P-09-67

Oskarshamn site investigation Groundwater Monitoring Program

Report for October 2008–September 2009

Göran Nyberg, Eva Wass
Geosigma

November 2009

Svensk Kärnbränslehantering AB
Swedish Nuclear Fuel
and Waste Management Co

Box 250, SE-101 24 Stockholm
Phone +46 8 459 84 00

ISSN 1651-4416
SKB P-09-67

Oskarshamn site investigation Groundwater Monitoring Program

Report for October 2008–September 2009

Göran Nyberg, Eva Wass
Geosigma

November 2009

Keywords: AP PS 400-07-069, AP PS 400-08-021, Groundwater, Borehole, Instrumentation, Measurement methods, Monitoring, HMS, 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 were collected during the period of October 2008 until September 2009 and include groundwater levels in boreholes as well as some surface water levels. Meteorological and hydrological variables are also monitored within the framework of the site investigation but reported separately.

The data collecting system in HMS (Hydro Monitoring System) consists of measurement stations (computers) that 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 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 October 2008–September 2009 (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 programmet för grundvattenmonitering, 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 oktober 2008 till och med september 2009 och består av grundvattennivå i borrhål samt ytvattennivå i ett par mätpunkter. Inom ramen för platsundersökningen insamlas även meteorologiska och ythydrologiska data, vilka dock presenteras i annan rapport.

Datainsamlingssystemet i HMS (Hydro Monitoring System) består av mätstationer (datorer) vilka kommunicerar med och samlar in data från ett antal dataloggrar. Datorerna är förbundna med SKB:s nätverk. Alla data samlas in med hjälp av 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 oktober 2008 till september 2009 (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 400-07-069 and SKB AP PS 400-08-021. Controlling documents for this activity are listed in Table 1-1. The activity plans and the method description are SKB's internal controlling documents. The site investigation internal reports, Table 1-2, present the results from the quality check performed once every four months, see Section 4.4.

Data presented in this report include groundwater levels collected during October 2008–September 2009.

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

Table 1-1. Controlling documents.

Document	Number	Version
Activity Plans		
Platsundersökning i Oskarshamn – Grundvattenmonitering 2008	AP PS 400-07-069	1.0
Platsundersökning i Oskarshamn – Grundvattenmonitering 2009	AP PS 400-08-021	1.0
Method Descriptions		
Metodbeskrivning för grundvattenmonitering vid SKB:s platsundersökningar	SKB MD 360.002	1.0

Table 1-2. Monitoring reports

Site investigation Internal Reports (in Swedish)	Number
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: juni–oktober 2008	PIR-08-53
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: oktober 2008–februari 2009	PIR-09-03
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: februari–juni 2009	PIR-09-08
Platsundersökning i Oskarshamn – Kvalitetskontroll av grundvattenmonitering Period: juni–oktober 2009	In prep.

2 Objective and scope

The objective of the groundwater monitoring program during the site investigation is to determine baseline conditions for 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 the hardware performance and the environment in which the hardware is used. However, these are not reported herein.

The objects that were monitored and for which the results are presented in this report may be divided into the following categories:

- 40 core-drilled boreholes,
- 40 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 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. Coordinates of all boreholes in the reference system RT90 2.5 gon V 0:-15 and elevation at top of casing (TOC) in the reference system RHB70 are provided in Sicada.

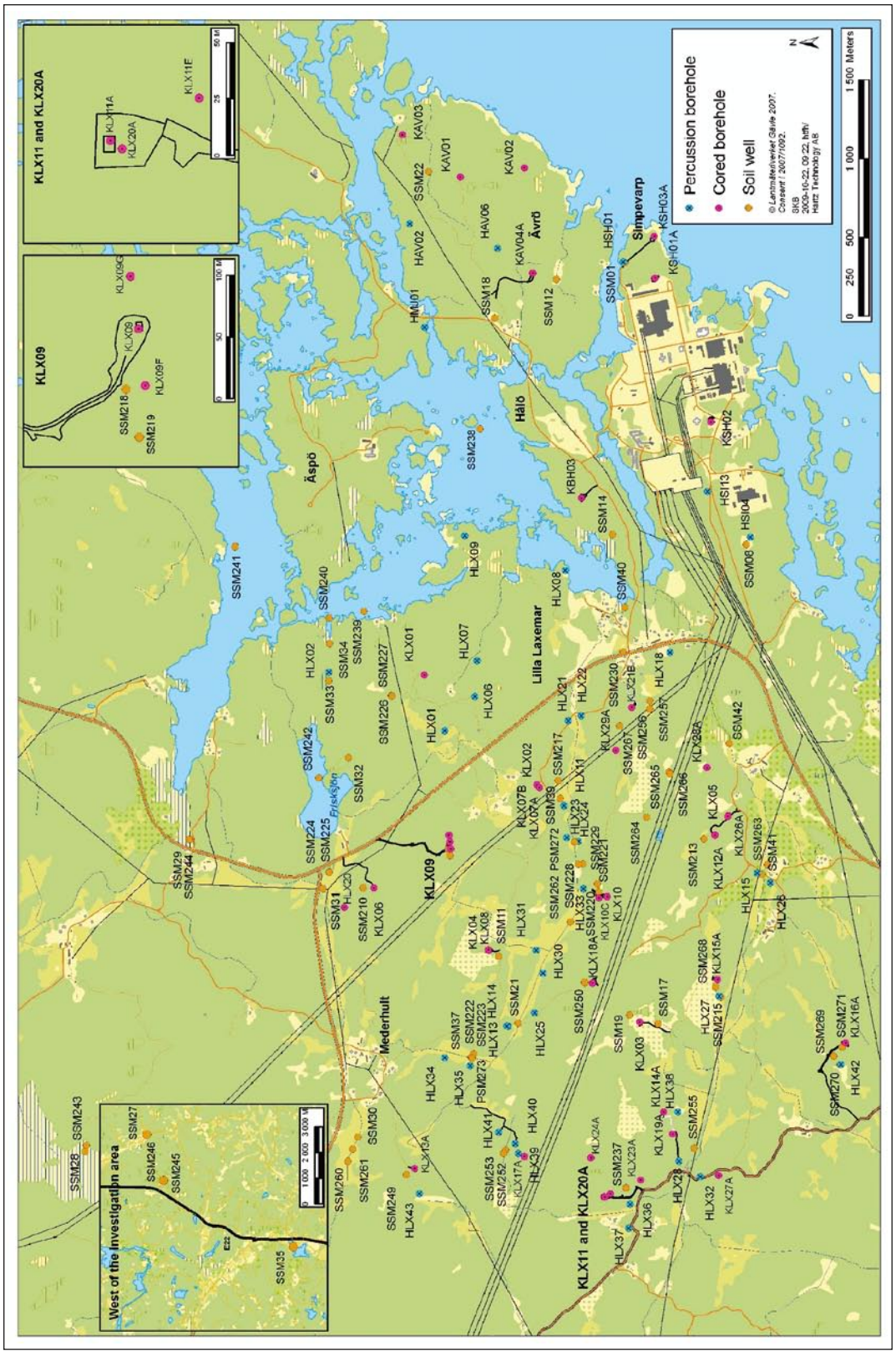


Figure 2 1. Overview of the Oskarshamn site investigation area showing the locations of monitored boreholes.

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	
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		
	744.6			1986-11-16		
	757.31	–89.2	14.10	1996-11-27	68.04	
	70.04			2004-01-10		Reaming
KAV02	97.1	–89.5	7.55	1977-05-31	12.40	
KAV03	248.4	–89.4	8.74	1986-10-05	2.80	
KAV04A	1004.0	–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	0.0–1.0 268.3–702.1	Inner supportive casing remaining in the borehole
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	

Borehole	Borehole length (m)	Inclination at ground (°)	Elevation at TOC (m.a.s.l)	Drilling completed	Length of casing (m)	Comment
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	1001.2	–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		
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		

Borehole	Borehole length (m)	Inclination at ground (°)	Elevation at TOC (m.a.s.l)	Drilling completed	Length of casing (m)	Comment
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		
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.

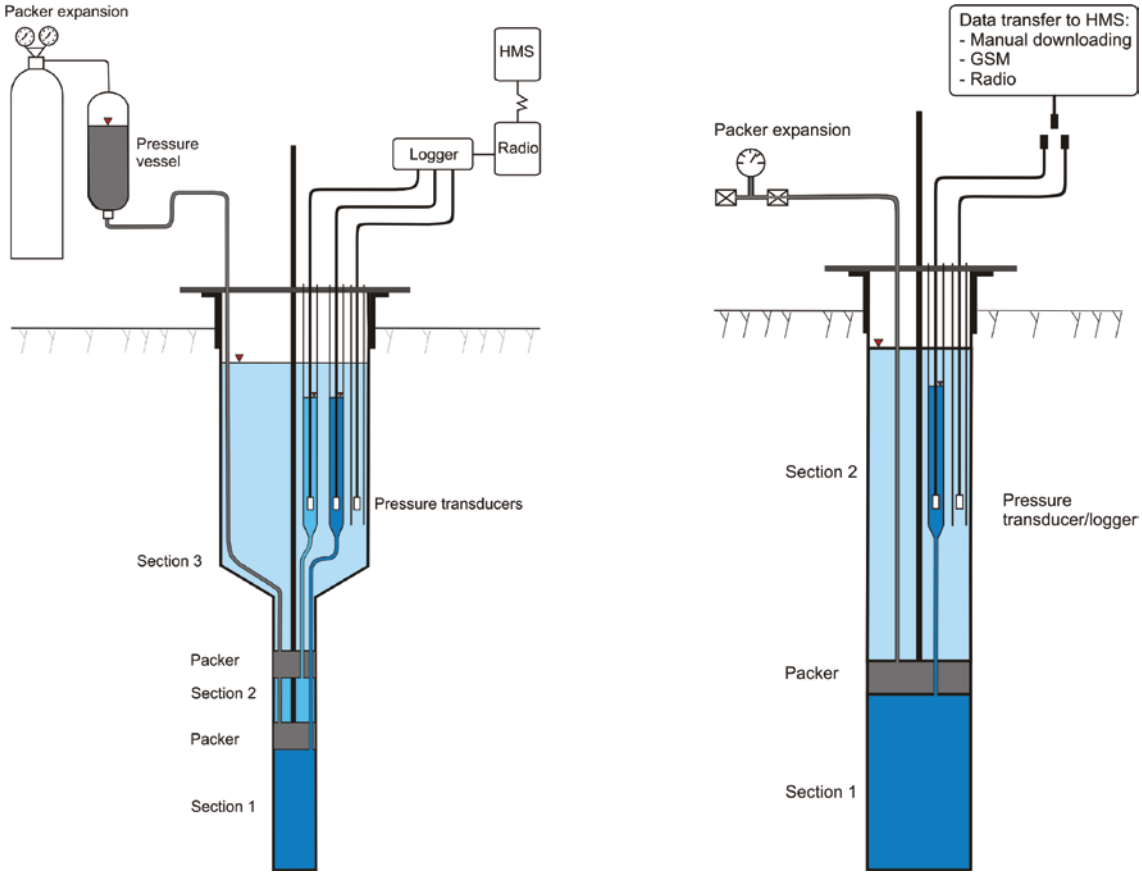


Figure 3-1. *Explanatory sketch of permanent instrumentation in core boreholes (left) and percussion boreholes (right).*

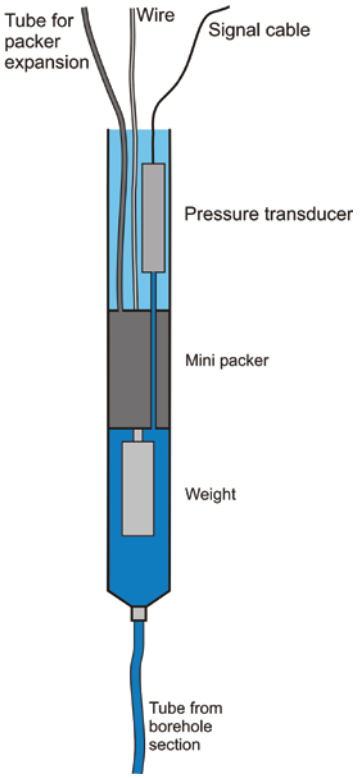


Figure 3-2. *Explanatory sketch of instrumentation in standpipes in core and percussion boreholes.*

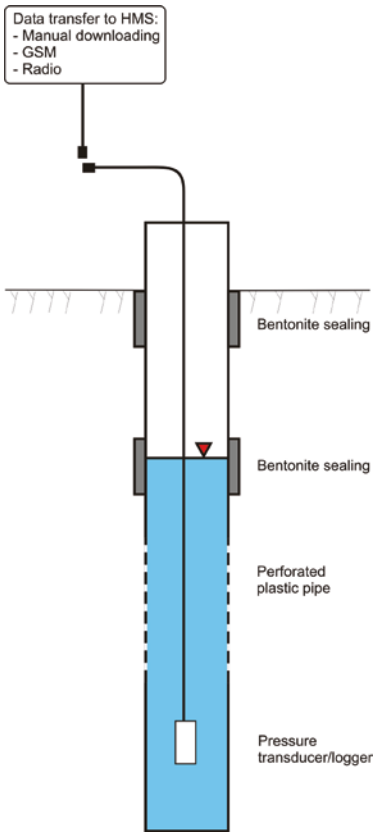


Figure 3-3. *Explanatory sketch of instrumentation in soil wells.*

3.2 Data collection

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

All data are collected by means of pressure transducers connected to various types of data loggers or by manual levelling. Table 3-1 shows the monitoring equipment used in 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 pressure monitoring and the other ones can be used for monitoring of the battery voltage and temperature.

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-drilled boreholes.

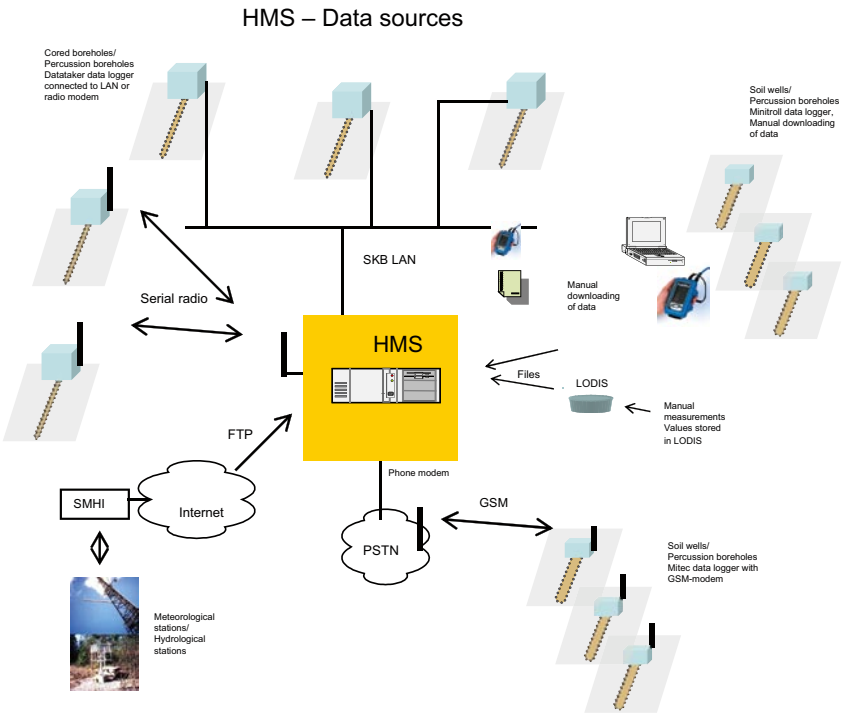


Figure 3-4. *HMS data sources.*

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	LevelTroll	2008-01	
HLX09	Mitec	2004-06	
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	2008-10	
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	DataTaker	2008-06	
HLX39	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	
KLX06	DataTaker	2005-07	
KLX07A	DataTaker	2006-03	
KLX07B	DataTaker	2006-03	
KLX08	DataTaker	2007-06	
KLX09	DataTaker	2006-12	

Borehole	Logger	from	to
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	2009-08
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	DataTaker	2008-06	
KLX28A	LevelTroll	2007-06	
KLX29A	LevelTroll	2007-06	
KSH01A	DataTaker	2004-10	
KSH02	DataTaker	2005-01	
KSH03A	DataTaker	2004-05	2009-08
PSM000272	Minitroll	2007-02	
PSM000273	Minitroll	2007-06	
SSM000001	LevelTroll	2008-02	
SSM000008	Minitroll	2008-02	2009-01
	LevelTroll	2009-01	
SSM000011	Minitroll	2004-04	
SSM000012	LevelTroll	2007-10	
SSM000014	Mitec	2004-09	2009-02
	Minitroll	2009-02	
SSM000017	LevelTroll	2006-09	
SSM000018	Minitroll	2008-02	
SSM000019	LevelTroll	2006-09	
SSM000021	Minitroll	2004-08	
SSM000022	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	
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	

Borehole	Logger	from	to
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	2009-08

Note - Data not relevant for the reported period October 2008–September 2009 are to be found in earlier reports /1, 2, 3, 4 or 5/.

4 Execution

4.1 General

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

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.

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

4.2 Field work

Manual levelling is generally carried out 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 made, normally once every month, in order to calibrate the registrations from the data loggers.

The logger data are converted to water levels by means of a linear calibration equation. It is also necessary to subtract the air pressure since all transducers give the absolute pressure. Converted logger data are compared with results from manual levelling. If the two differ, calibration constants (offset) 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-drilled 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.

4.3.3 Required accuracy of results

Required measurement accuracy for the groundwater parameters are presented in Table 4-1.

Table 4-1. Required accuracy of groundwater parameters.

Parameter	Resolution[1]	Measurement inaccuracy[2]
Core and percussion boreholes		
Groundwater level	≤ 0,02 m	± 0,2 m
Groundwater flow	–	± 50% of measured flow
Soil monitoring wells		
Groundwater level	≤ 0,02 m	± 0,07 m
Wells		
Groundwater level	–	± 0,1 m
Springs		
Spring flow	–	± 50% of measured flow

[1] Resolution is the smallest difference between adjacent values that the measurement system is able to register.

[2] Measurement inaccuracy represents the estimated spread of values for the measured quantity.

4.4 Quality assurance

Once every week, an inspection of all collected data is performed. The purpose of this is to verify 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 omitted and calibration constants are corrected so that the monitored data comply 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.

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 400-07-069 and AP PS 400-08-021). 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 the corresponding P-report. Minor data revisions are normally presented as supplements, available at www.skb.se.

5.2 Groundwater levels

Diagrams of groundwater levels and surface water levels are presented in Appendix 1. All levels in the diagrams are given as meters above sea level in the national elevation system (RHB70). Data from previously reported periods can be found in earlier reports /1, 2, 3, 4 or 5/.

Daily values are presented for each section in the diagrams. 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 core-drilled 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	
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
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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
	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	2008-10-21		153.0	164.7	
	2	2008-10-21		0.0	152.0	
HLX28	1	2008-06-09	2009-06-09	0.0	154.2	
	1	2009-06-11		91.0	154.2	
	2	2009-06-11		70.0	90.0	
	3	2009-06-11		7.5	69.0	
	4	2009-06-11		0.0	6.5	
HLX30	1	2005-09-14		101.0	163.4	
	2	2005-09-14		0.0	100.0	
HLX31	1	2005-10-19		0.0	133.2	
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	2008-04-15		150.0	199.8	
	2	2008-04-15		111.0	149.0	
	3	2008-04-15		94.0	110.0	
	4	2008-04-15		13.25	93.0	
HLX38	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	2008-11-10	187.0	199.3	
	2	2007-09-12	2008-11-10	51.0	186.0	
	3	2007-09-12	2008-11-10	0.0	50.0	
	1	2008-11-11	2009-04-30	0.0	199.3	
	1	2009-04-30		187.0	199.3	
	2	2009-04-30		51.0	186.0	
	3	2009-04-30		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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
HMJ01	1	2006-09-07		33.0	46.0	
	2	2006-09-07		0.0	32.0	
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	757.31	
	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	1,000.0	
	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	1,077.5	
	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	
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	993.49	
	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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
	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	
	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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
KLX11E	1	2006-04-25		0.0	121.3	Measurement start date
KLX12A	1	2006-11-06		546.0	602.29	
	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	
	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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
	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	
	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	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*	
	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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
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			3.3	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	
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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
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*	
	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	

Borehole	Section no	Section installed from	to	Borehole length** from (m)	to (m)	Comment
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 October 2008–September 2009 are to be found in earlier reports /1, 2, 3, 4 or 5/.

* 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 monitoring in boreholes as well as in surface-water are presented in diagrams. Level data from all sections in each borehole are presented in diagrams for the period of October 2008 until September 2009.

The symbols used in the diagrams for boreholes divided into a number of sections by a packer system (maximum 10 sections) are:

The lowermost section =

Section 1 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Section 2 + + + + + + + + + + +

Section 3 × × × × × × × × × ×

Section 4 □ □ □ □ □ □ □ □ □ □ □

Section 5 ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊

Section 6 △ △ △ △ △ △ △ △ △ △

Section 7 ◁ ◁ ◁ ◁ ◁ ◁ ◁ ◁ ◁ ◁

Section 8 ▽ ▽ ▽ ▽ ▽ ▽ ▽ ▽ ▽ ▽

Section 9 ▷ ▷ ▷ ▷ ▷ ▷ ▷ ▷ ▷ ▷

Section 10 ✶ ✶ ✶ ✶ ✶ ✶ ✶ ✶ ✶ ✶

The symbol used for boreholes with only one section (for example soil wells) and surface water gauges is: ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○.

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. 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 activities such as pumping, water sampling, tracer tests etc in or in vicinity of the monitored object.

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

In many of the percussion- and core-drilled surface boreholes, more or less pronounced drawdowns in the groundwater level can be seen during winter and spring 2009. This is due to the pumping performed in HLX28 described further below.

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

HLX28: Pumping (300 L/min) was performed in the borehole from the middle of January to the end of May 2009.

HLX36: The groundwater level in section 1 was strongly affected by the pumping in HLX28 and was during the entire pumping period lower than the pressure transducer. However, data have not been omitted as they can be of interest for interpretation of the pumping test.

KLX01: The higher levels that occurred during shorter periods in section 4 are due to precipitation/ snowmelt.

KLX02: Pumping was performed during October in order to clean parts of the borehole equipment and to exchange the water volume in the borehole section, tubes and standpipe. After this, the tubes from the deeper sections contained more saline water than before, causing the levels in these sections to decrease considerably.

KLX11E: The groundwater level was strongly affected by the pumping in HLX28 and was lower than the pressure transducer during some days at the end of February and also from the beginning of April until the end of May. However, data have not been omitted as they can be of interest for interpretation of the pumping test.

KLX27A:4 and KSH01A:1: The deviating appearance for these two 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 beginning of September 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.

/5/ **Nyberg G, Wass E, 2008.** Oskarshamn site investigation. Groundwater monitoring program. Report for September 2007–September 2008. SKB P-08-88, Svensk Kärnbränslehantering AB.

Appendix 1

Groundwater level

Percussion boreholes

HAV02
HAV06
HLX01
HLX02
HLX06 – HLX09
HLX11
HLX13 – HLX15
HLX18
HLX20 – HLX28
HLX30 – HLX43
HMJ01
HSH01
HSI04
HSI13

Core boreholes

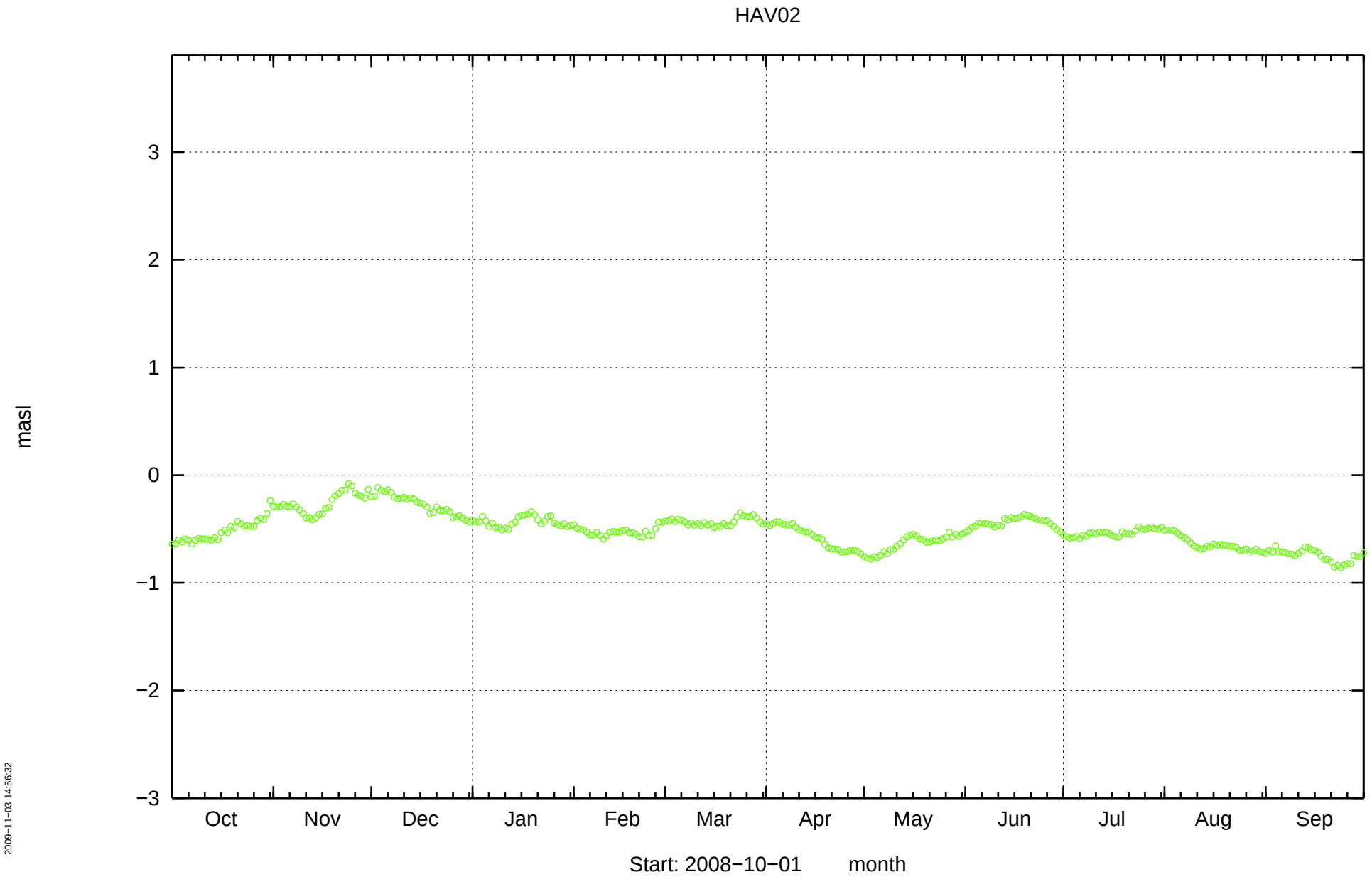
KAV01 – KAV03
KAV04A
KBH03
KLX01 – KLX06
KLX07A
KLX07B
KLX08
KLX09
KLX09F
KLX09G
KLX10
KLX10C
KLX11A
KLX11E
KLX12A
KLX13A
KLX14A
KLX15A
KLX16A
KLX17A
KLX18A
KLX19A
KLX20A
KLX21B
KLX23A
KLX24A
KLX26A
KLX27A
KLX28A
KLX29A
KSH01A
KSH02
KSH03A

