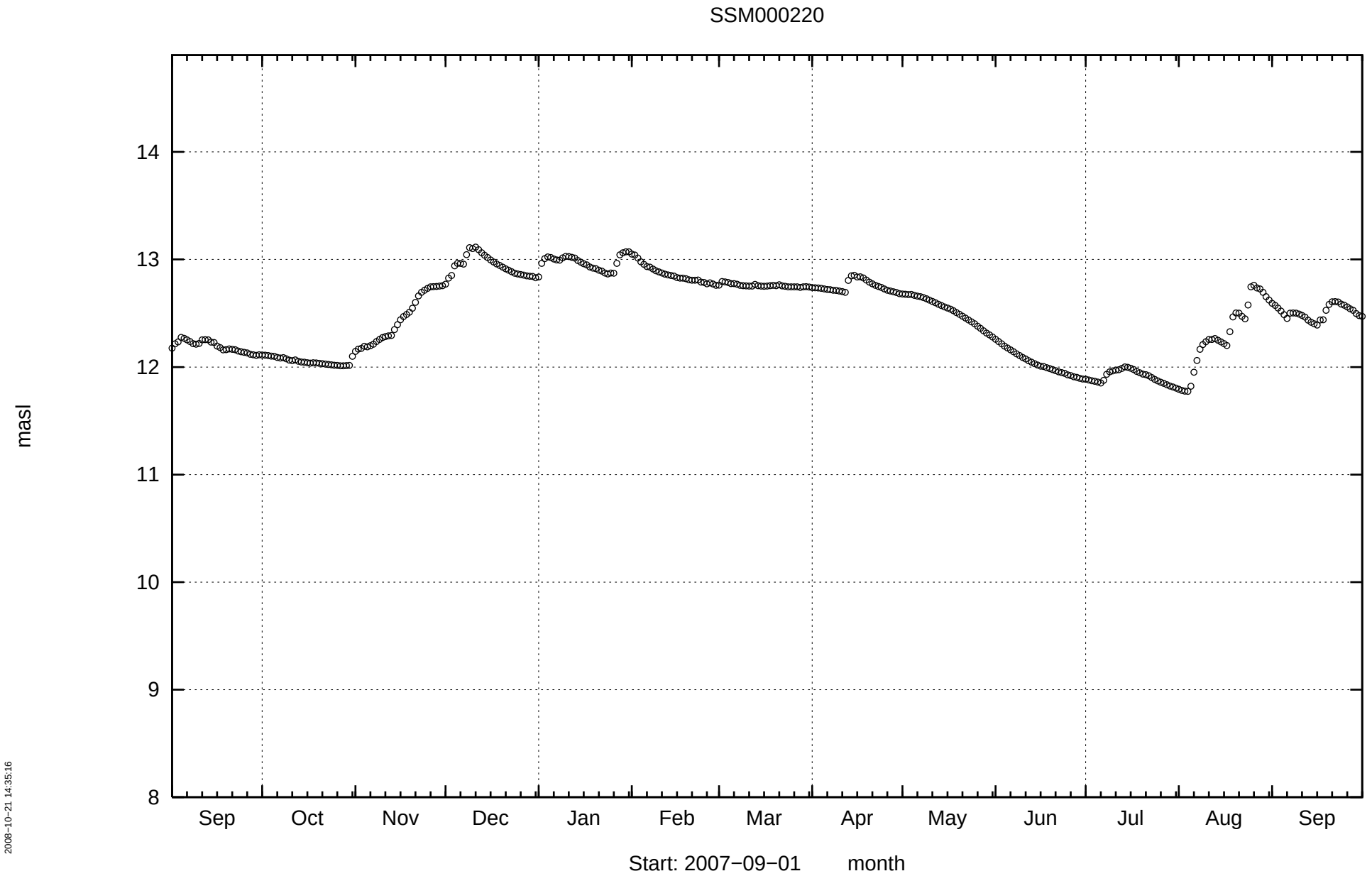
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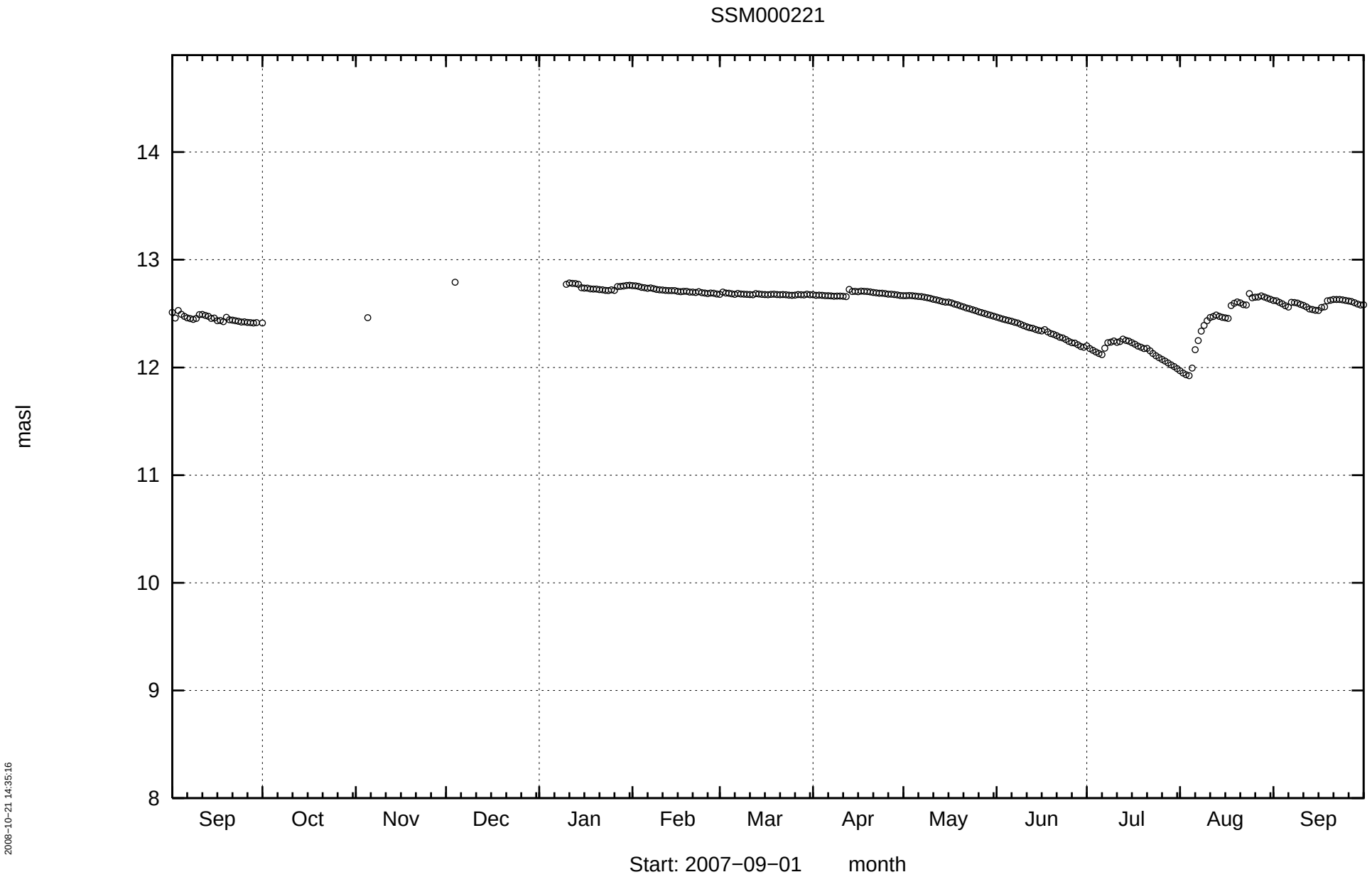
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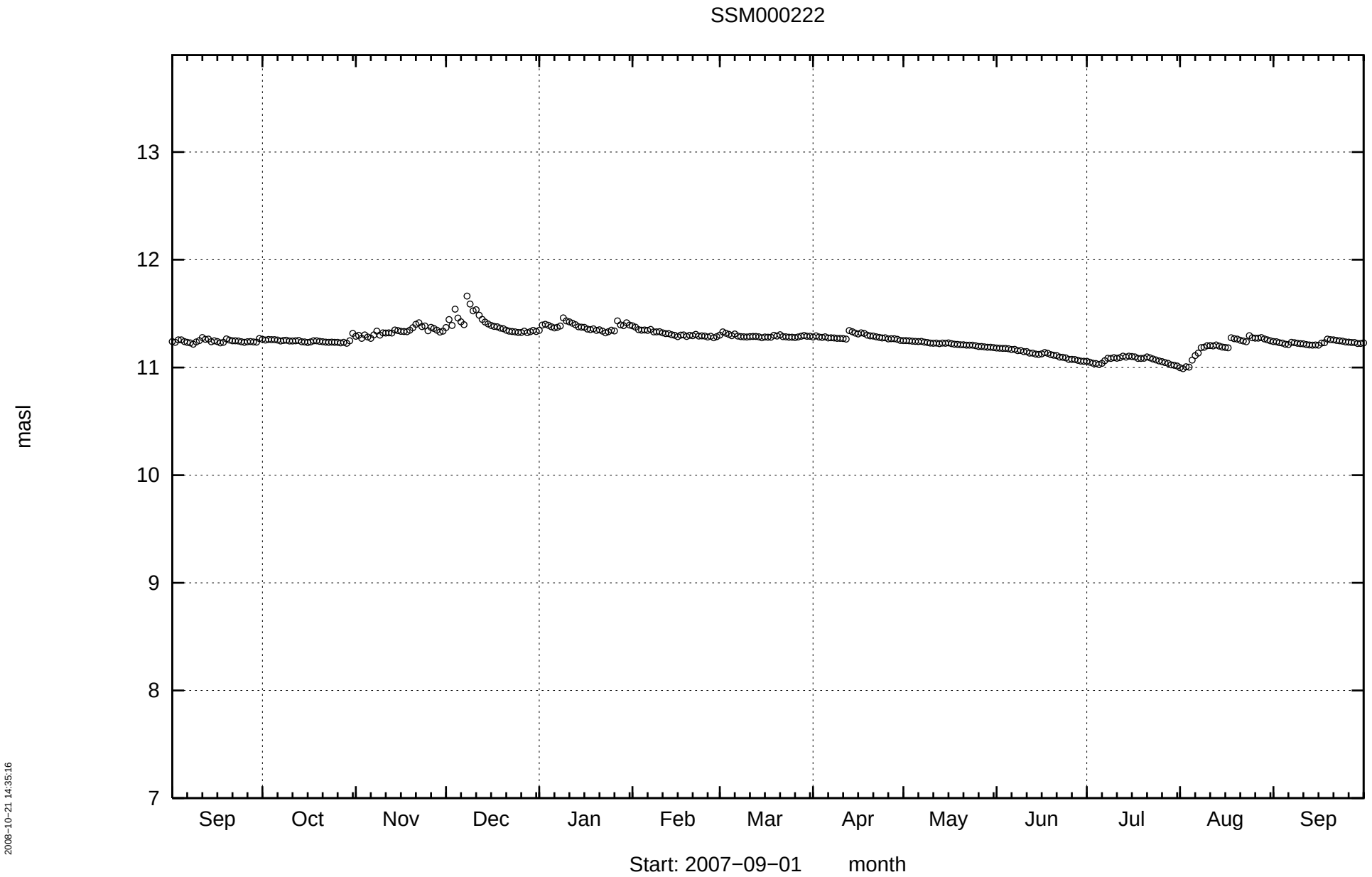
SSM000222
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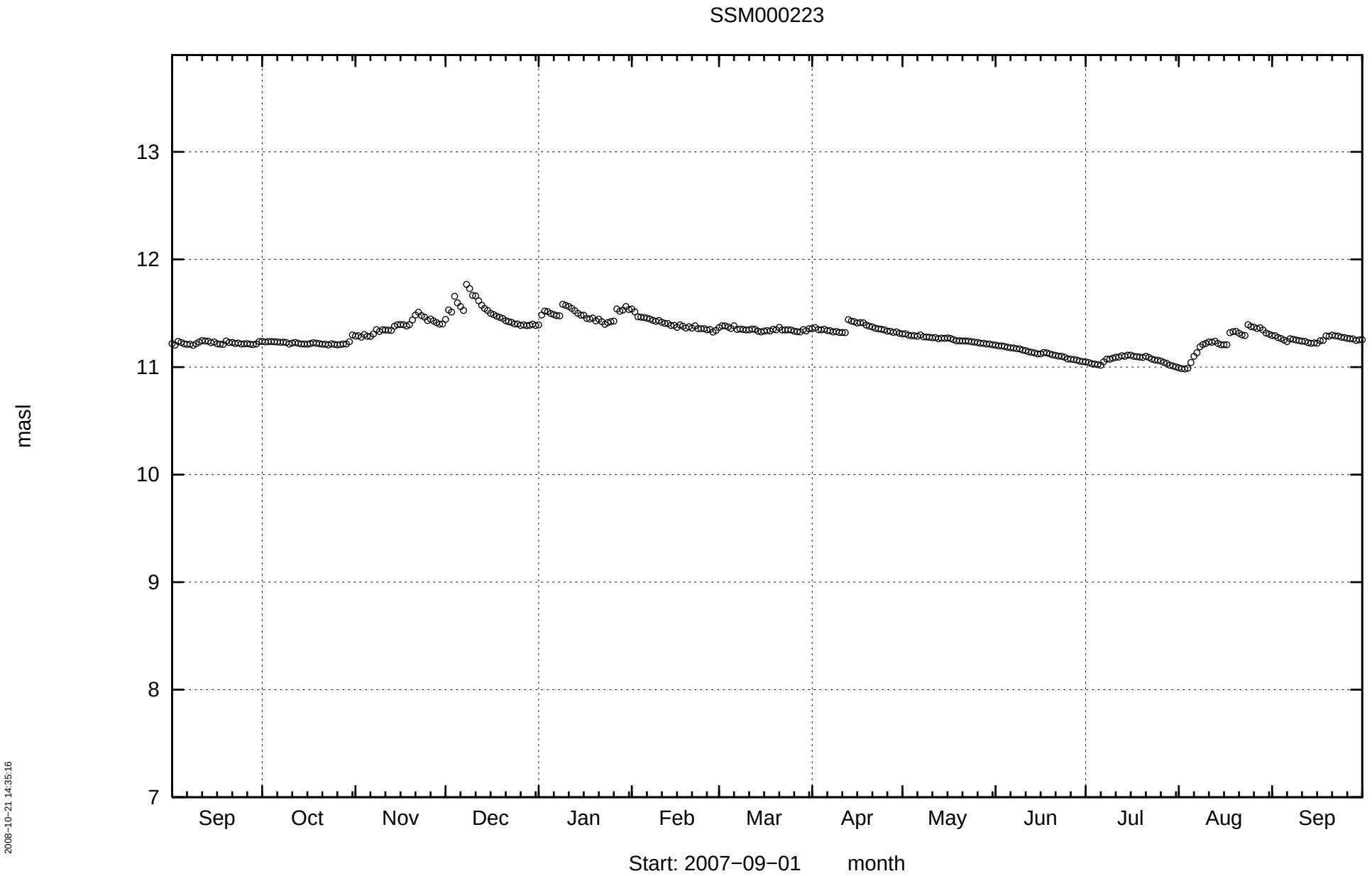
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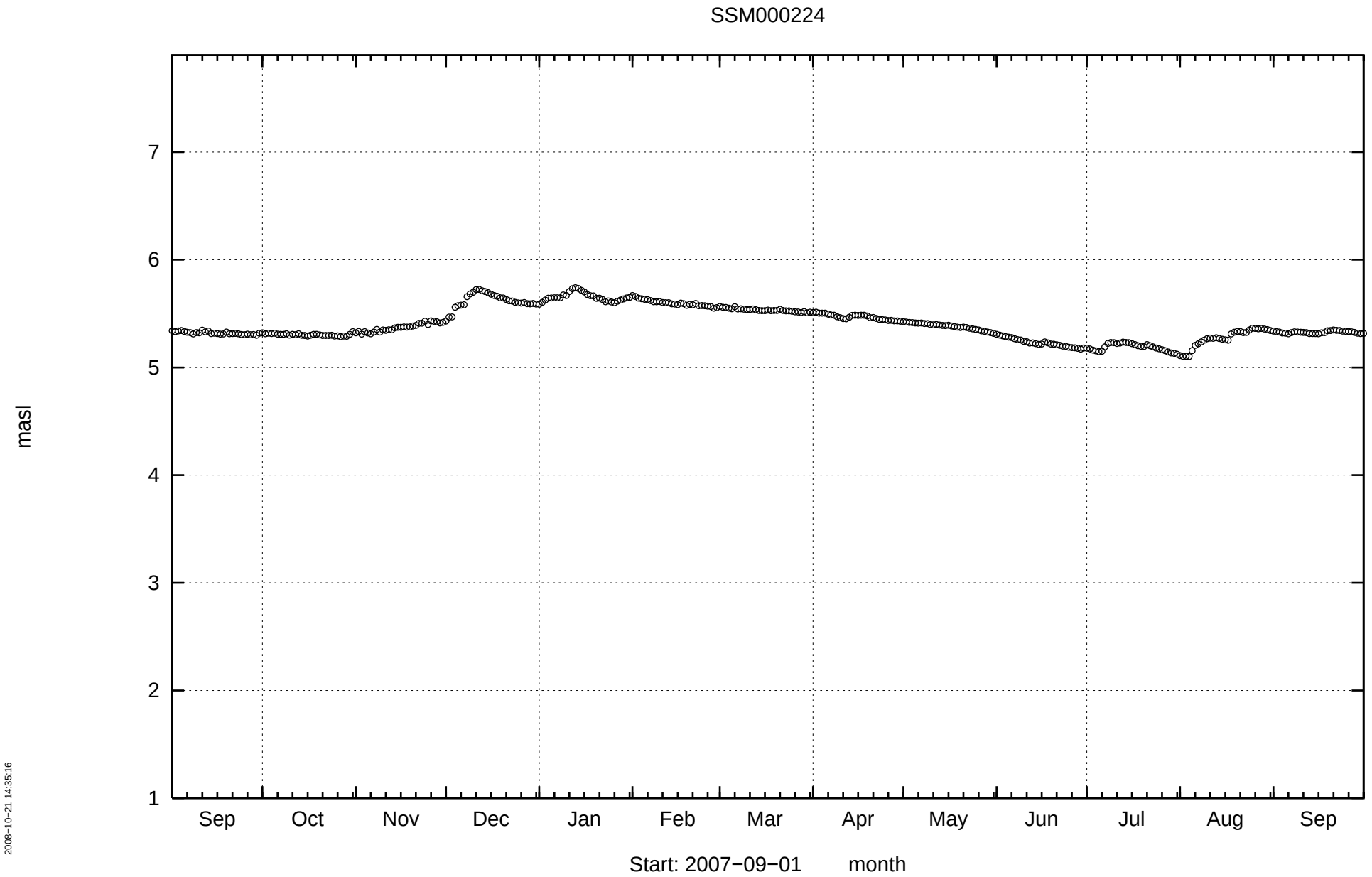
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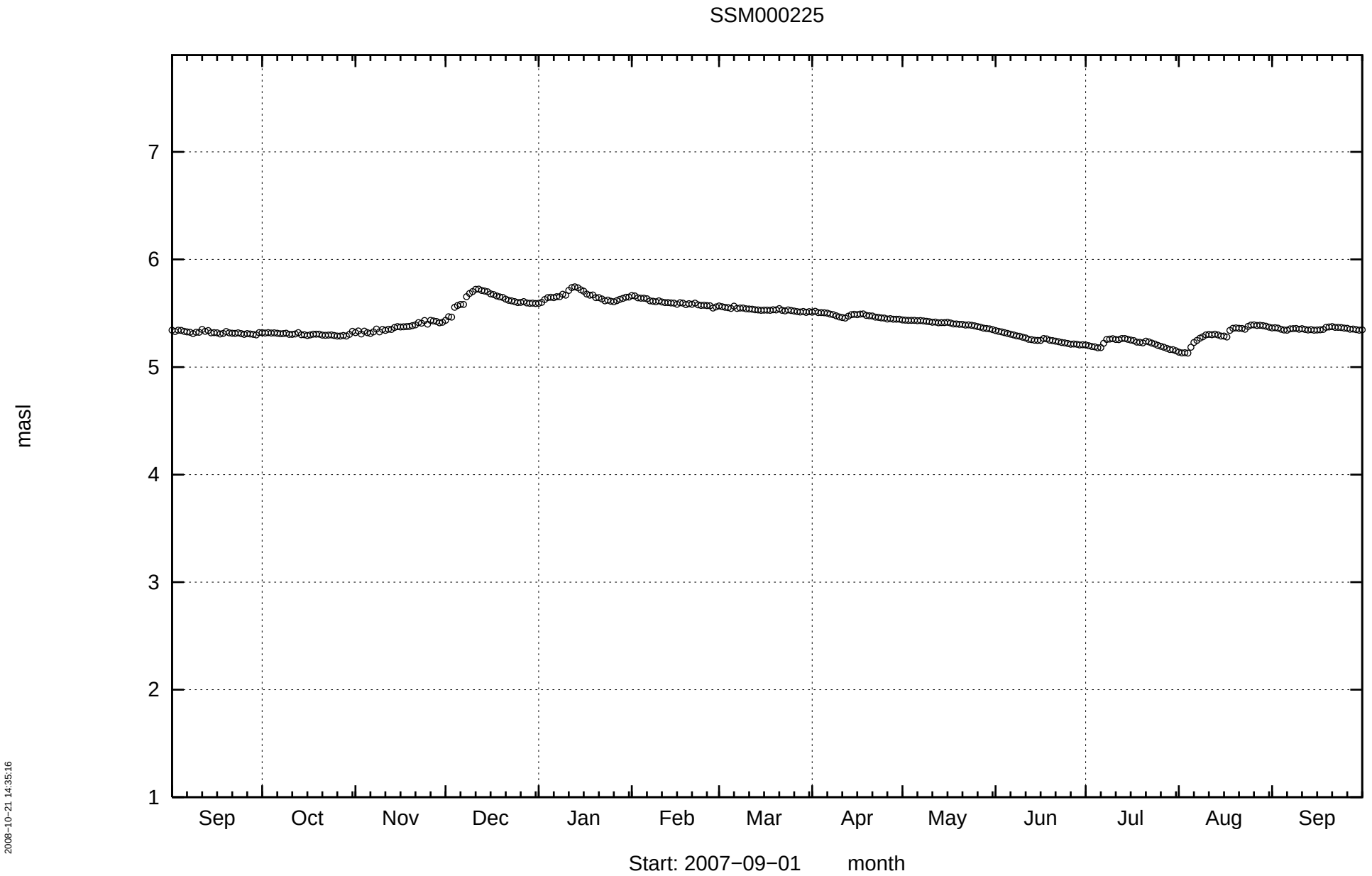
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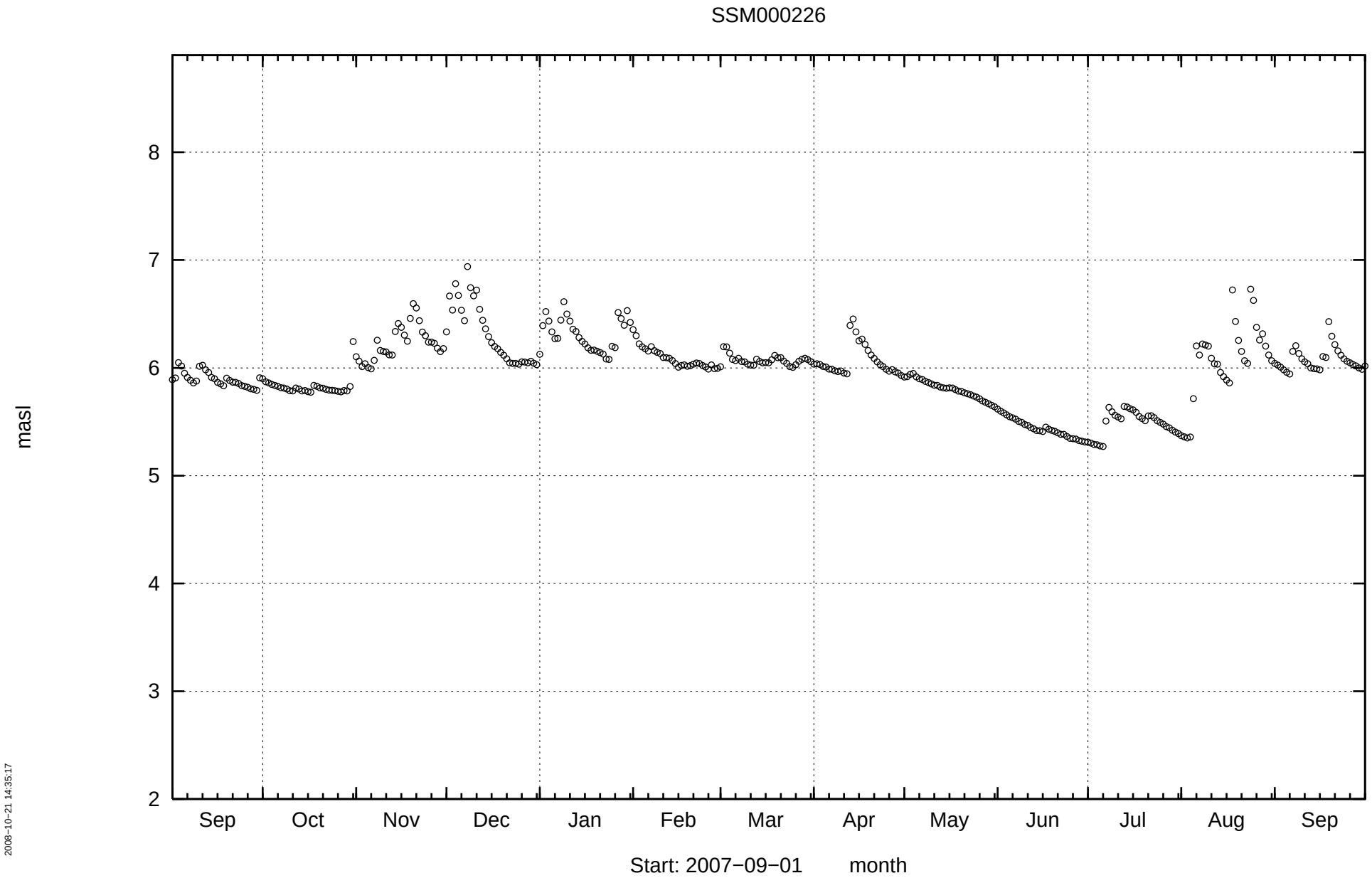
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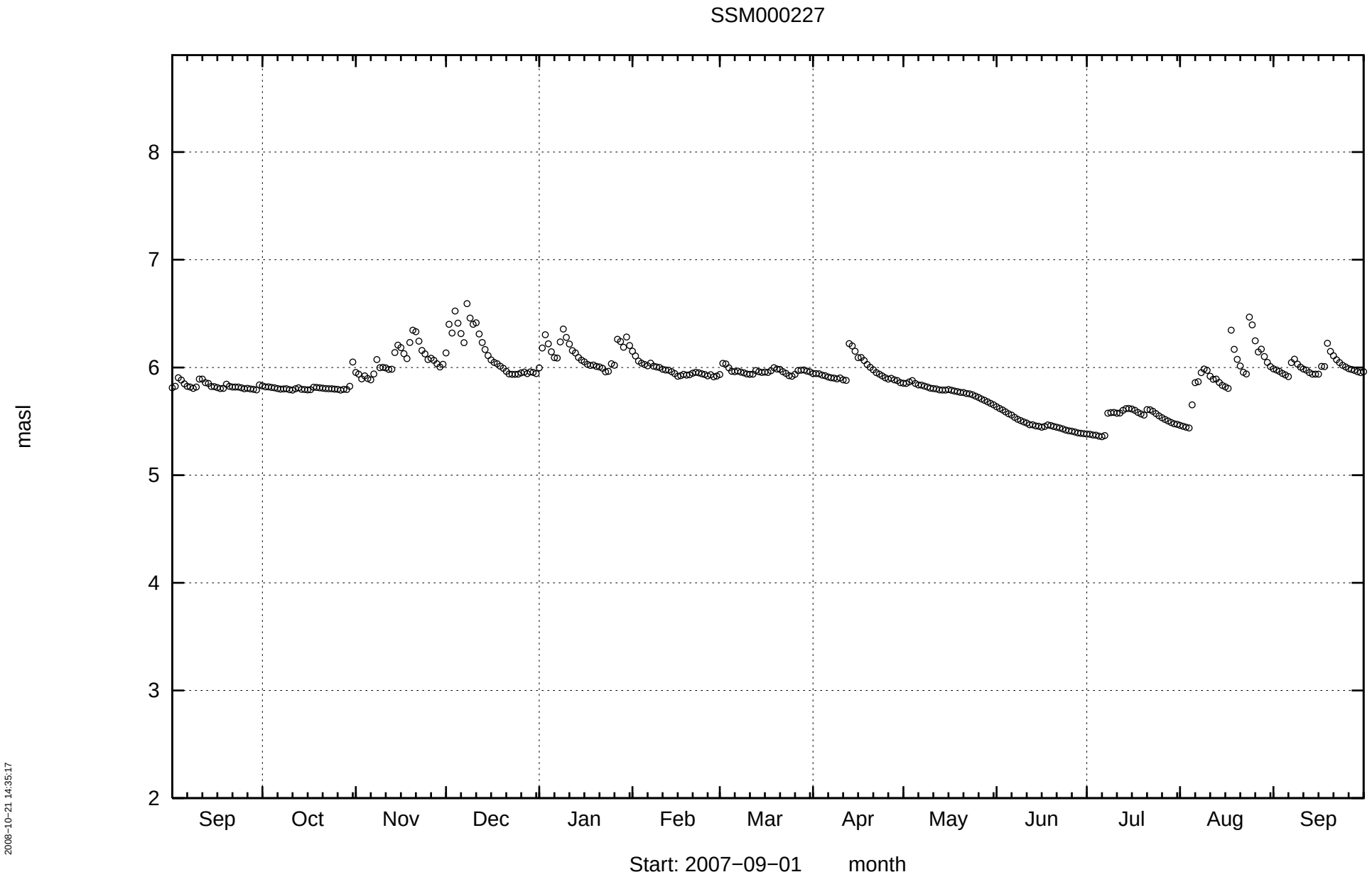
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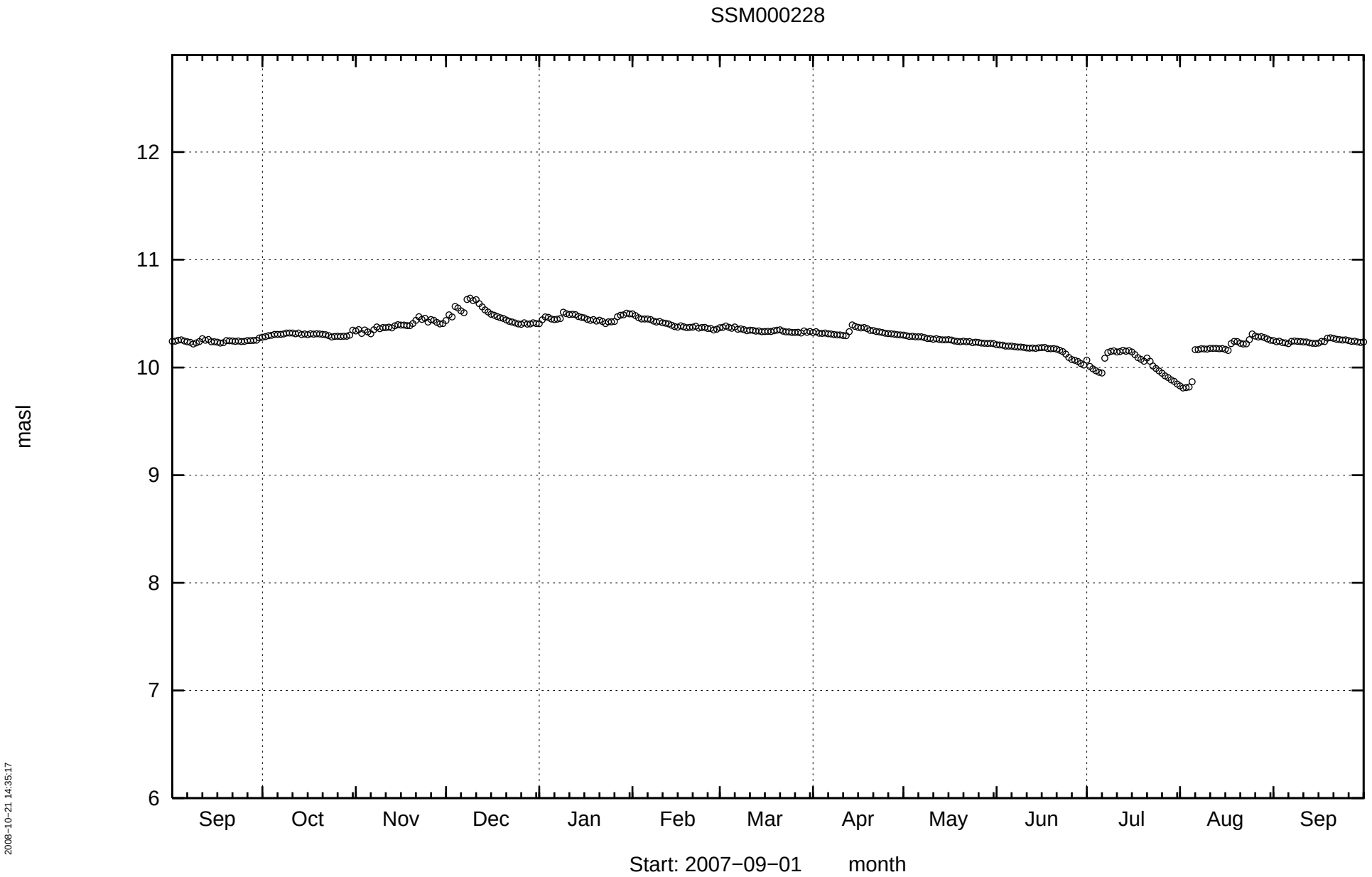
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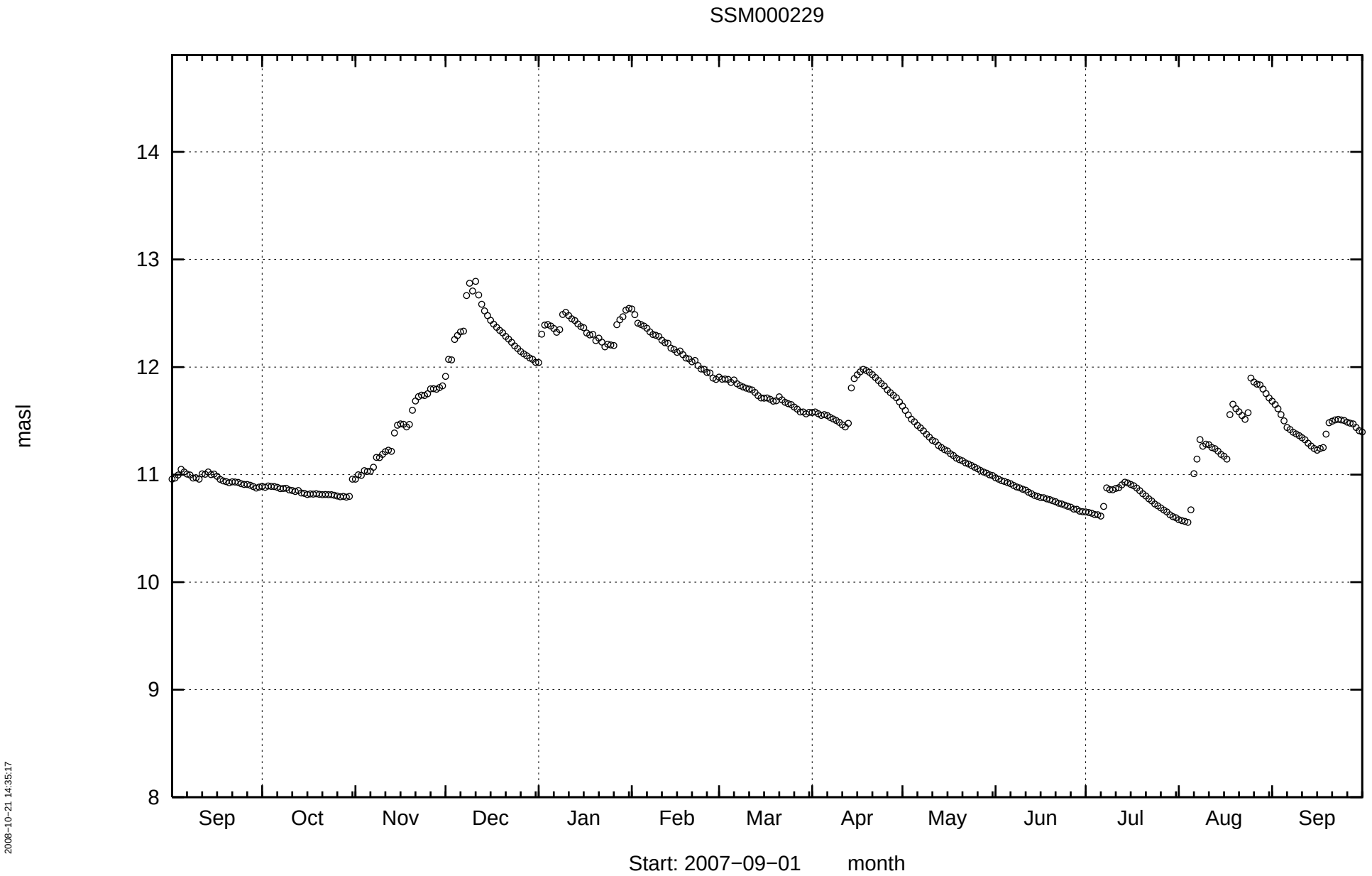
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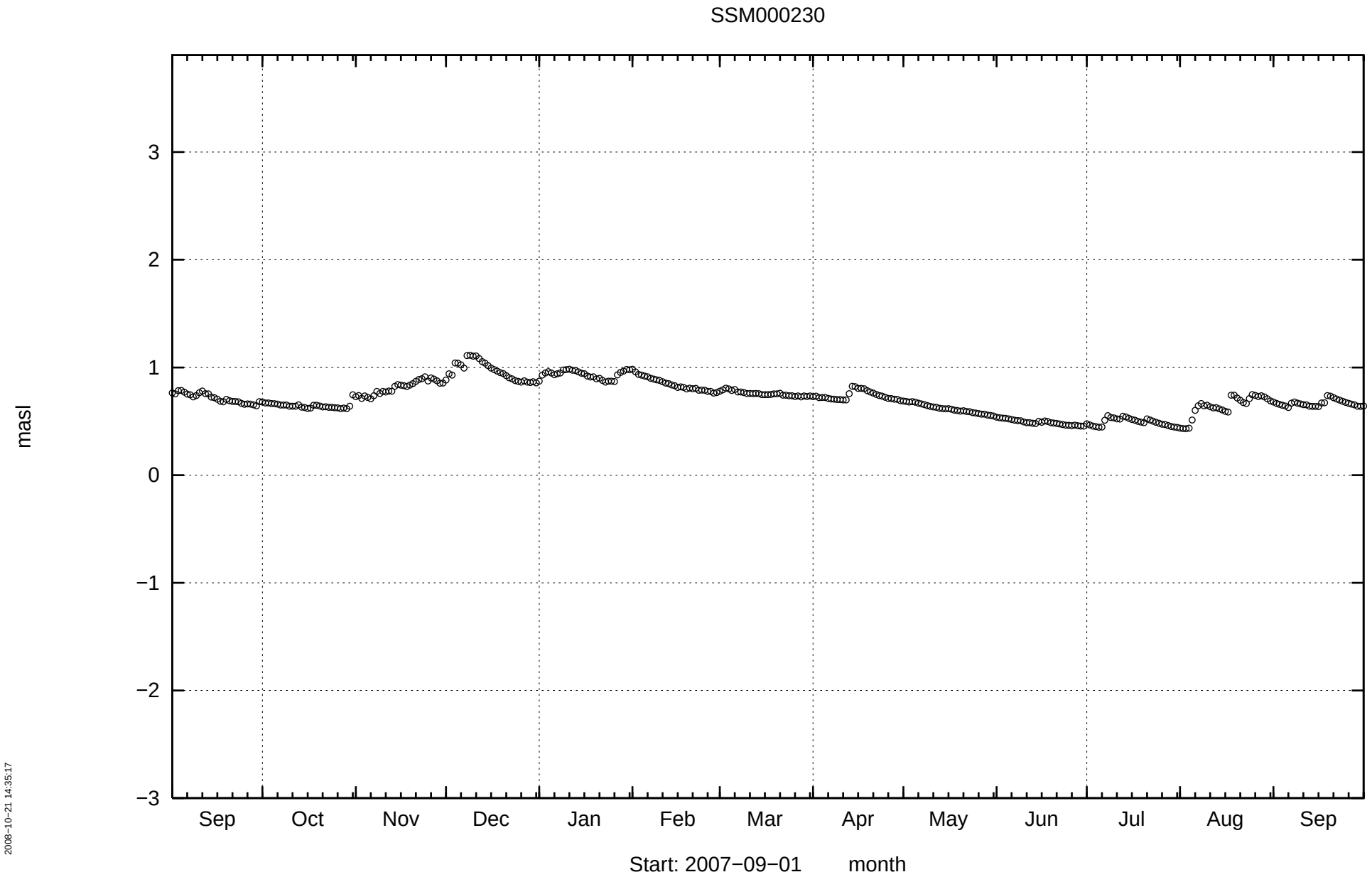
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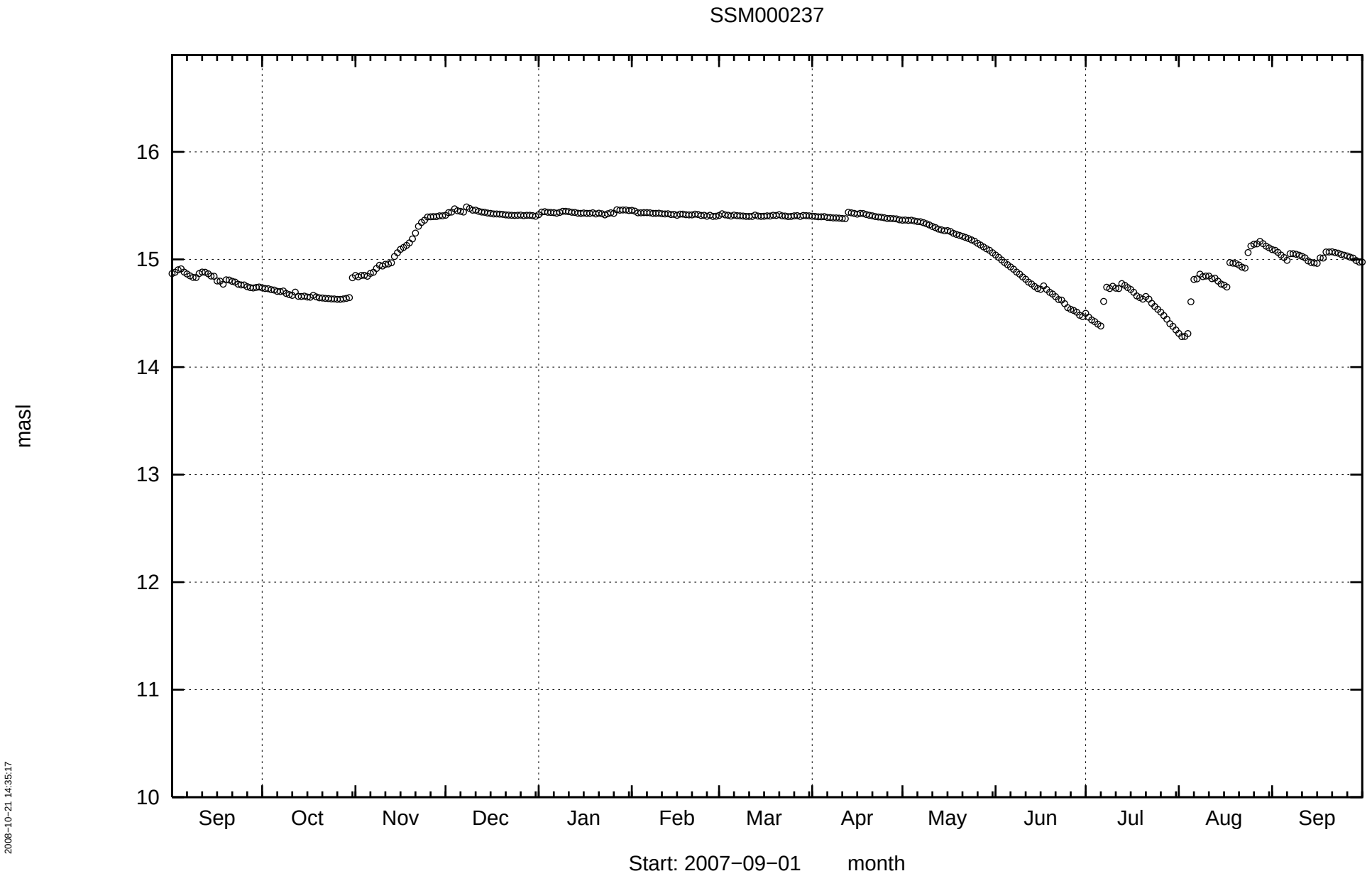
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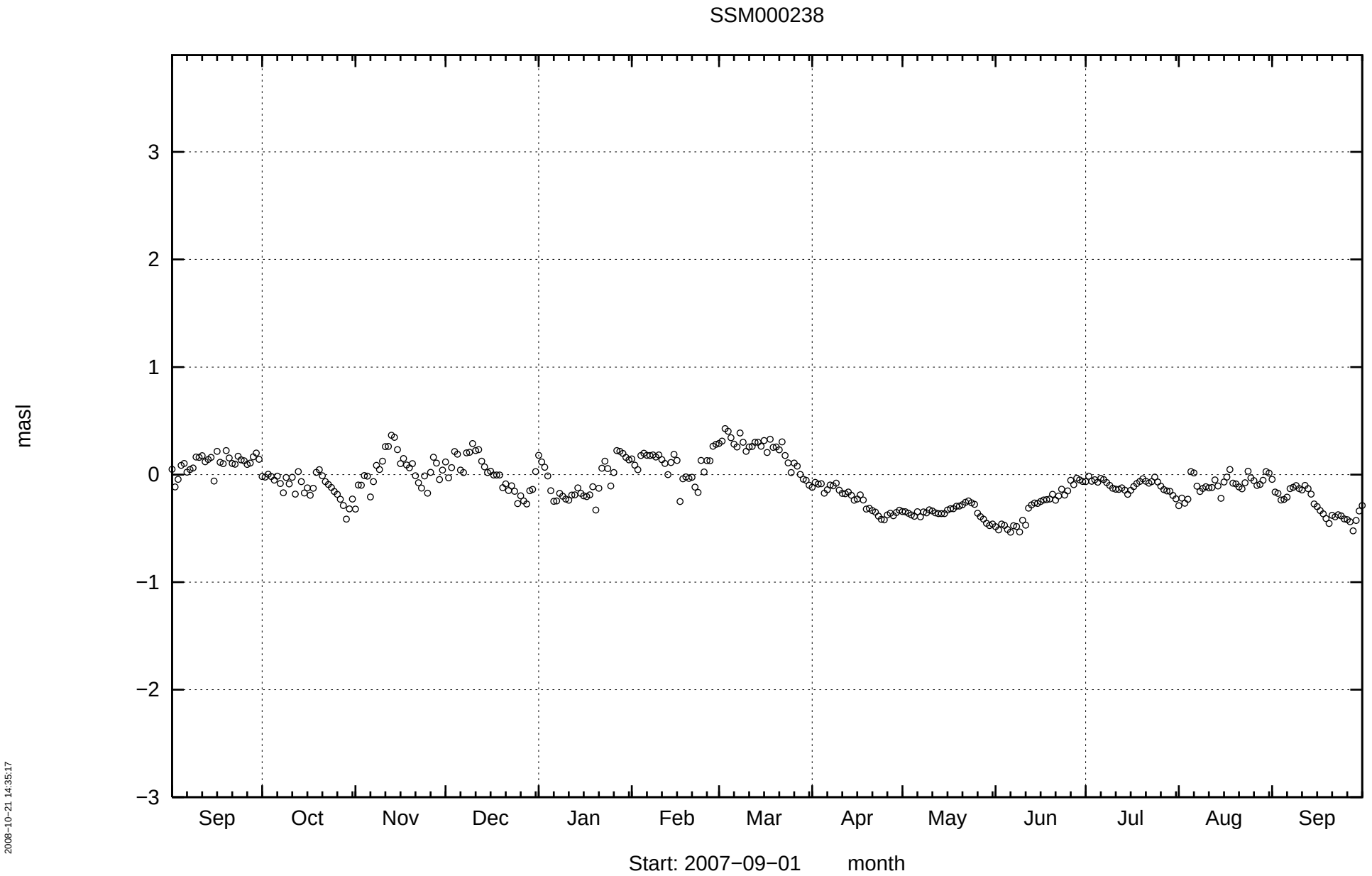
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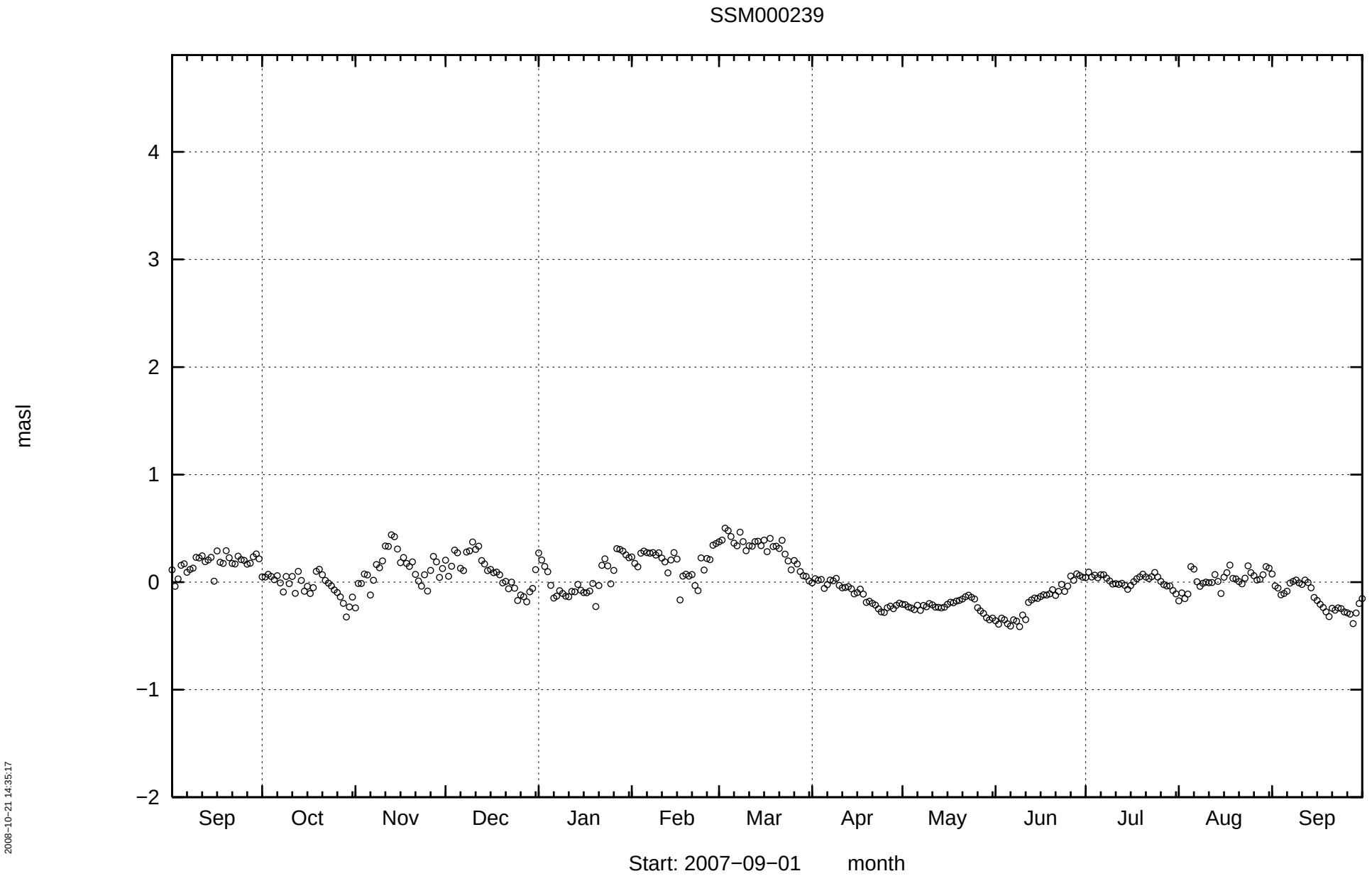
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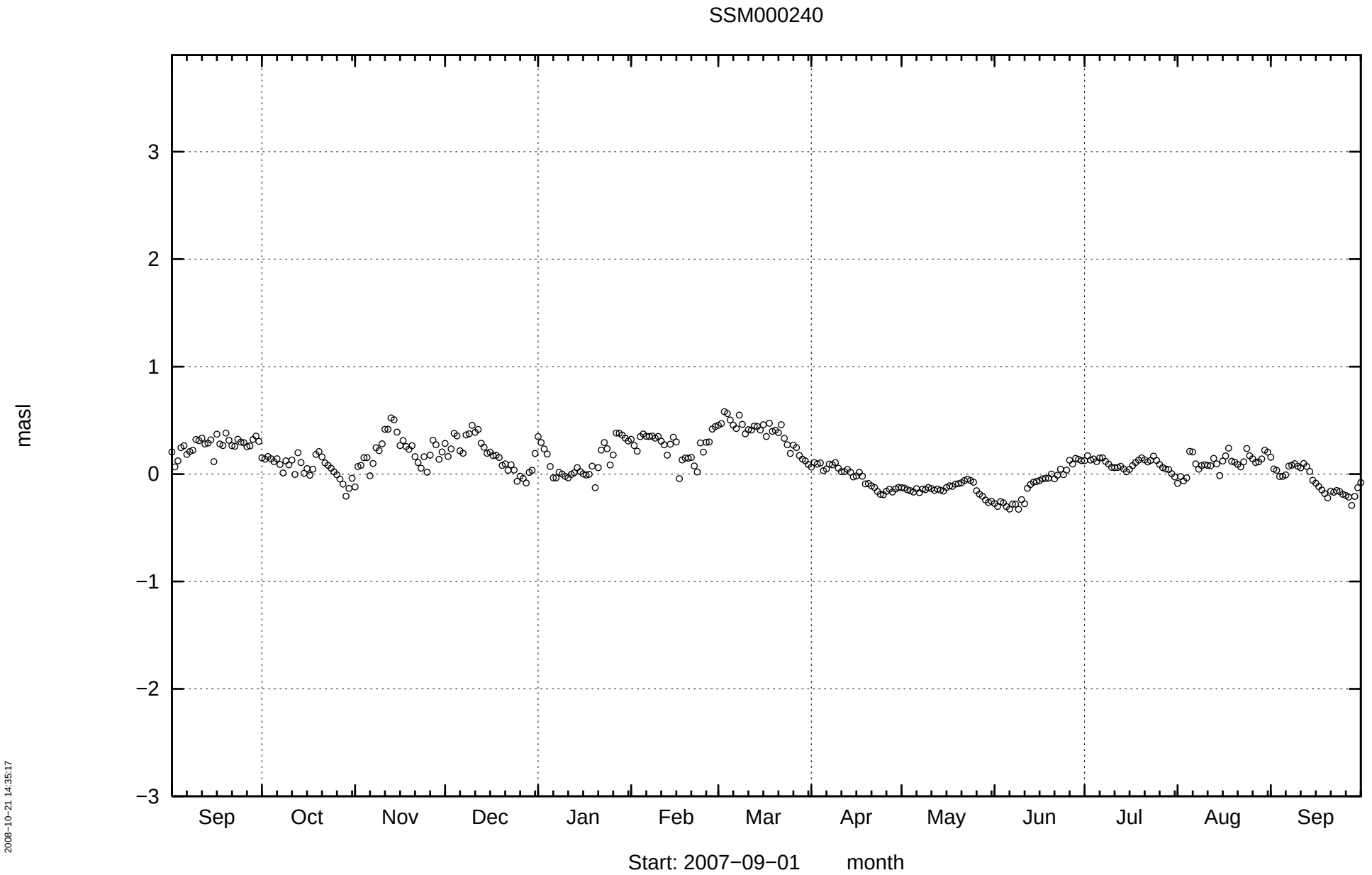
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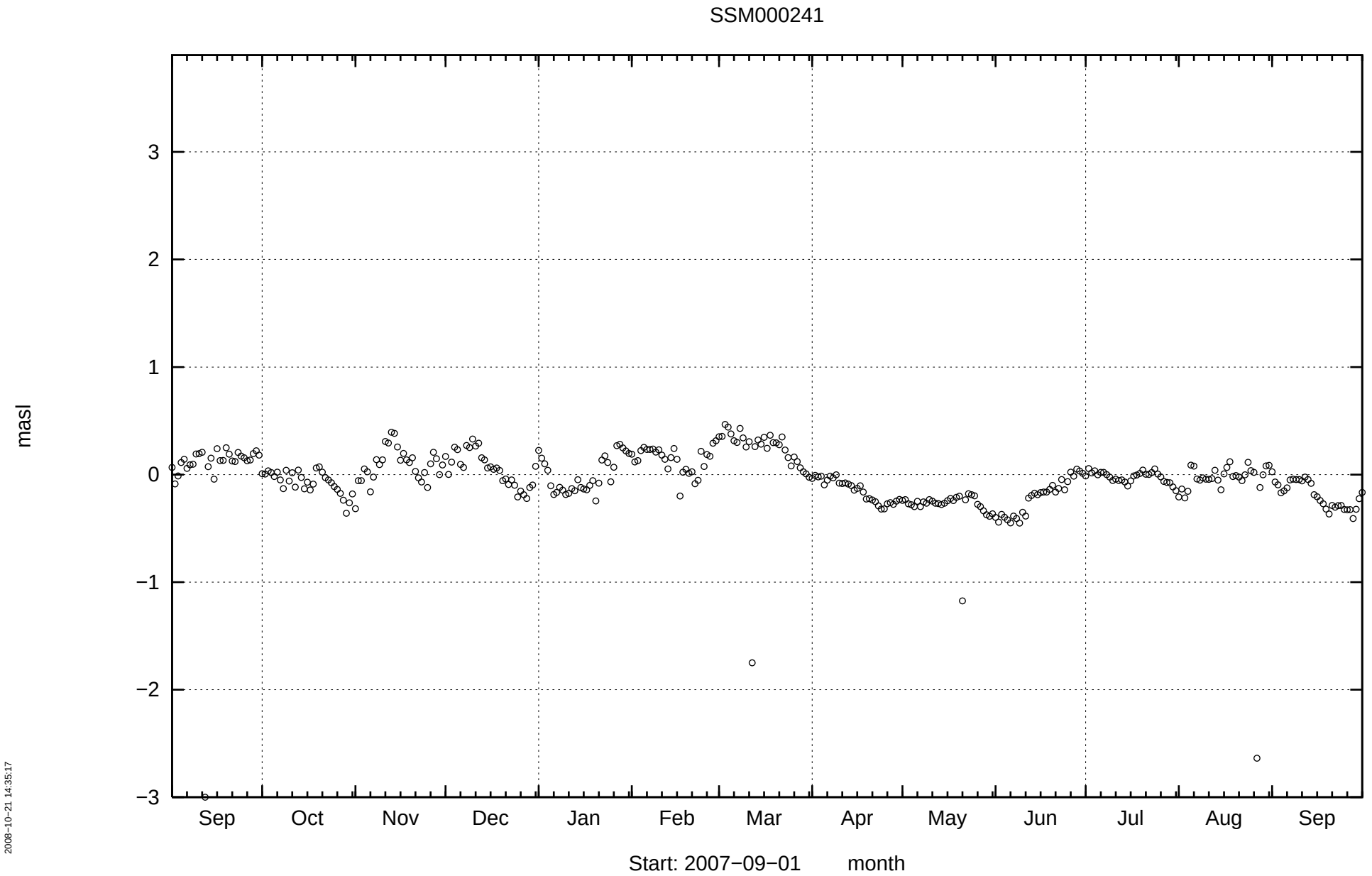