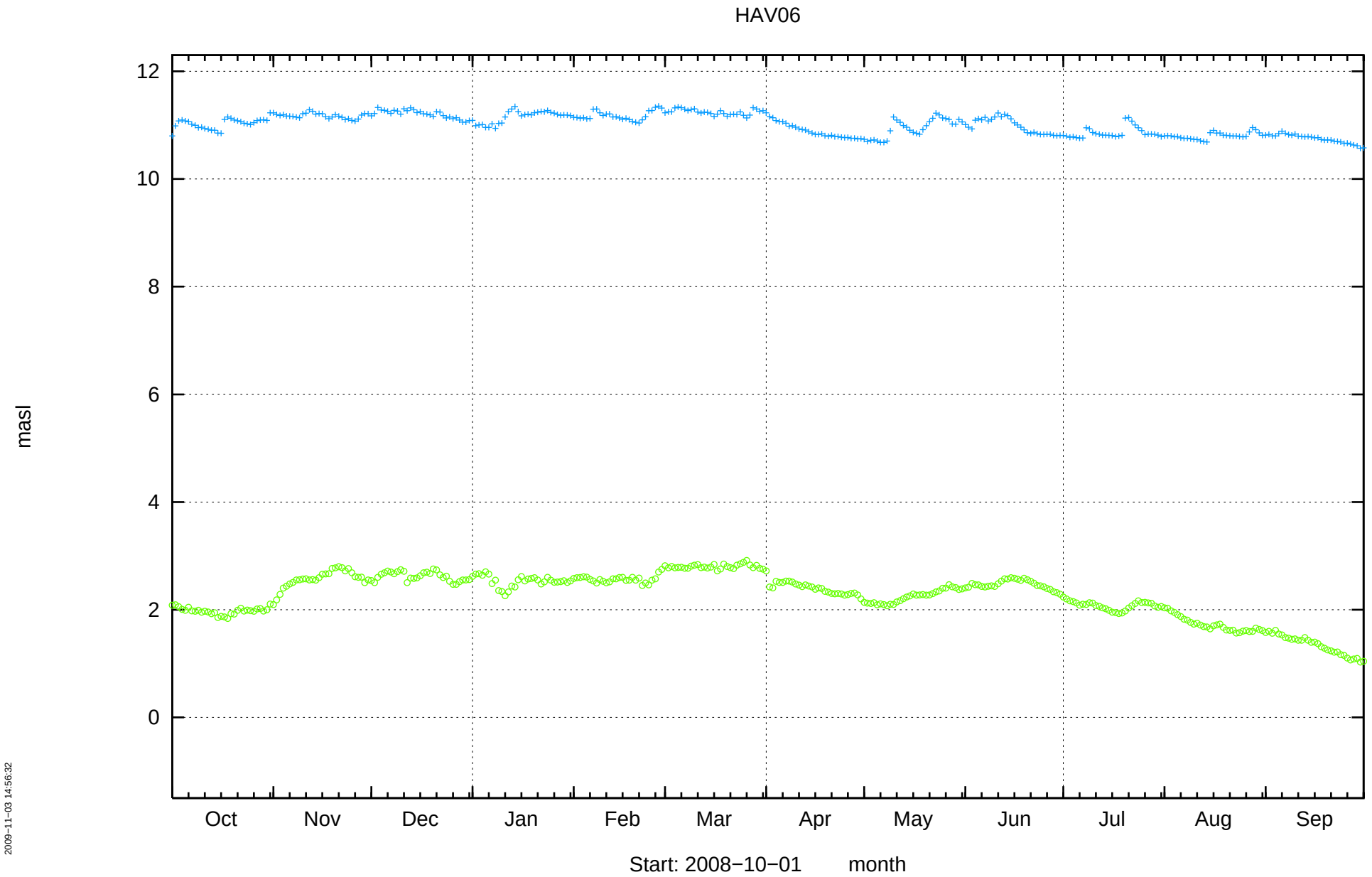
Water level in streams

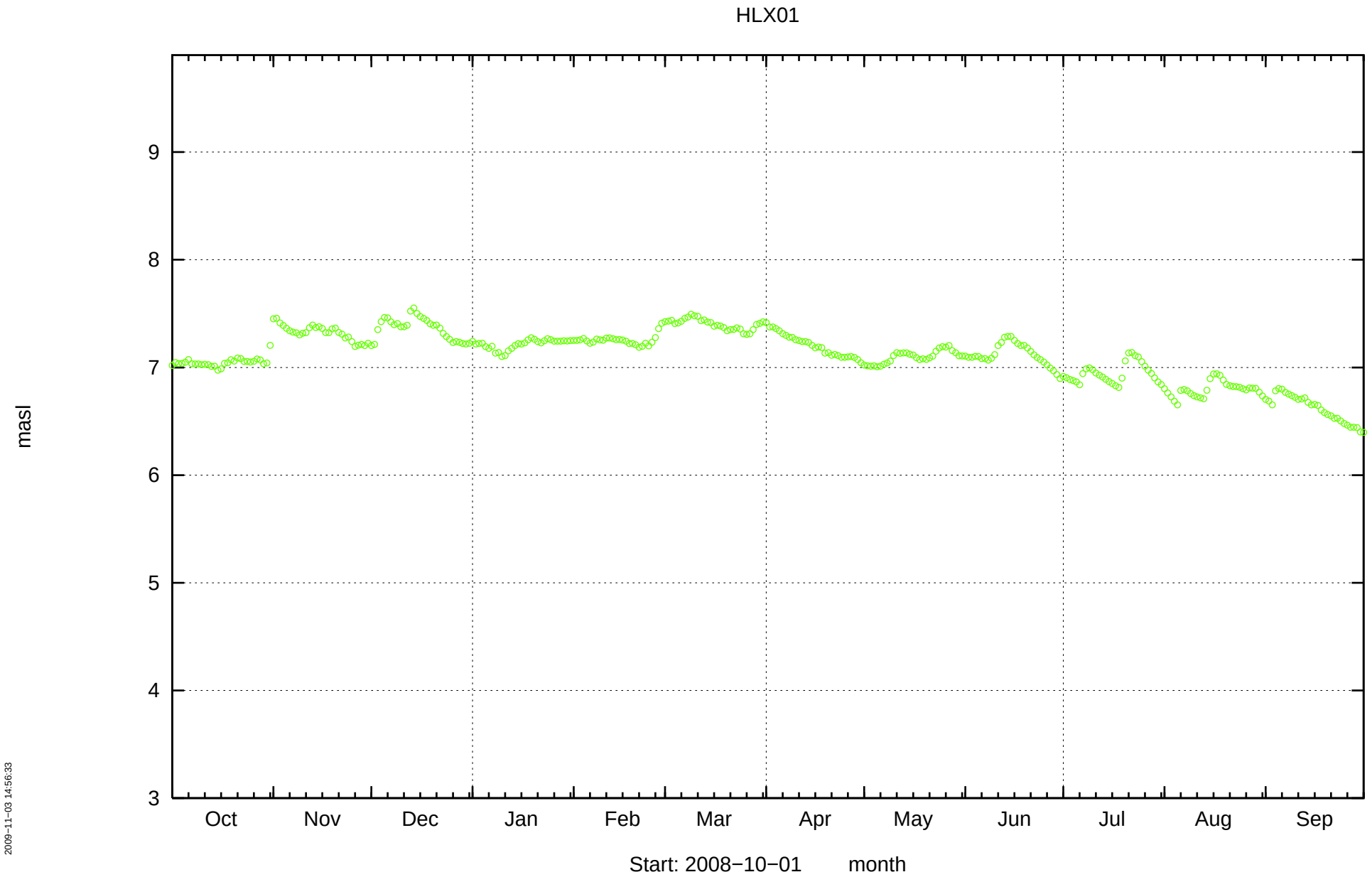
PSM000272
PSM000273

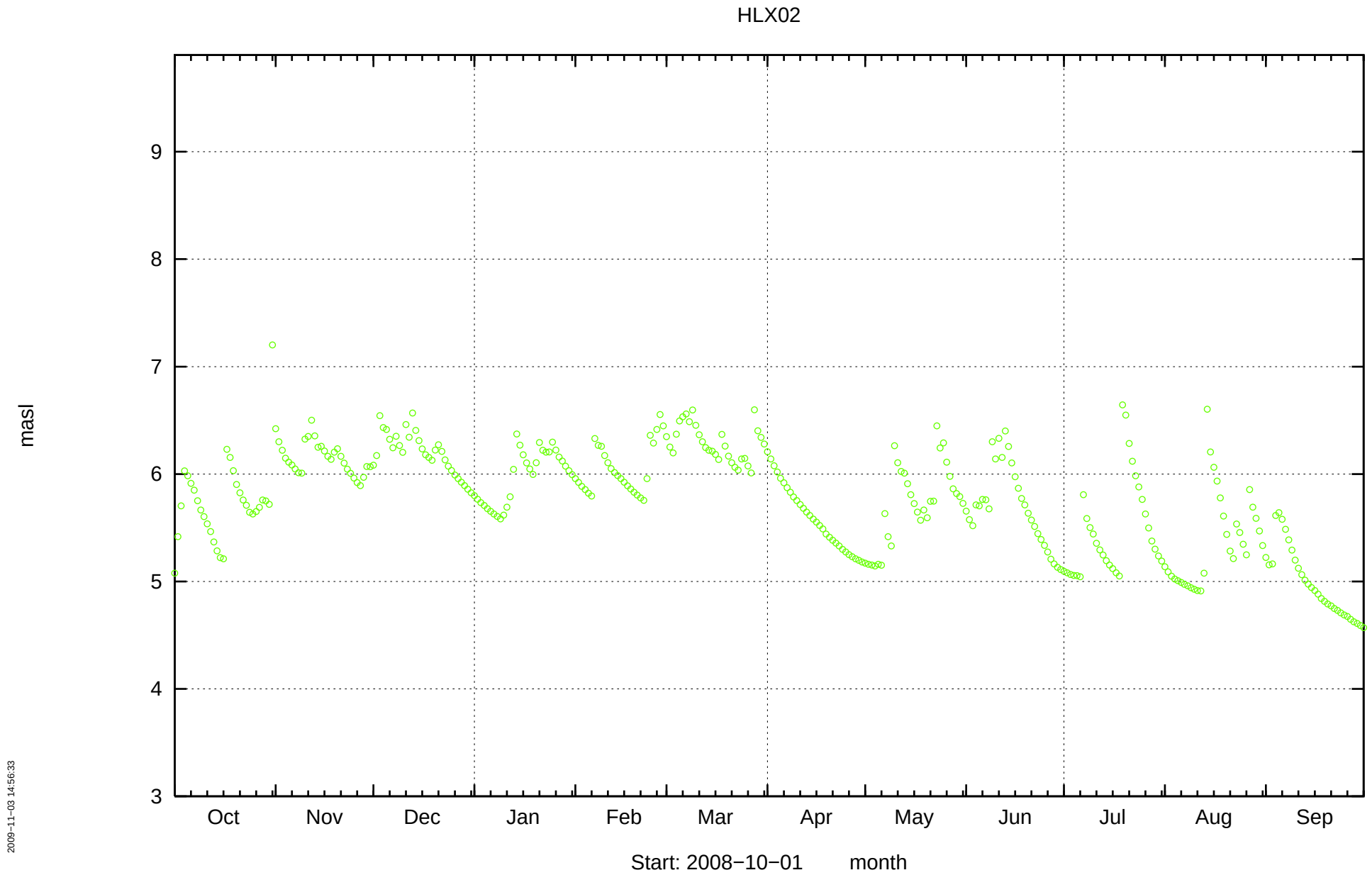
Soil wells

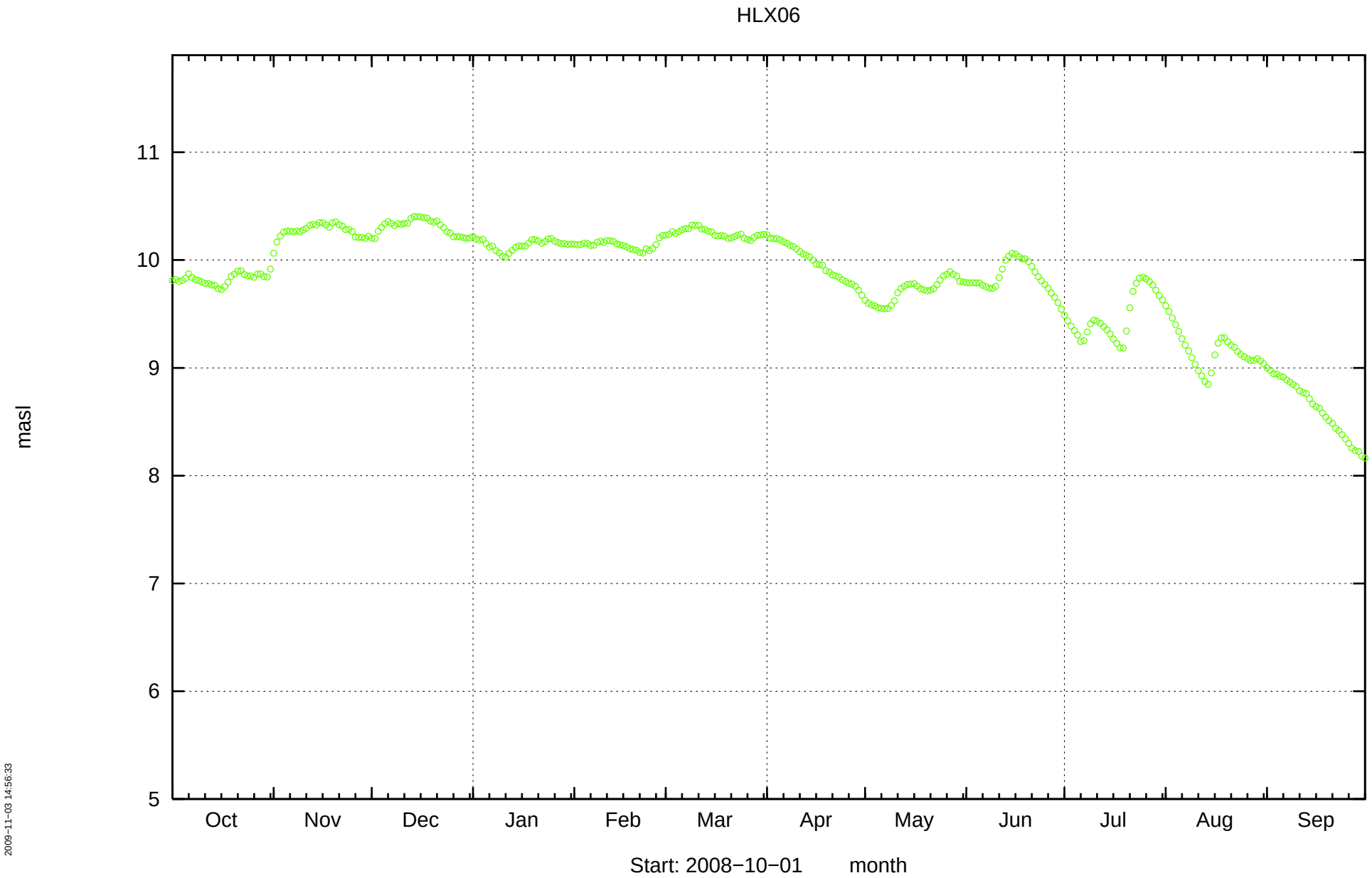
SSM000001
SSM000008
SSM000011
SSM000012
SSM000014
SSM000017
SSM000018
SSM000019
SSM000021
SSM000022
SSM000027
SSM000028
SSM000029
SSM000030
SSM000031
SSM000032
SSM000033
SSM000034
SSM000035
SSM000037
SSM000039
SSM000040
SSM000041
SSM000042
SSM000210
SSM000213
SSM000215
SSM000217
SSM000218
SSM000219
SSM000220
SSM000221
SSM000222
SSM000223
SSM000224
SSM000225
SSM000226
SSM000227
SSM000228
SSM000229
SSM000230
SSM000237
SSM000238
SSM000239
SSM000240
SSM000241
SSM000242
SSM000243
SSM000244
SSM000245
SSM000246
SSM000249
SSM000250
SSM000252
SSM000253
SSM000255
SSM000256
SSM000257
SSM000260
SSM000261
SSM000262
SSM000263
SSM000264
SSM000265
SSM000266
SSM000267
SSM000268
SSM000269
SSM000270
SSM000271

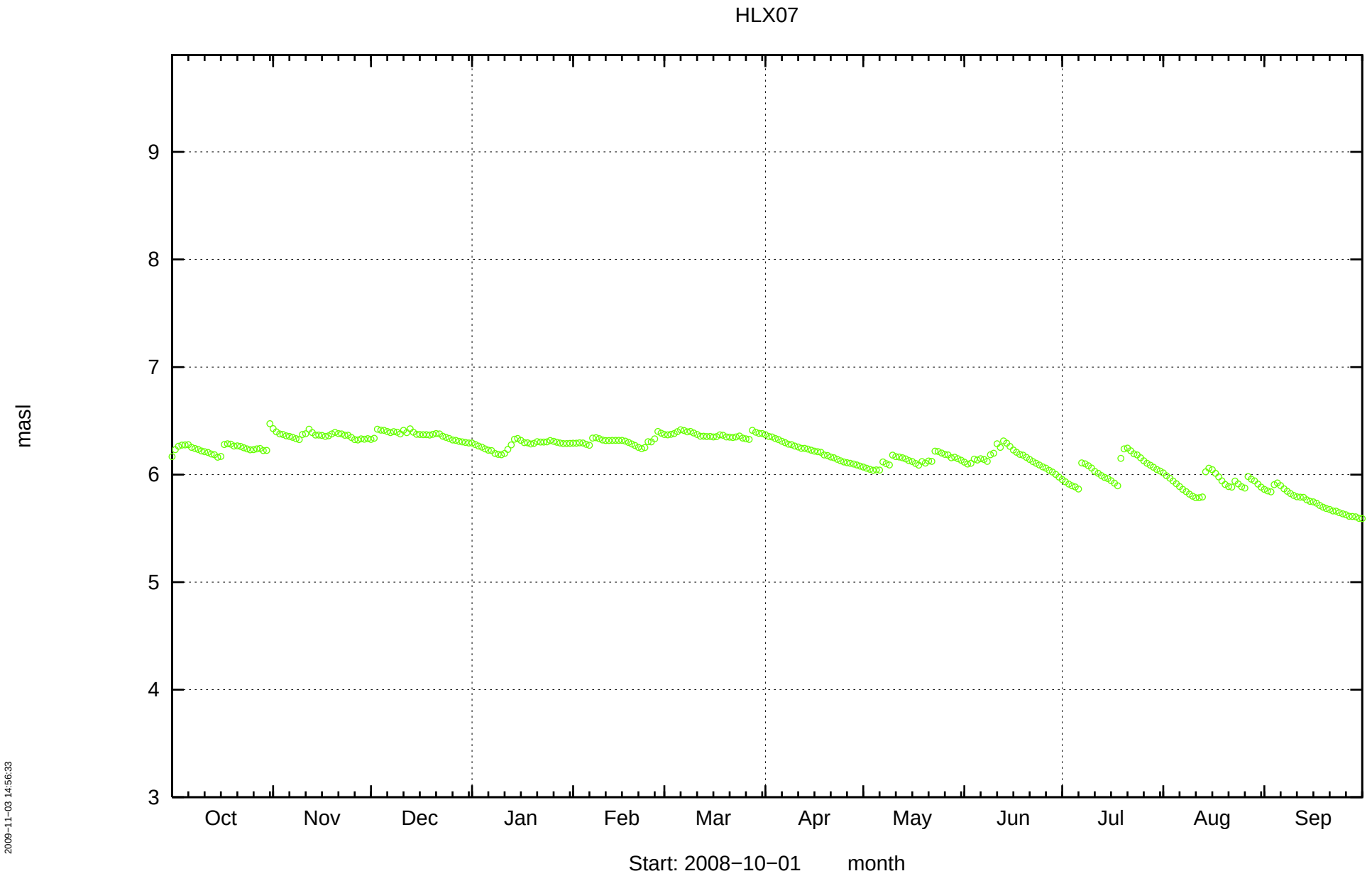

HAV02
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:32

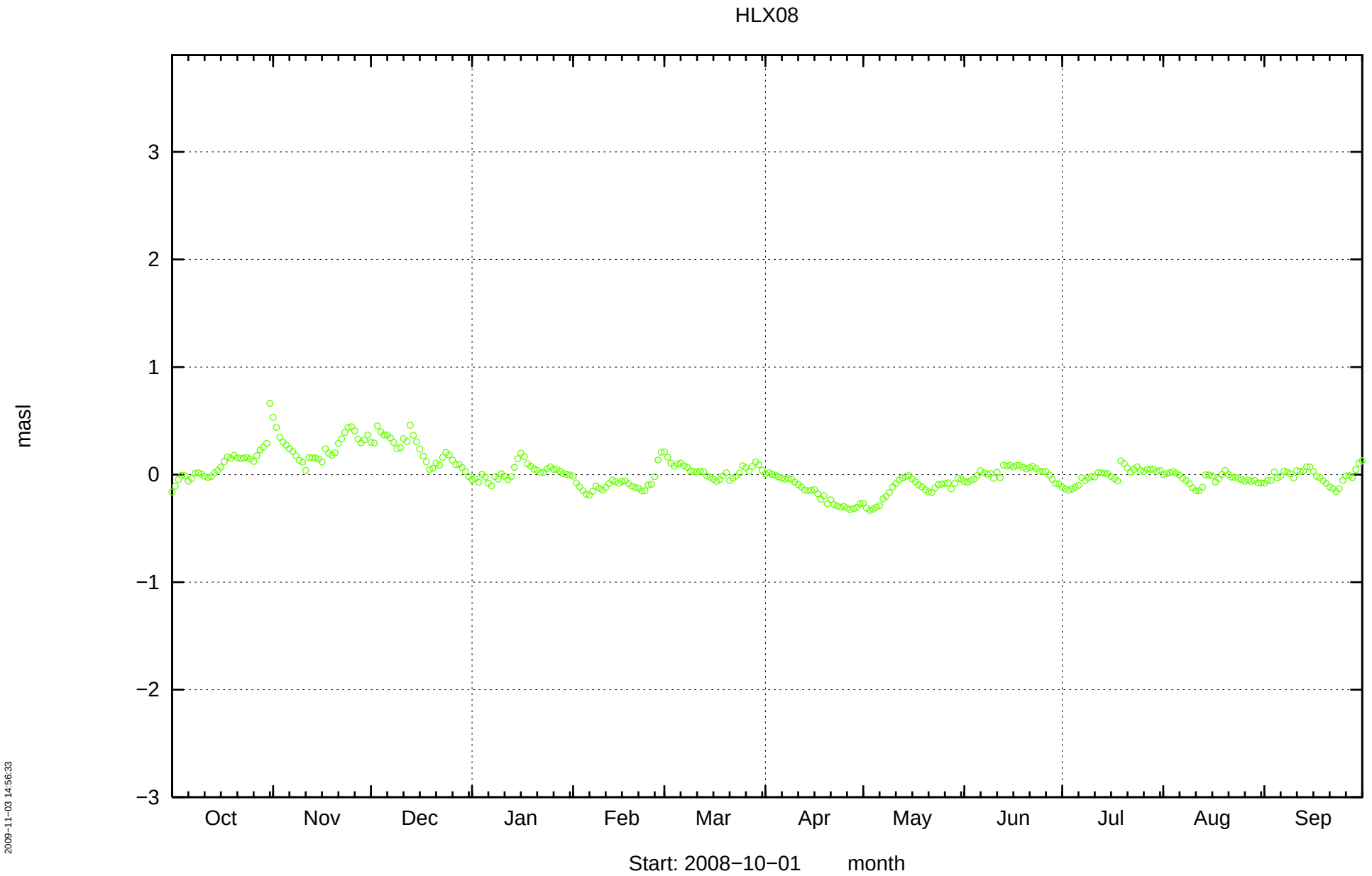

HAV06
masl
12
10
8
6
4
2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:32

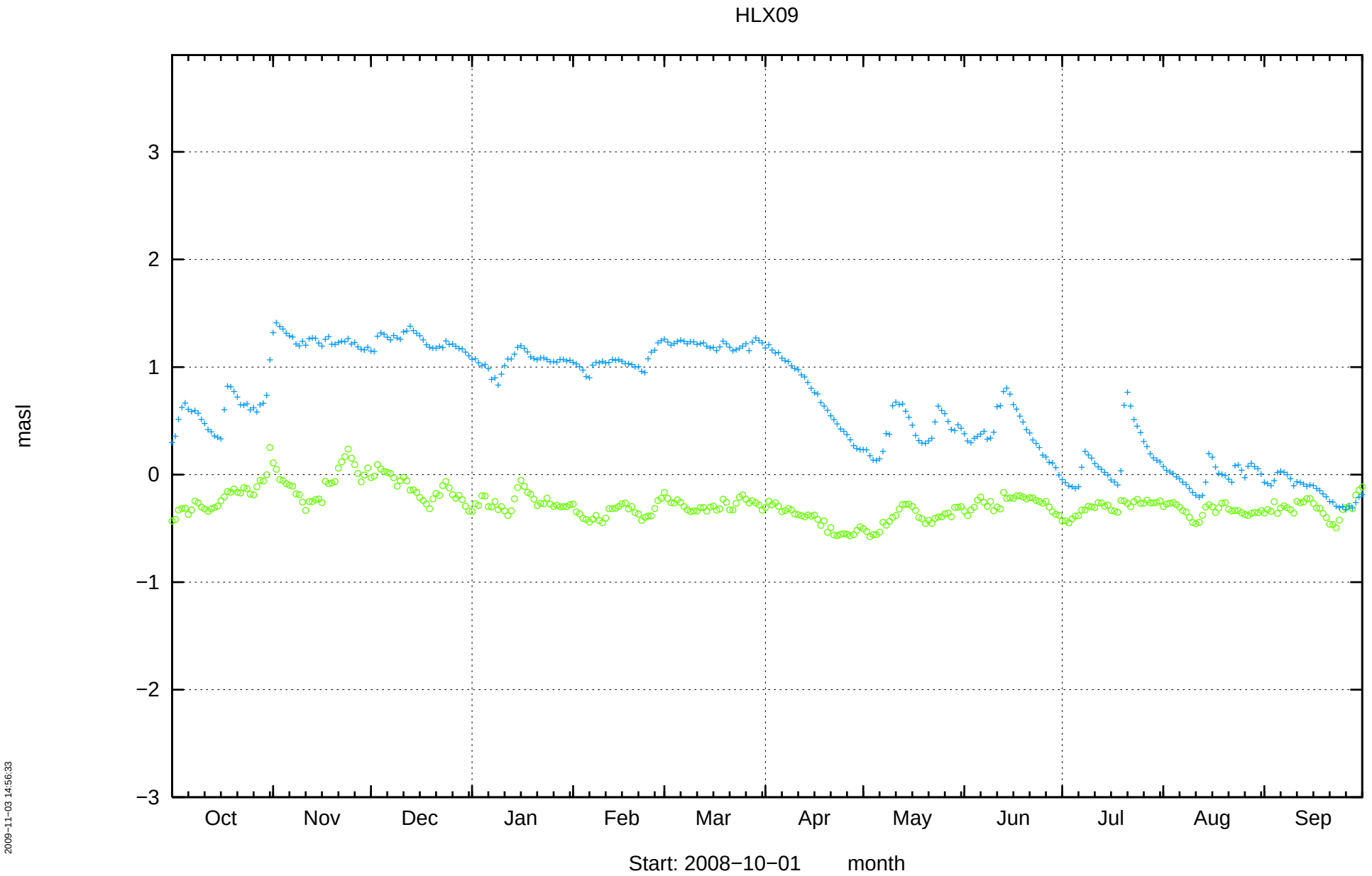

HLX01
masl
9
8
7
6
5
4
3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

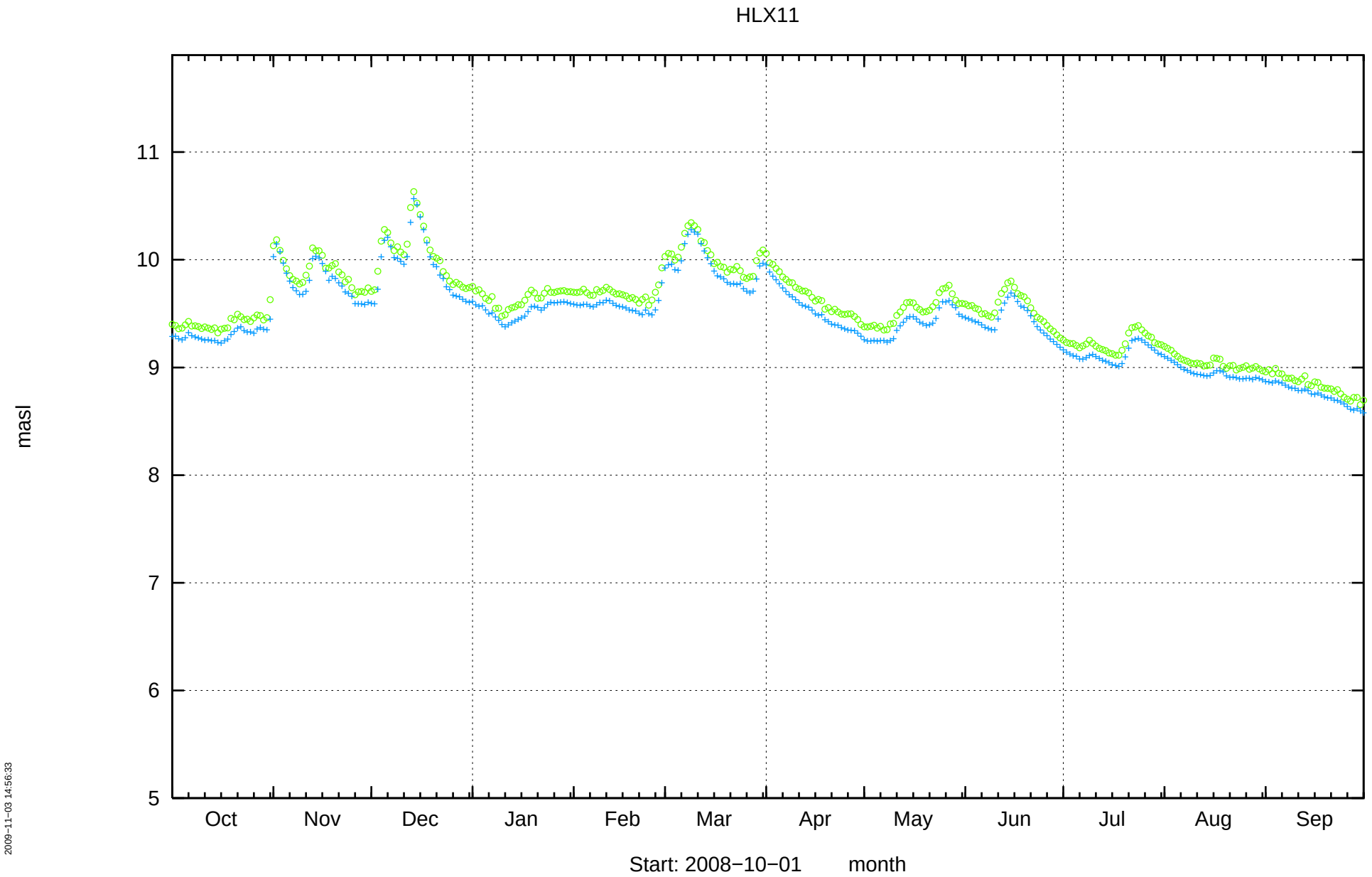

HLX02
masl
9
8
7
6
5
4
3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

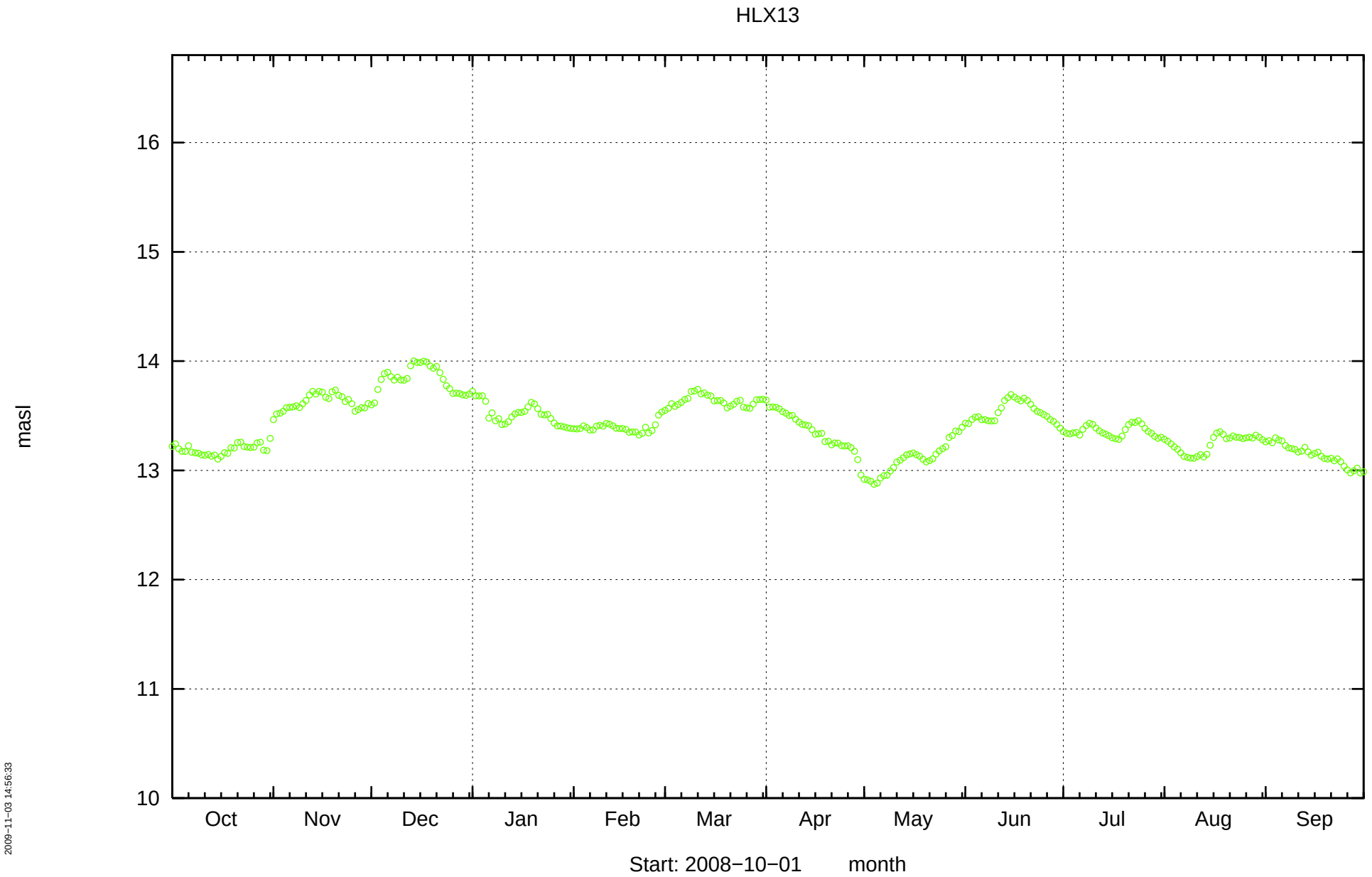

HLX06
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

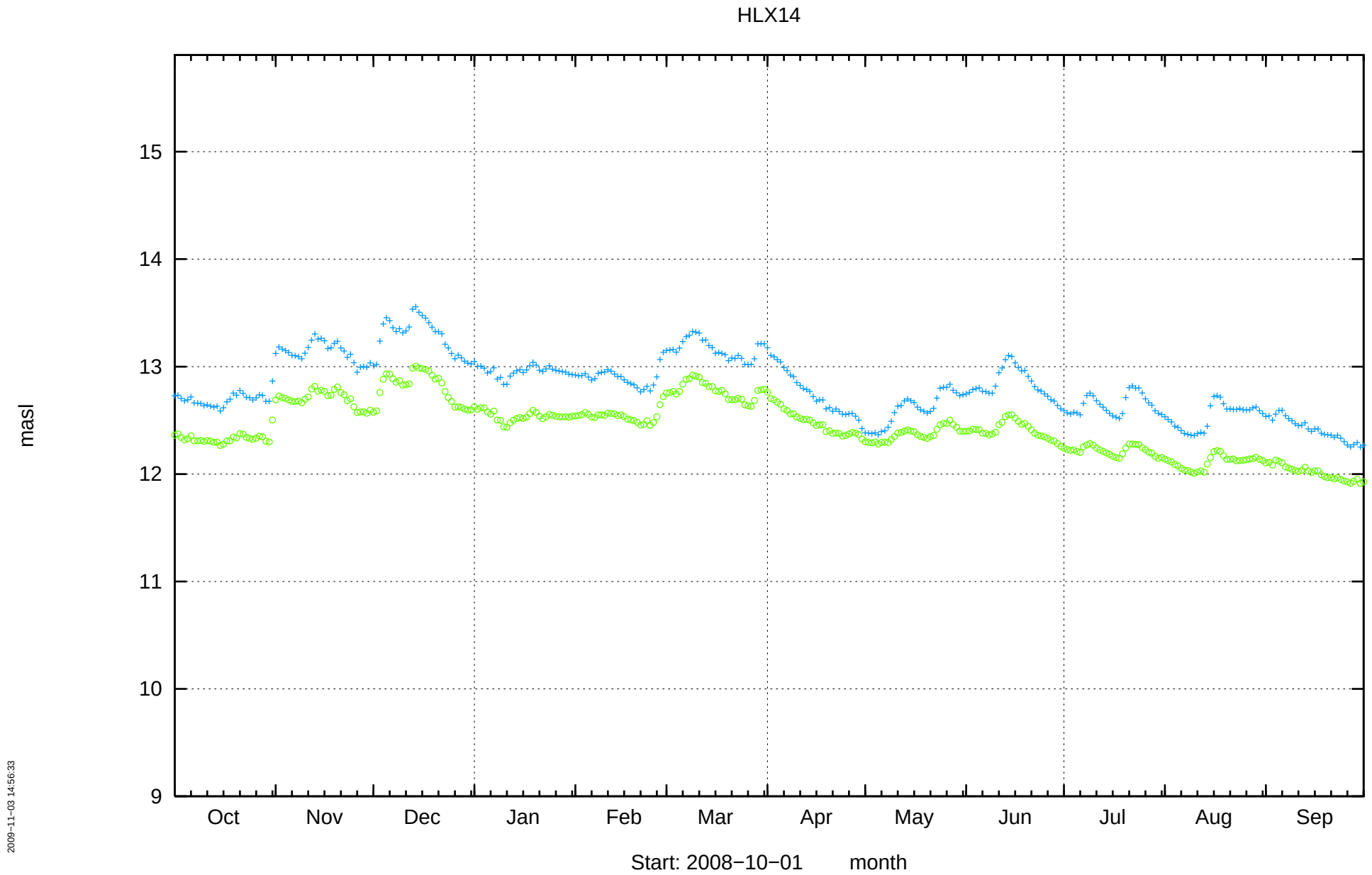

HLX07
masl
9
8
7
6
5
4
3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

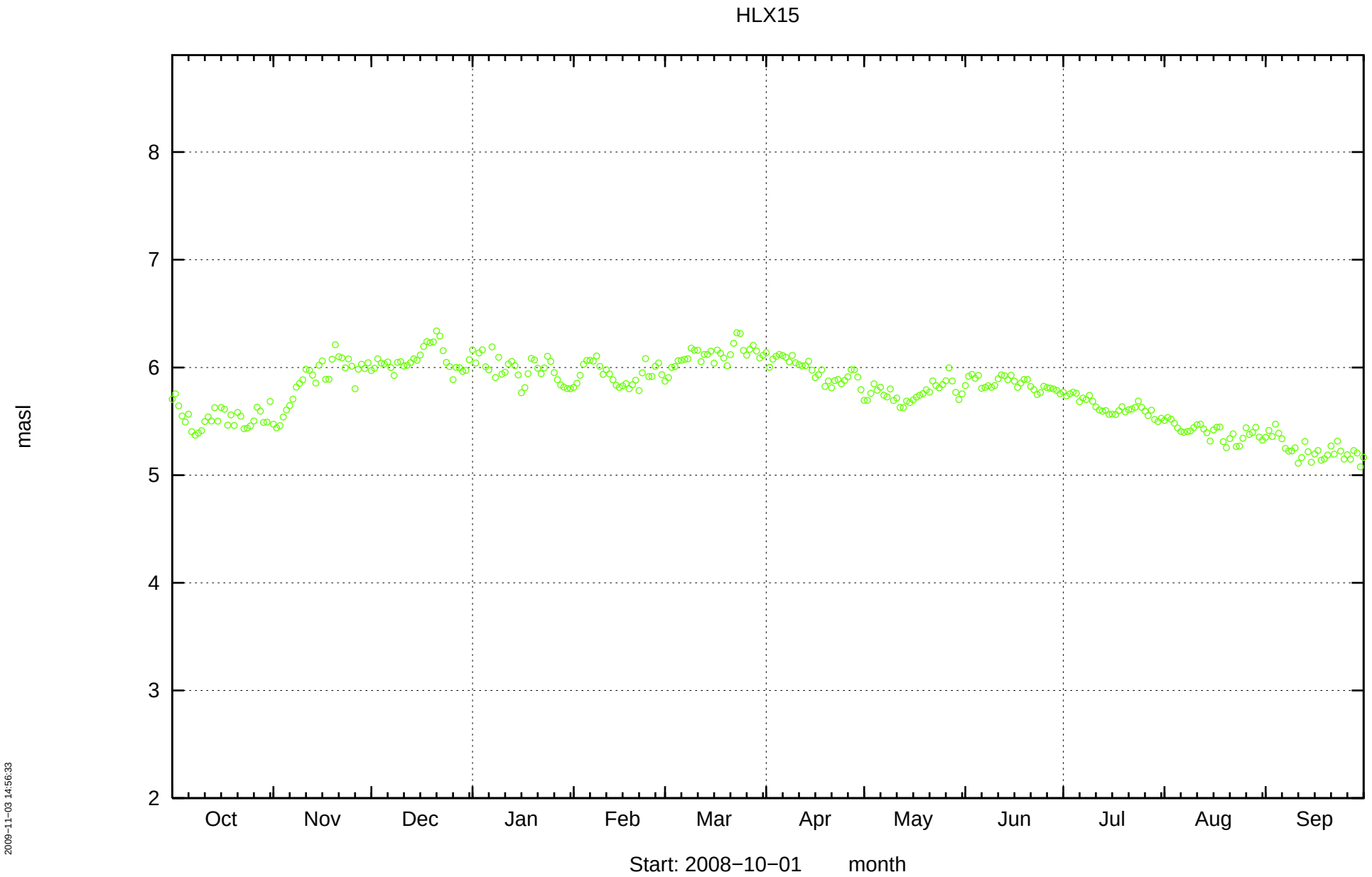

HLX08
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

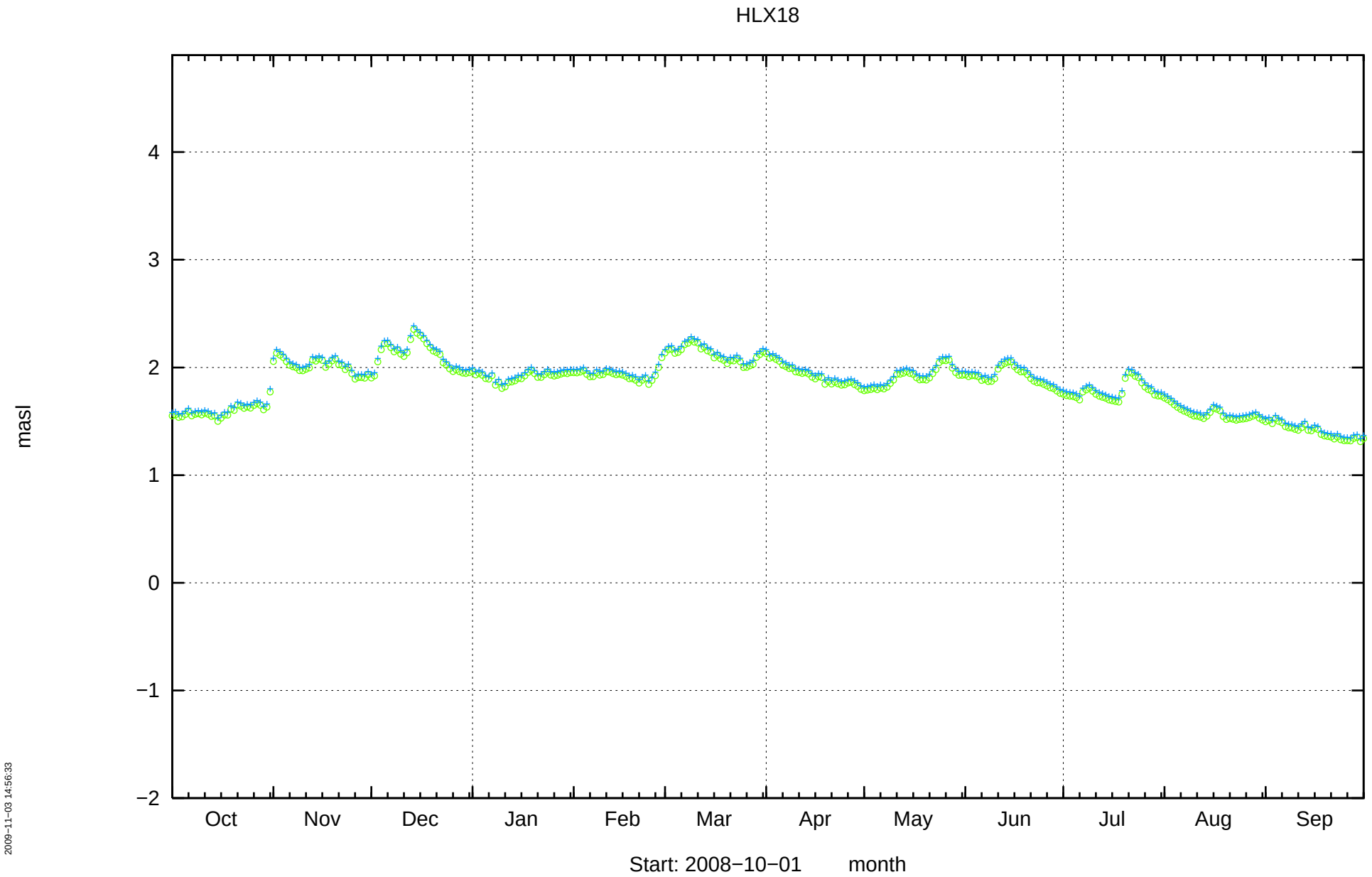

HLX09
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

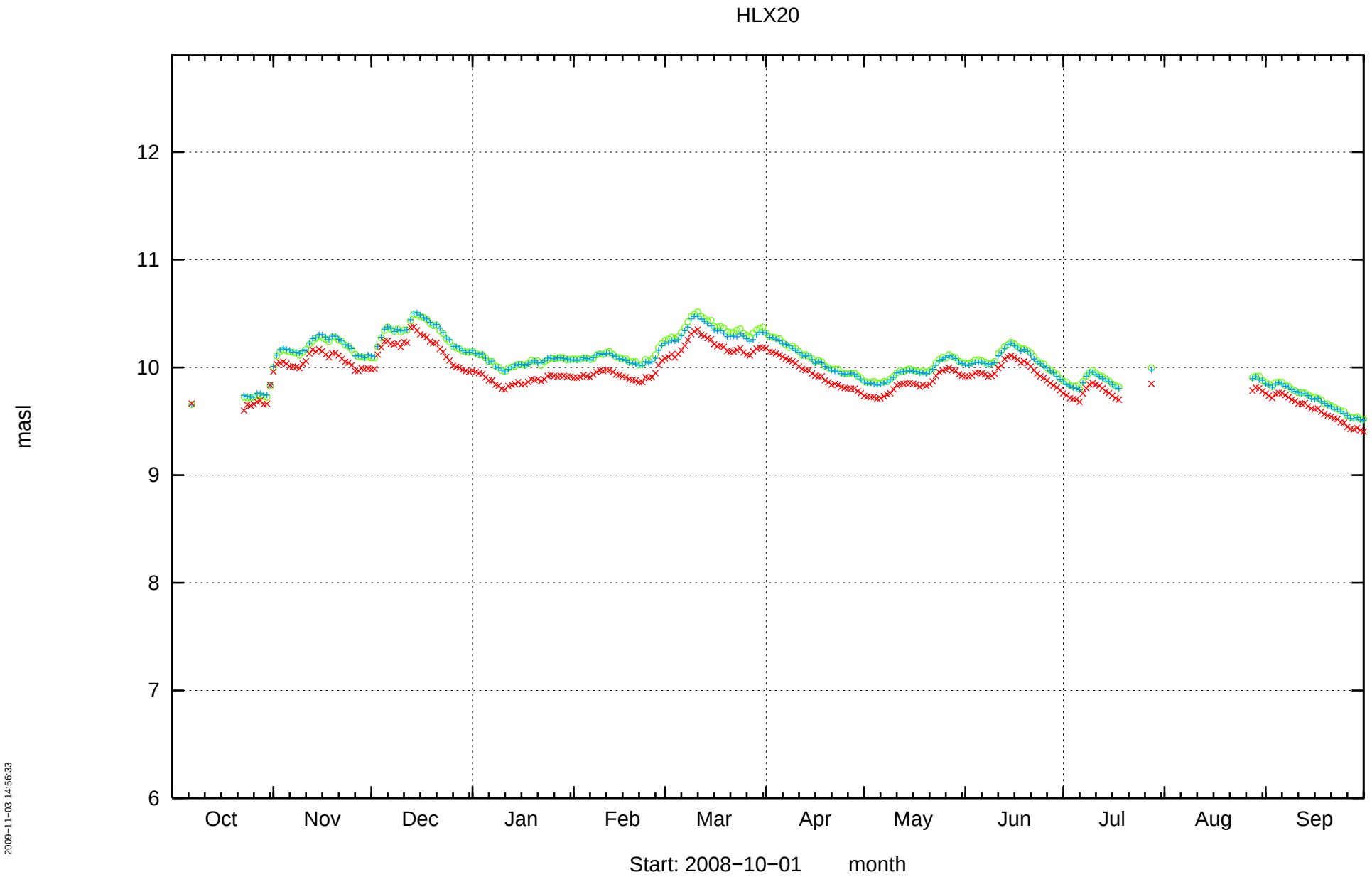

HLX11
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

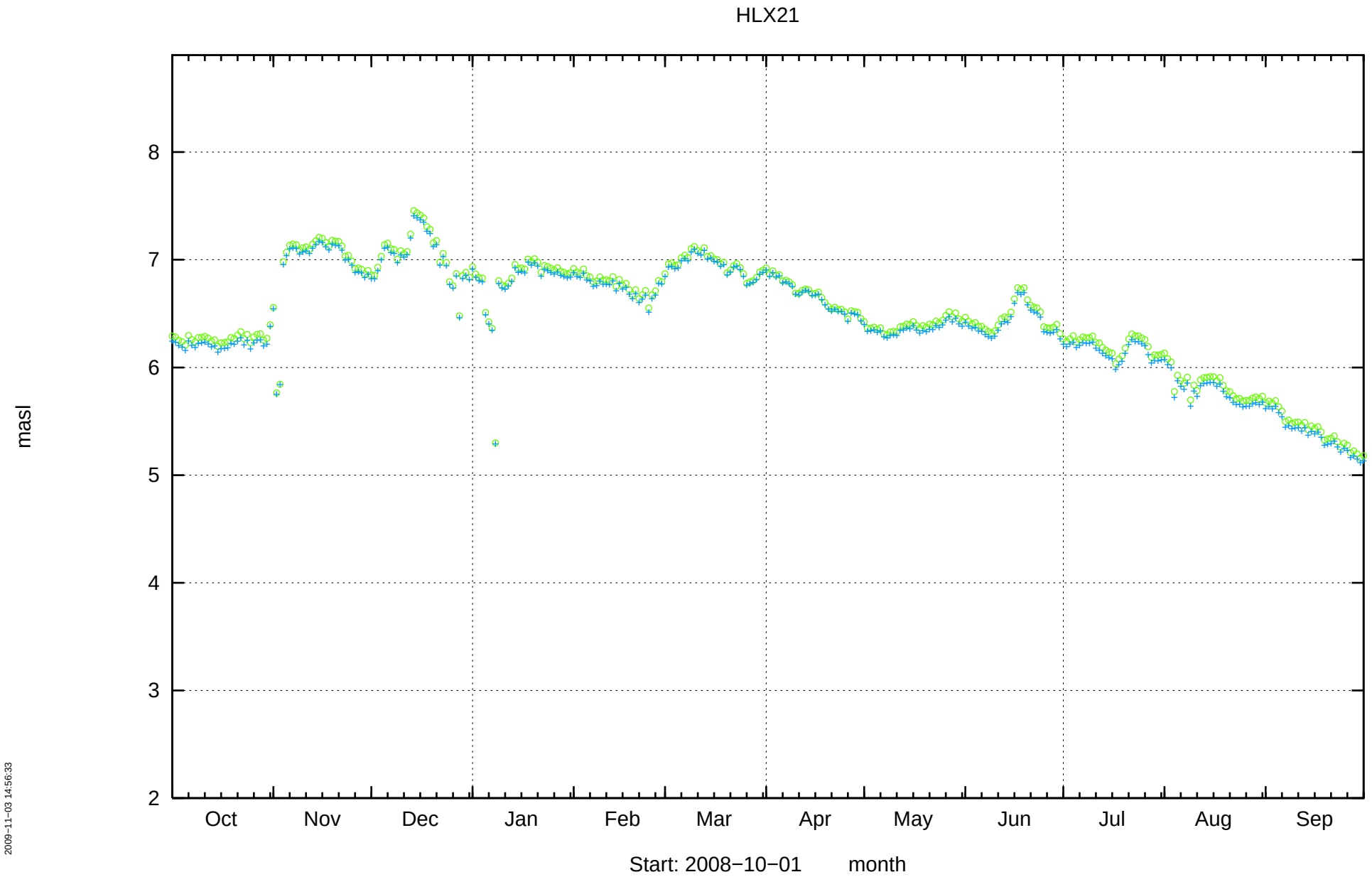

HLX13
masl
16
15
14
13
12
11
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

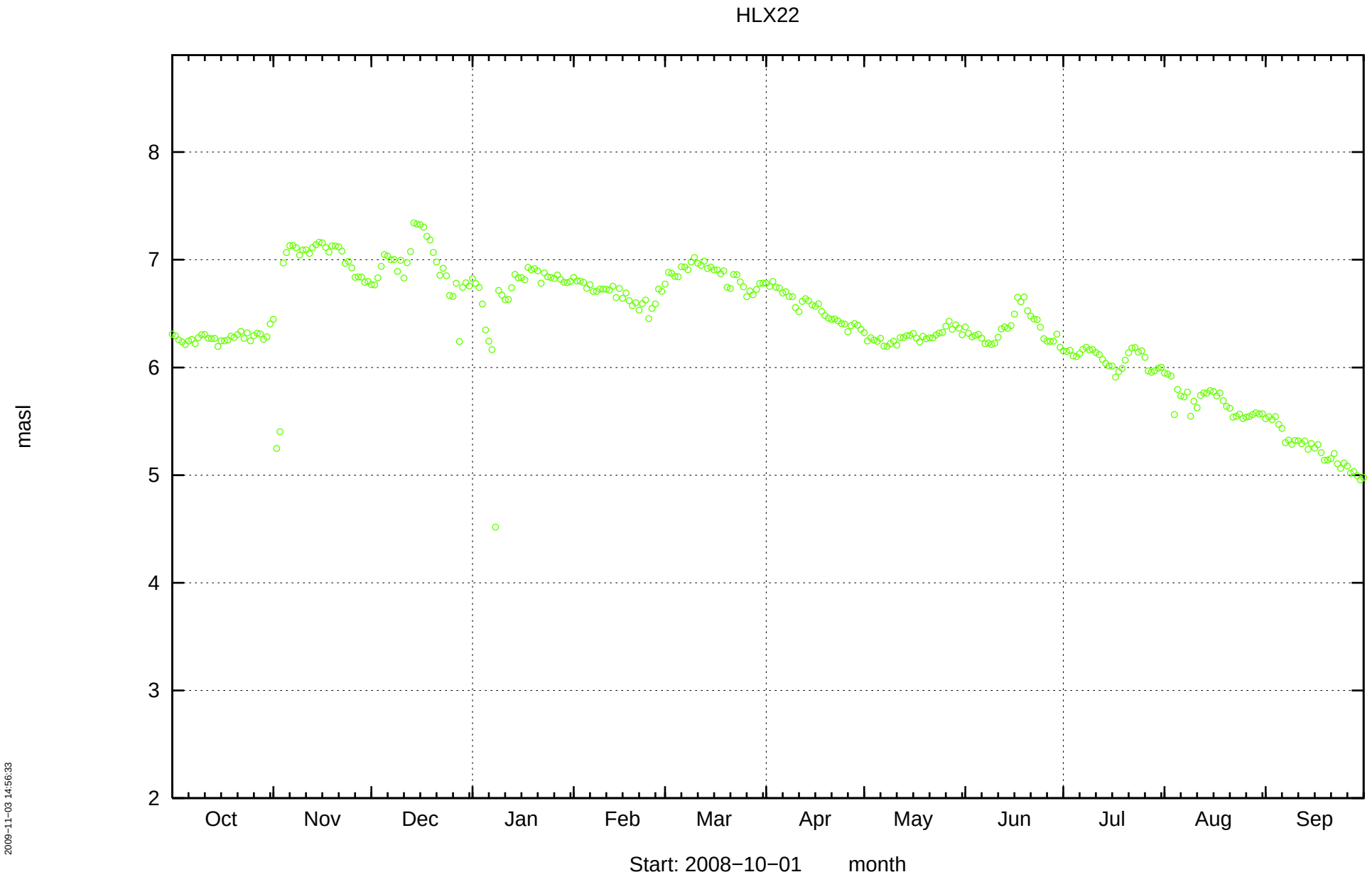

HLX14
masl
15
14
13
12
11
10
9
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