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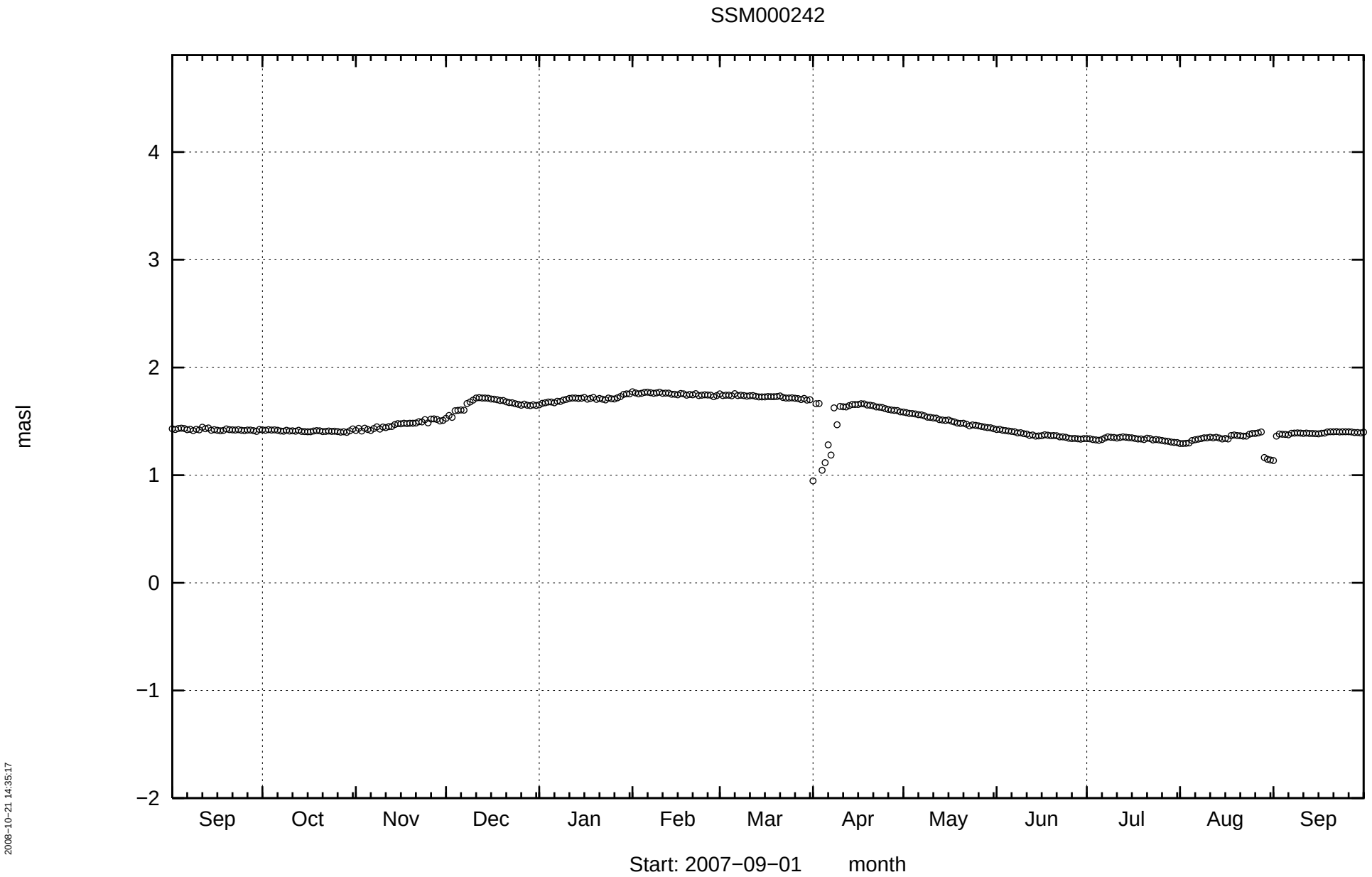
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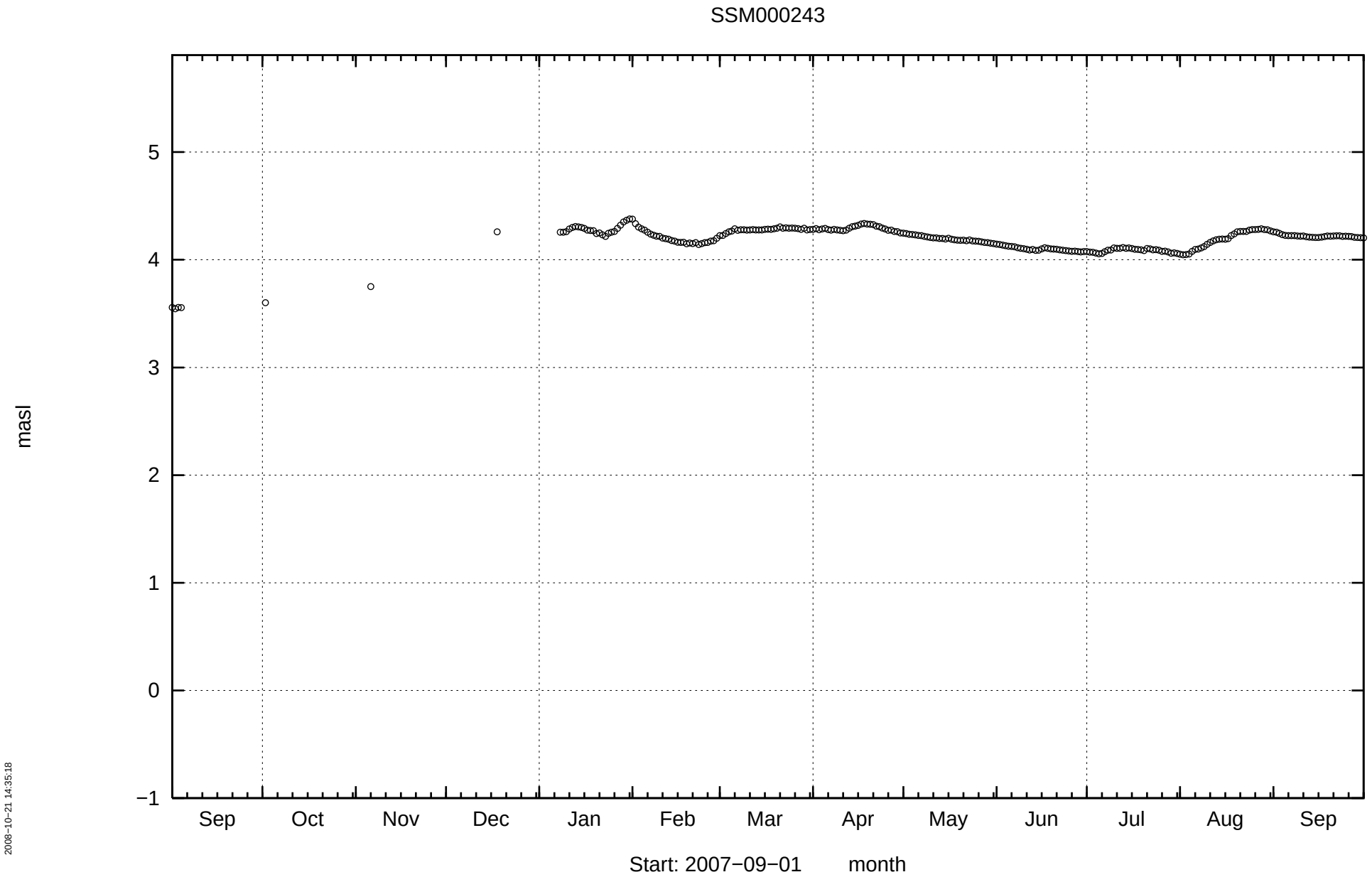
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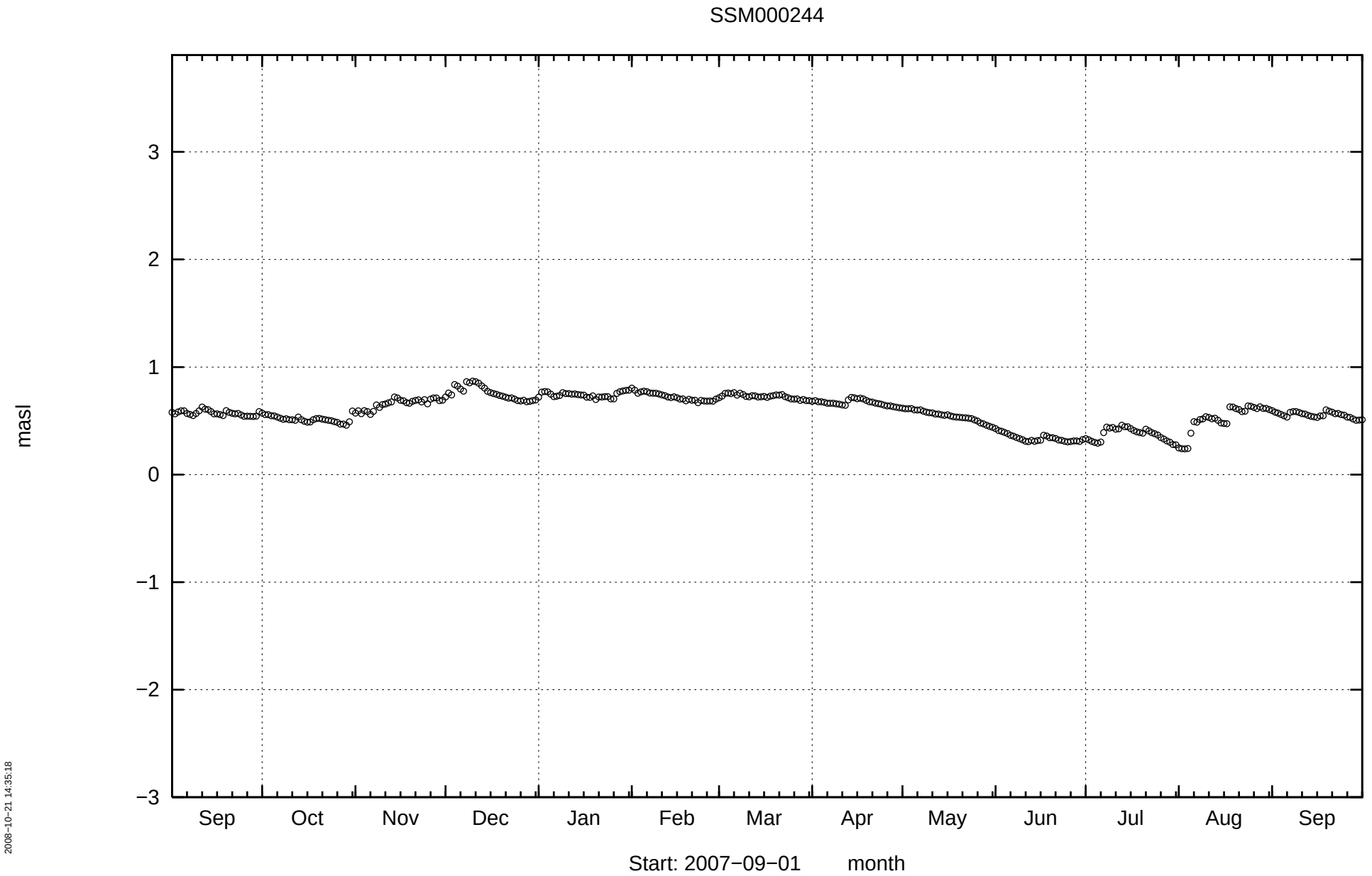
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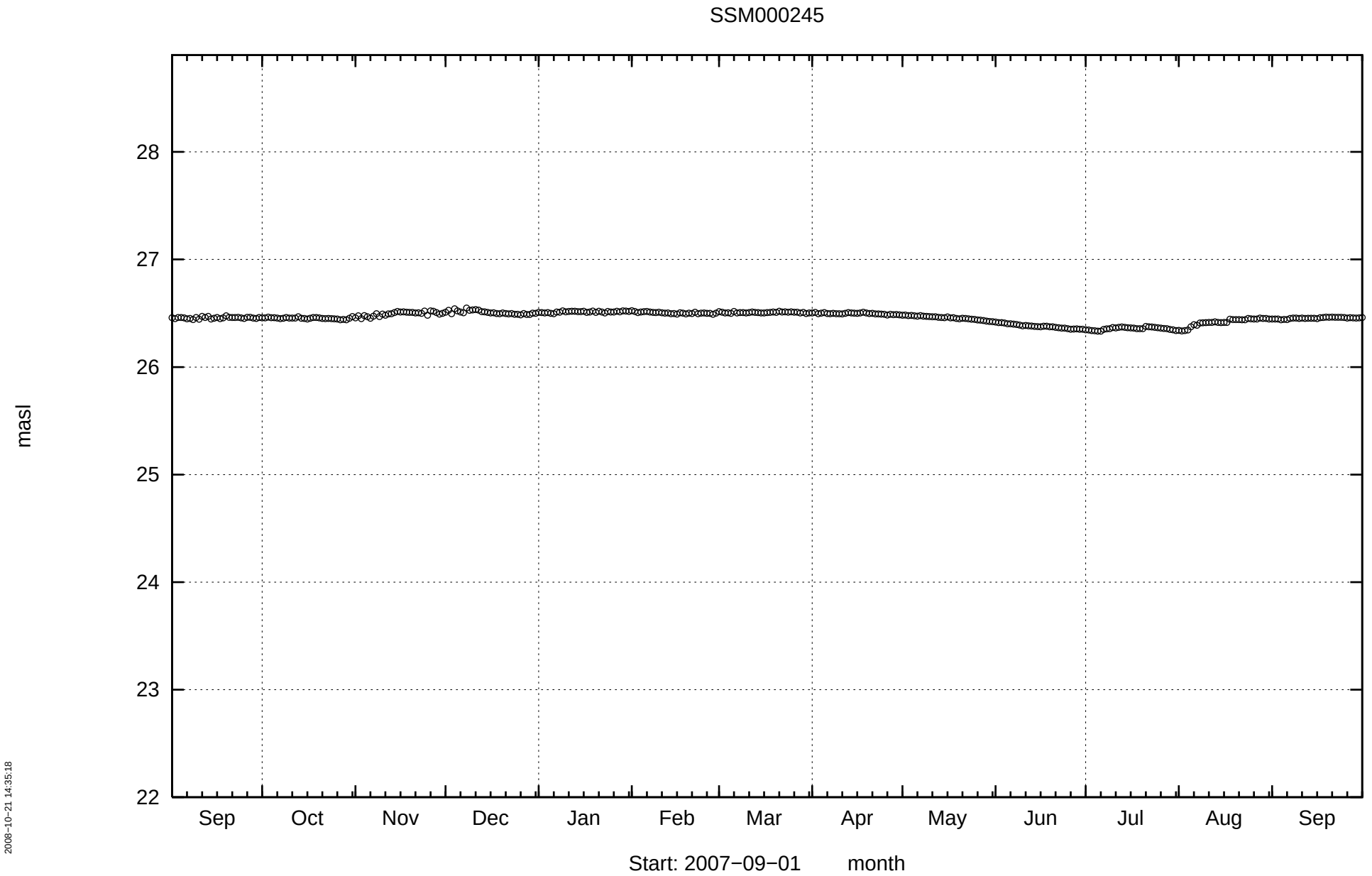
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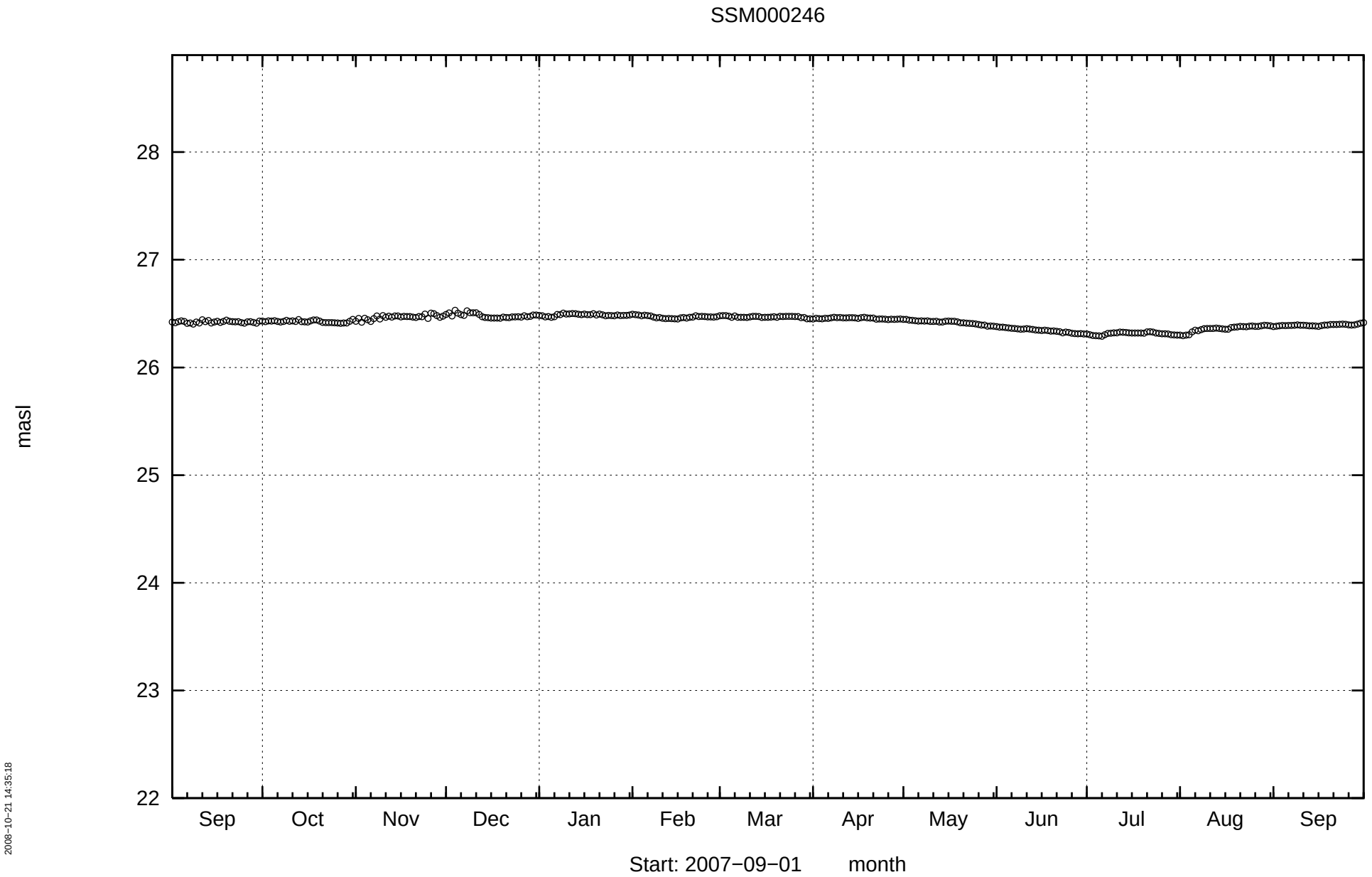
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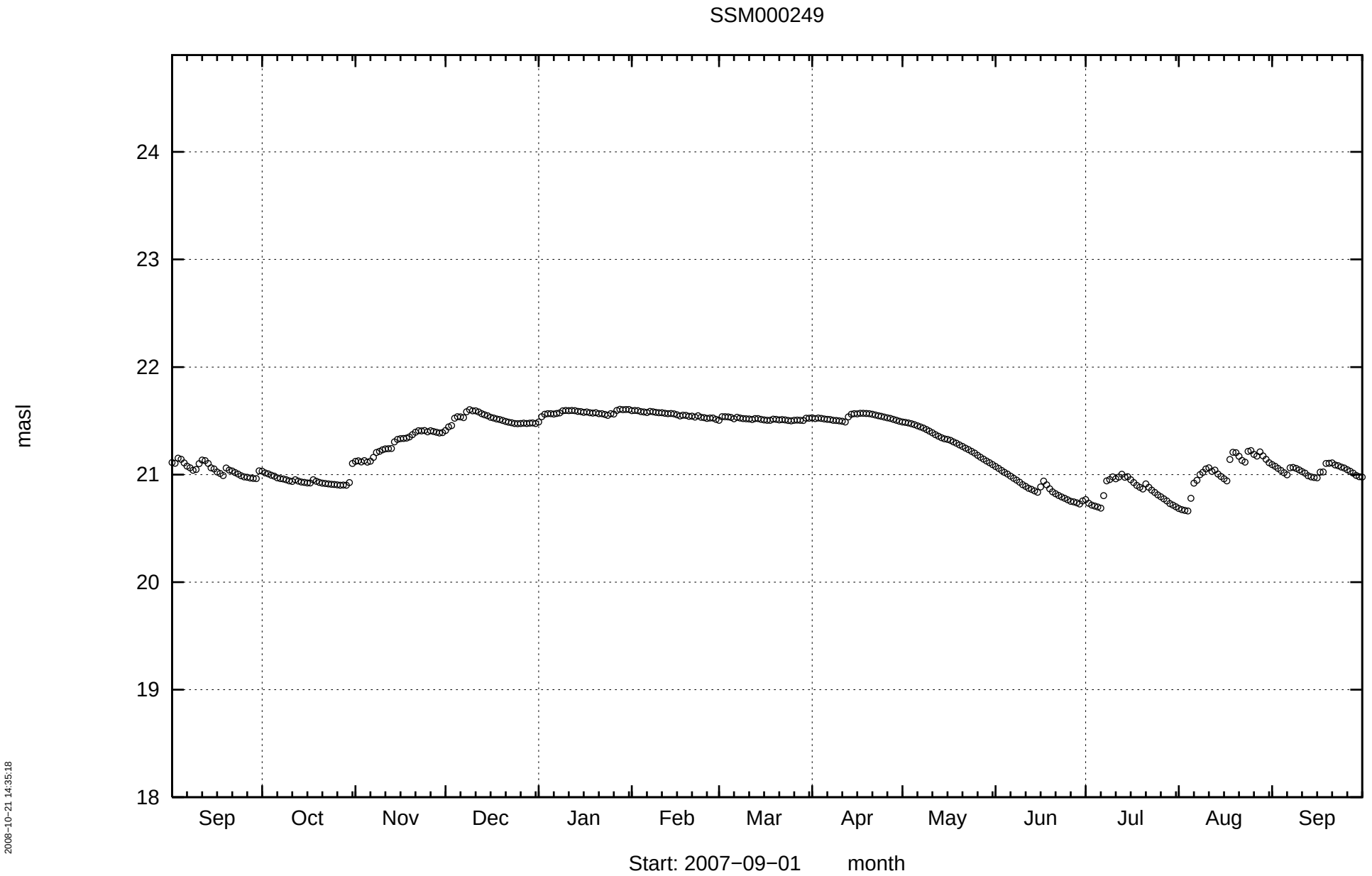
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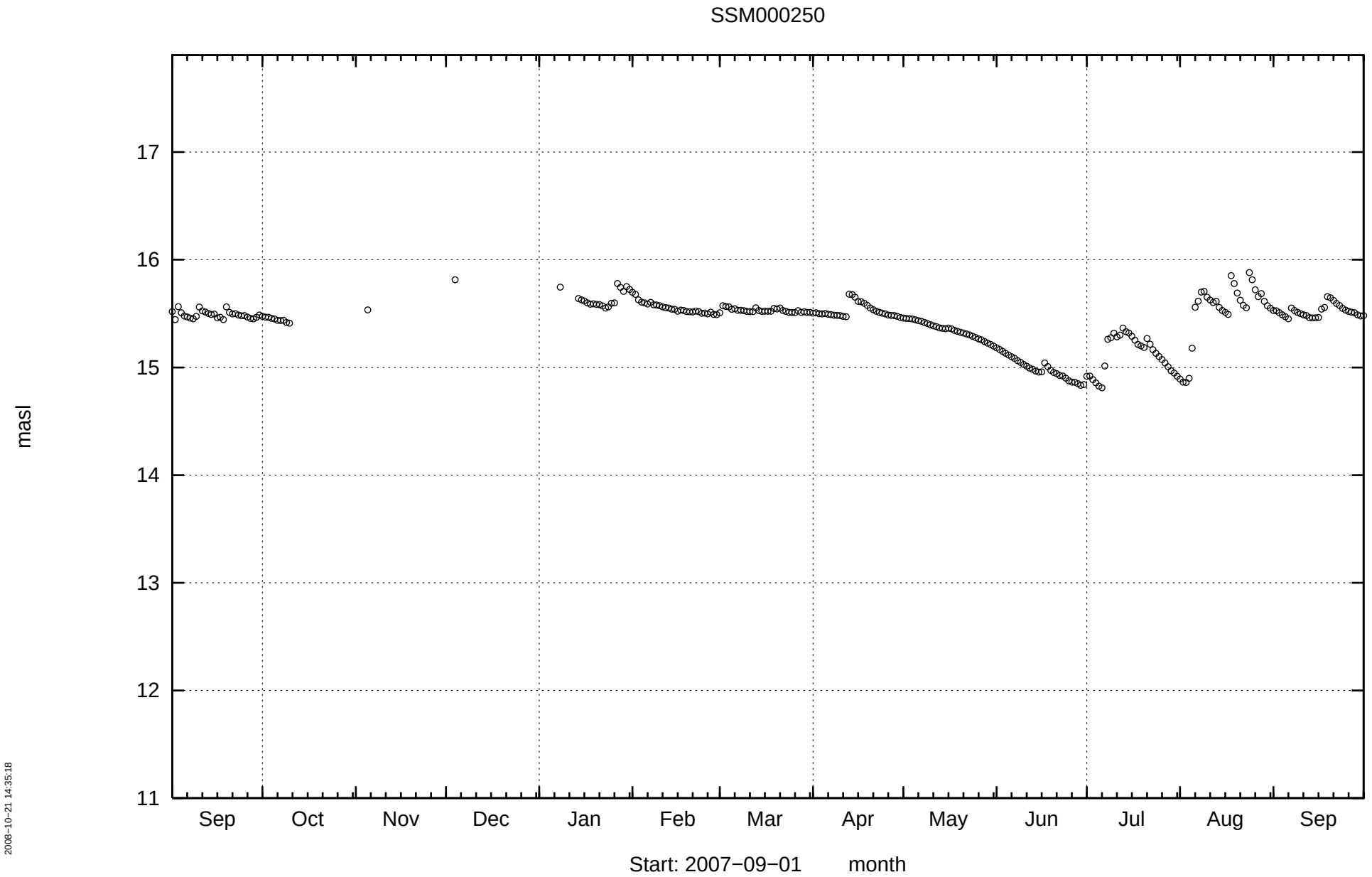
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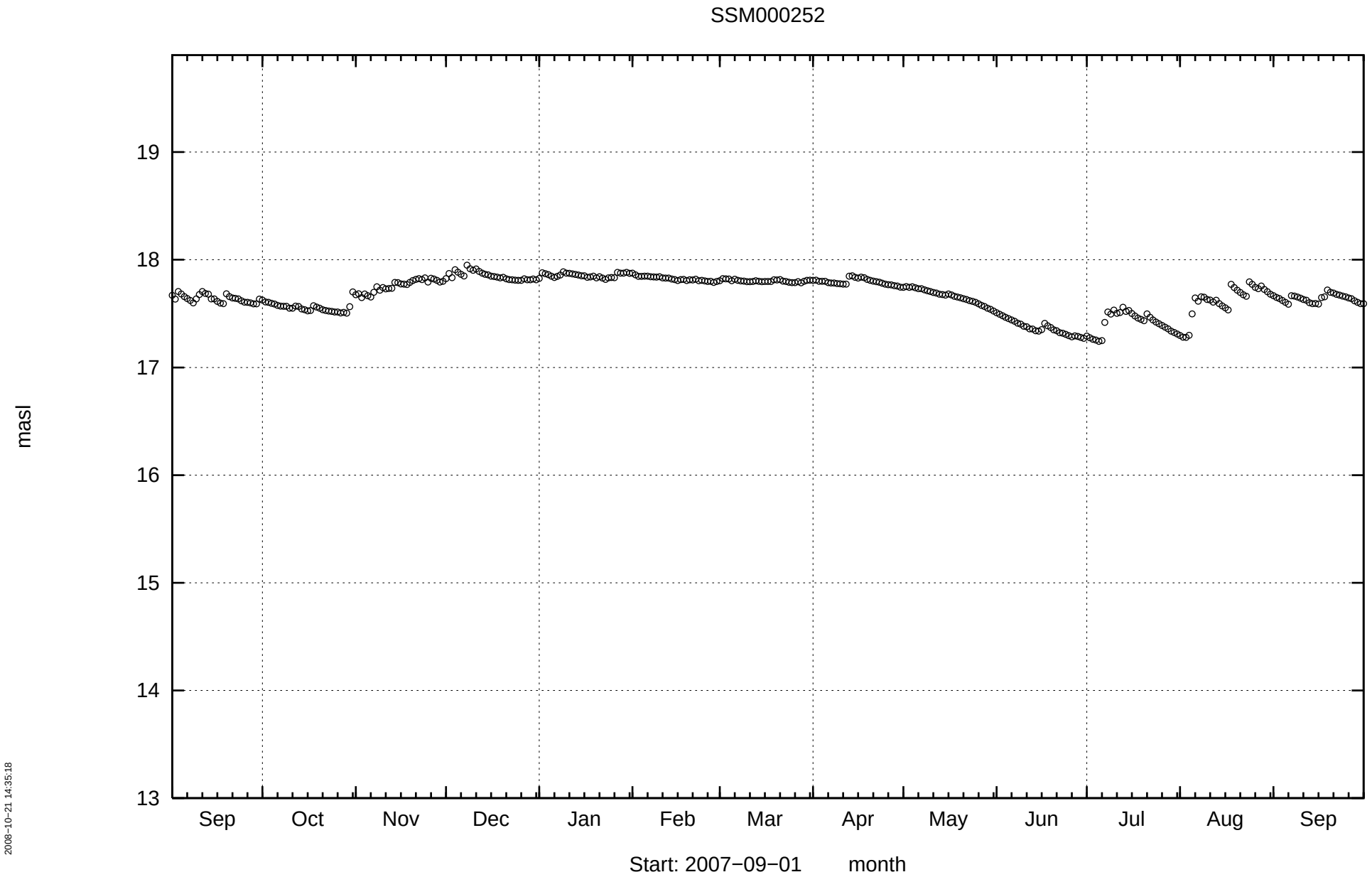