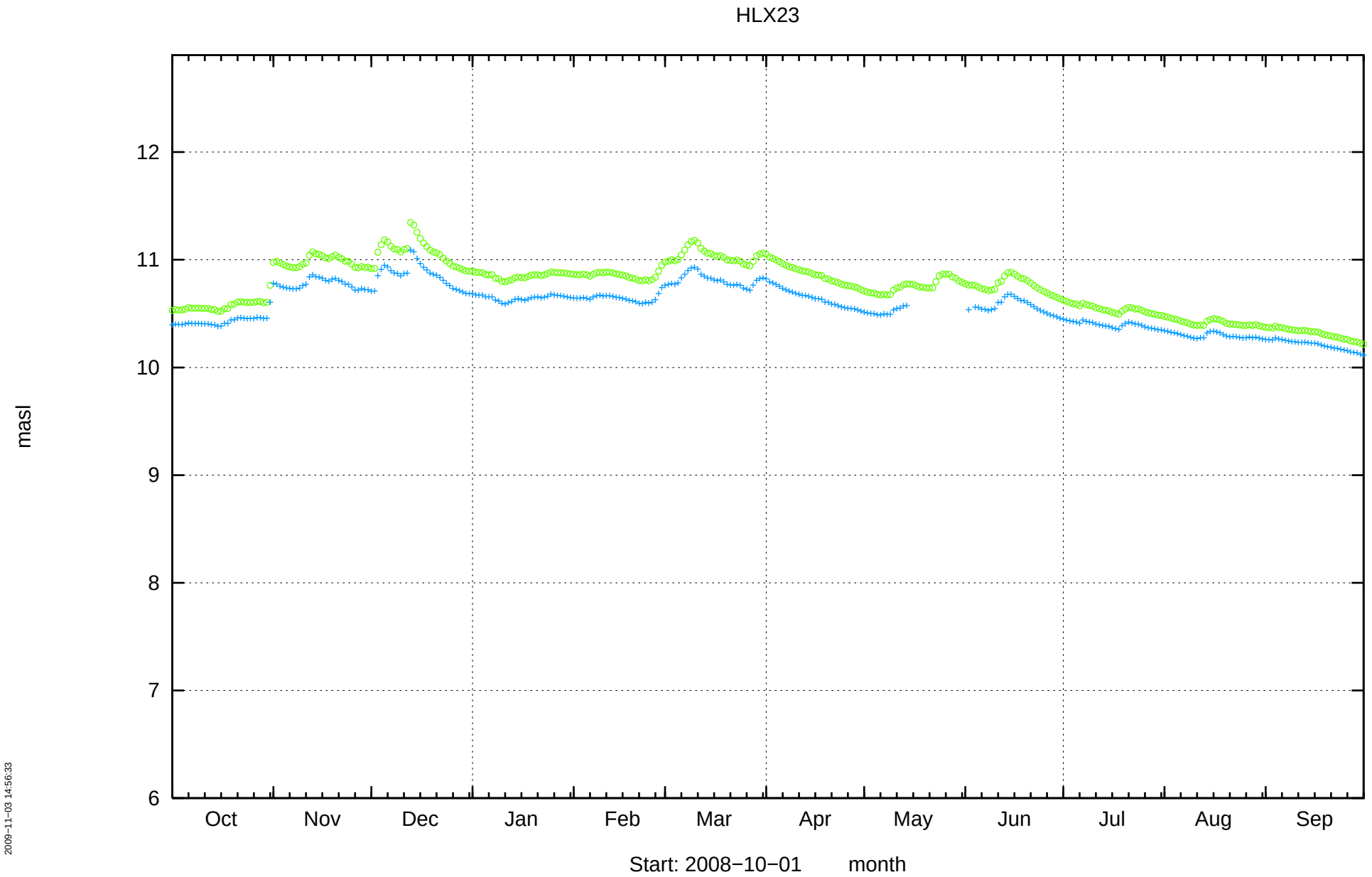

HLX15
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

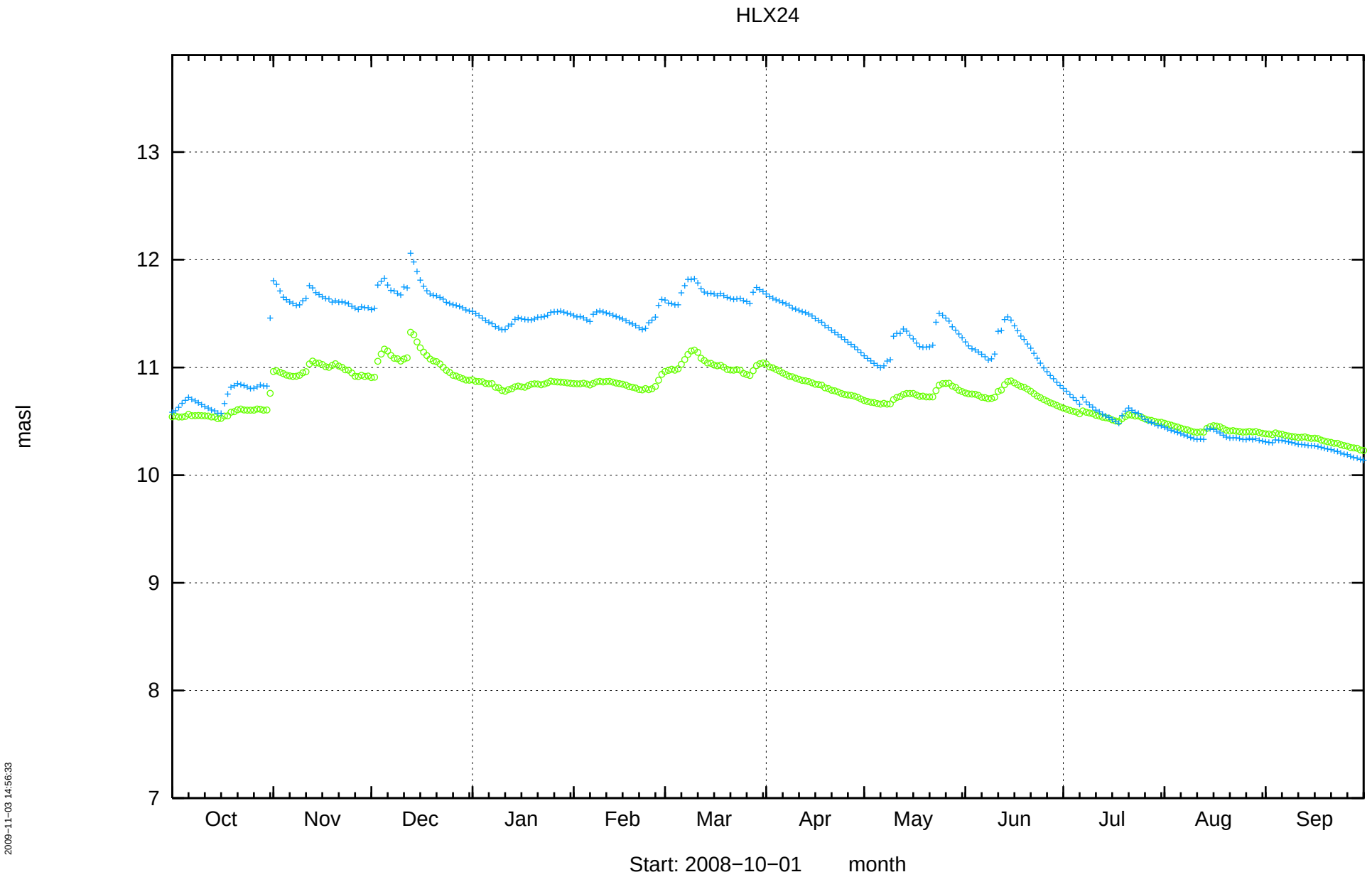

HLX18
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

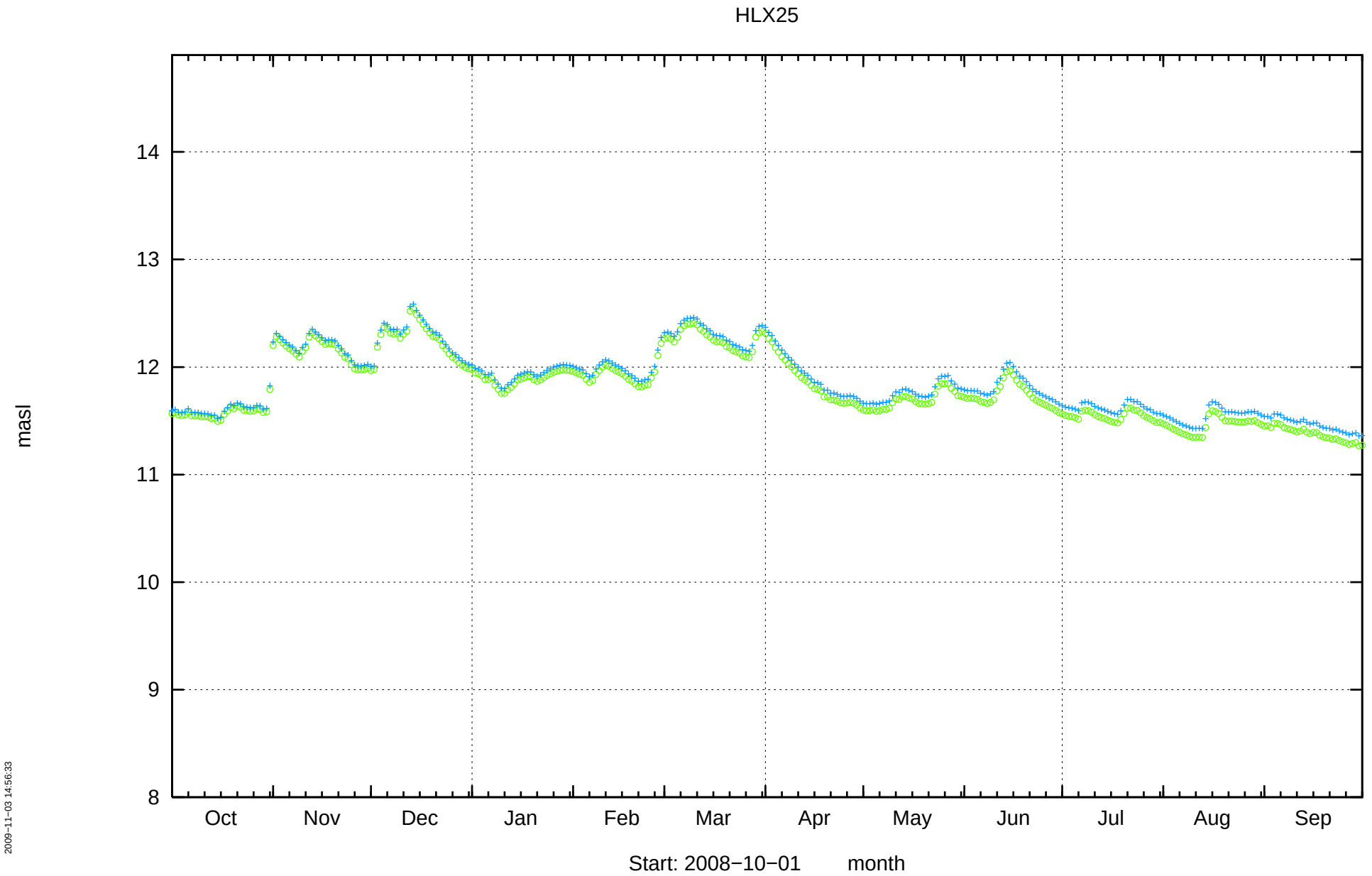

HLX20
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

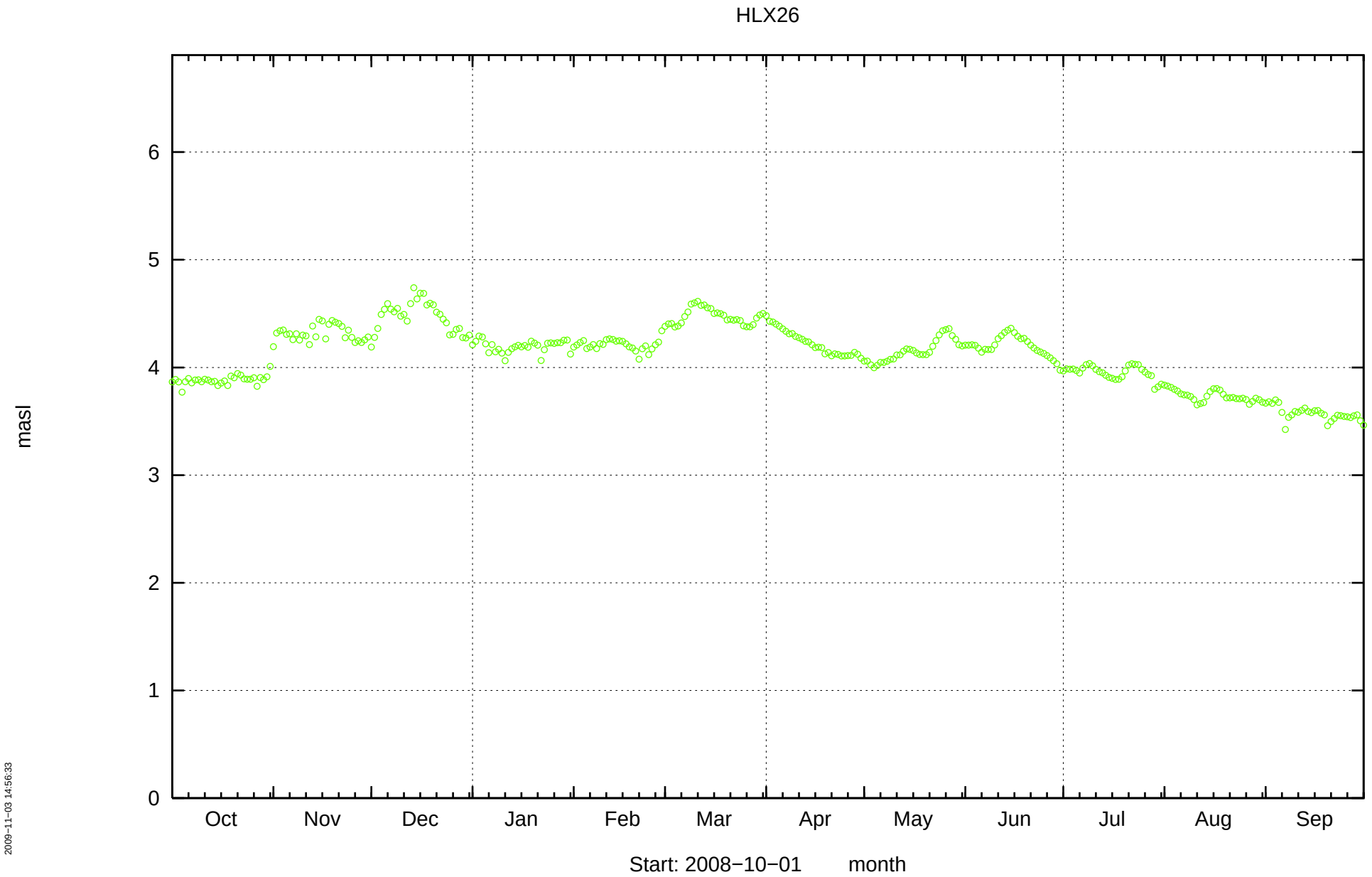

HLX21
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

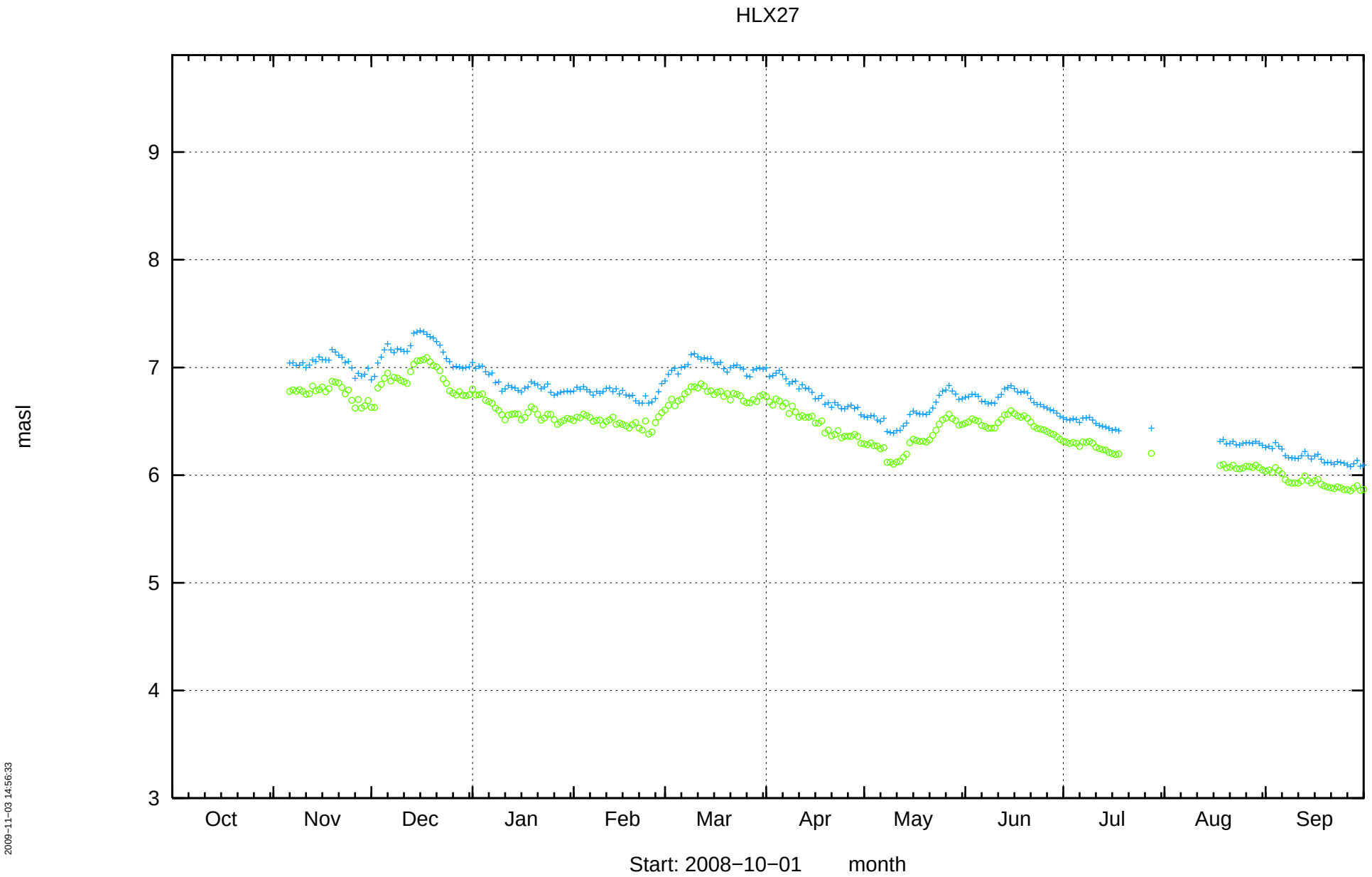

HLX22
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

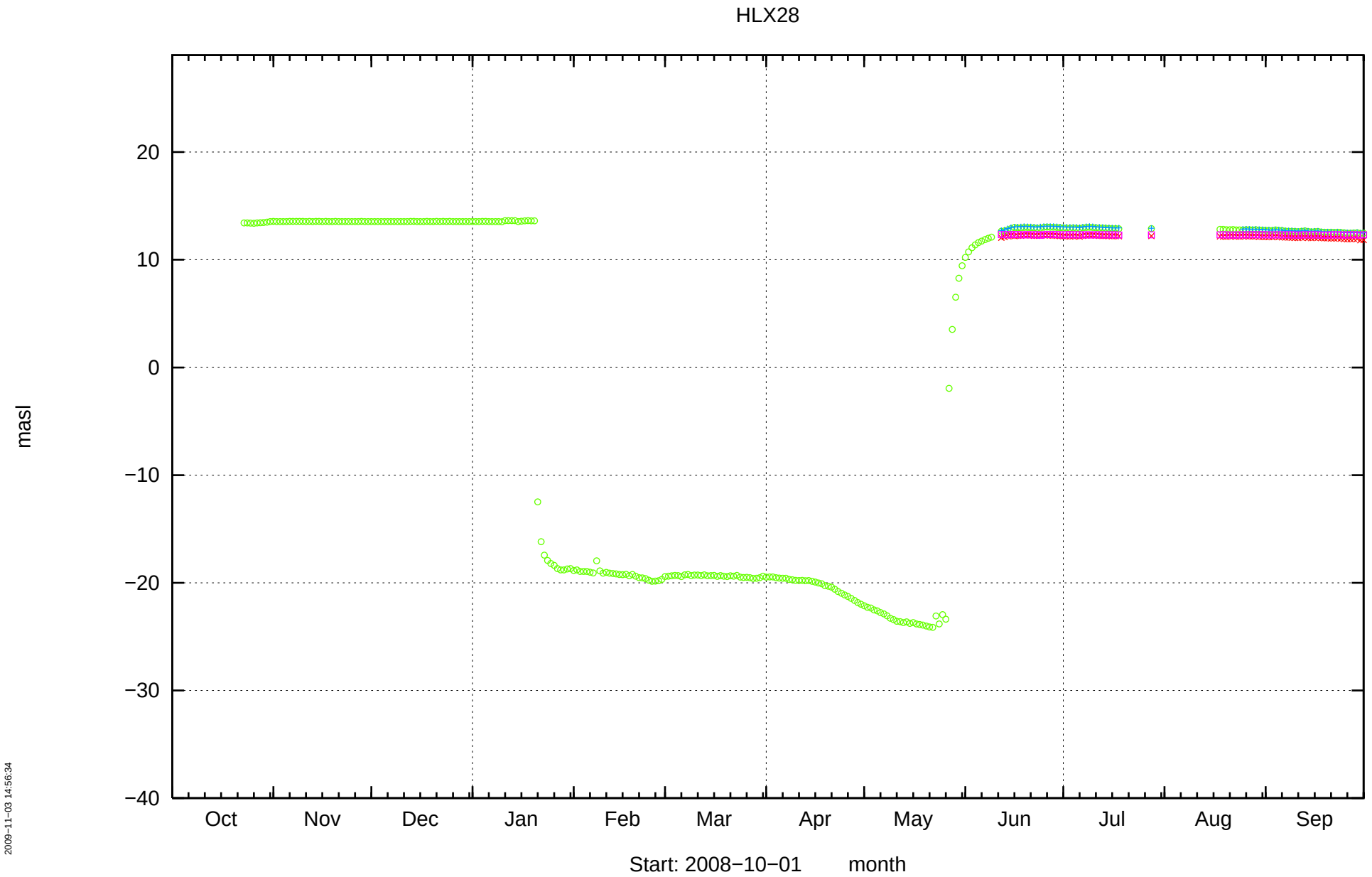

HLX23
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

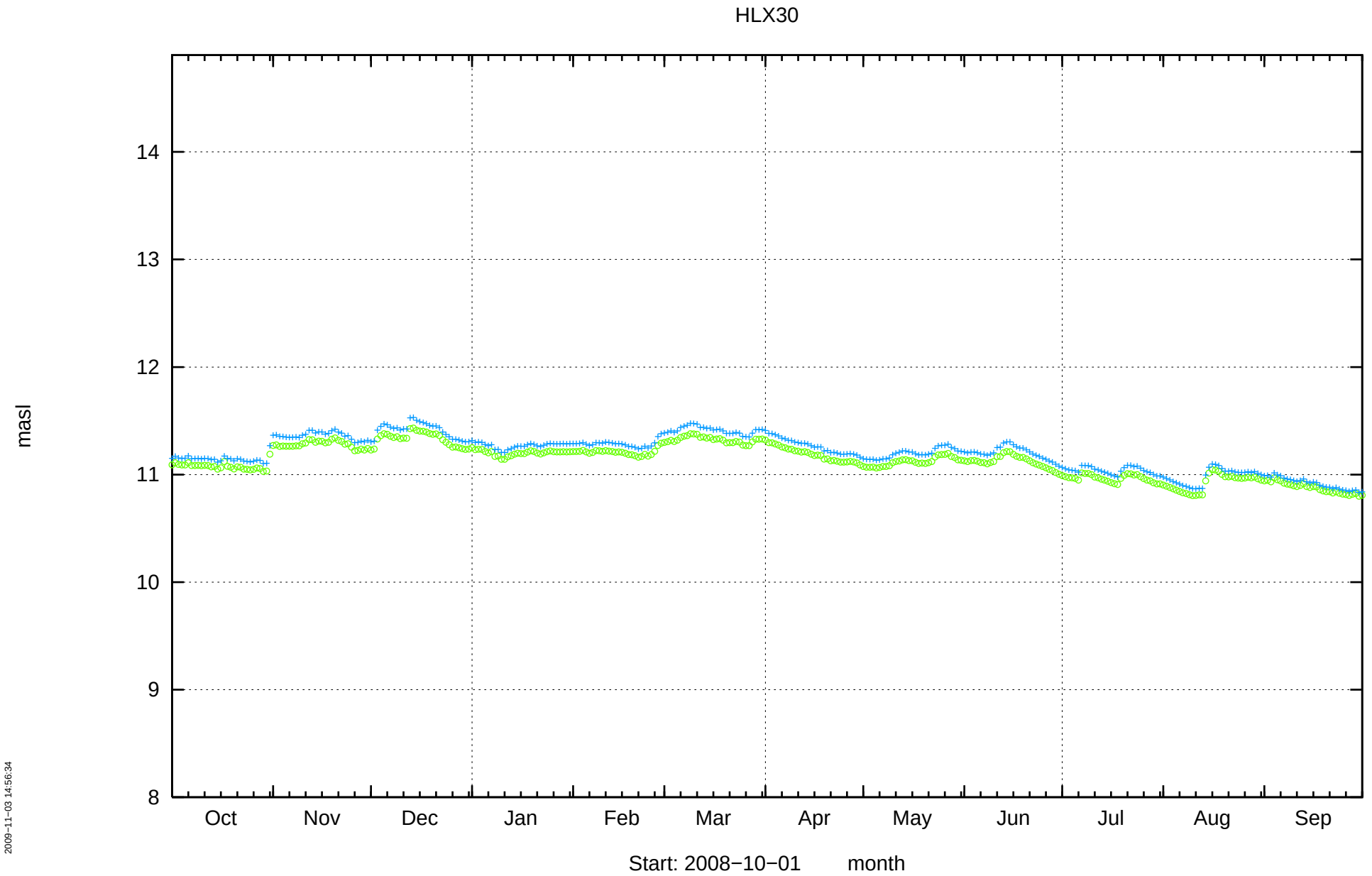

HLX24
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

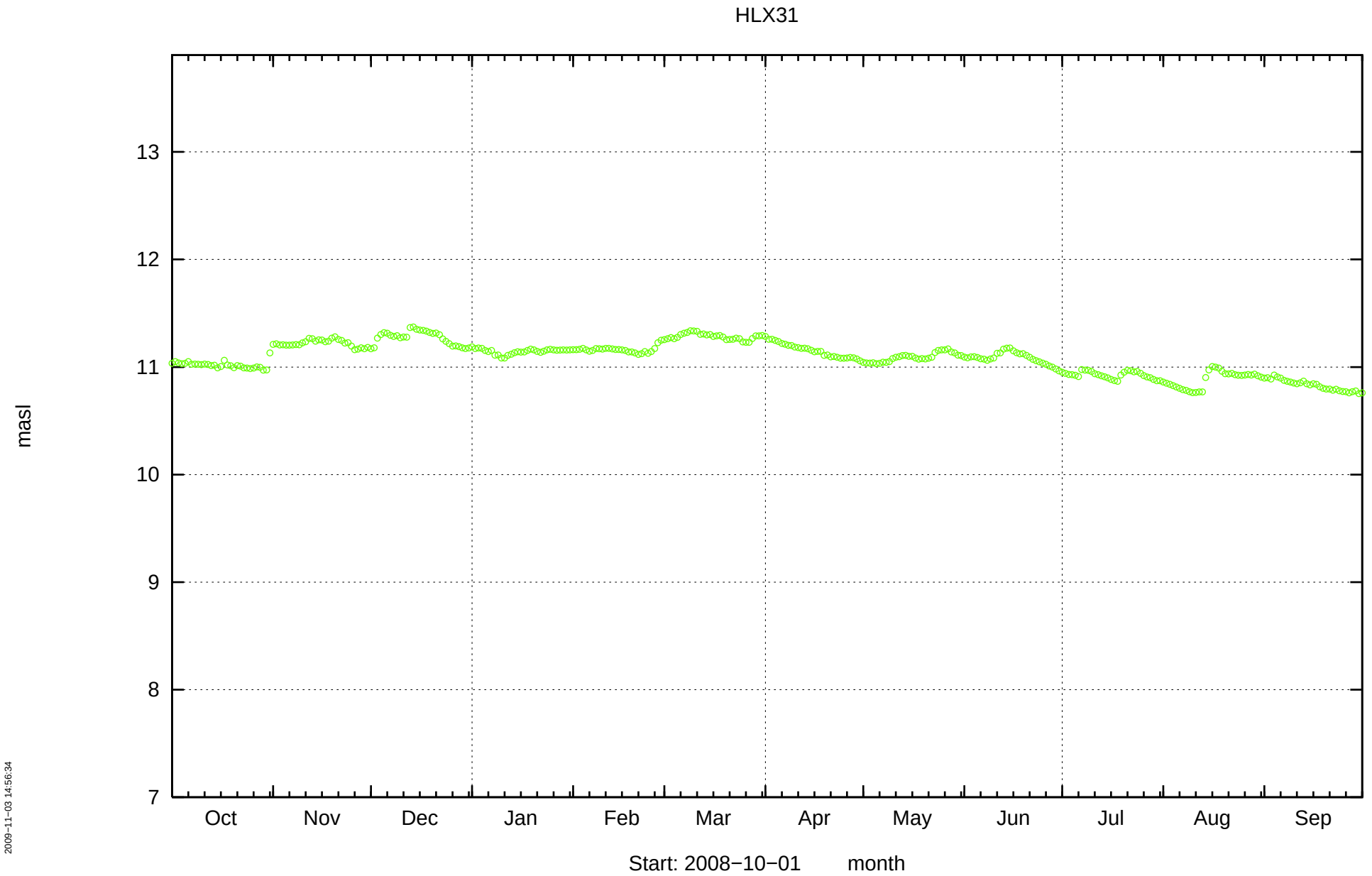

HLX25
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

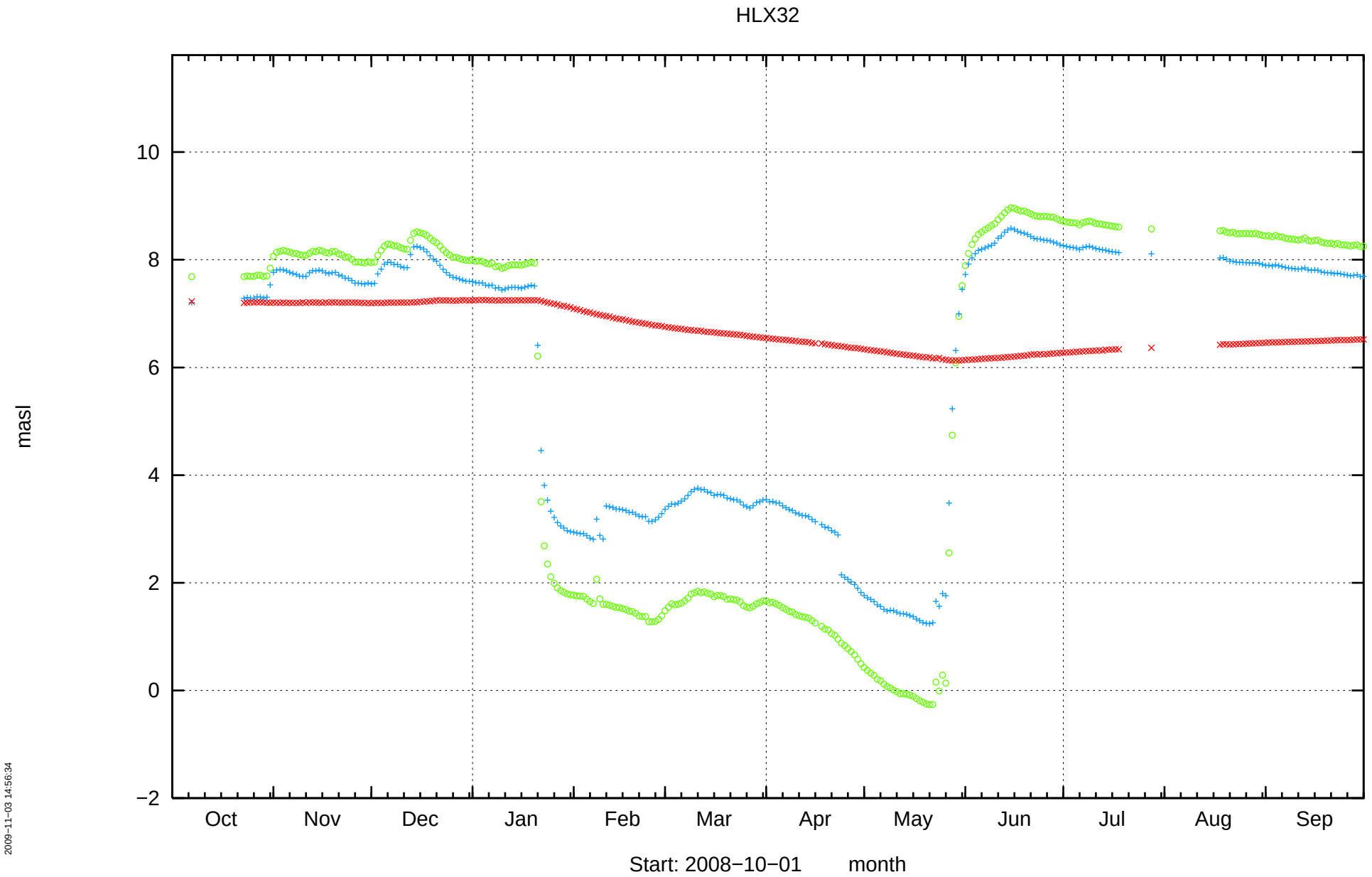

HLX26
masl
6
5
4
3
2
1
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:33

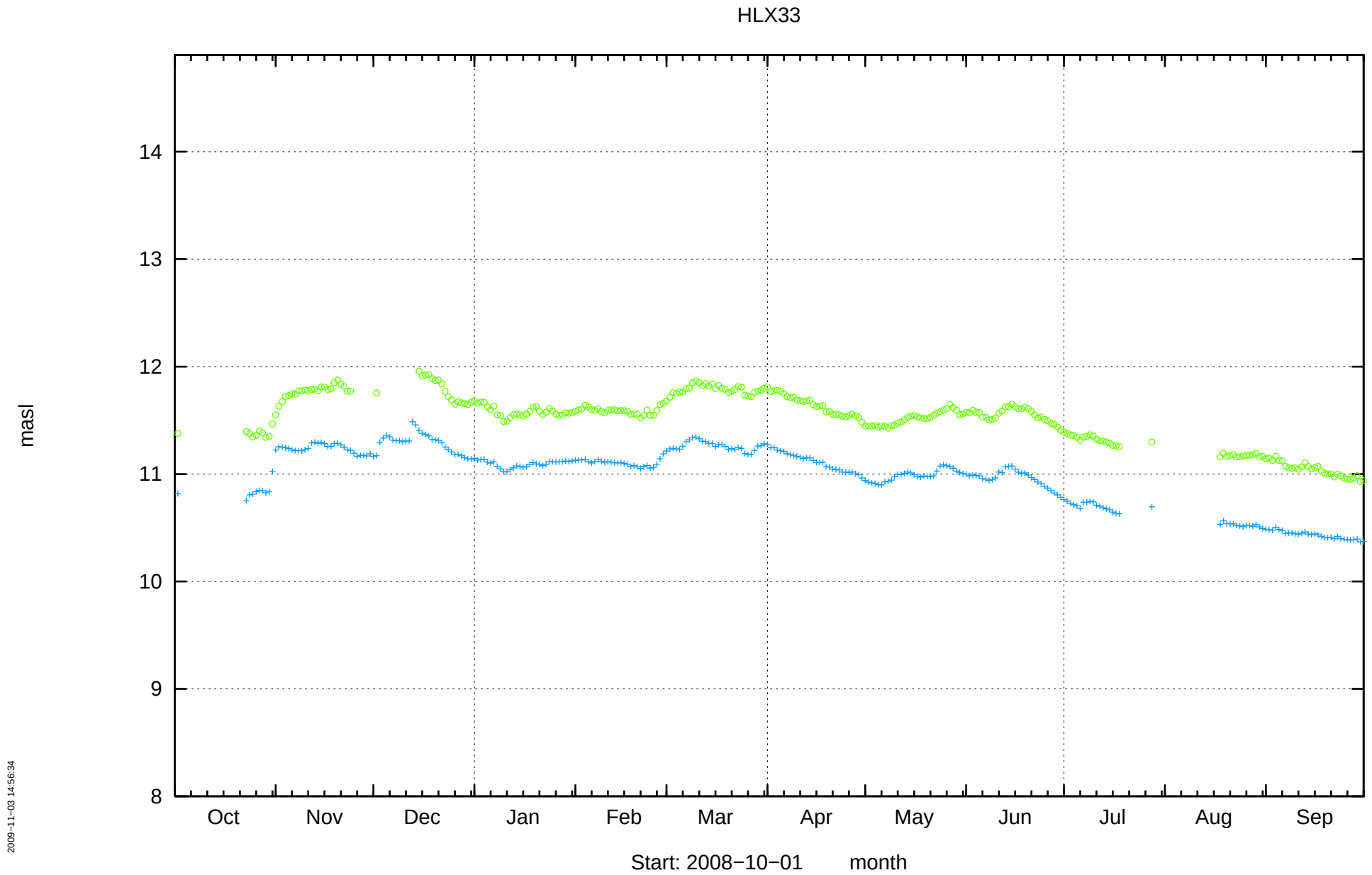

HLX27
masl
9
8
7
6
5
4
3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:33

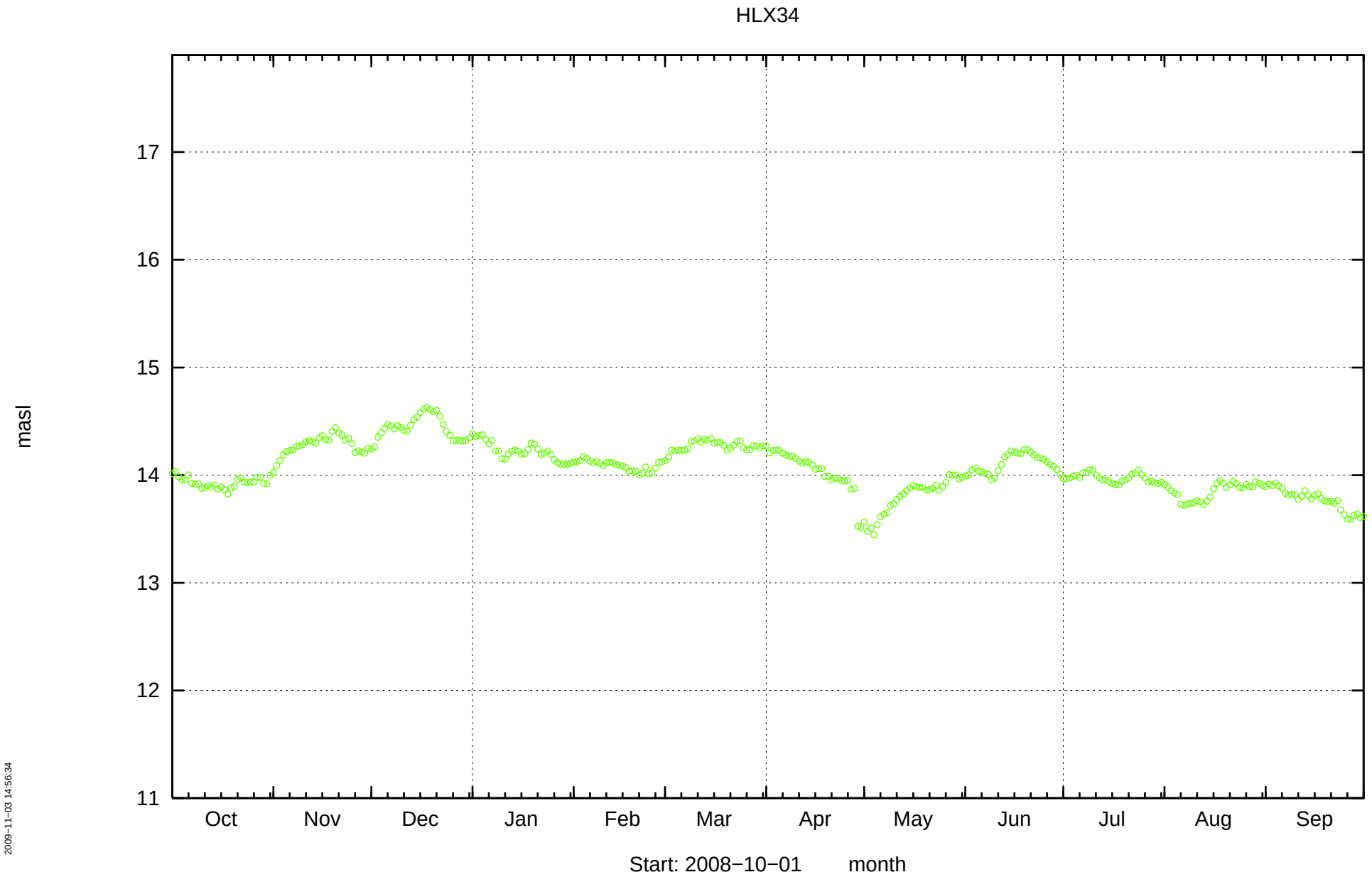

HLX28
masl
20
10
0
−10
−20
−30
−40
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