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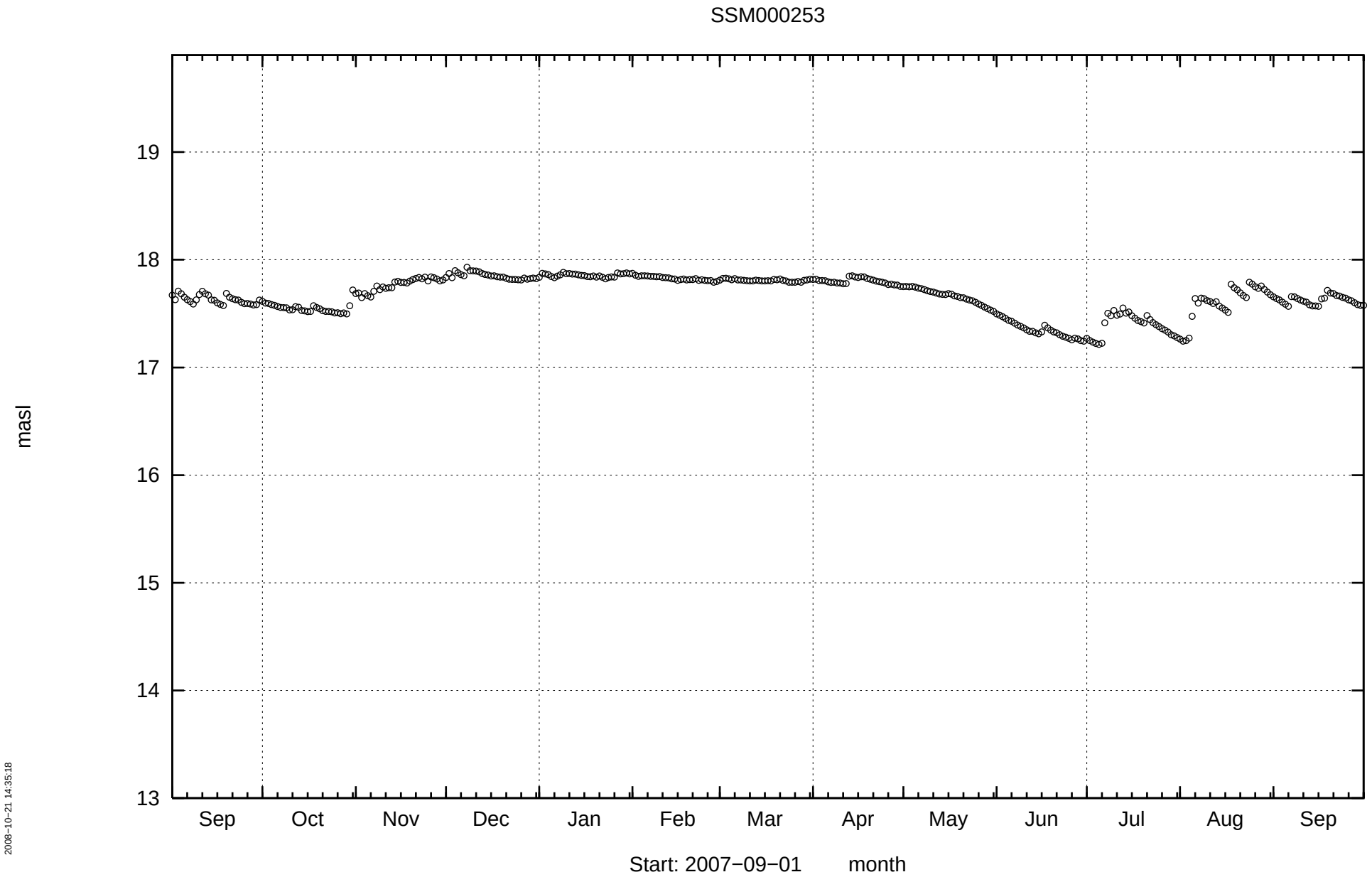
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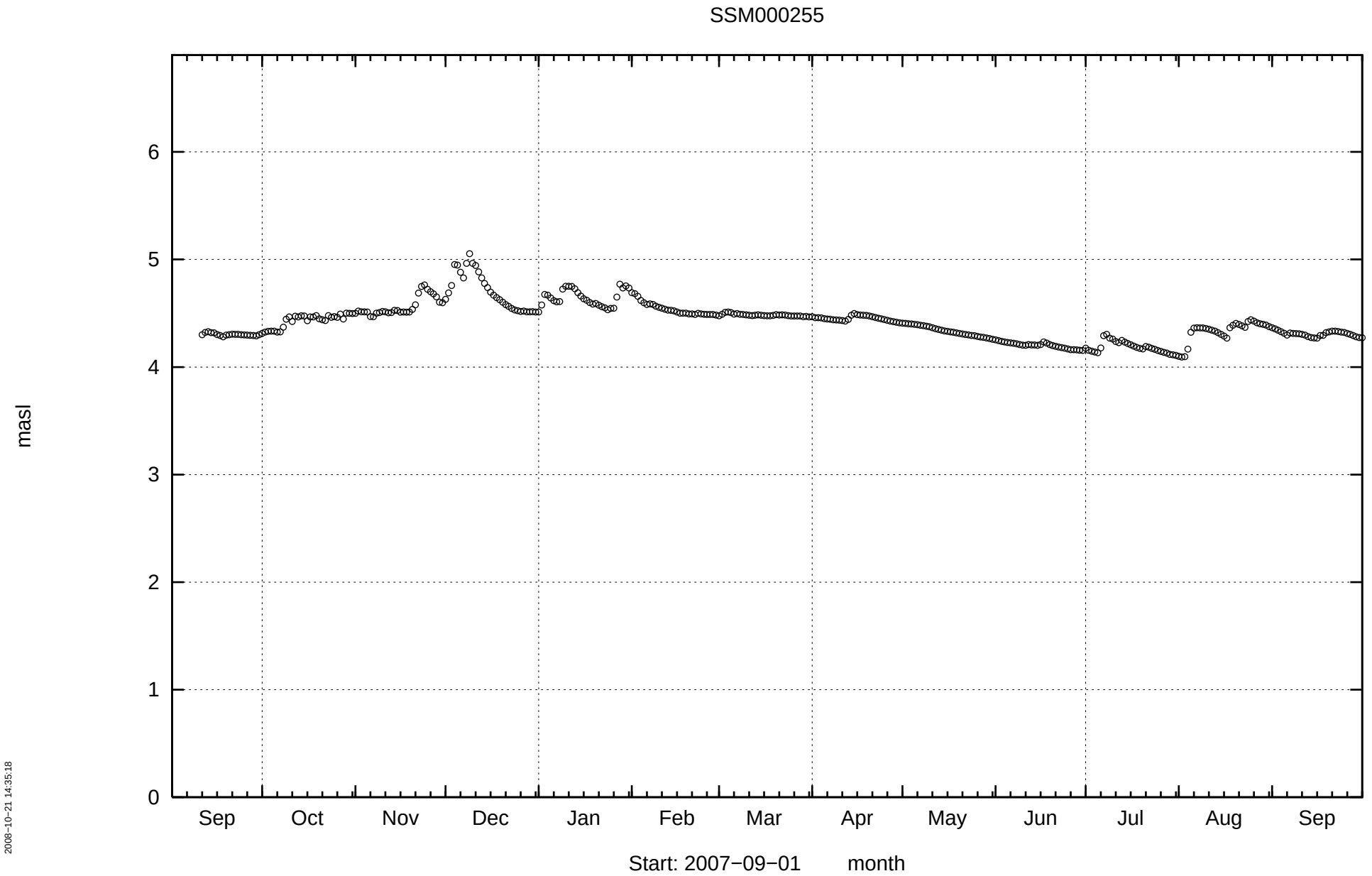
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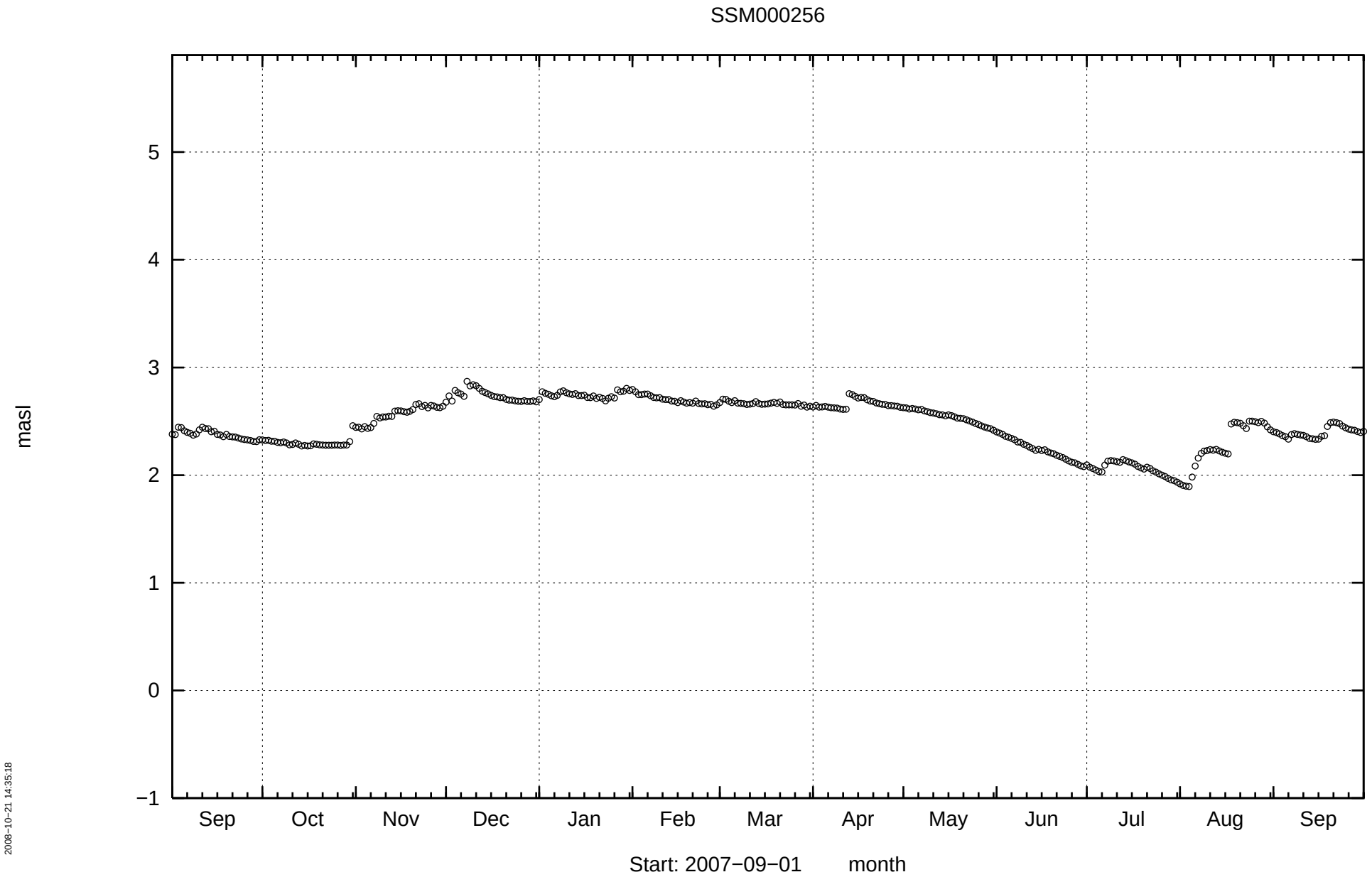
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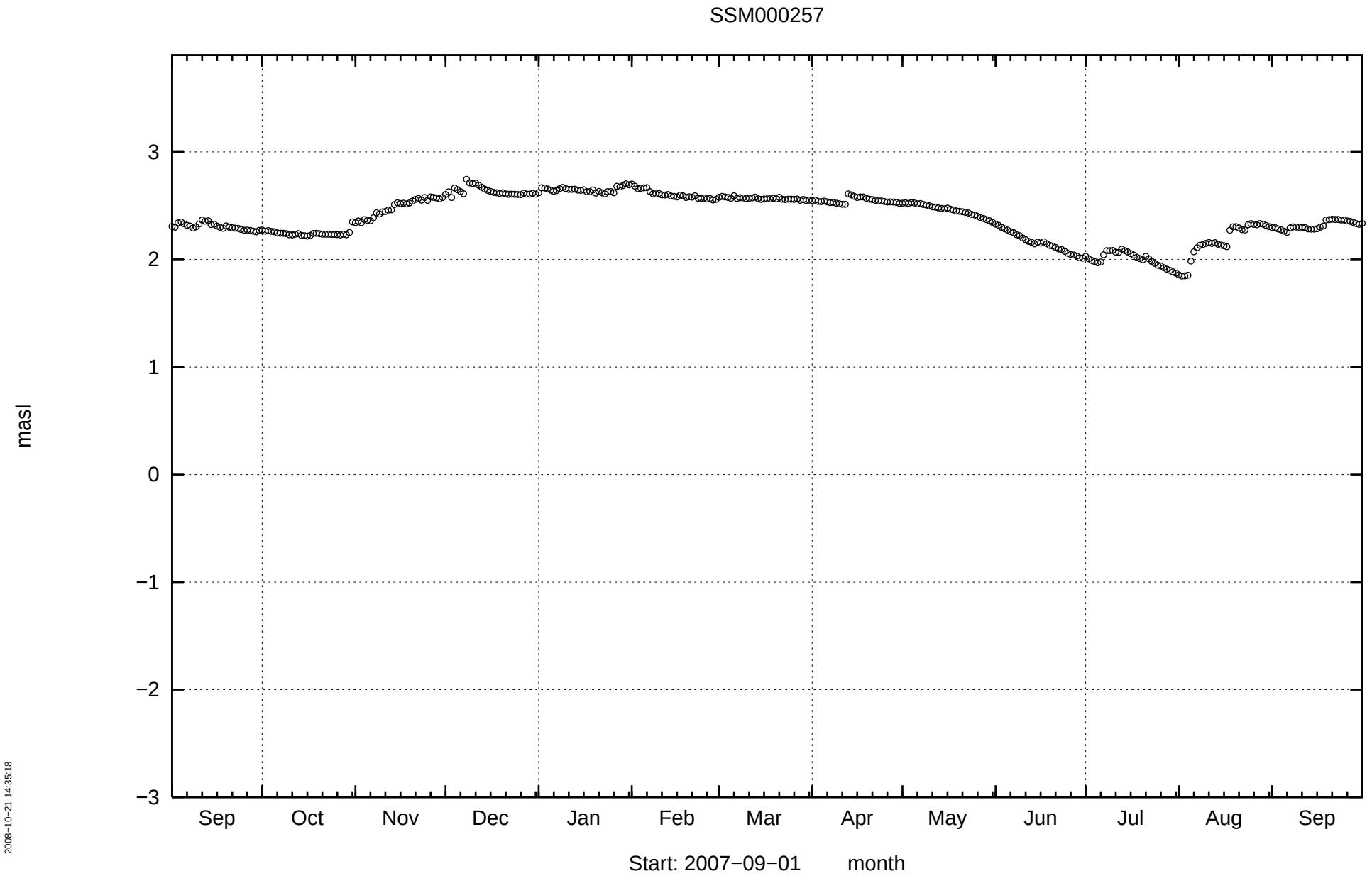
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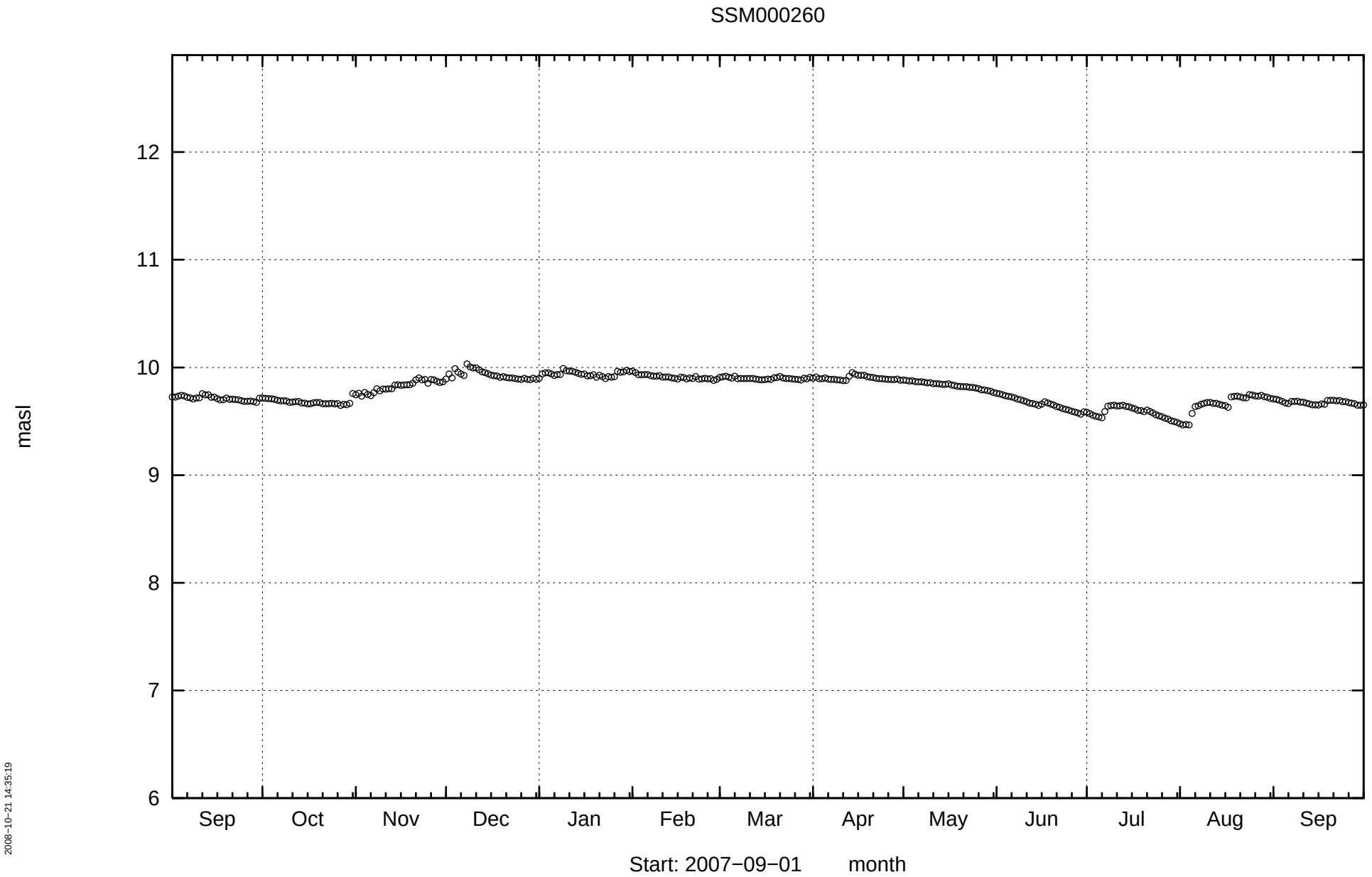
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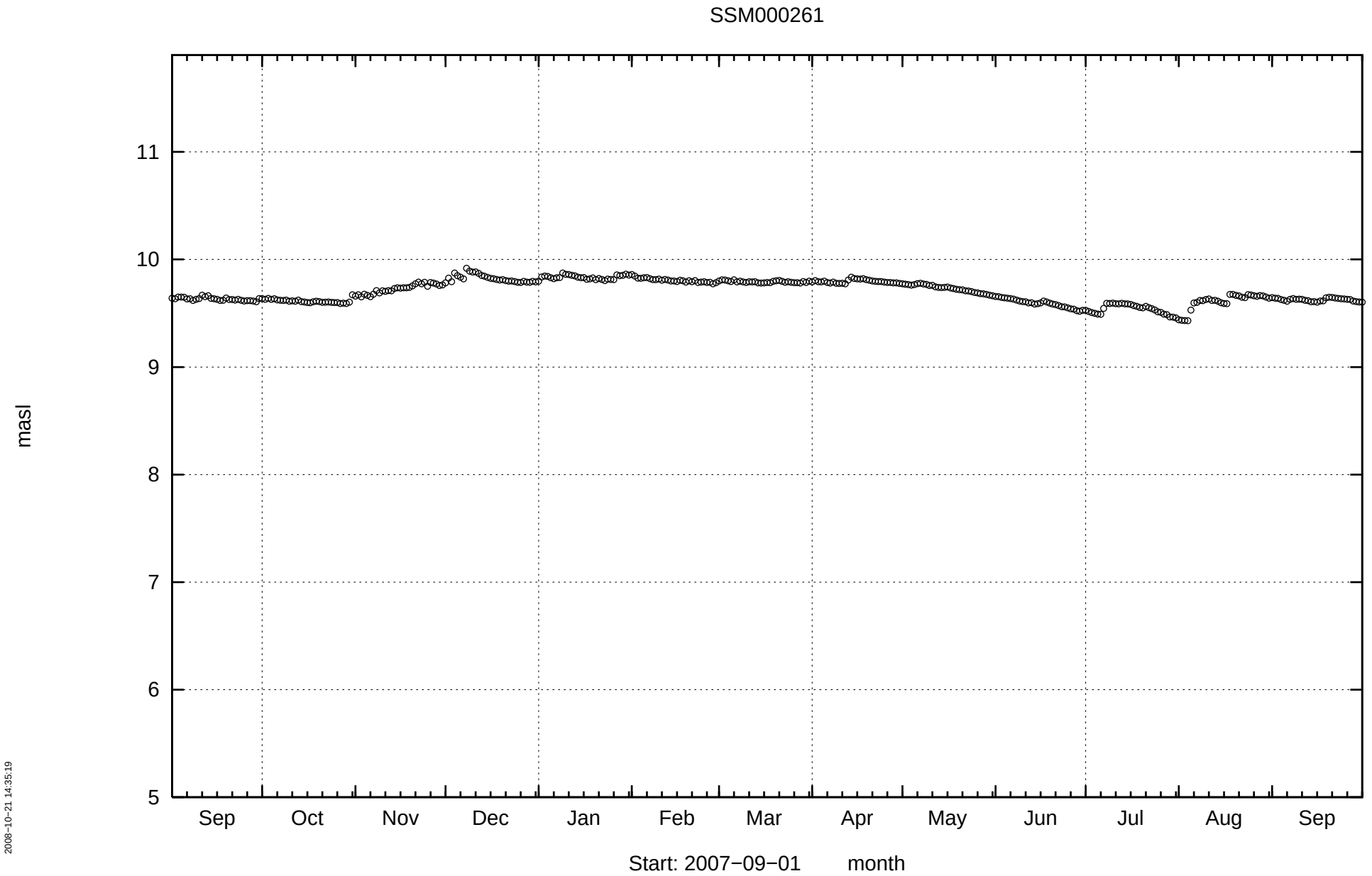
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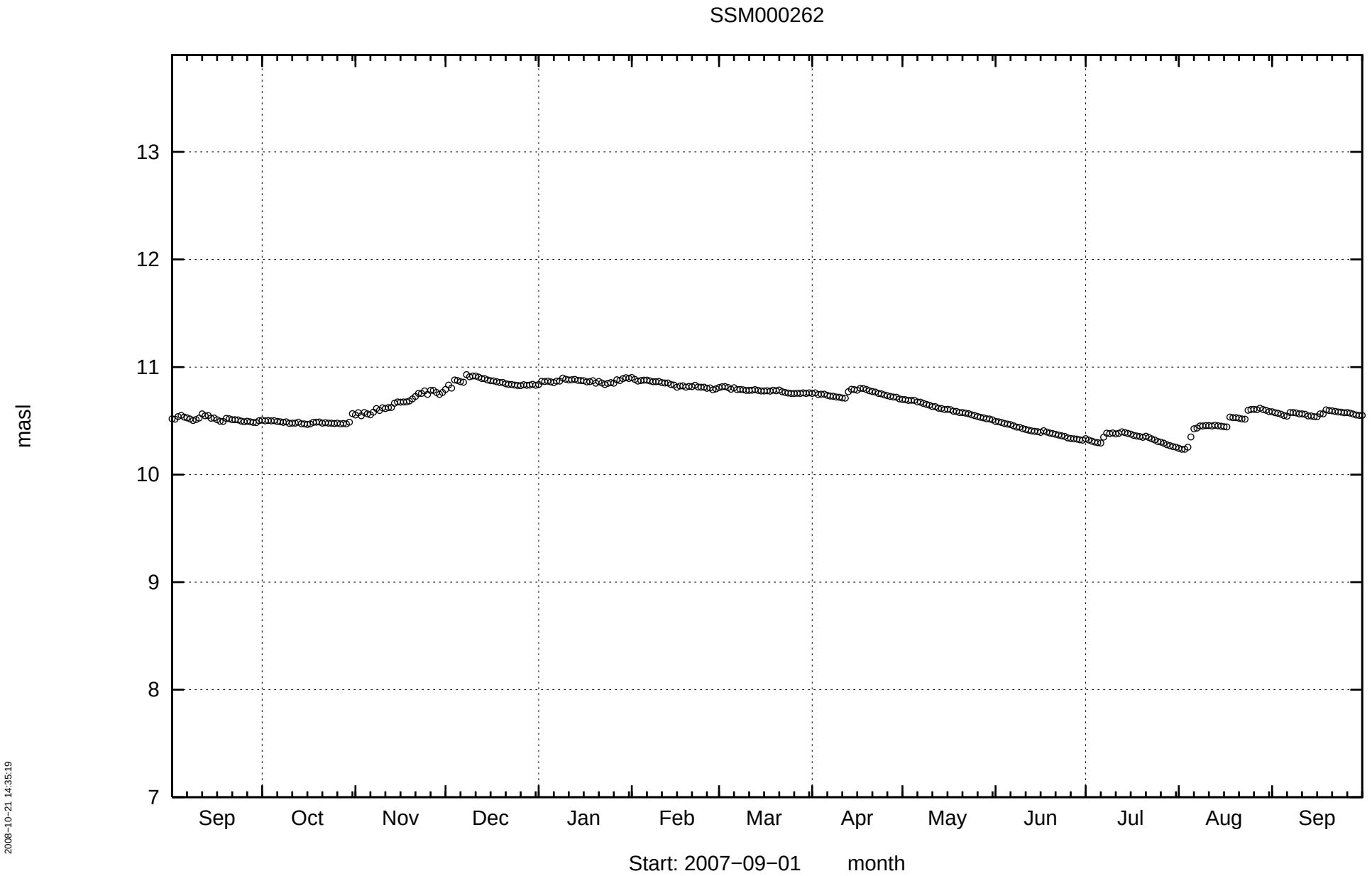
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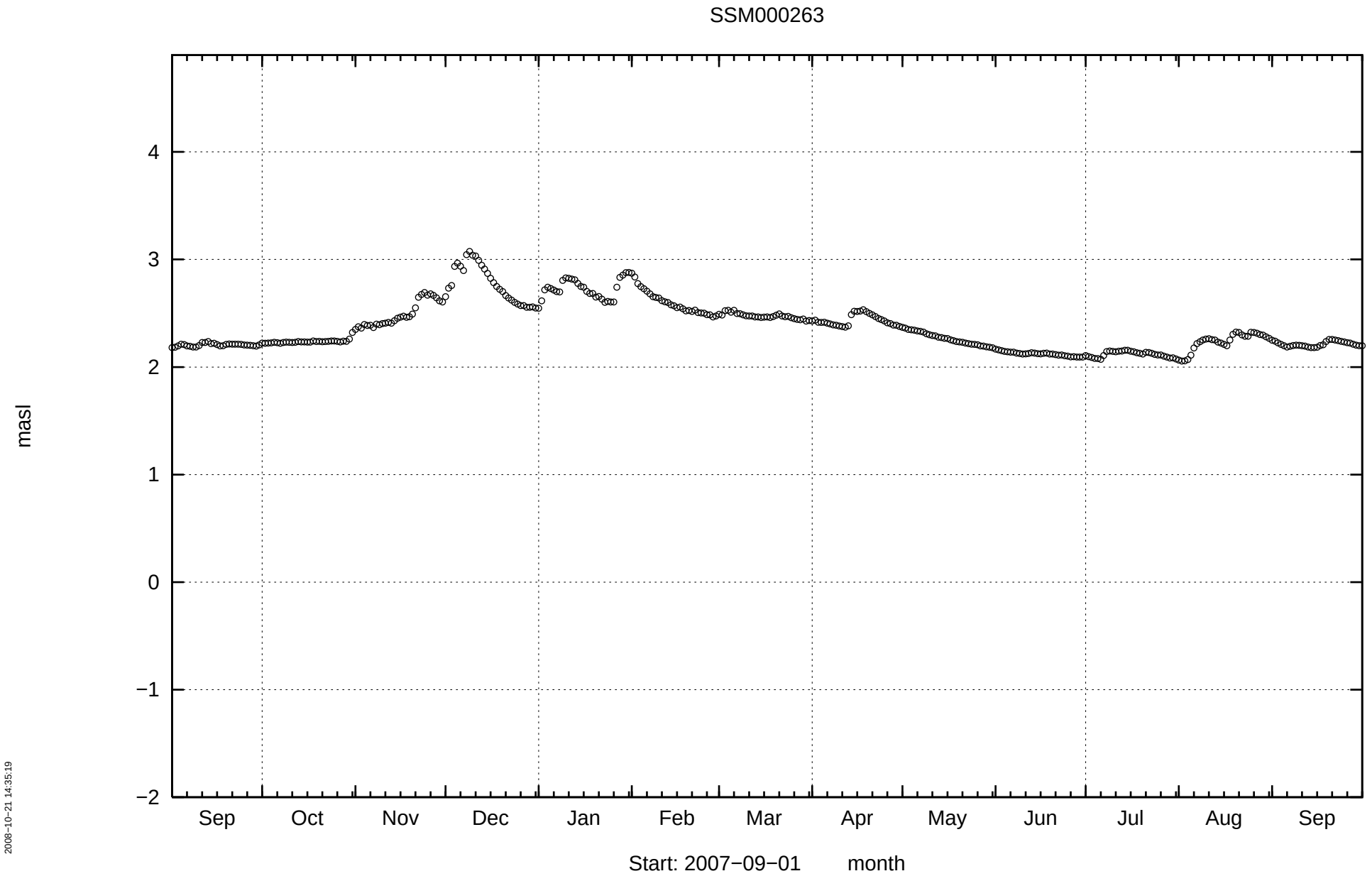
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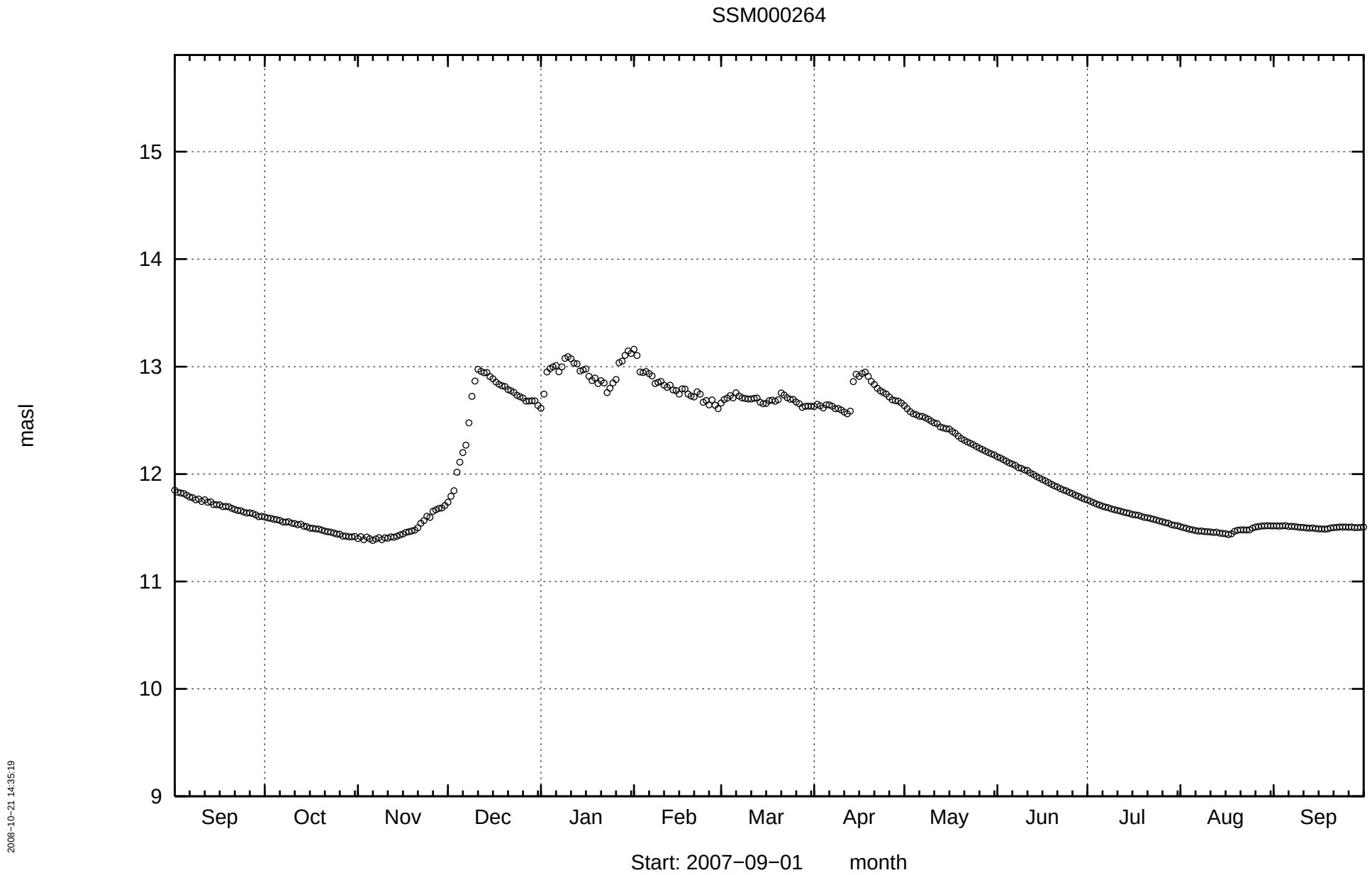
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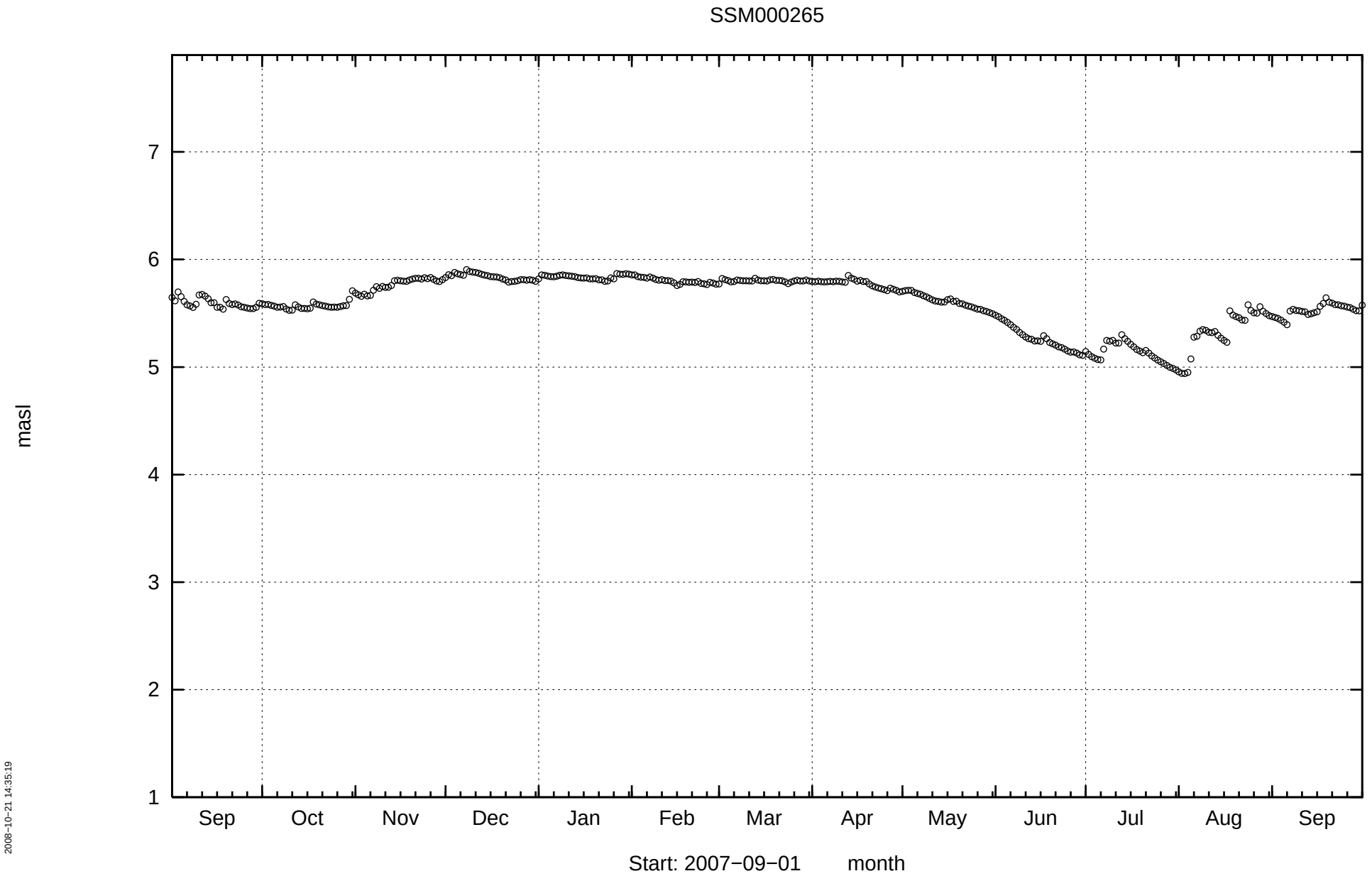
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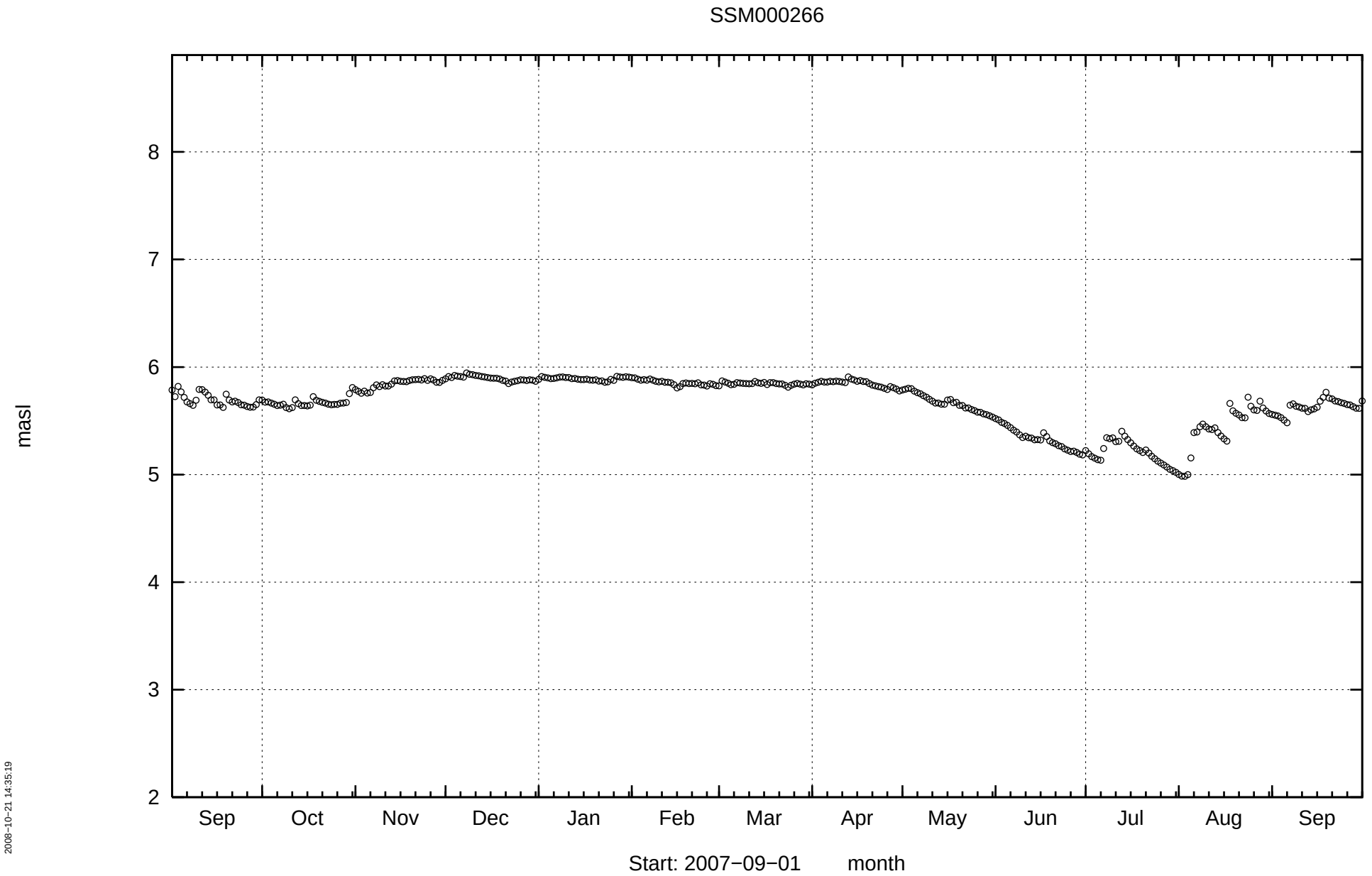
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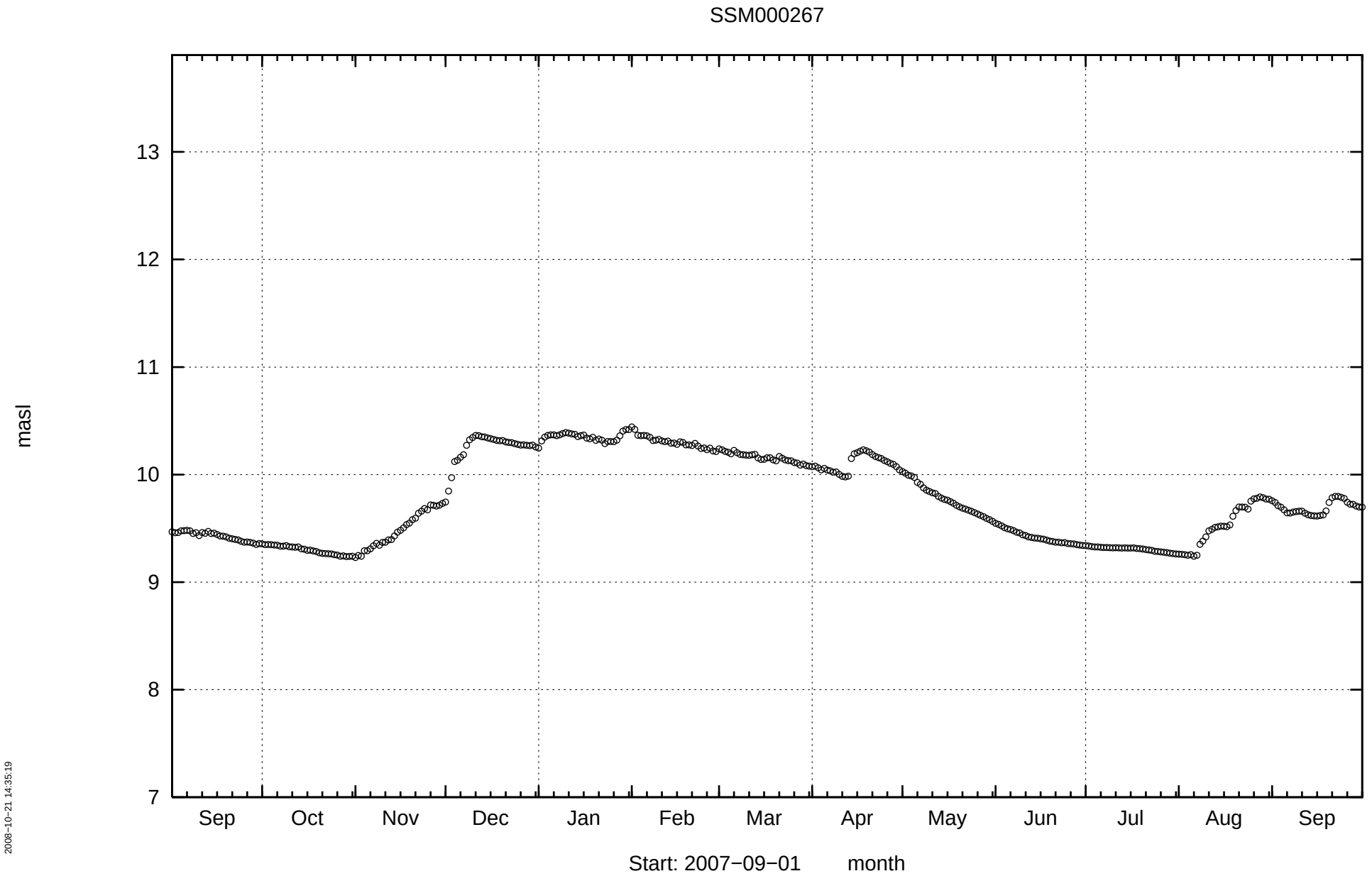
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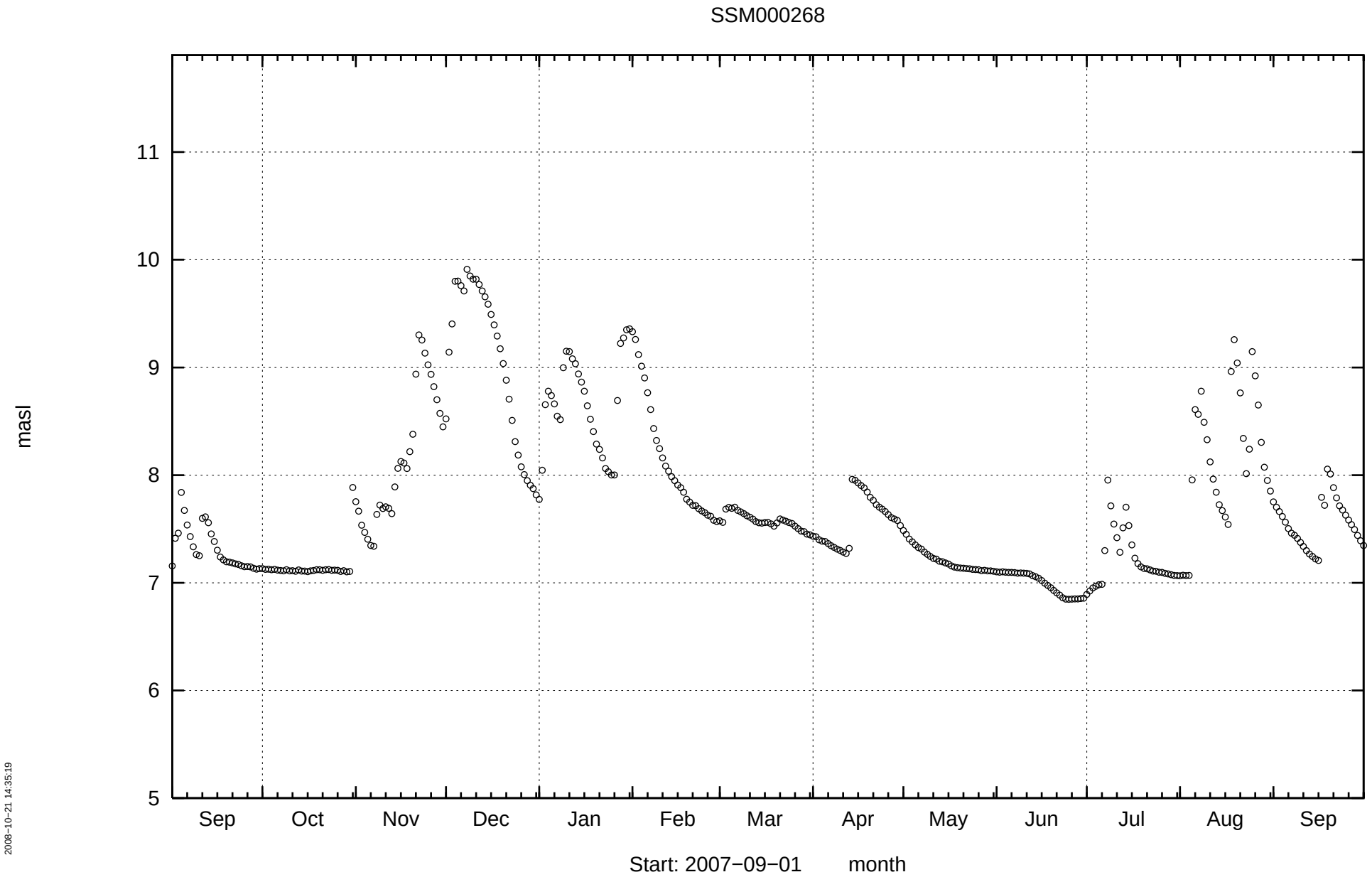
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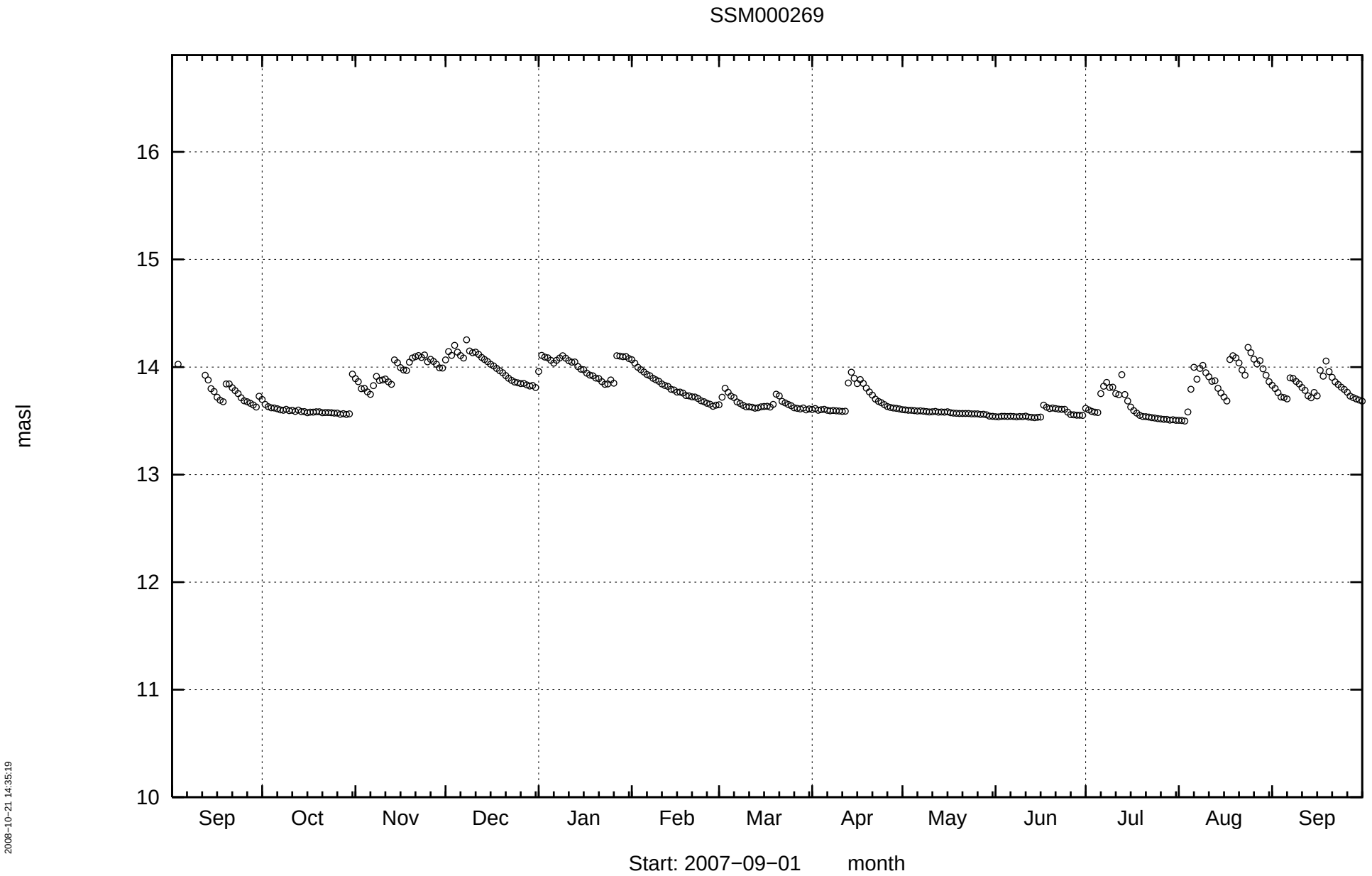
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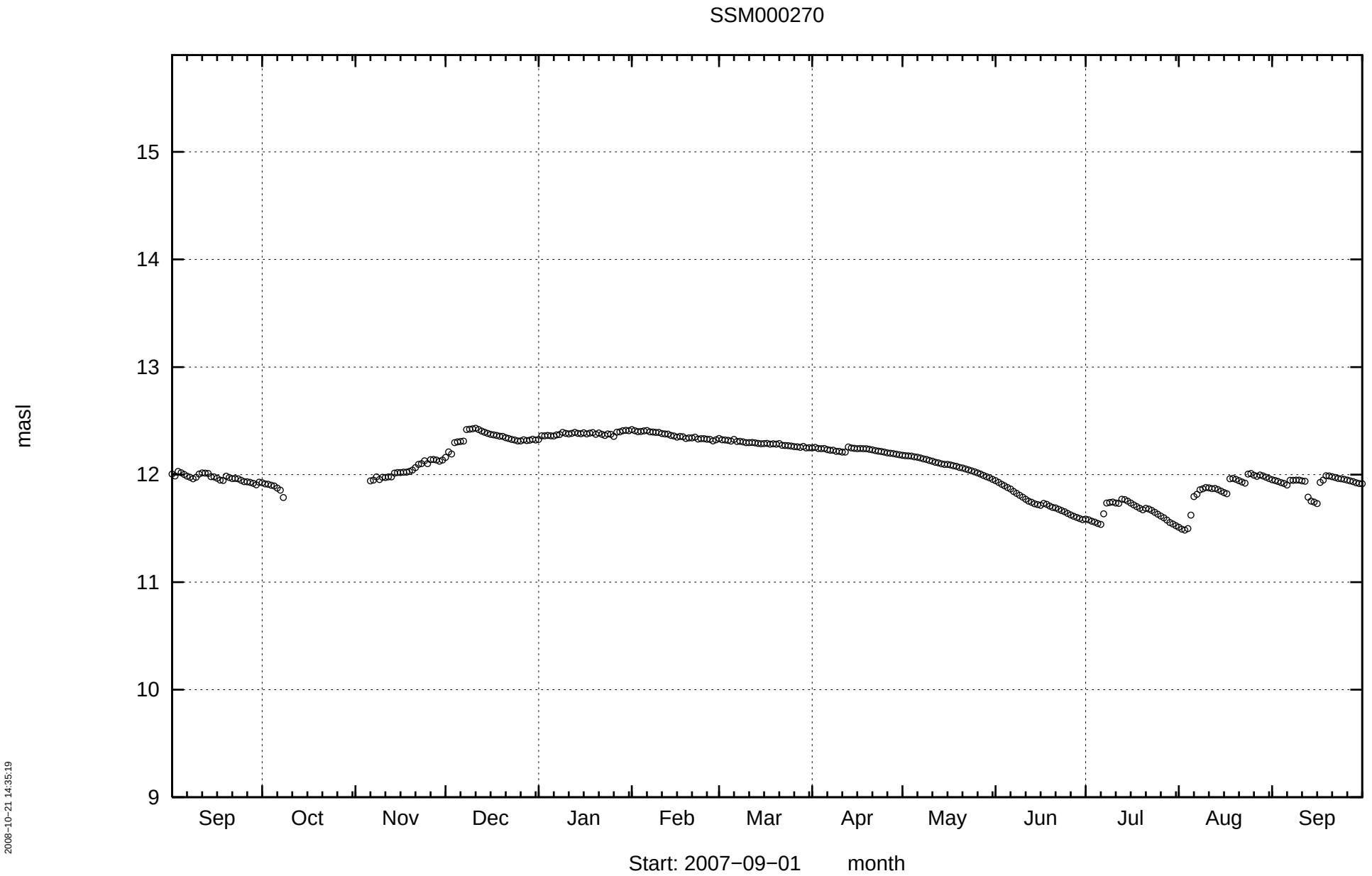
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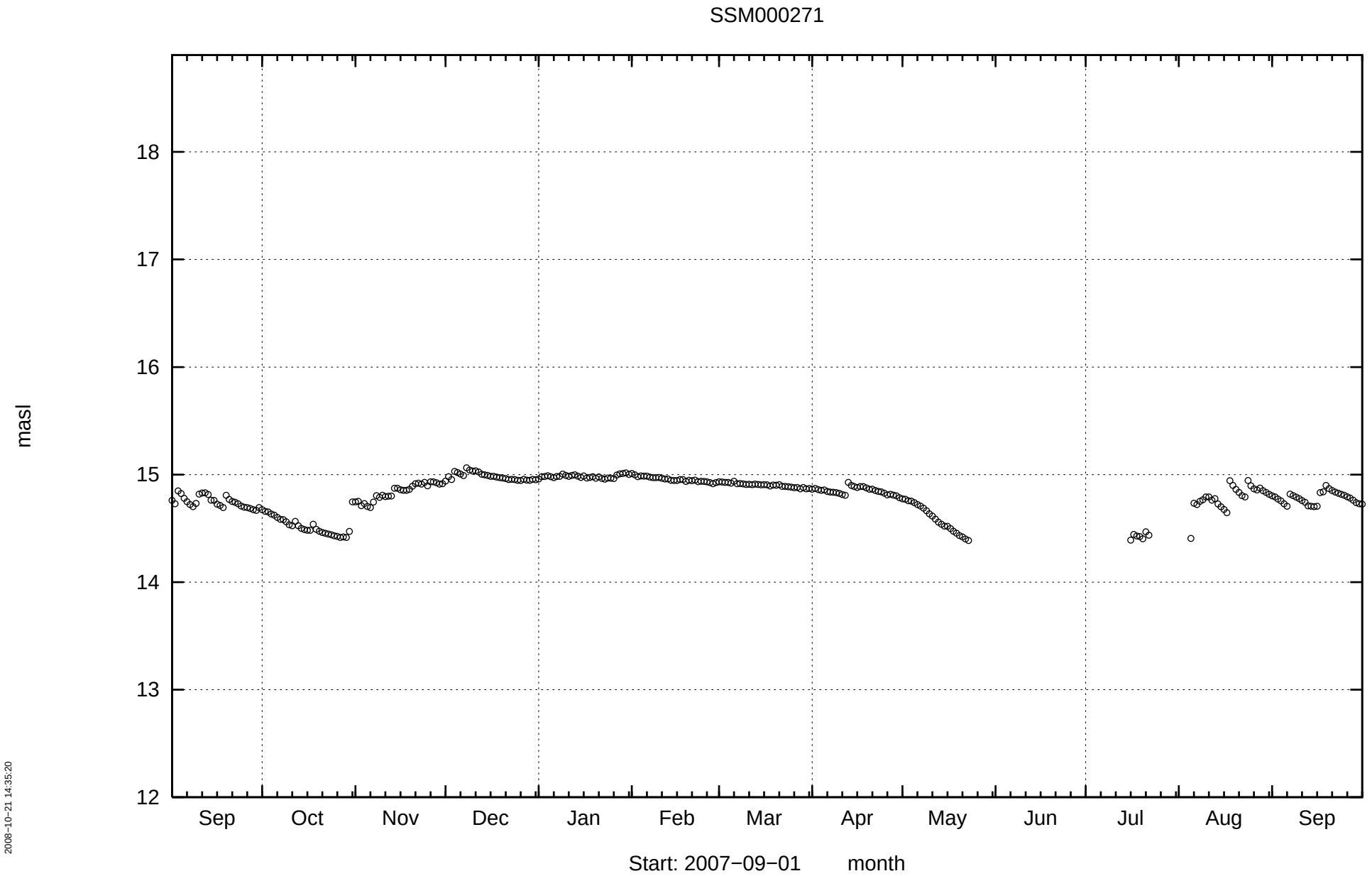
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Appendix 2

Hydraulic disturbances in boreholes – GANTT chart.

The extensive geoscientific investigation programme that took place during the period for this monitoring report generated some fluctuations in the groundwater level.

This appendix compiles, in chronological order, the dates when major hydraulic disturbances took place in boreholes. It should be noted that, although this compilation is intended to be complete, additional occurrences of hydraulic disturbance may not be excluded.

Hydraulic disturbances:

- **Core drilling**: Drilling of core boreholes includes a) flushing and air-lift pumping and b) nitrogen lifting.
- **Percussion drilling**: This is done with DTH-technology which involves constantly flushing out borehole water and drill chips with air while drilling. Separate air-lifting operations are also included.
- **Pumping for drilling water supply**: Core drilling requires large amounts of drilling fluid and water is taken from a percussion hole for this purpose.
- **Pumping test with submersible pump**: Conventional test for assessment of aquifer properties, including interference testing and flow logging (spinner and difference flow logging).
- **Pumping for water supply**: A site investigation borehole (HLX22) was taken into production as a water supply well to the village of Lilla Laxemar.
- **Water pumping**: Pumping for sampling of water for chemical analysis.