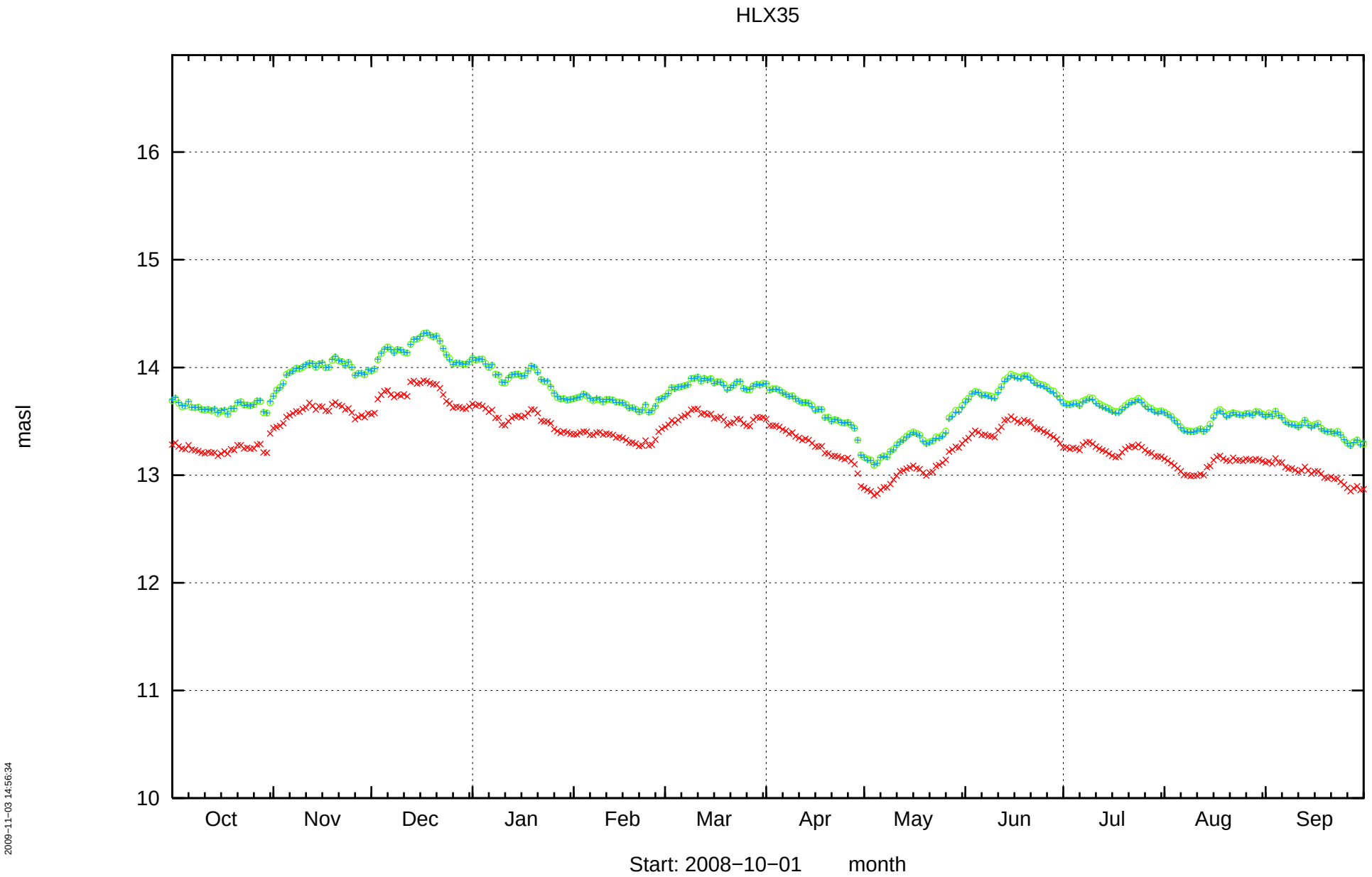

HLX30
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

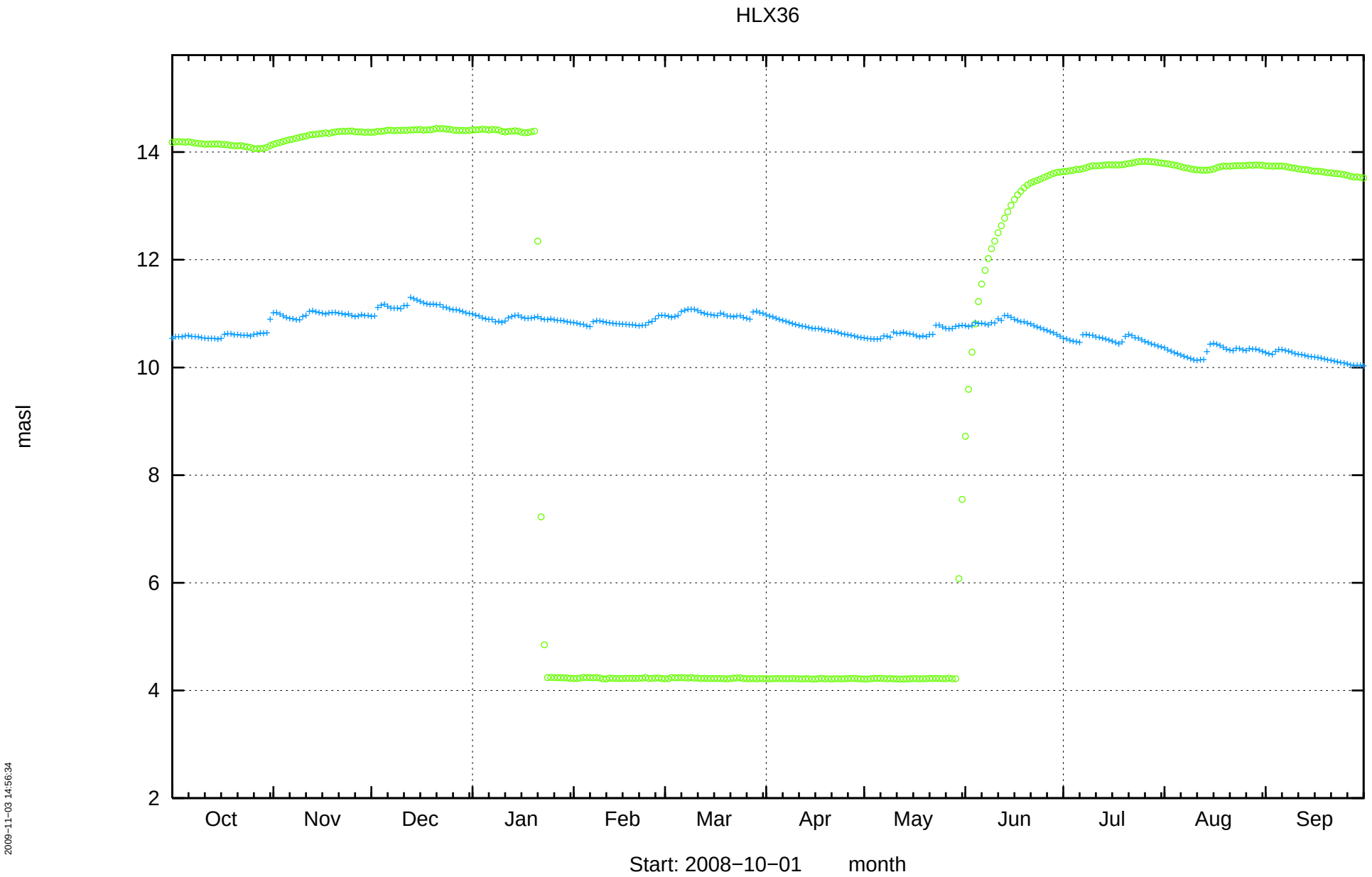

HLX31
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

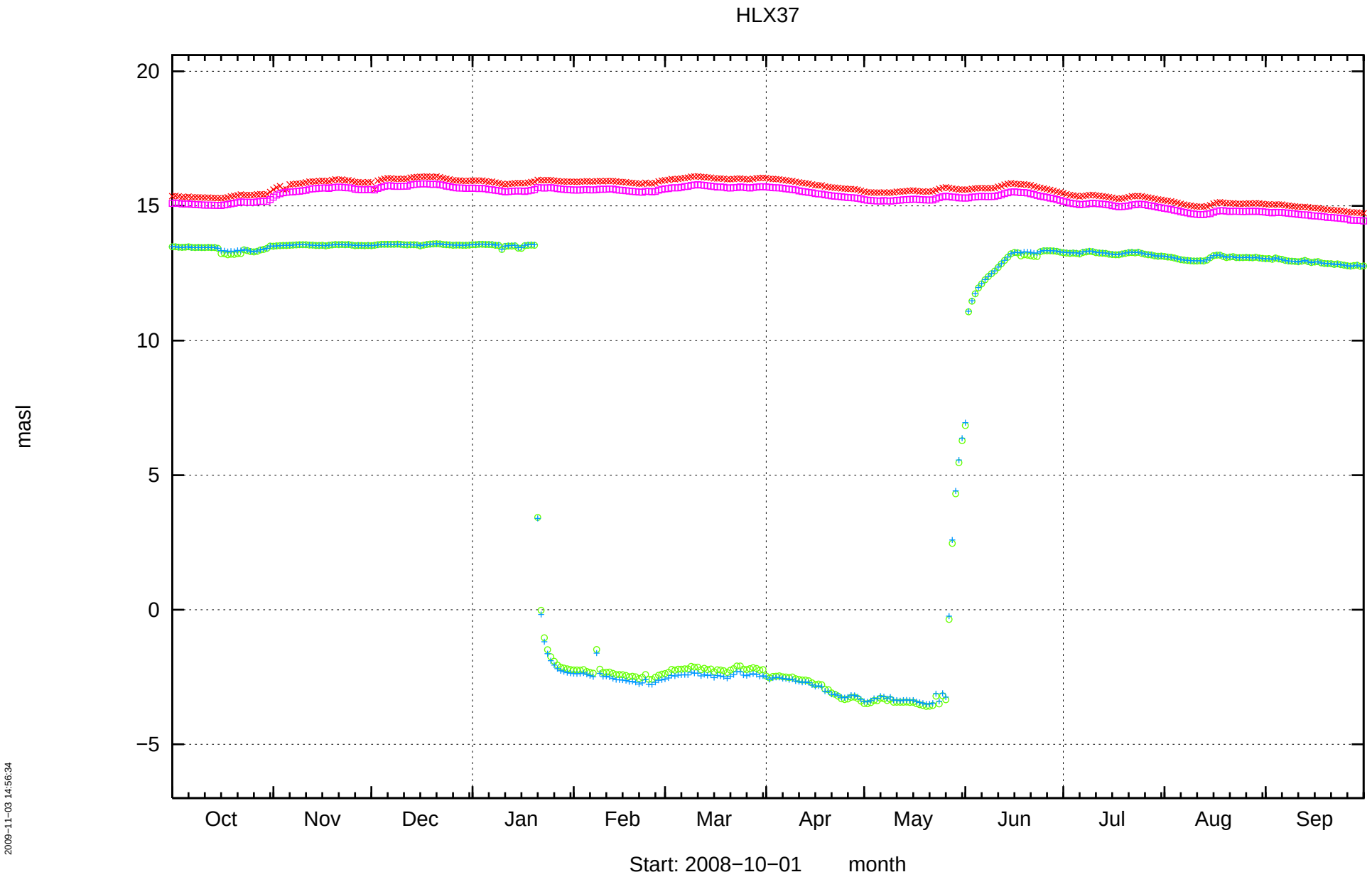

HLX32
masl
10
8
6
4
2
0
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

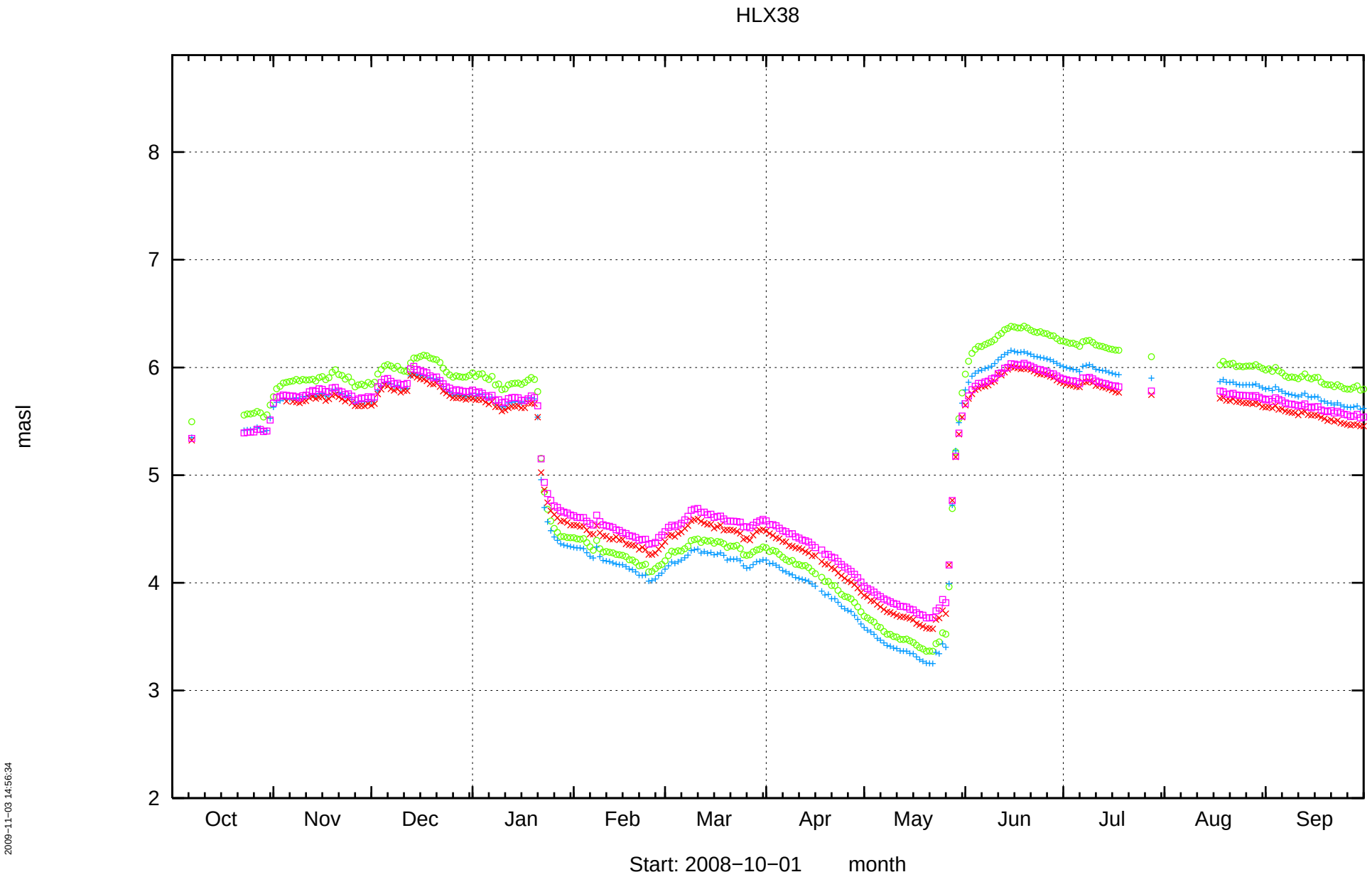

HLX33
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

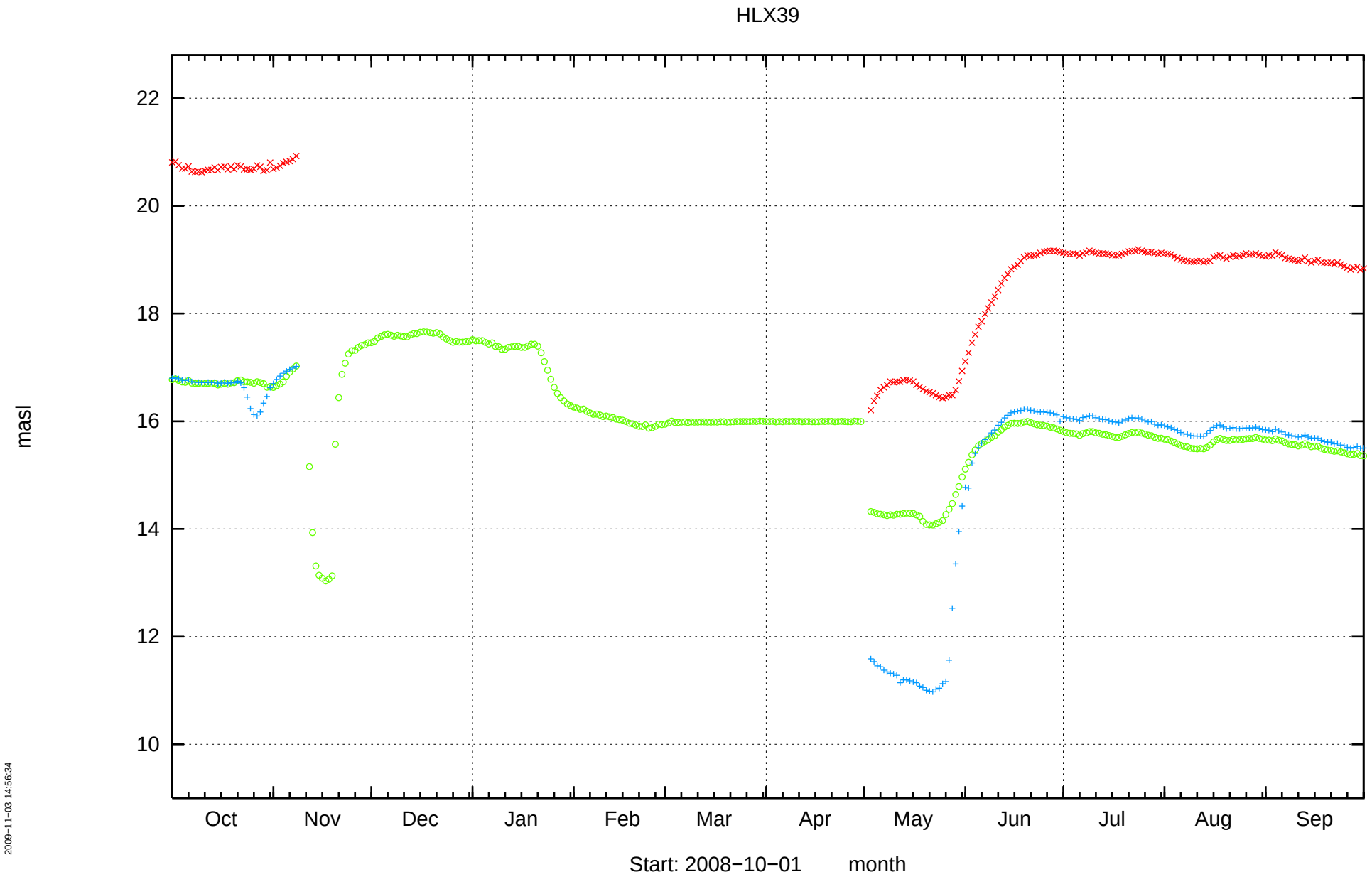

HLX34
masl
17
16
15
14
13
12
11
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

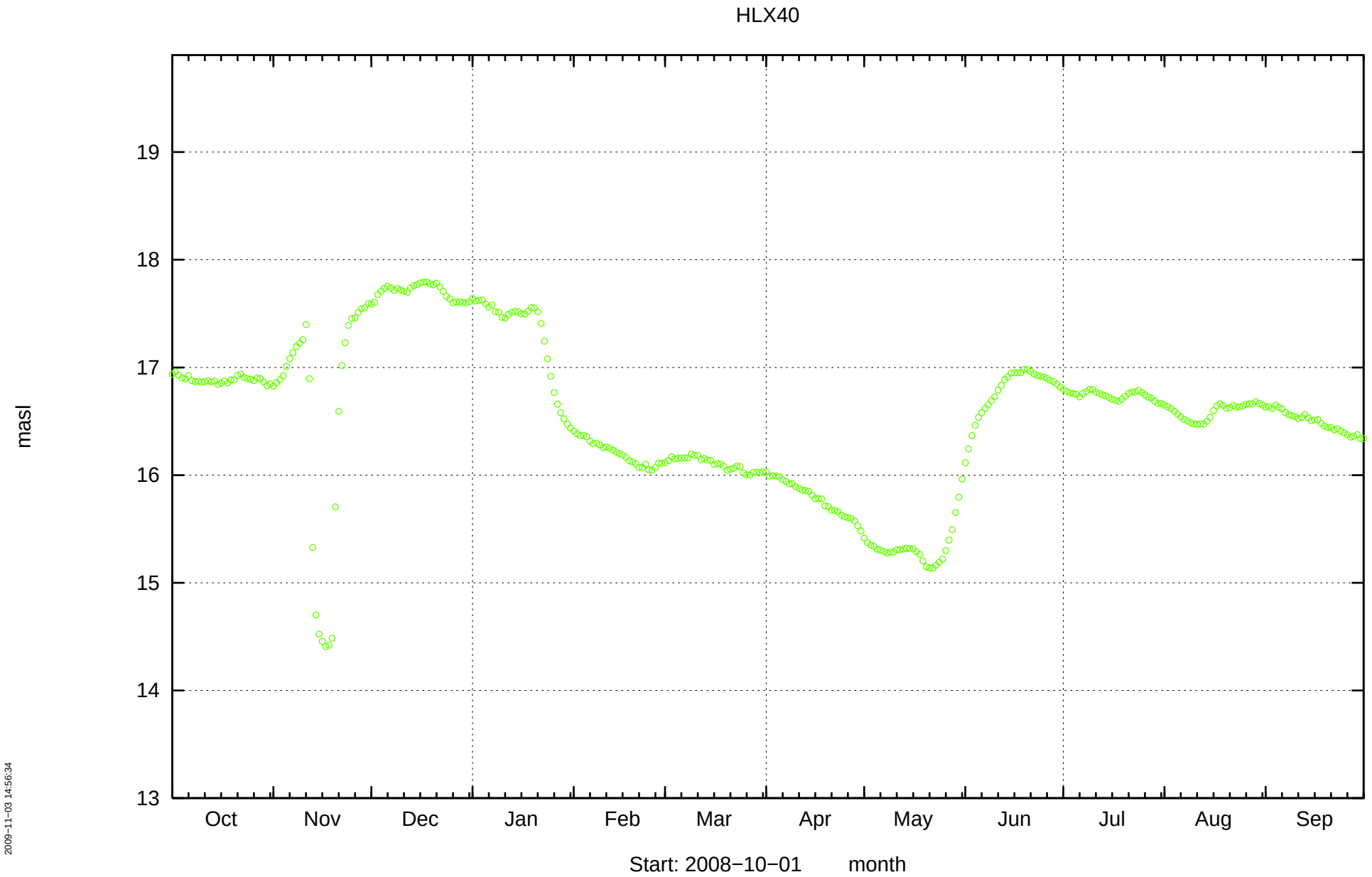

HLX35
masl
16
15
14
13
12
11
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

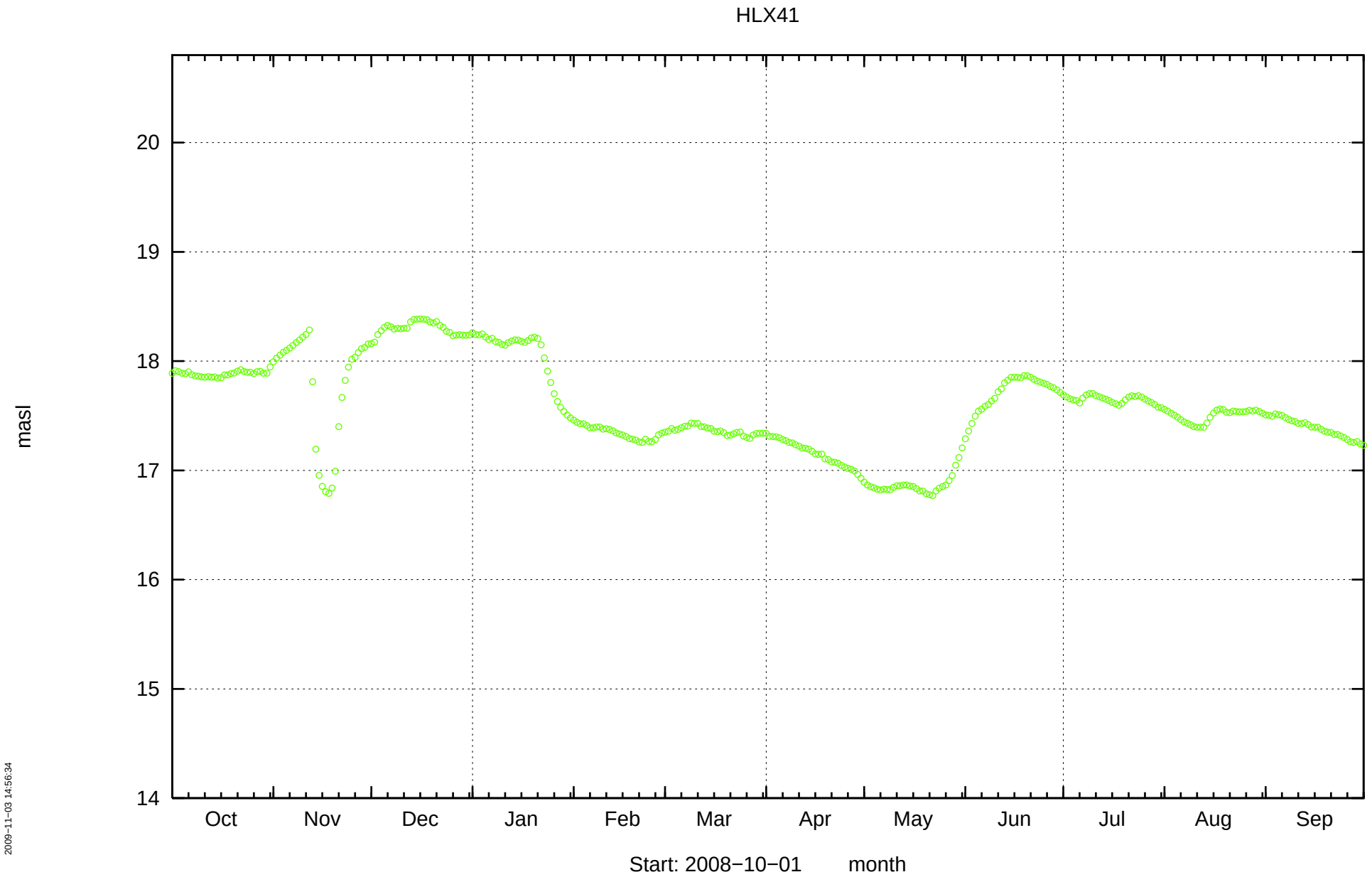

HLX36
masl
14
12
10
8
6
4
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

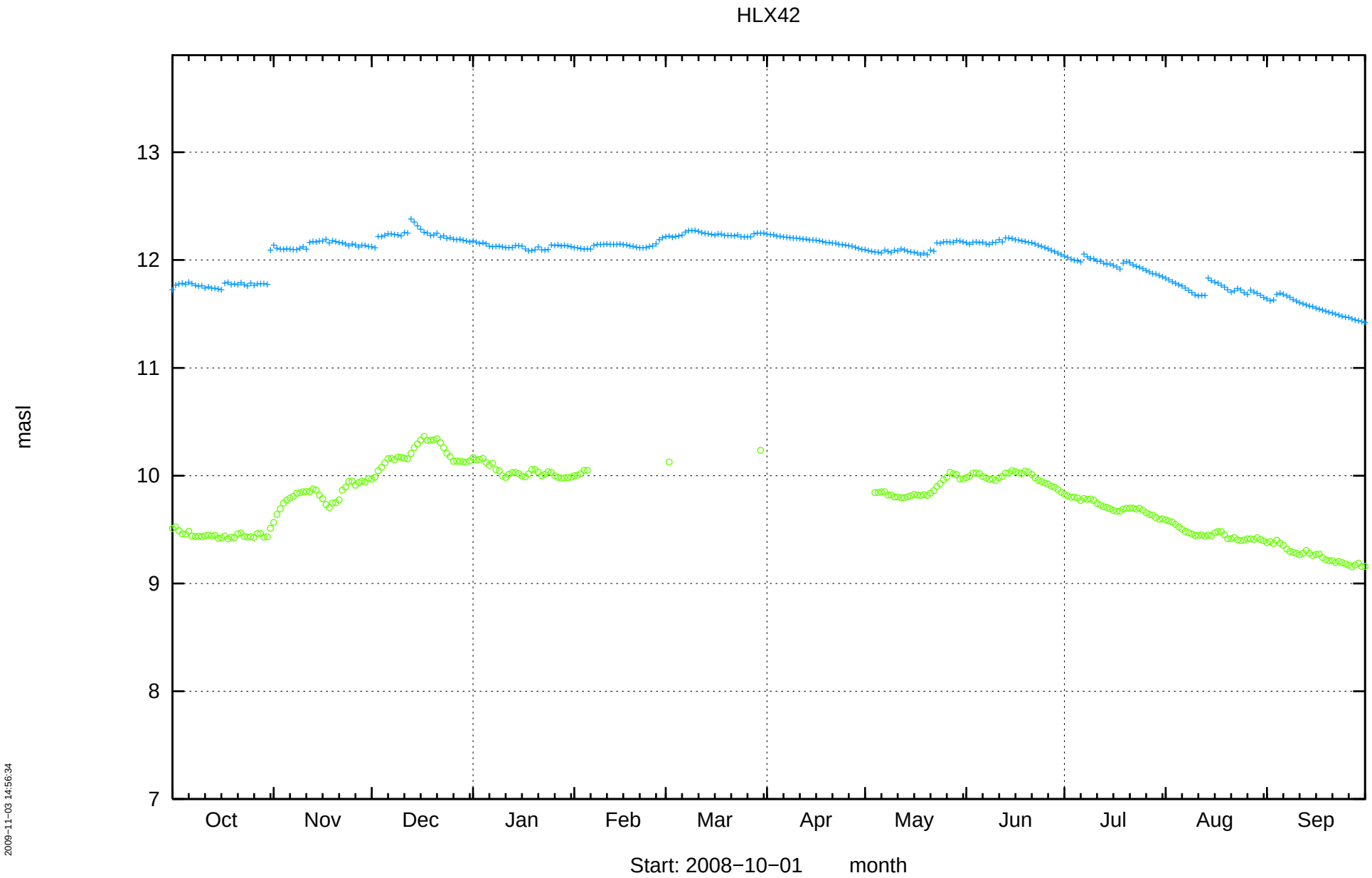

HLX37
masl
20
15
10
5
0
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

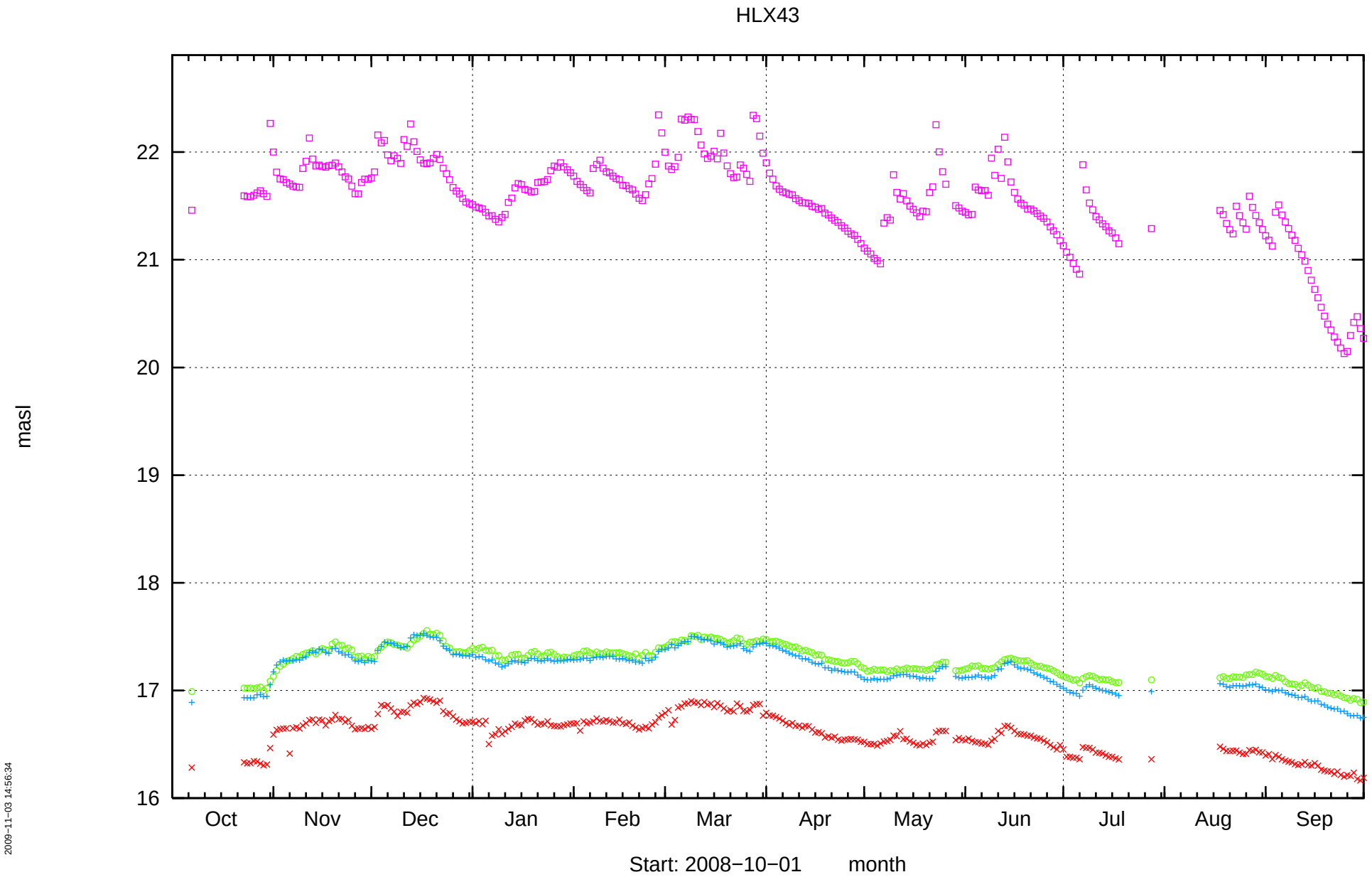

HLX38
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

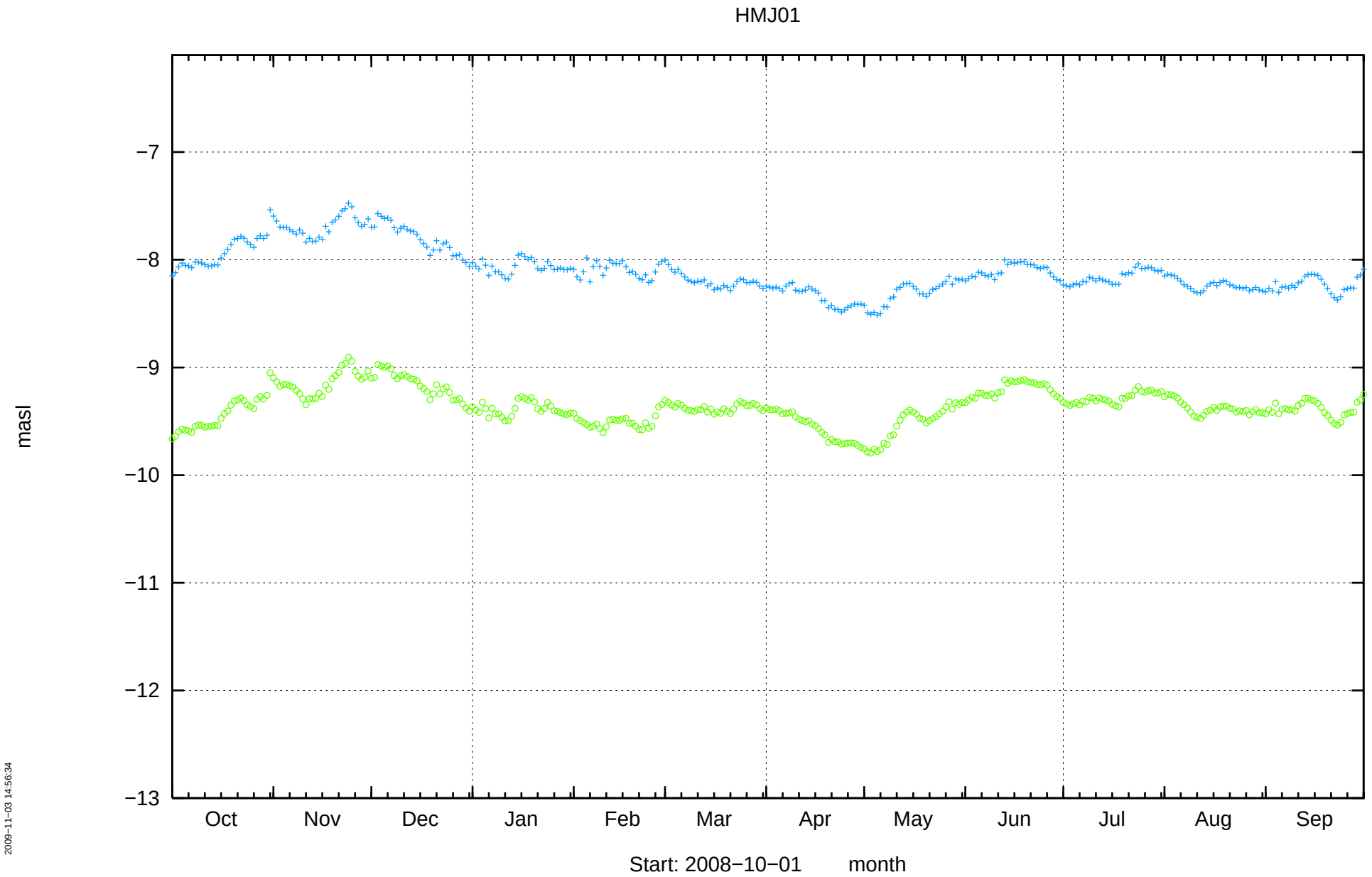

HLX39
masl
22
20
18
16
14
12
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