ID	Aktivitet	ID code	2008											
			s	o	n	d	j	f	m	a	m	j	j	a	s
1	**Core drilling**													
2	Core drilling	KLX27A												
3	Nitrogen lifting	KLX27A												
4	Nitrogen lifting	KLX27A												
5	Nitrogen lifting	KLX27A												
6	**Percussion drilling**													
7	Air lifting	KLX27A												
8	Air lifting	KLX27A												
9	Air lifting	KLX27A												
10	Air lifting	KLX27A												
11	Air lifting	KLX27A												
12	Air lifting	KLX27A												
13	Air lifting	KLX27A												
14	Air lifting	KLX27A												
15	Air lifting	KLX27A												
16	Air lifting	KLX27A												
17	Air lifting	KLX27A												
18	Air lifting	KLX27A												
19	Air lifting	KLX27A												
20	Air lifting	KLX27A												
21	Air lifting	KLX27A												
22	Air lifting	KLX27A												
23	Air lifting	KLX27A												
24	Air lifting	KLX27A												
25	Air lifting	KLX27A												
26	Air lifting	KLX27A												
27	Air lifting	KLX27A												
28	Air lifting	KLX27A												
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31	Air lifting	KLX27A												
32	Air lifting	KLX27A												
33	Air lifting	KLX27A												
34	Air lifting	KLX27A												
35	Air lifting	KLX27A												
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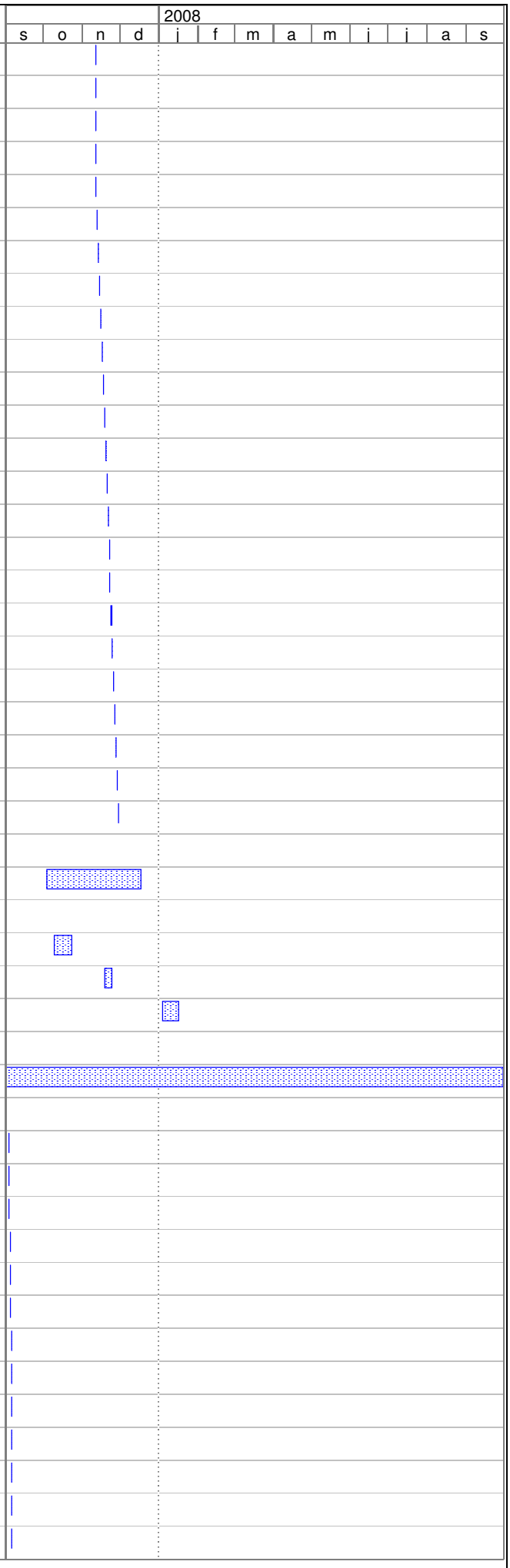
37	Air lifting	KLX27A												
38	Air lifting	KLX27A												
39	Air lifting	KLX27A												
40	Air lifting	KLX27A												
41	Air lifting	KLX27A												
42	Air lifting	KLX27A												
43	Air lifting	KLX27A												
44	Air lifting	KLX27A												
45	Air lifting	KLX27A												
46	Air lifting	KLX27A												

ID	Aktivitet	ID code
47	Air lifting	KLX27A
48	Air lifting	KLX27A
49	Air lifting	KLX27A
50	Air lifting	KLX27A
51	Air lifting	KLX27A
52	Air lifting	KLX27A
53	Air lifting	KLX27A
54	Air lifting	KLX27A
55	Air lifting	KLX27A
56	Air lifting	KLX27A
57	Air lifting	KLX27A
58	Air lifting	KLX27A
59	Air lifting	KLX27A
60	Air lifting	KLX27A
61	Air lifting	KLX27A
62	Air lifting	KLX27A
63	Air lifting	KLX27A
64	Air lifting	KLX27A
65	Air lifting	KLX27A
66	Air lifting	KLX27A
67	Air lifting	KLX27A
68	Air lifting	KLX27A
69	Air lifting	KLX27A
70	Air lifting	KLX27A
71	**Pumping for drilling water supply**	
72	DMS - Flush water well - Auto generated	HLX10
73	**Pumping test-submersible pump**	
74	Pumping test-submersible pump	KLX27A
75	Pumping test-submersible pump	KLX27A
76	Pumping test-submersible pump	KLX27A
77	**Pumping for water supply**	
78	Pumping HLX22	HLX22
79	**Water pumping**	
80	Near Surface GW Measurements	SSM000030
81	Near Surface GW Measurements	SSM000228
82	Near Surface GW Measurements	SSM000037
83	Near Surface GW Measurements	SSM000030
84	Near Surface GW Measurements	SSM000228
85	Near Surface GW Measurements	SSM000037
86	Water sampling, class 1	HLX39
87	Water sampling, class 1	HLX39
88	Water sampling, class 1	HLX39
89	Water sampling, class 1	HLX39
90	Near Surface GW Measurements	SSM000041
91	Near Surface GW Measurements	SSM000042
92	Near Surface GW Measurements	SSM000022



ID	Aktivitet	ID code	2008												
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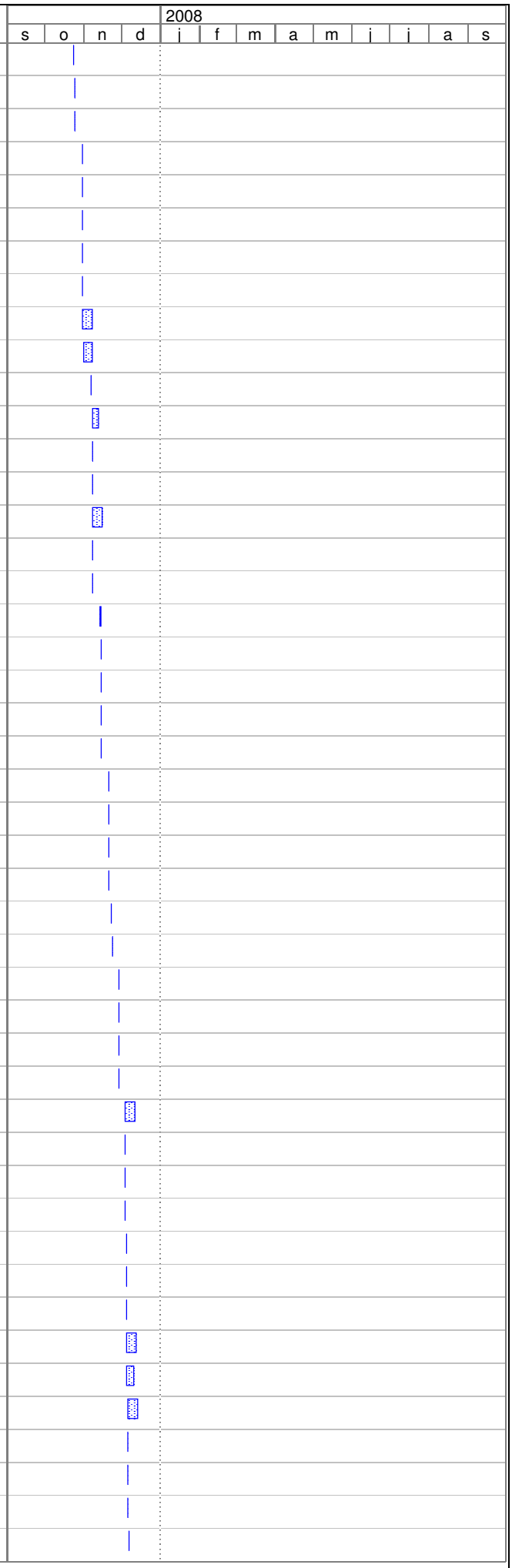
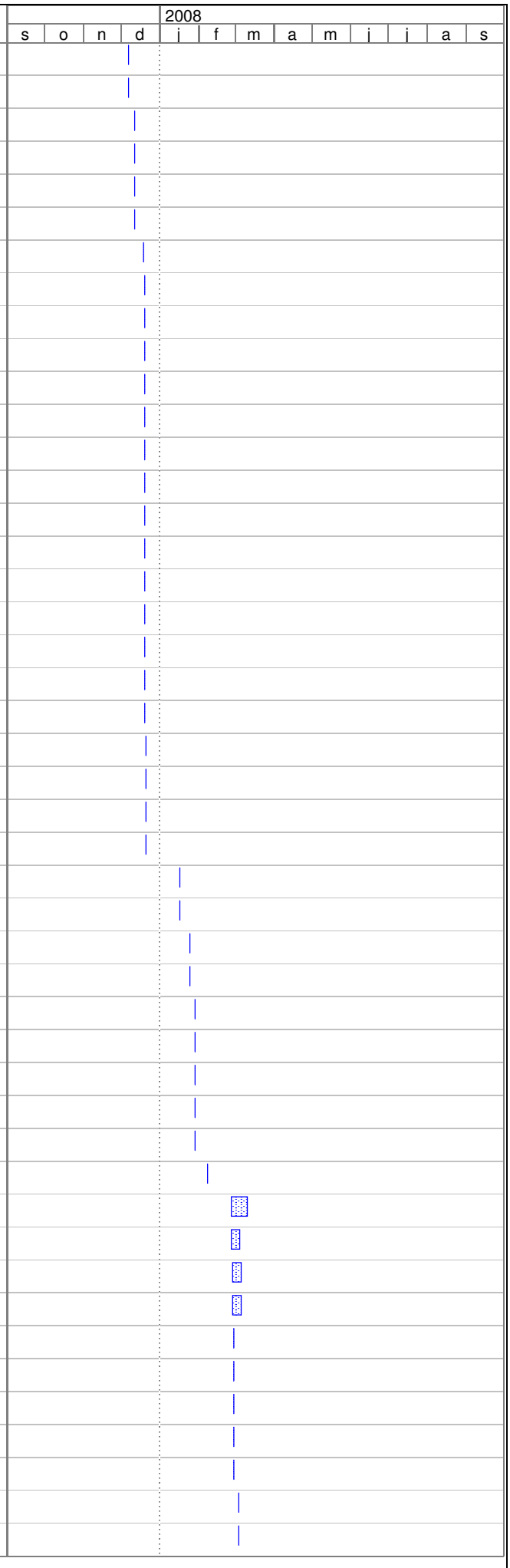
93	Near Surface GW Measurements	SSM000041													
94	Near Surface GW Measurements	SSM000042													
95	Near Surface GW Measurements	SSM000022													
96	Near Surface GW Measurements	SSM000240													
97	Near Surface GW Measurements	SSM000241													
98	Near Surface GW Measurements	SSM000240													
99	Near Surface GW Measurements	SSM000241													
100	Water sampling, class 1	HLX27													
101	Water sampling, class 1	HLX27													
102	Water sampling, class 1	HLX27													
103	Water sampling, class 1	HLX27													
104	Near Surface GW Measurements	SSM000277													
105	Water sampling, class 1	SSM000277													
106	Near Surface GW Measurements	SSM000255													
107	Water sampling, class 1	SSM000255													
108	Water sampling, class 1	KLX26A													
109	Water sampling, class 1	KLX26A													
110	Water sampling, class 1	KLX11A													
111	Water sampling, class 1	KLX11A													
112	Water sampling, class 1	KLX11A													
113	Water sampling, class 1	KLX11A													
114	Water sampling, class 1	KLX11A													
115	Water sampling, class 1	KLX11A													
116	Water sampling, class 1	KLX11A													
117	Water sampling, class 1	KLX11A													
118	Water sampling, class 1	KLX11A													
119	Water sampling, class 1	KLX11A													
120	Water sampling, class 1	KLX11A													
121	Water sampling, class 1	KLX11A													
122	Near Surface GW Measurements	SSM000277													
123	Water sampling, class 1	SSM000277													
124	Near Surface GW Measurements	SSM000255													
125	Water sampling, class 1	SSM000255													
126	Water sampling, class 3	KLX27A													
127	Near Surface GW Measurements	SSM000277													
128	Water sampling, class 1	SSM000277													
129	Near Surface GW Measurements	SSM000255													
130	Water sampling, class 1	SSM000255													
131	Water sampling, class 1	KLX16A													
132	Water sampling, class 1	KLX16A													
133	Water sampling, class 3	KLX27A													
134	Water sampling, class 3	KLX17A													
135	Water sampling, class 3	KLX27A													
136	Near Surface GW Measurements	SSM000277													
137	Water sampling, class 1	SSM000277													
138	Near Surface GW Measurements	SSM000255													

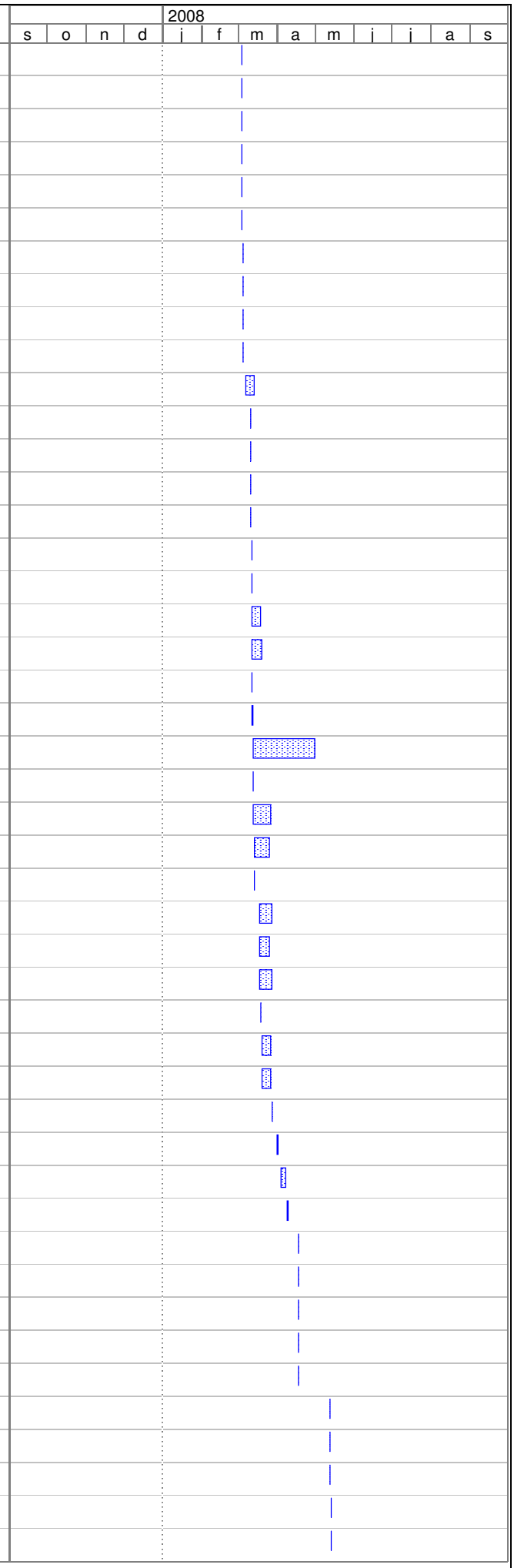
ID	Aktivitet	ID code
139	Water sampling, class 1	SSM000255
140	Water sampling, class 1	KLX10C
141	Water sampling, class 1	KLX10C
142	Near Surface GW Measurements	SSM000277
143	Water sampling, class 1	SSM000277
144	Near Surface GW Measurements	SSM000255
145	Water sampling, class 1	SSM000255
146	Water sampling series	KLX08
147	Water sampling series	KLX04
148	Water sampling series	KLX18A
149	Water sampling series	KLX08
150	Water sampling series	KLX05
151	Near Surface GW Measurements	SSM000277
152	Water sampling, class 1	SSM000277
153	Water sampling series	KLX12A
154	Near Surface GW Measurements	SSM000255
155	Water sampling, class 1	SSM000255
156	Water sampling series	KLX10
157	Near Surface GW Measurements	SSM000277
158	Water sampling, class 1	SSM000277
159	Near Surface GW Measurements	SSM000255
160	Water sampling, class 1	SSM000255
161	Near Surface GW Measurements	SSM000277
162	Water sampling, class 1	SSM000277
163	Near Surface GW Measurements	SSM000255
164	Water sampling, class 1	SSM000255
165	Water sampling, class 3	KLX27A
166	Water sampling, class 5	KLX27A
167	Near Surface GW Measurements	SSM000277
168	Water sampling, class 1	SSM000277
169	Near Surface GW Measurements	SSM000255
170	Water sampling, class 1	SSM000255
171	Water sampling series	KLX19A
172	Near Surface GW Measurements	SSM000030
173	Near Surface GW Measurements	SSM000037
174	Near Surface GW Measurements	SSM000228
175	Near Surface GW Measurements	SSM000030
176	Near Surface GW Measurements	SSM000037
177	Near Surface GW Measurements	SSM000228
178	Water sampling series	KLX15A
179	Water sampling series	KLX10
180	Water sampling series	KLX07A
181	Near Surface GW Measurements	SSM000041
182	Near Surface GW Measurements	SSM000042
183	Near Surface GW Measurements	SSM000022
184	Near Surface GW Measurements	SSM000041



ID	Aktivitet	ID code
185	Near Surface GW Measurements	SSM000042
186	Near Surface GW Measurements	SSM000022
187	Water sampling, class 1	KLX17A
188	Water sampling, class 1	KLX17A
189	Water sampling, class 1	KLX17A
190	Water sampling, class 1	KLX17A
191	Near Surface GW Measurements	SSM000240
192	Near Surface GW Measurements	SSM000240
193	Water sampling, class 1	KLX15A
194	Water sampling, class 1	KLX15A
195	Water sampling, class 1	KLX15A
196	Water sampling, class 1	KLX15A
197	Water sampling, class 1	KLX15A
198	Water sampling, class 1	KLX15A
199	Water sampling, class 1	KLX15A
200	Water sampling, class 1	KLX17A
201	Water sampling, class 1	KLX17A
202	Water sampling, class 1	KLX17A
203	Water sampling, class 1	KLX17A
204	Water sampling, class 1	KLX17A
205	Water sampling, class 1	KLX17A
206	Water sampling, class 1	KLX15A
207	Water sampling, class 1	KLX15A
208	Water sampling, class 1	KLX15A
209	Water sampling, class 1	KLX15A
210	Water sampling, class 1	KLX27A
211	Water sampling, class 1	KLX27A
212	Water sampling, class 1	KLX13A
213	Water sampling, class 1	KLX13A
214	Water sampling, class 1	KLX13A
215	Water sampling, class 1	KLX13A
216	Water sampling, class 1	KLX13A
217	Water sampling, class 1	KLX13A
218	Water sampling, class 1	KLX13A
219	Water sampling, class 3	KLX15A
220	Water sampling series	KLX15A
221	Water sampling series	KLX19A
222	Water sampling series	KLX18A
223	Water sampling series	KLX15A
224	Water sampling, class 1	KLX21B
225	Water sampling, class 1	KLX21B
226	Water sampling, class 1	KLX21B
227	Water sampling, class 1	KLX21B
228	Water sampling, class 1	KLX21B
229	Water sampling, class 1	KLX21B
230	Water sampling, class 1	KLX21B



ID	Aktivitet	ID code
231	Water sampling, class 1	KLX21B
232	Water sampling, class 1	KLX21B
233	Near Surface GW Measurements	SSM000030
234	Near Surface GW Measurements	SSM000037
235	Near Surface GW Measurements	SSM000228
236	Near Surface GW Measurements	SSM000041
237	Near Surface GW Measurements	SSM000030
238	Near Surface GW Measurements	SSM000037
239	Near Surface GW Measurements	SSM000228
240	Near Surface GW Measurements	SSM000041
241	Water sampling series	KLX04
242	Water sampling, class 2	KLX27A
243	Water sampling, class 2	KLX27A
244	Near Surface GW Measurements	SSM000042
245	Near Surface GW Measurements	SSM000022
246	Near Surface GW Measurements	SSM000042
247	Near Surface GW Measurements	SSM000022
248	Water sampling series	KLX08
249	Water sampling series	KLX08
250	Near Surface GW Measurements	SSM000240
251	Near Surface GW Measurements	SSM000241
252	Water sampling series	KLX27A
253	Near Surface GW Measurements	SSM000240
254	Water sampling series	KLX10
255	Water sampling series	KLX07A
256	Near Surface GW Measurements	SSM000241
257	Water sampling series	KLX12A
258	Water sampling series	KLX05
259	Water sampling series	KLX04
260	Water sampling, class 3	HLX27
261	Water sampling series	KLX20A
262	Water sampling series	KLX10
263	Water sampling, class 3	HLX27
264	Near Surface GW Measurements	SSM000242
265	Near Surface GW Measurements	SSM000242
266	Near Surface GW Measurements	SSM000242
267	Water sampling, class 1	HLX37
268	Water sampling, class 1	HLX37
269	Water sampling, class 1	HLX37
270	Water sampling, class 1	HLX37
271	Water sampling, class 1	HLX37
272	Near Surface GW Measurements	SSM000030
273	Near Surface GW Measurements	SSM000228
274	Near Surface GW Measurements	SSM000022
275	Near Surface GW Measurements	SSM000030
276	Near Surface GW Measurements	SSM000228



ID	Aktivitet	ID code
277	Near Surface GW Measurements	SSM000022
278	Near Surface GW Measurements	SSM000041
279	Near Surface GW Measurements	SSM000042
280	Near Surface GW Measurements	SSM000041
281	Near Surface GW Measurements	SSM000042
282	Near Surface GW Measurements	SSM000240
283	Near Surface GW Measurements	SSM000241
284	Near Surface GW Measurements	SSM000240
285	Water sampling, class 3	HLX27
286	Near Surface GW Measurements	SSM000241
287	Near Surface GW Measurements	SSM000242
288	Water sampling, class 1	HLX38
289	Water sampling, class 1	HLX38
290	Water sampling, class 1	HLX38
291	Water sampling, class 1	HLX38
292	Water sampling, class 1	HLX38
293	Water sampling, class 3	HLX28
294	Water sampling, class 1	KLX27A
295	Water sampling, class 1	KLX27A
296	Water sampling, class 1	KLX27A
297	Water sampling, class 1	KLX27A
298	Water sampling, class 3	HLX27
299	Water sampling, class 1	KLX27A
300	Water sampling, class 1	KLX27A
301	Water sampling, class 1	KLX27A
302	Water sampling, class 1	KLX27A
303	Water sampling, class 1	KLX27A
304	Water sampling, class 1	KLX27A
305	Water sampling, class 1	KLX27A
306	Near Surface GW Measurements	SSM000228
307	Near Surface GW Measurements	SSM000041
308	Near Surface GW Measurements	SSM000042
309	Near Surface GW Measurements	SSM000041
310	Near Surface GW Measurements	SSM000042
311	Near Surface GW Measurements	SSM000228
312	Near Surface GW Measurements	SSM000030
313	Near Surface GW Measurements	SSM000022
314	Near Surface GW Measurements	SSM000030
315	Near Surface GW Measurements	SSM000022
316	Near Surface GW Measurements	SSM000240
317	Near Surface GW Measurements	SSM000241
318	Near Surface GW Measurements	SSM000240
319	Near Surface GW Measurements	SSM000241
320	Near Surface GW Measurements	SSM000242