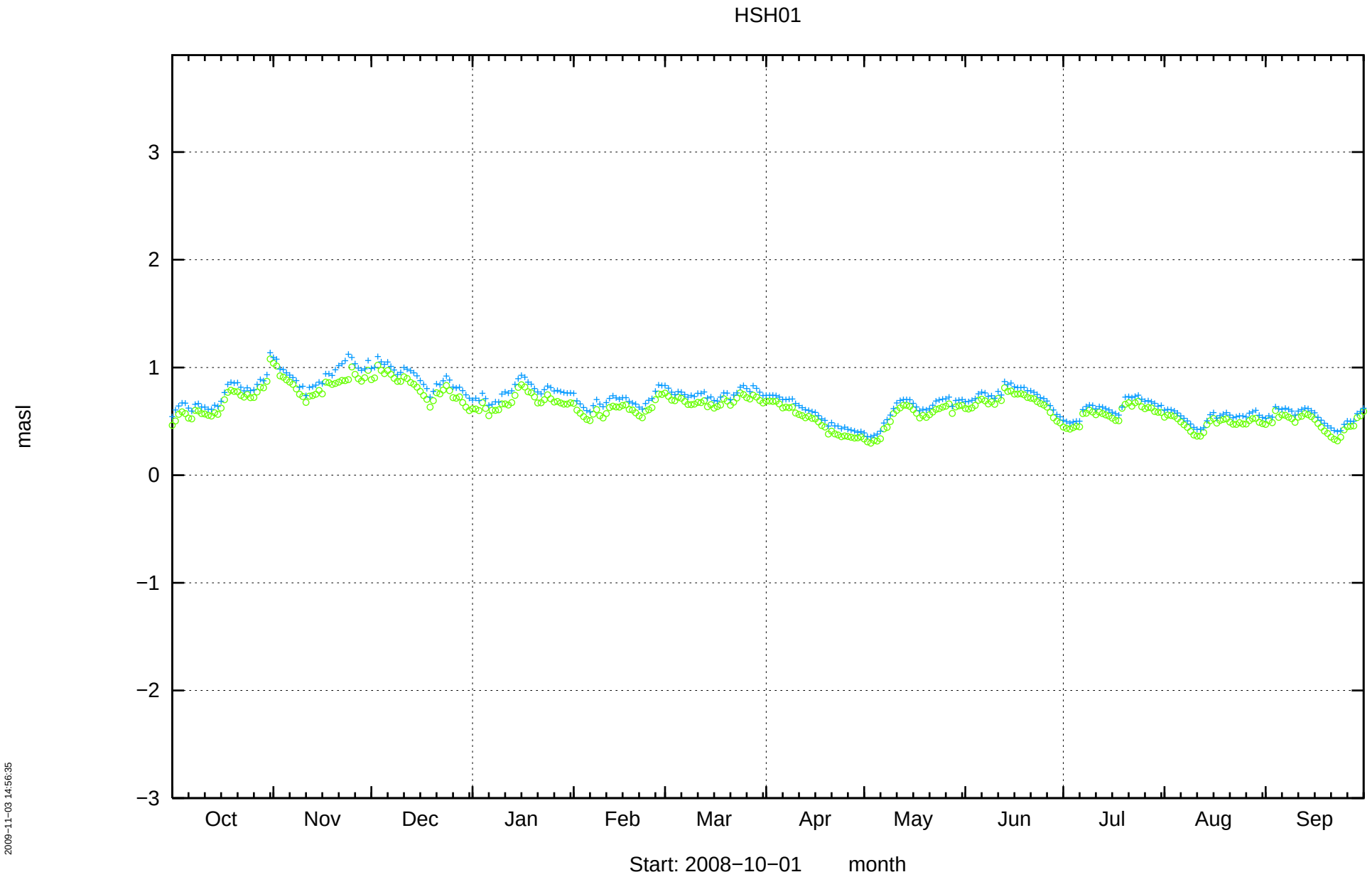

HLX40
masl
19
18
17
16
15
14
13
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

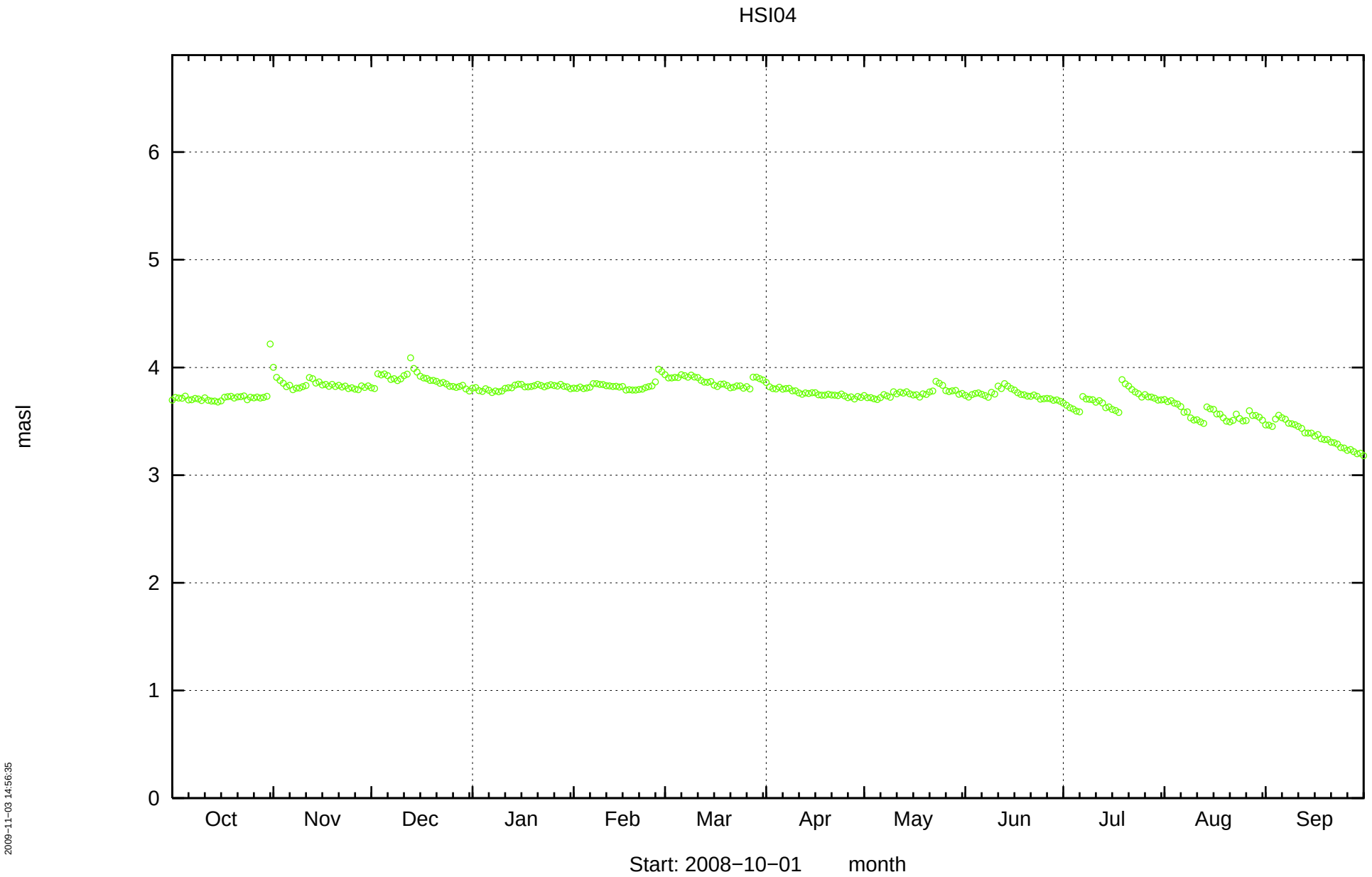

HLX41
masl
20
19
18
17
16
15
14
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

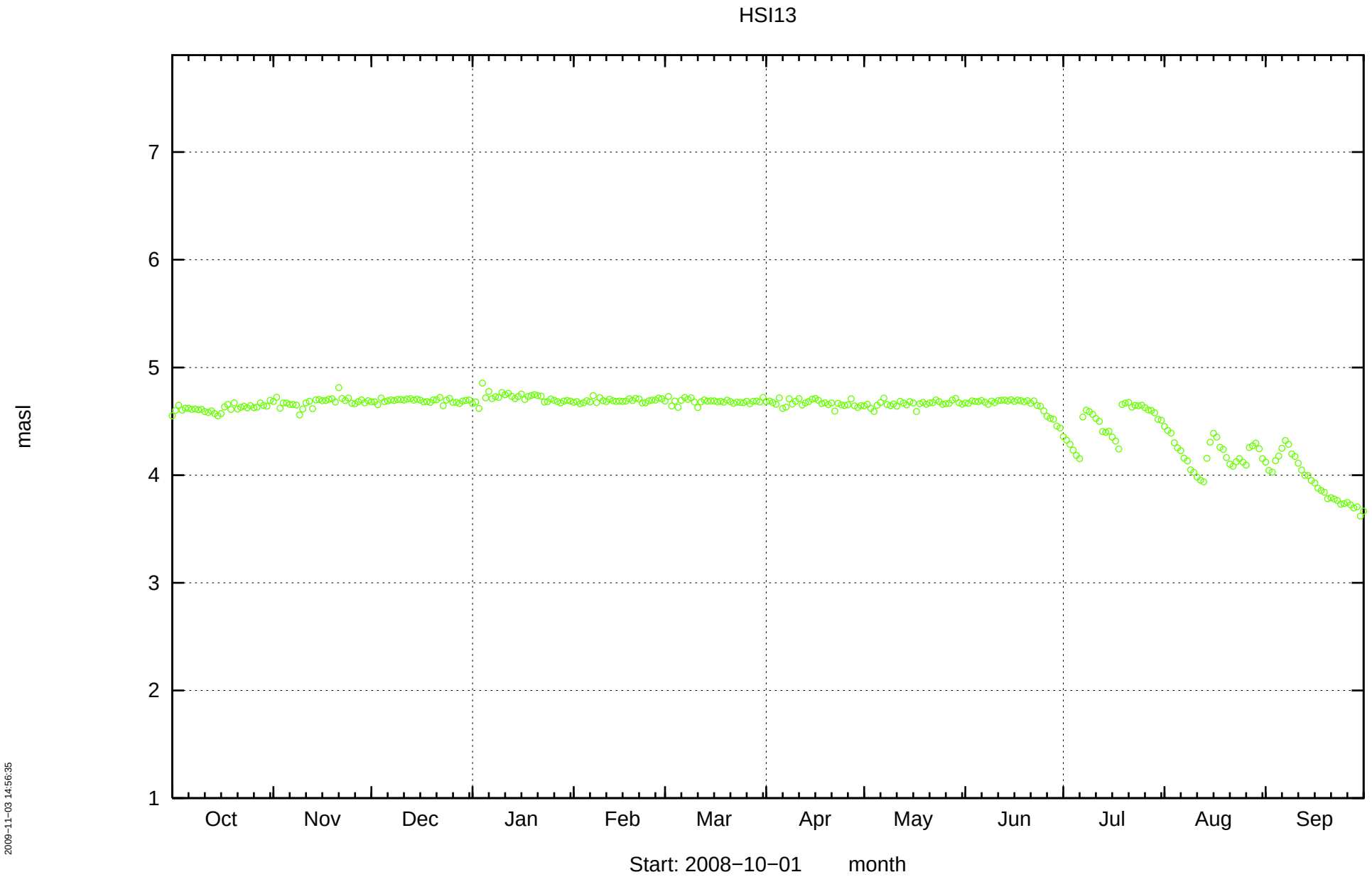

HLX42
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:34

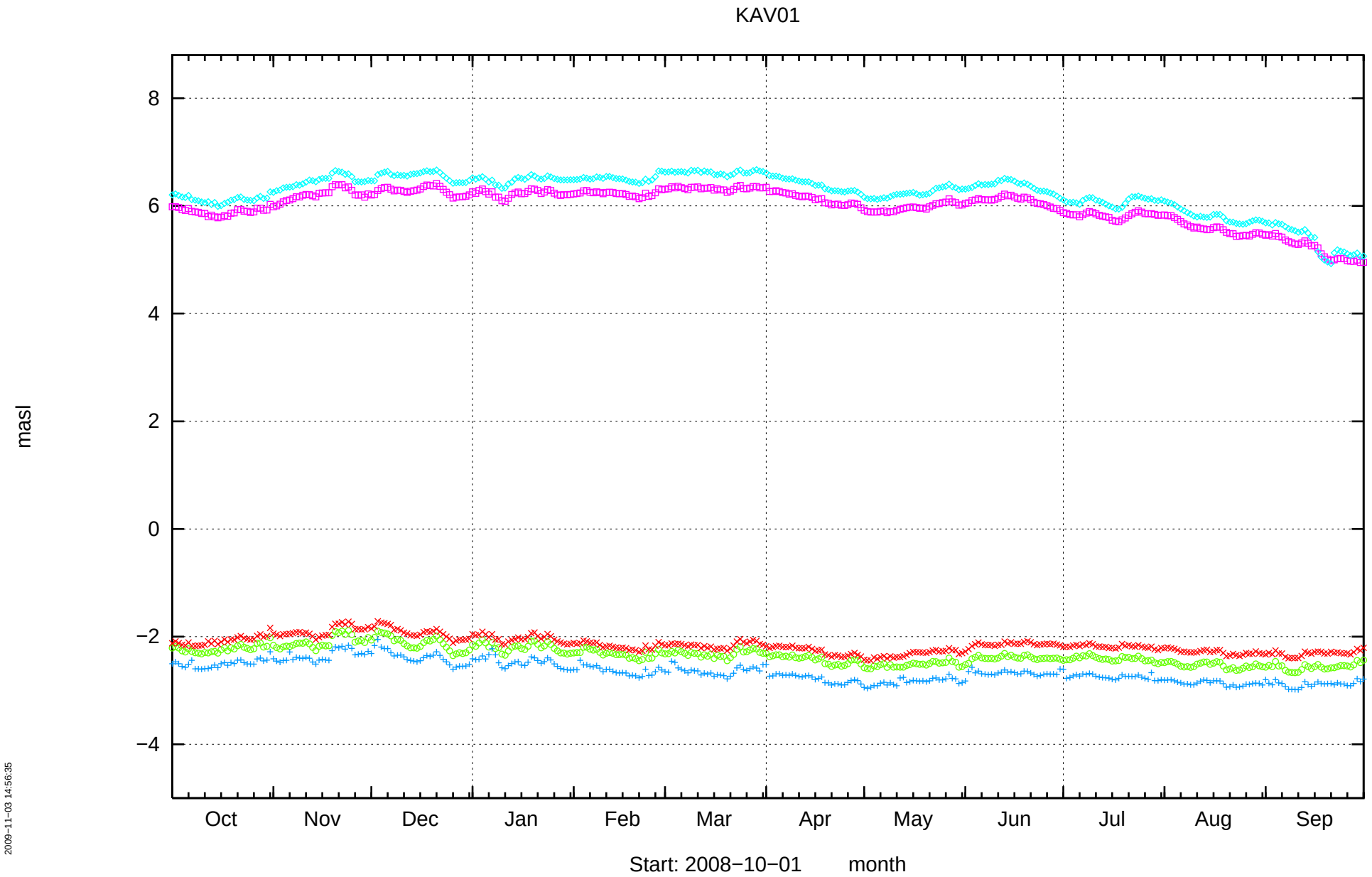

HLX43
masl
22
21
20
19
18
17
16
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

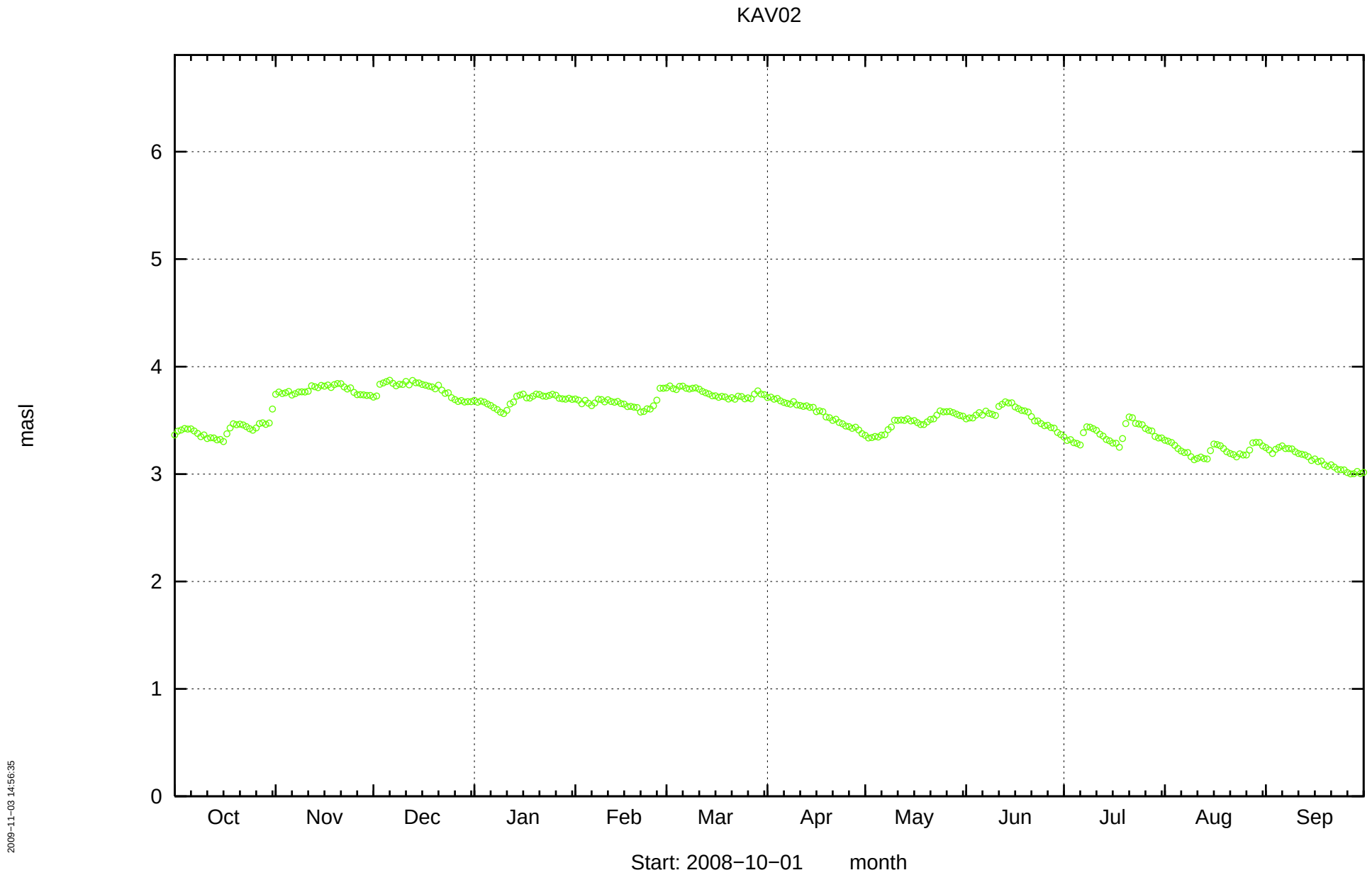

HMJ01
masl
−7
−8
−9
−10
−11
−12
−13
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:34

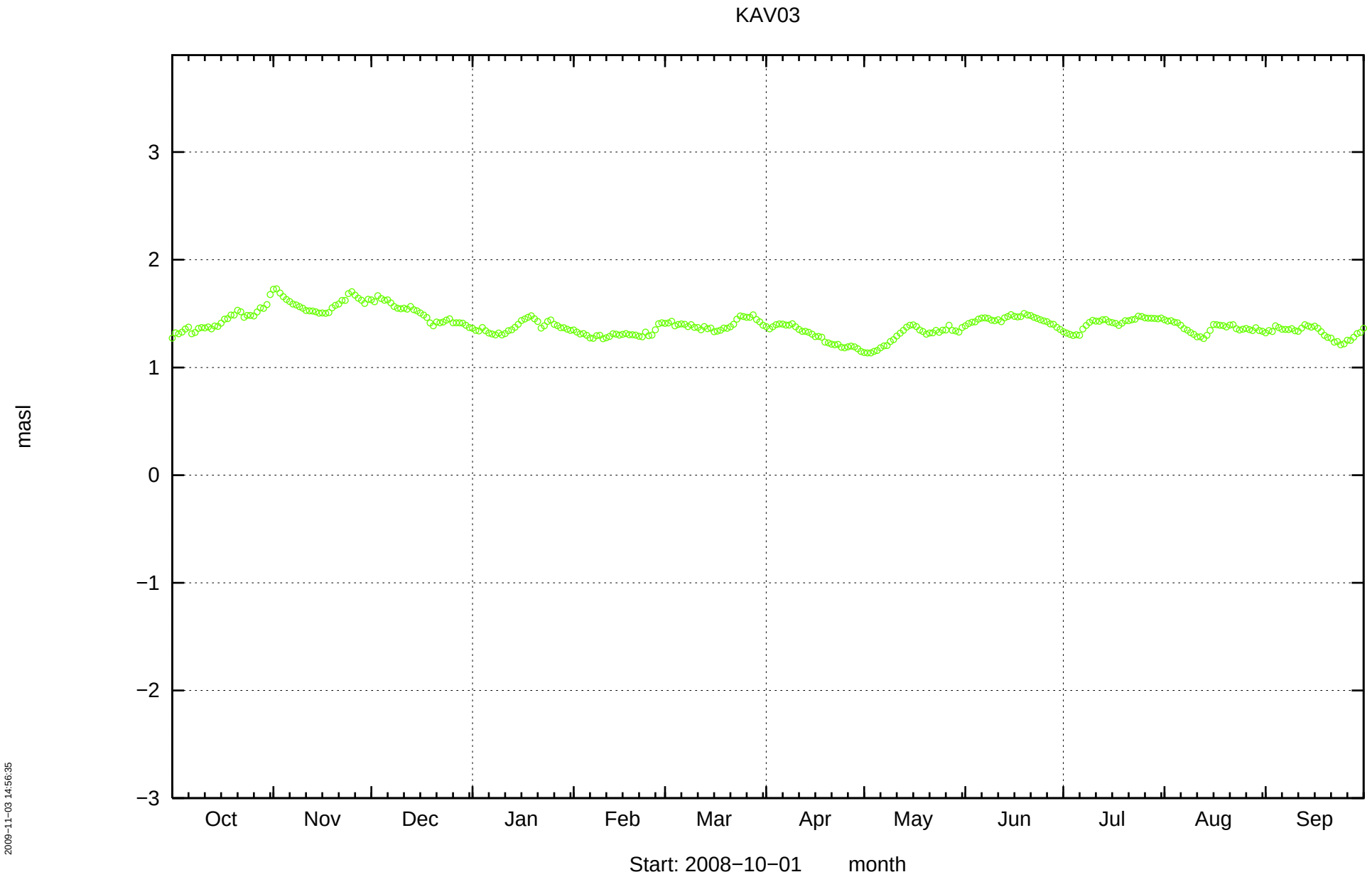

HSH01
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

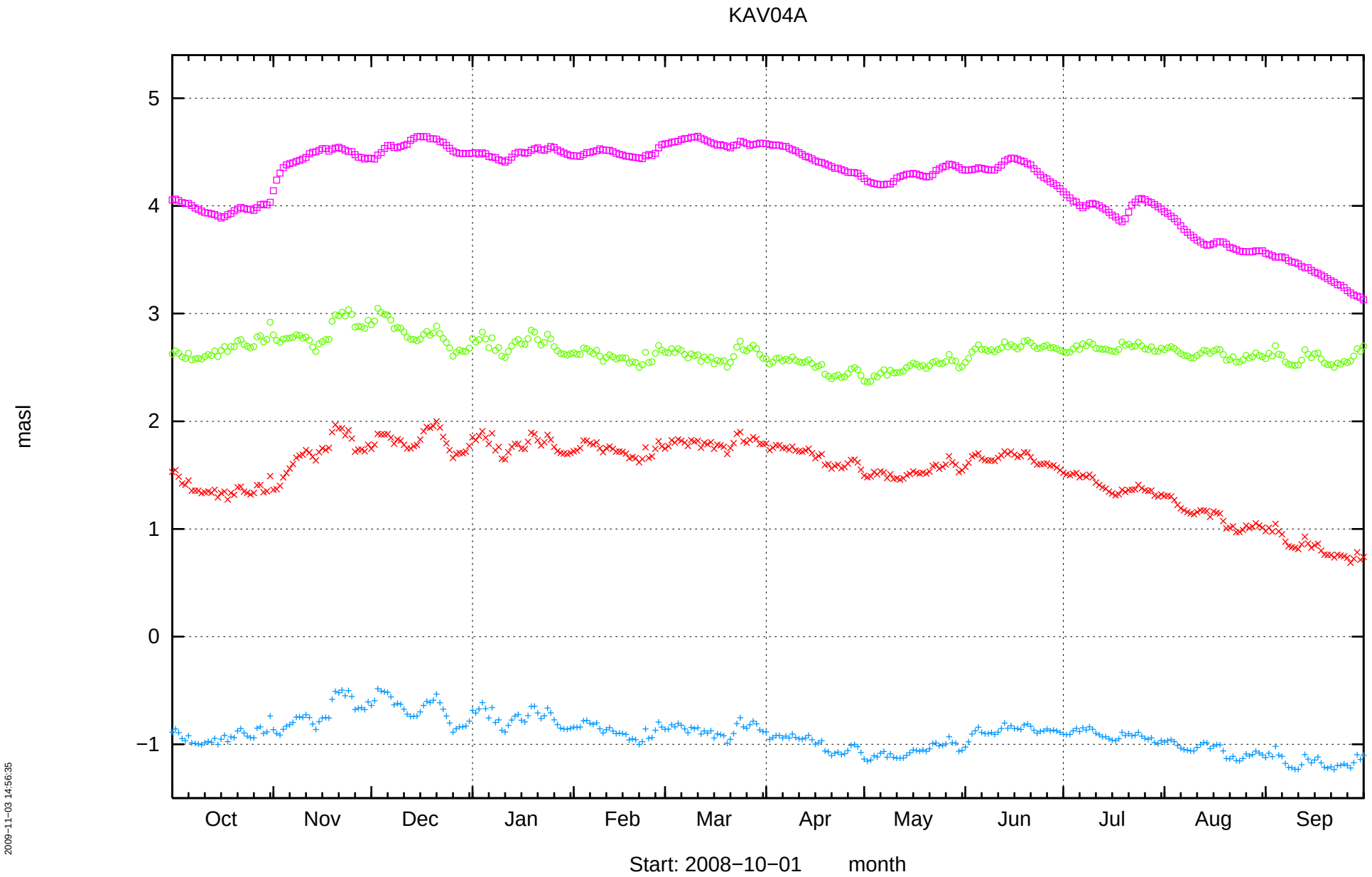

HSI04
masl
6
5
4
3
2
1
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

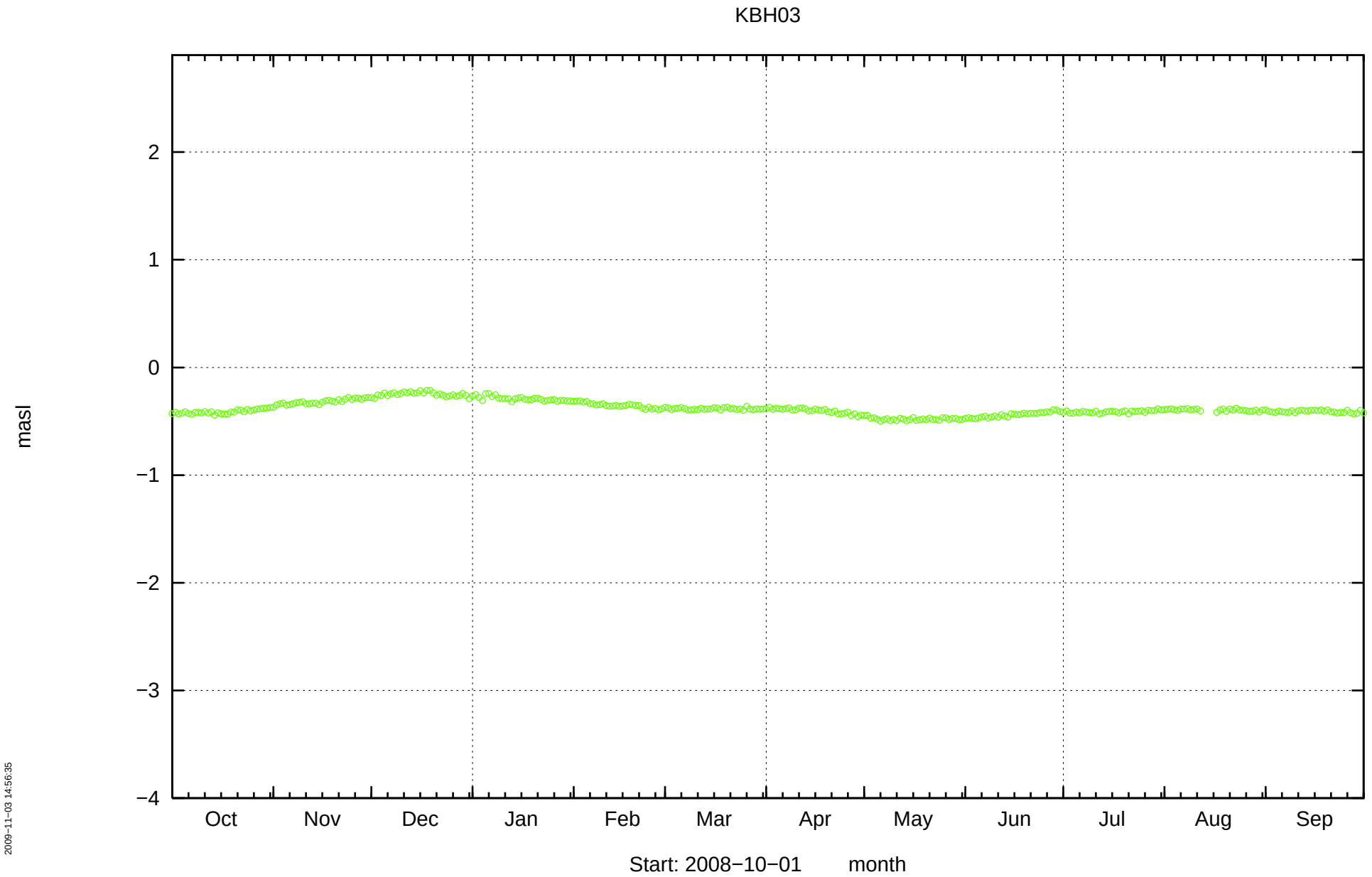

HSI13
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

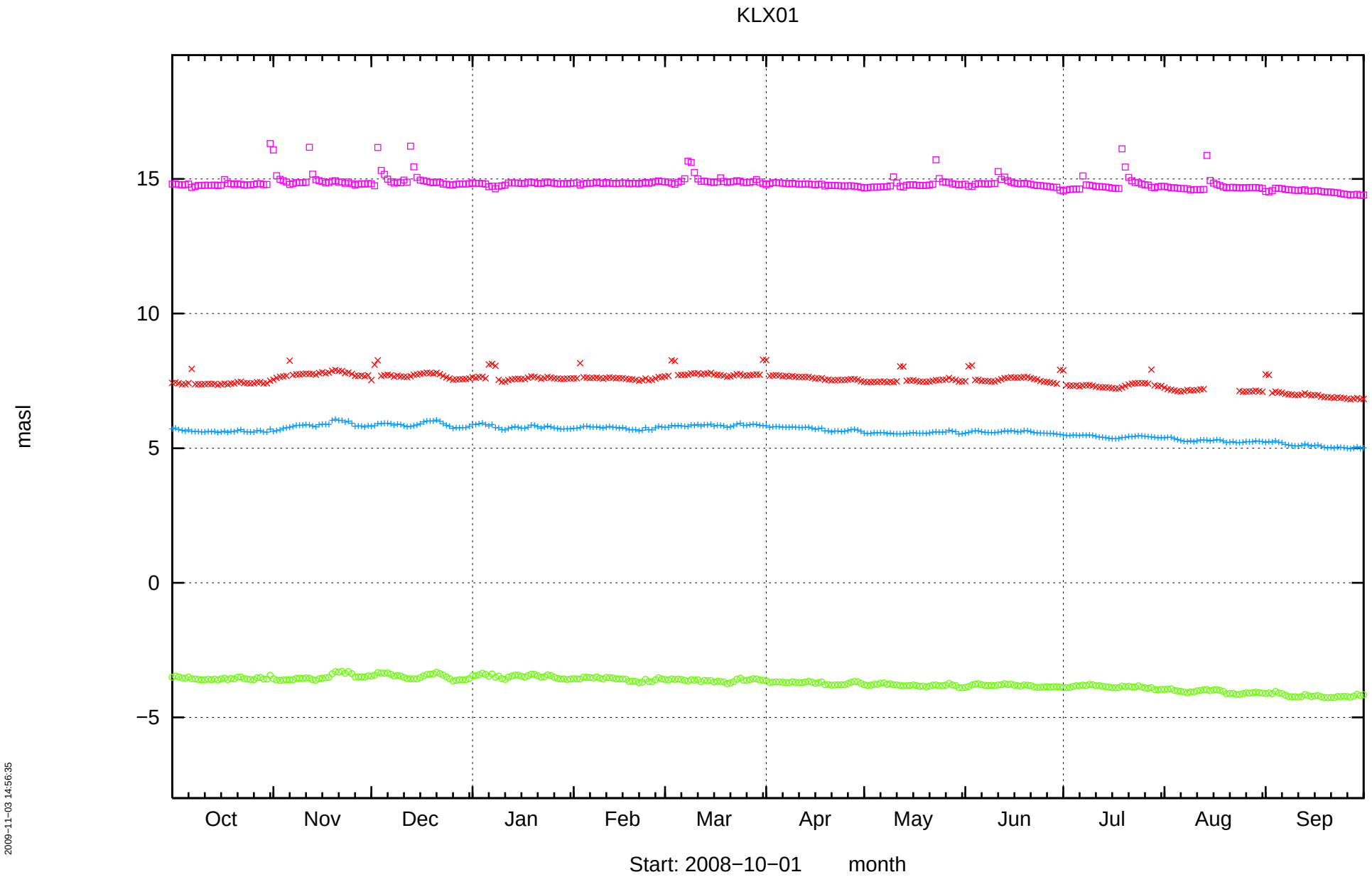

KAV01
masl
8
6
4
2
0
−2
−4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

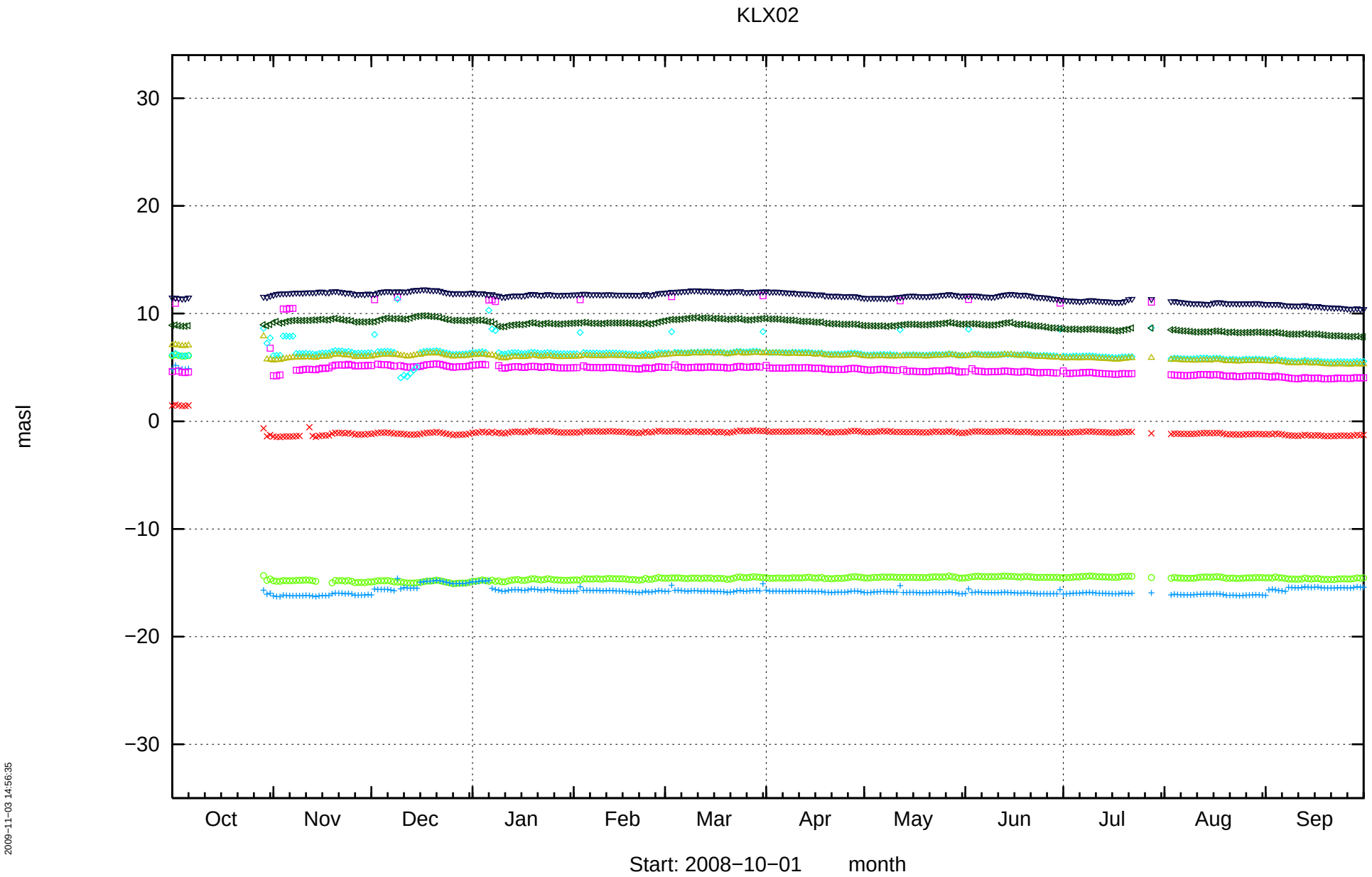

KAV02
masl
6
5
4
3
2
1
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

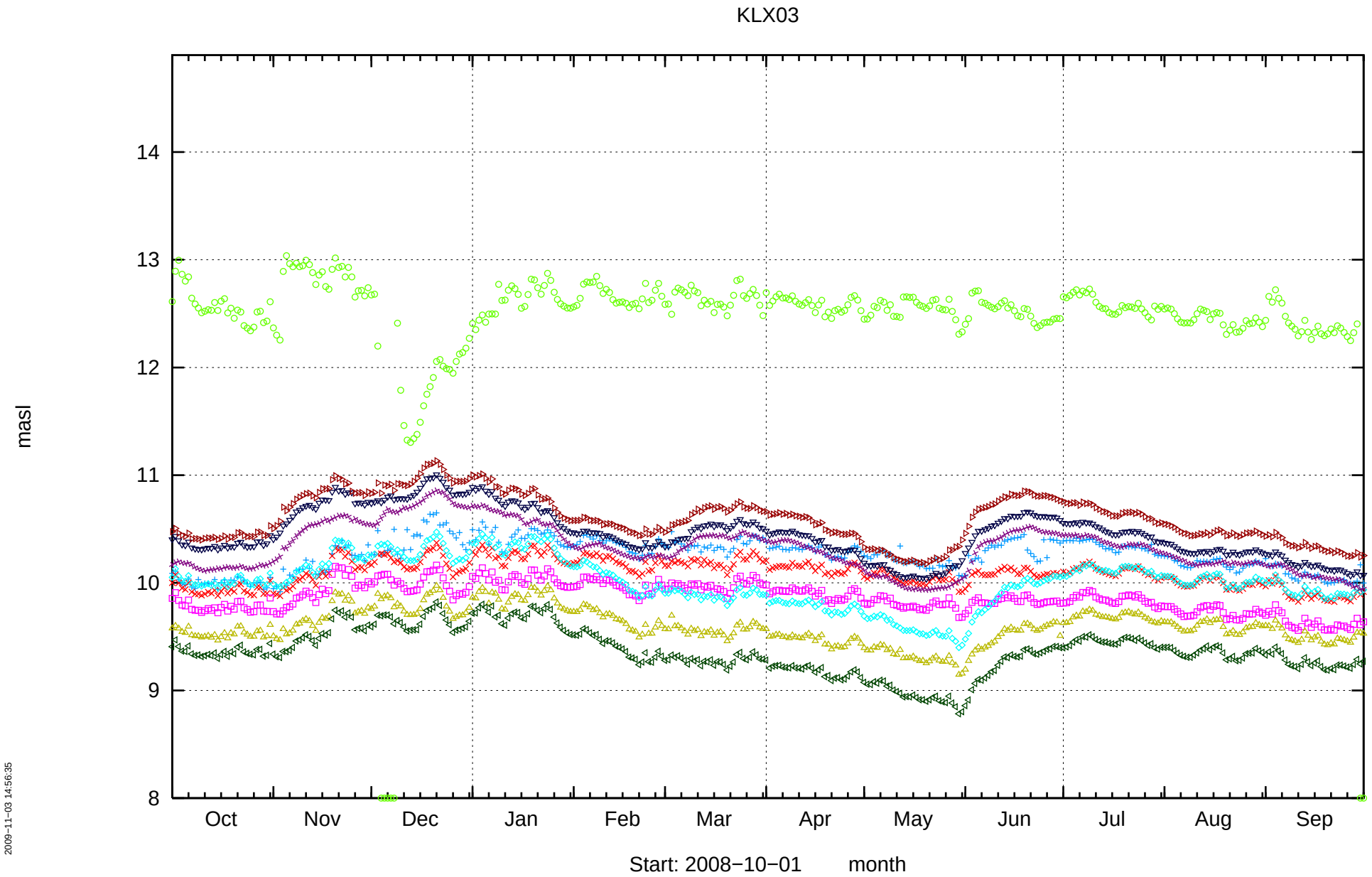

KAV03
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

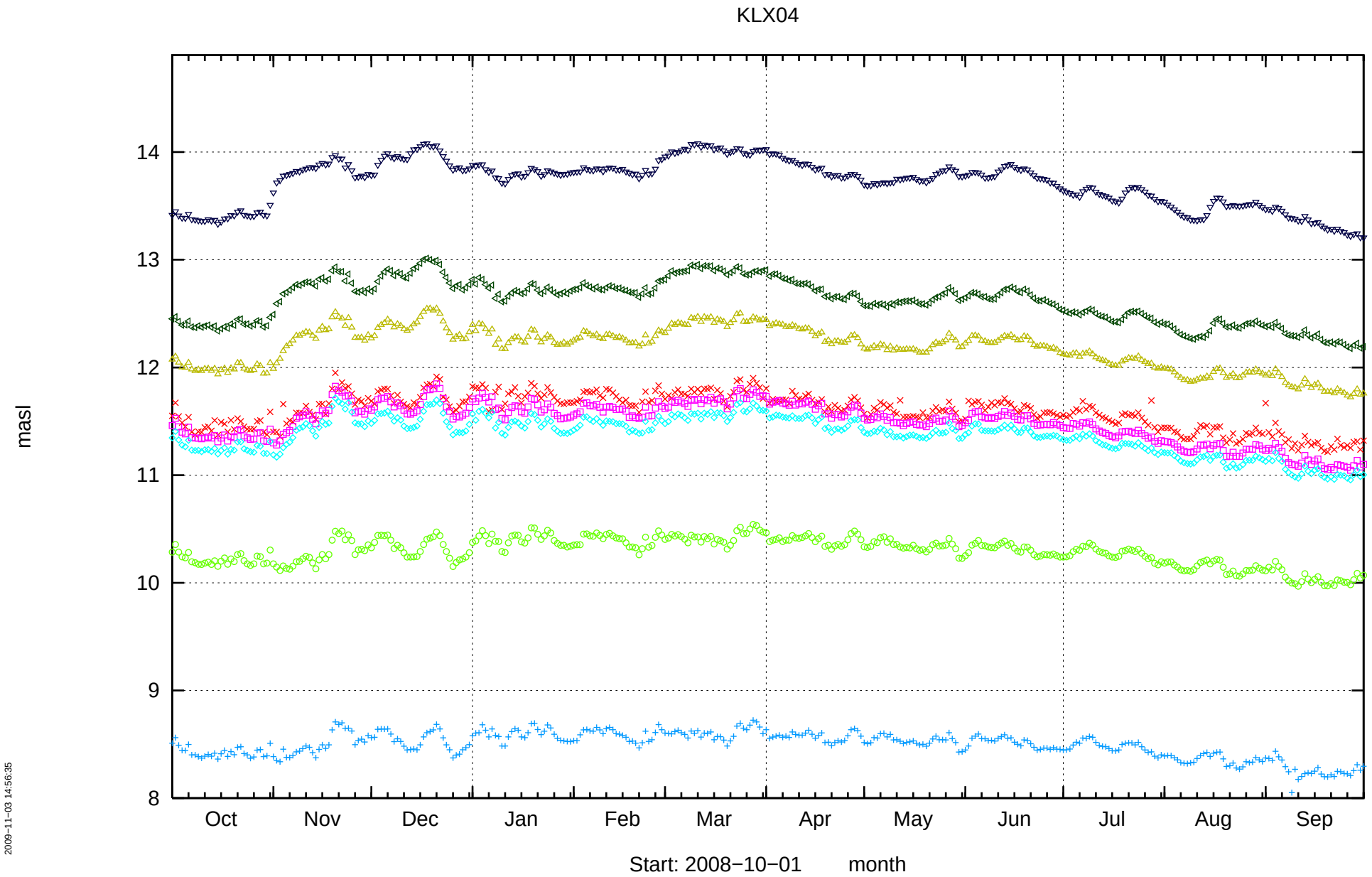

KAV04A
masl
5
4
3
2
1
0
−1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

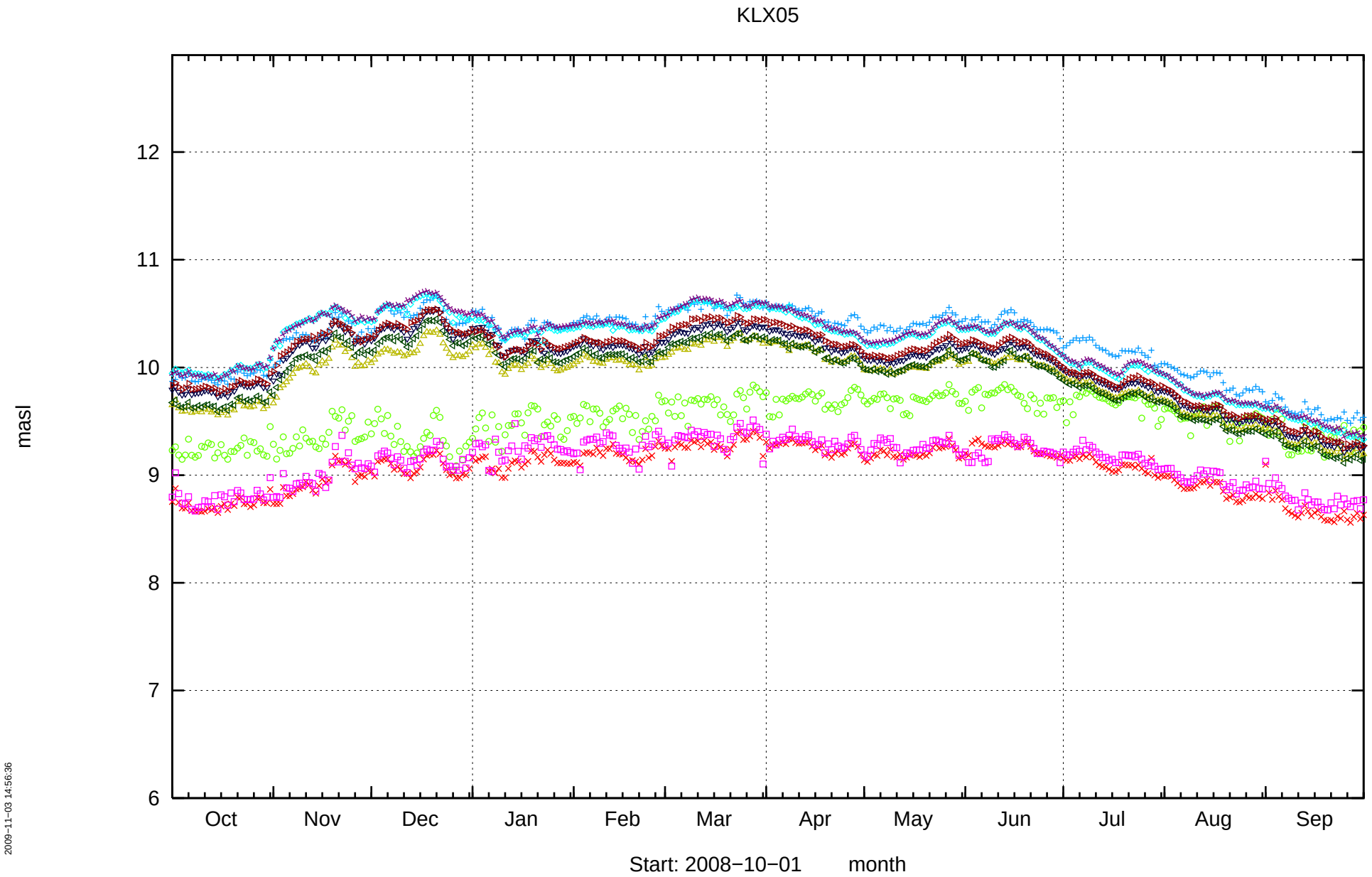

KBH03
masl
2
1
0
−1
−2
−3
−4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

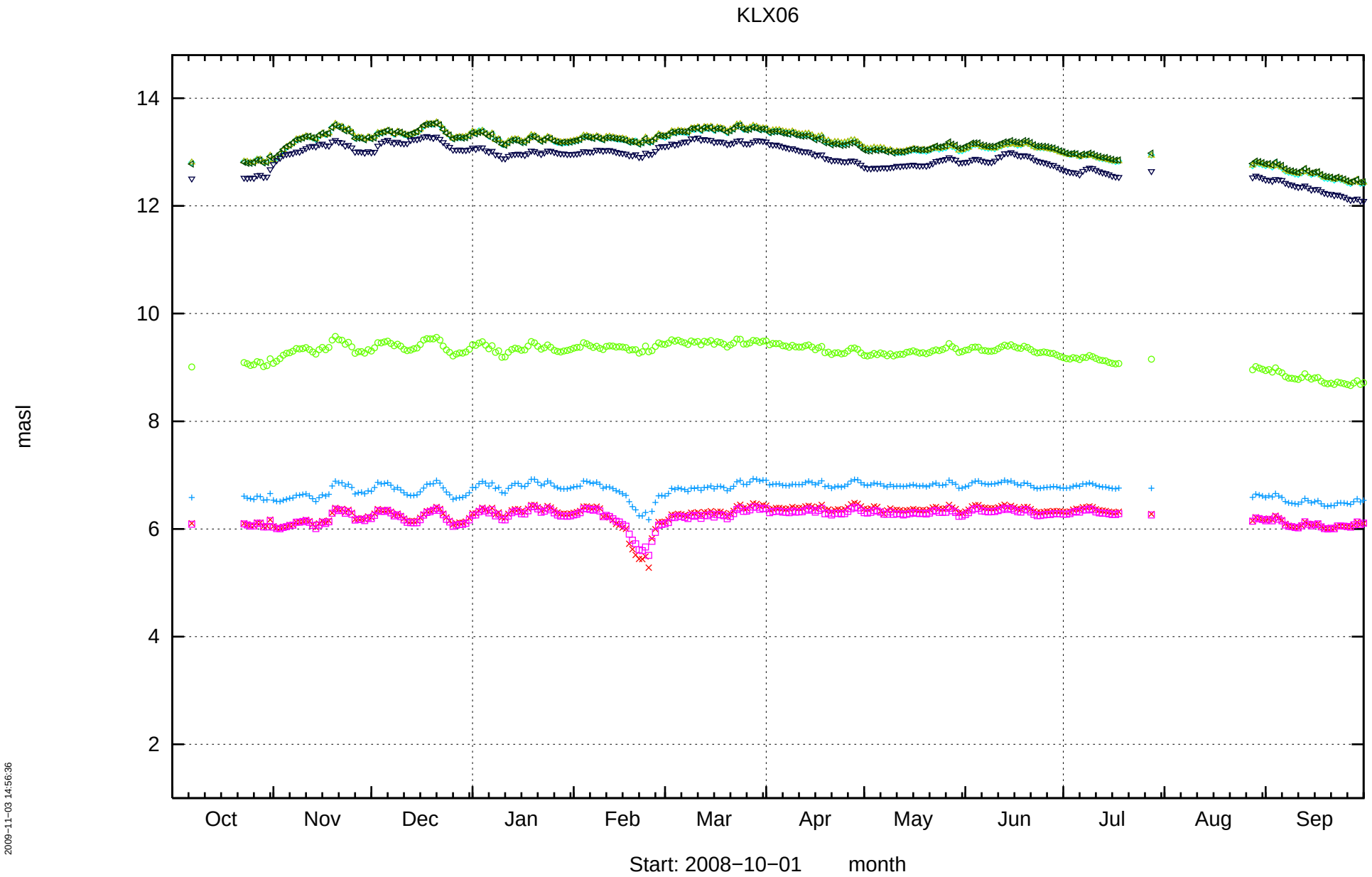

KLX01
masl
15
10
5
0
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

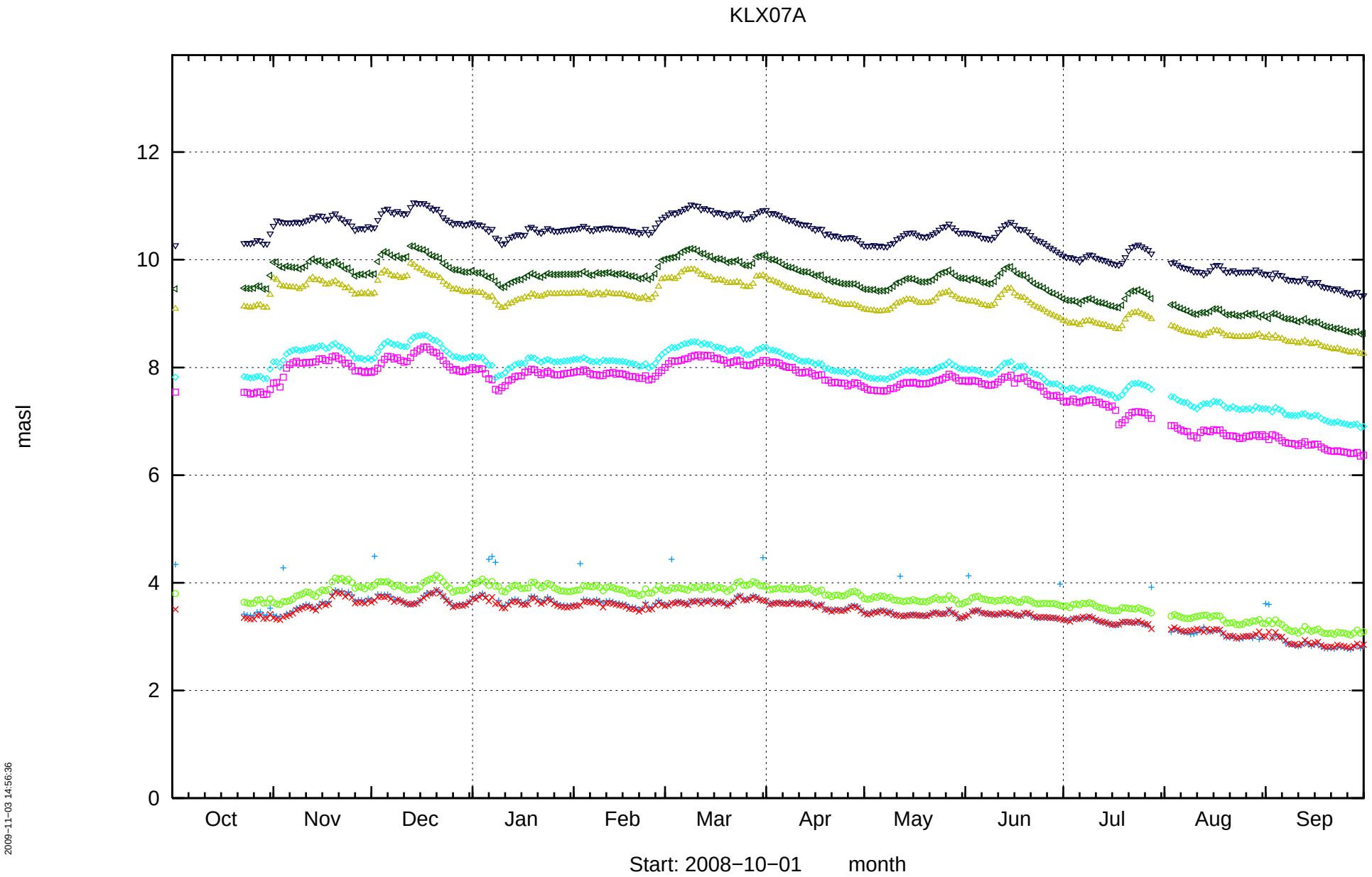

KLX02
masl
30
20
10
0
−10
−20
−30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

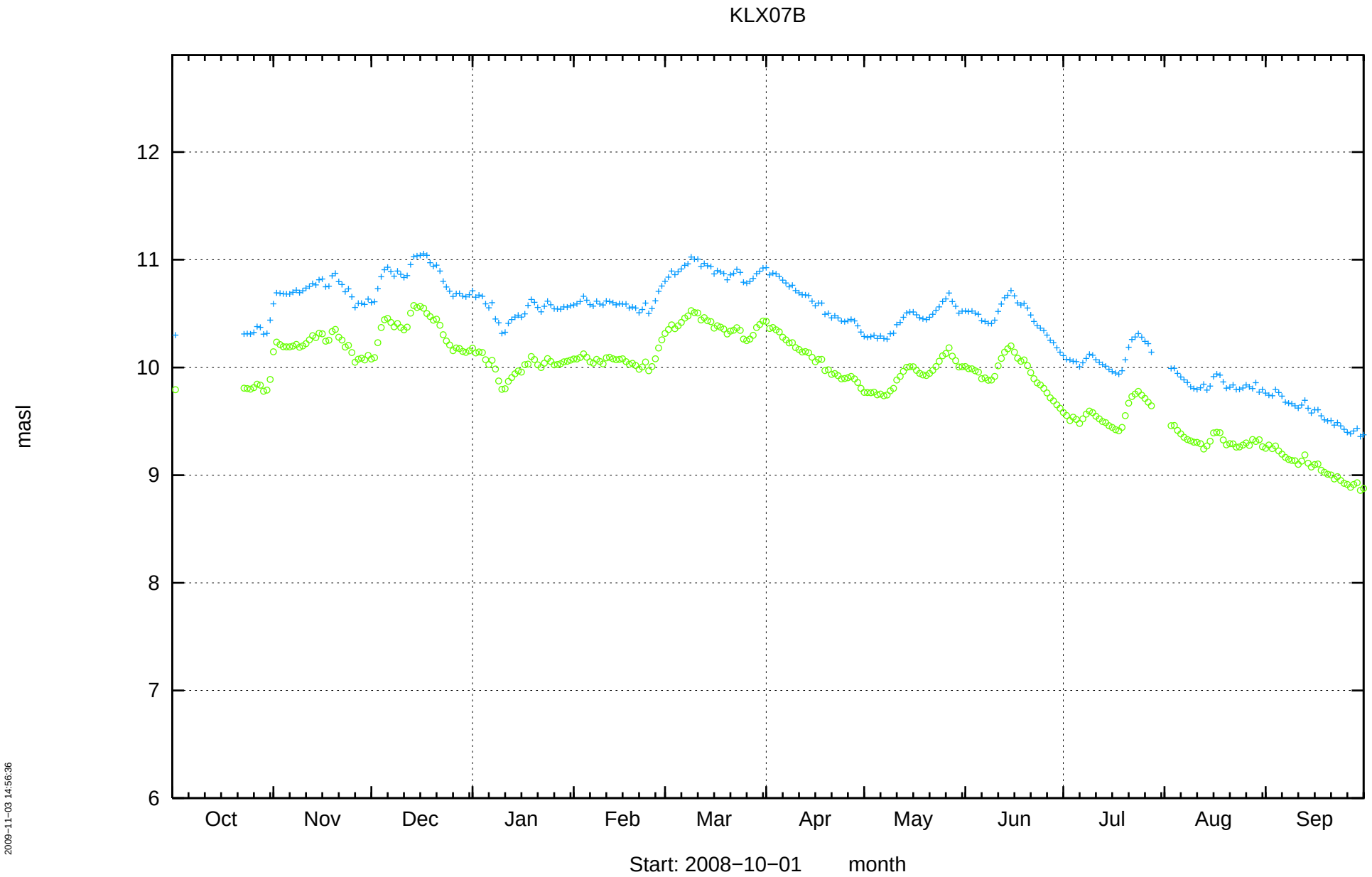

KLX03
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

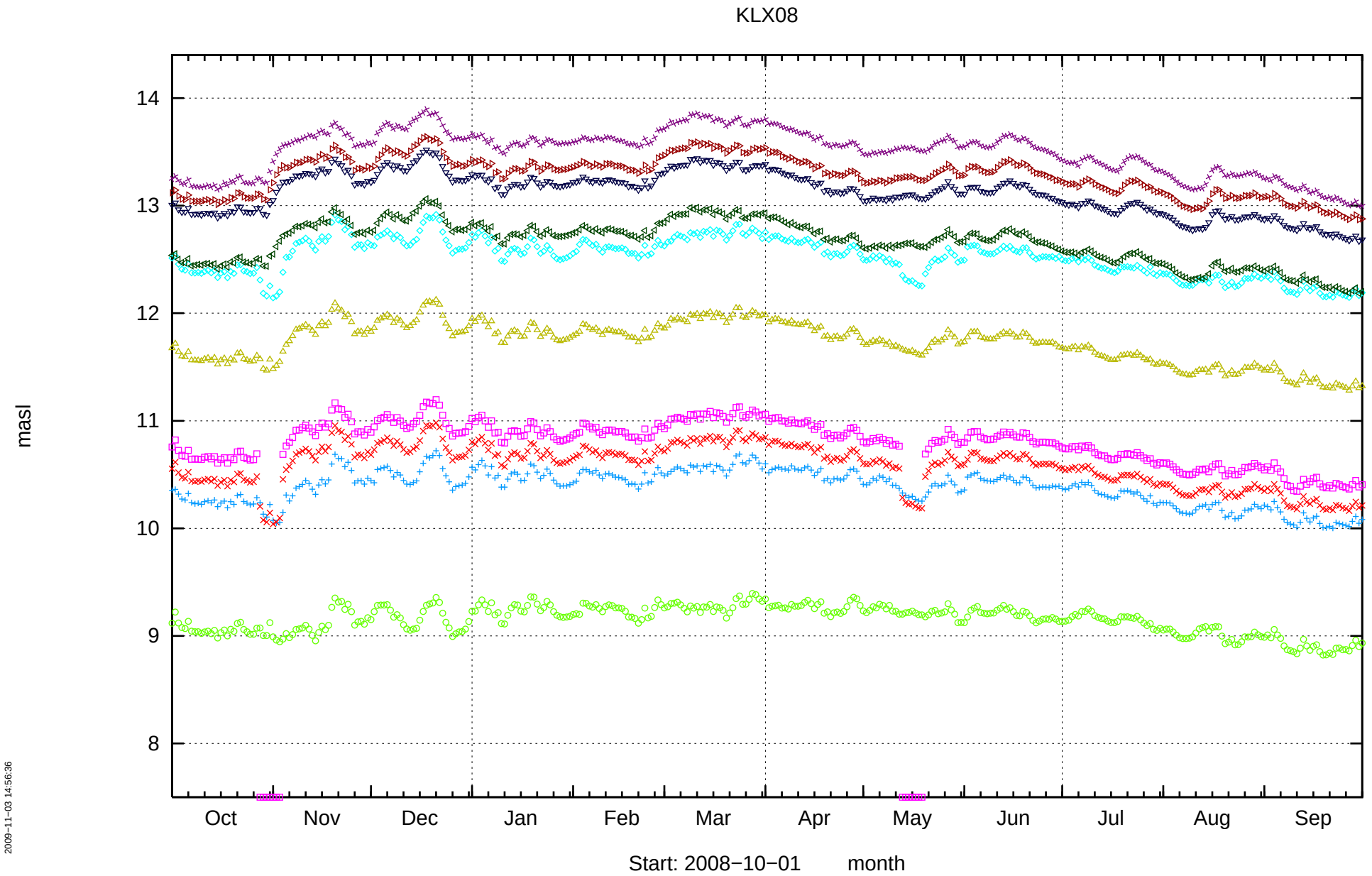

KLX04
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:35

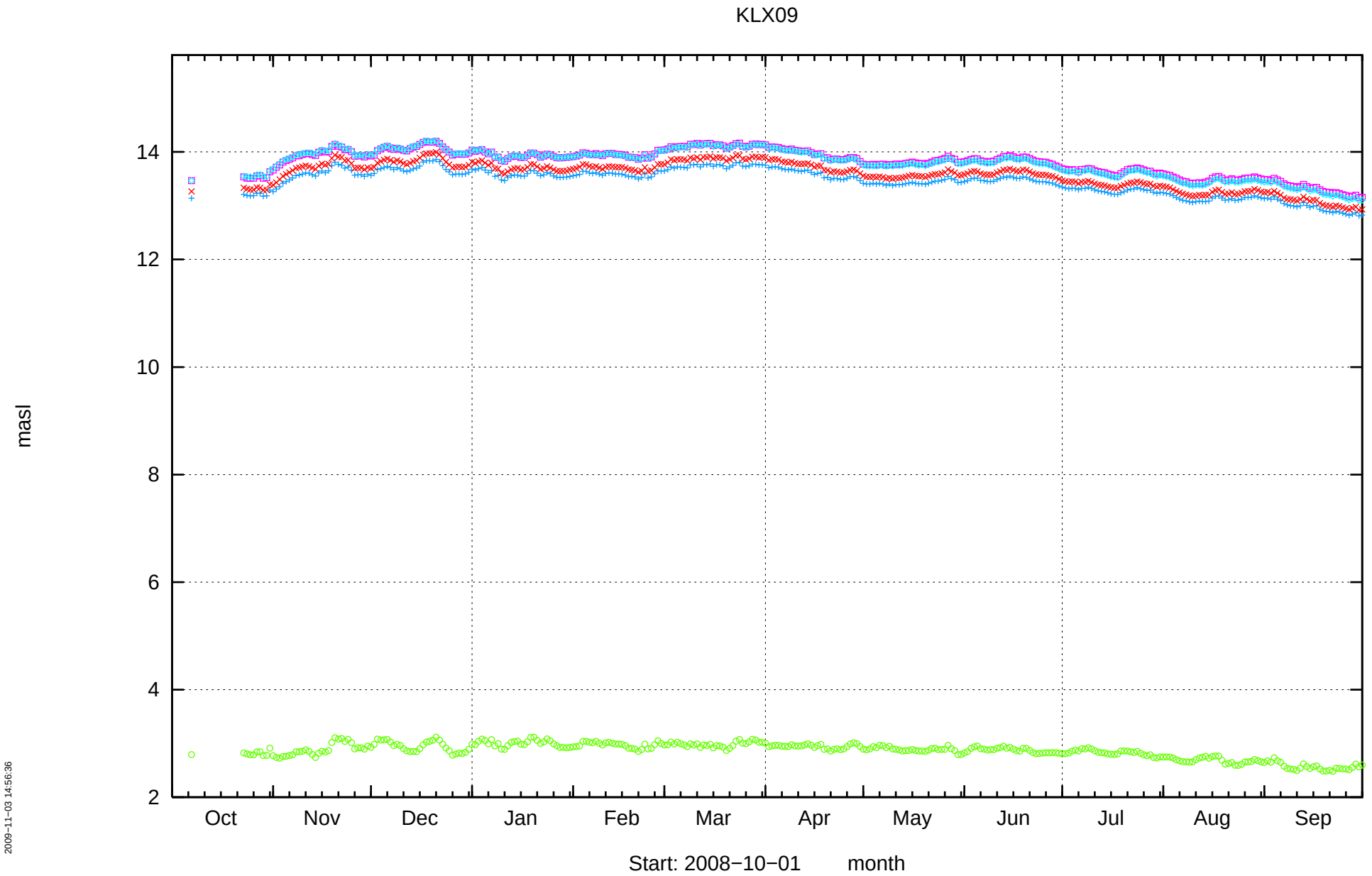

KLX05
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

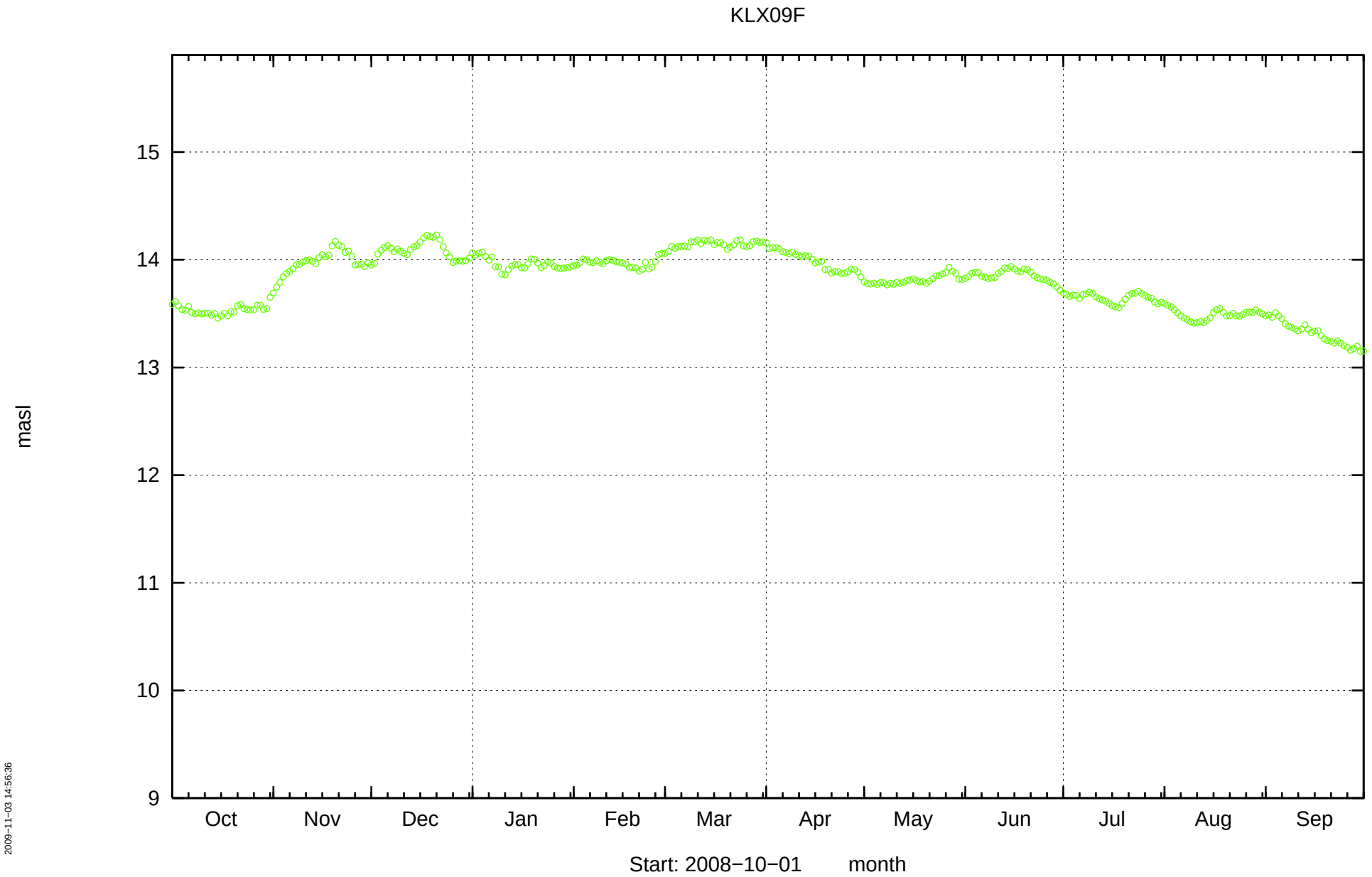

KLX06
masl
14
12
10
8
6
4
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:36

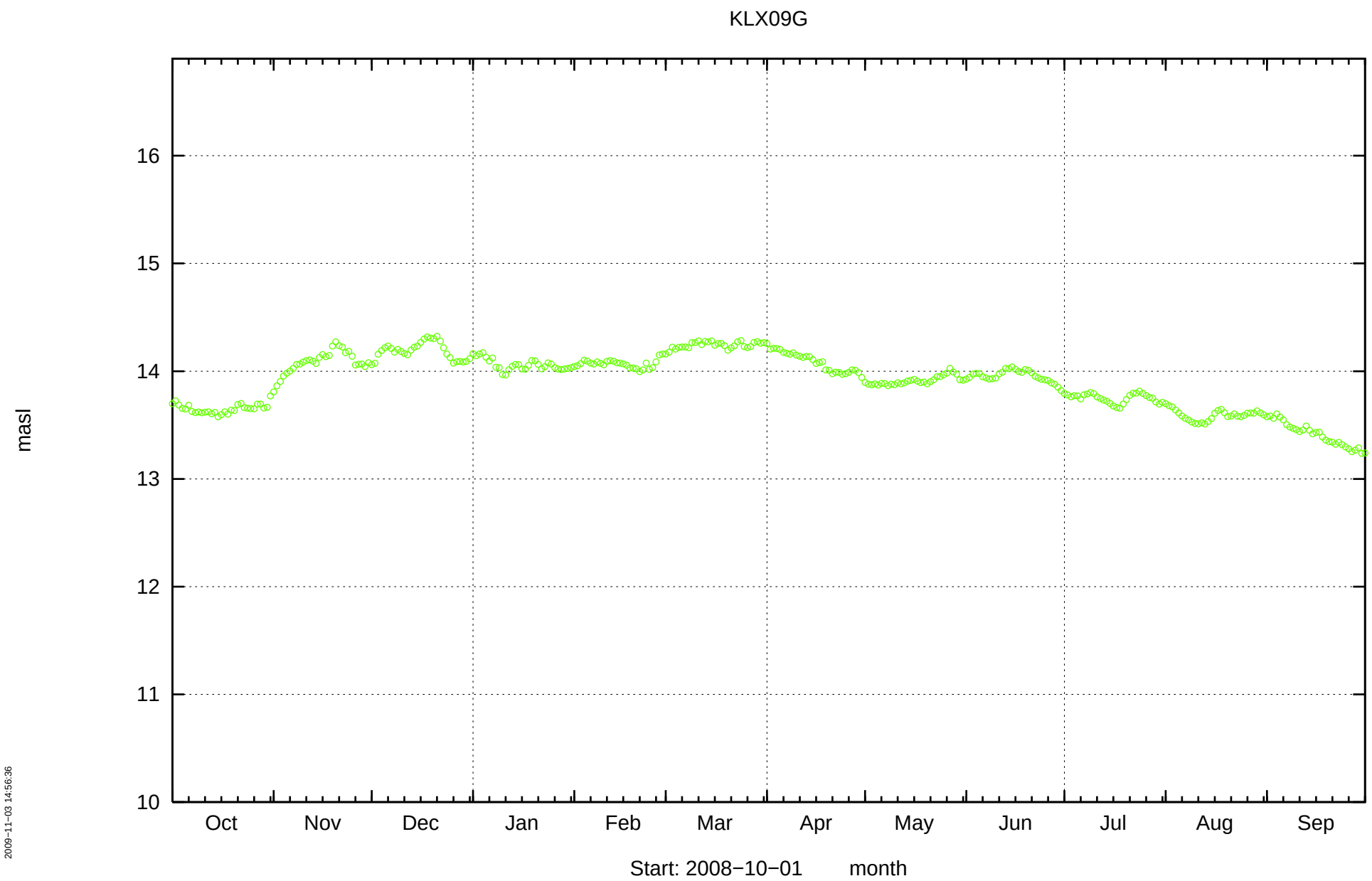

KLX07A
masl
12
10
8
6
4
2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

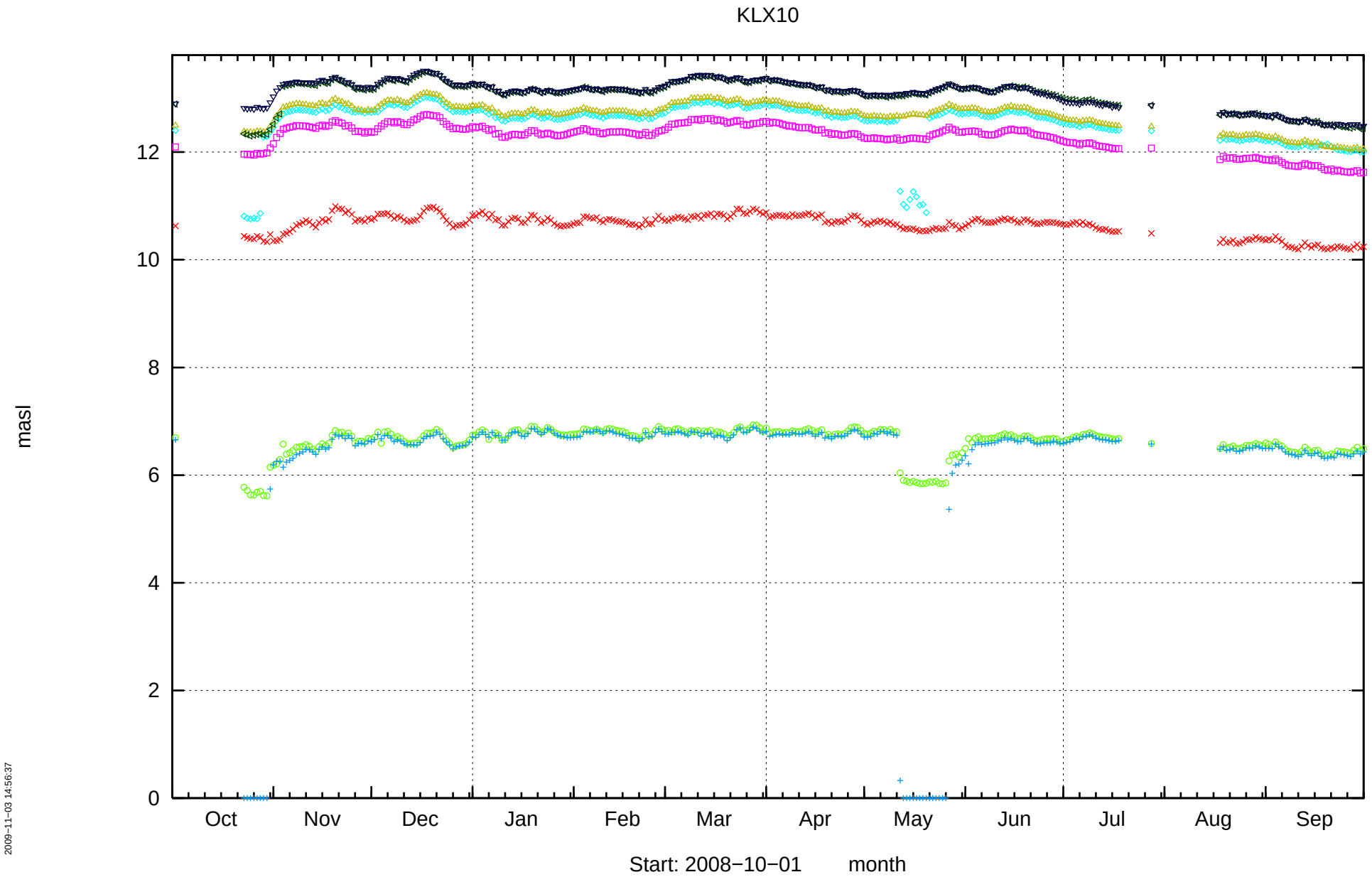

KLX07B
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

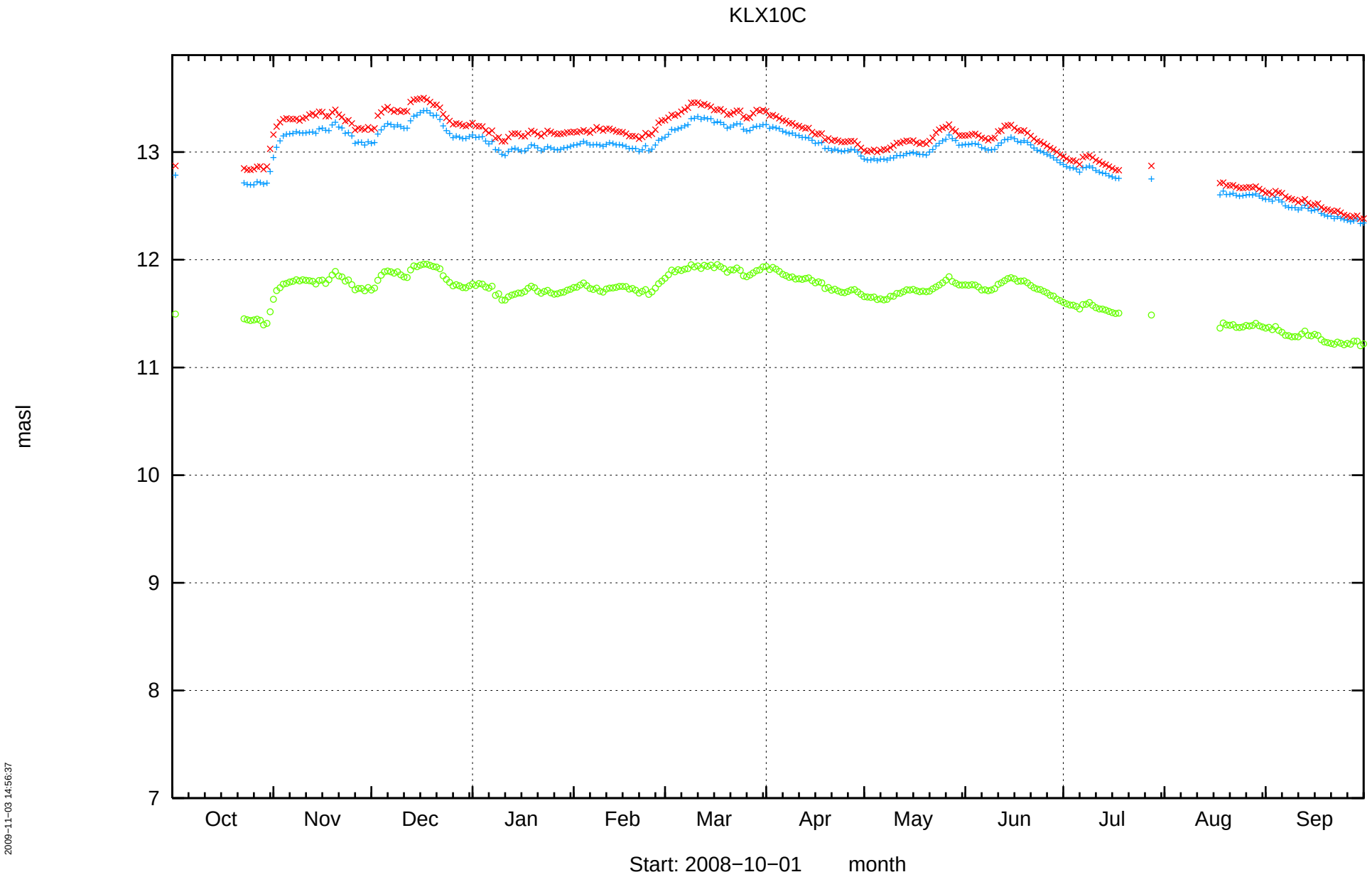

KLX08
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

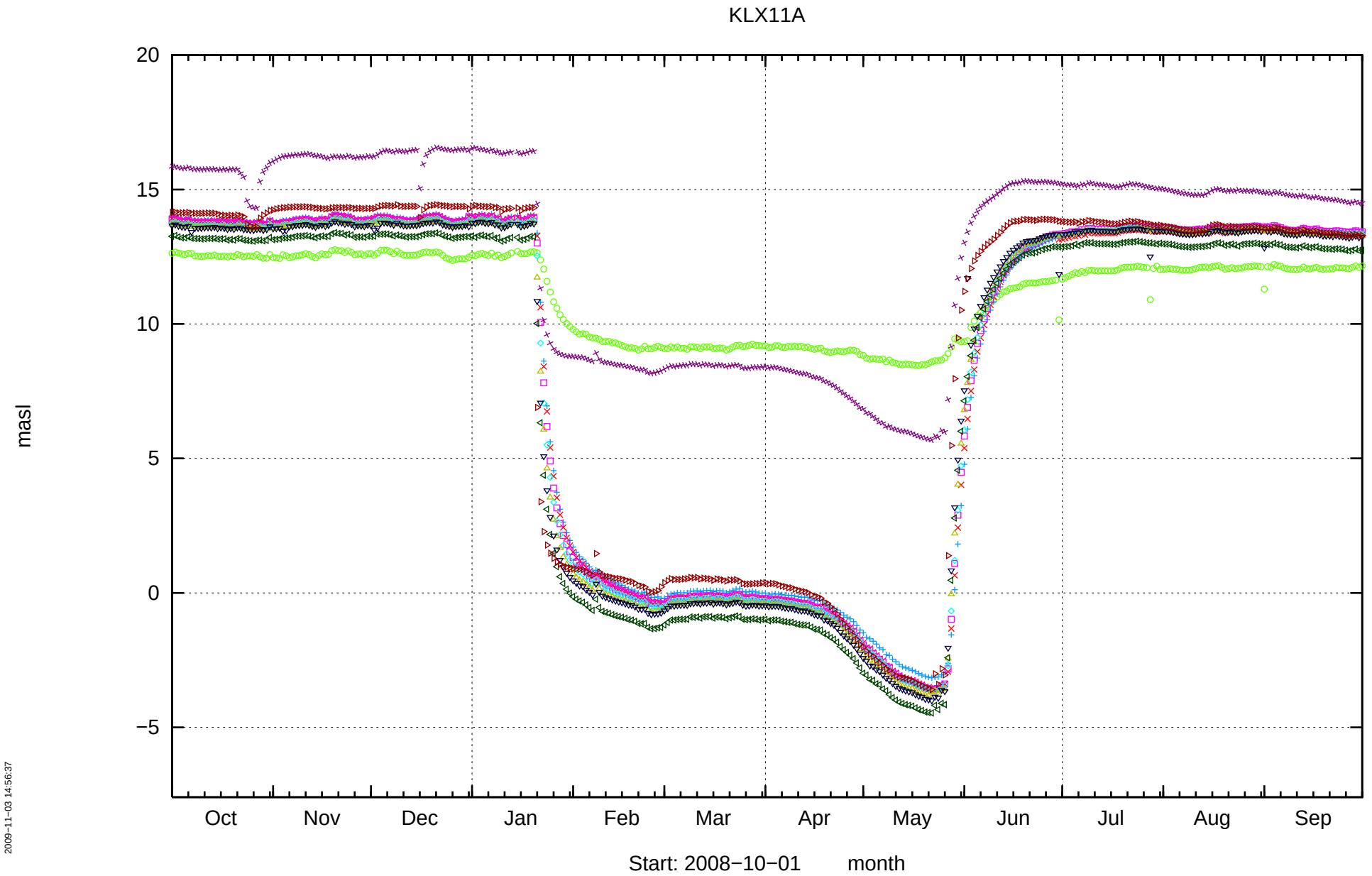

KLX09
masl
14
12
10
8
6
4
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

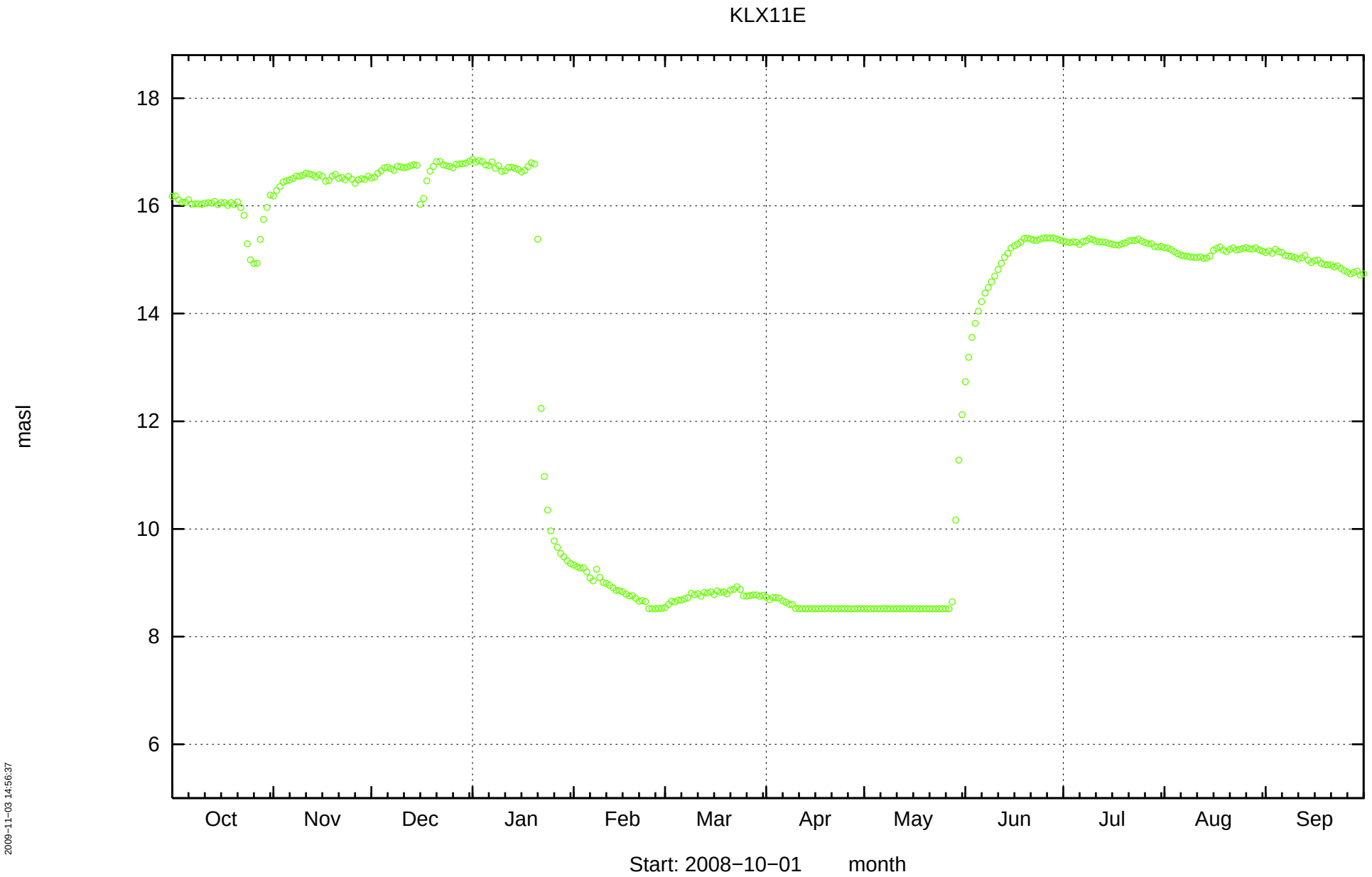

KLX09F
masl
15
14
13
12
11
10
9
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

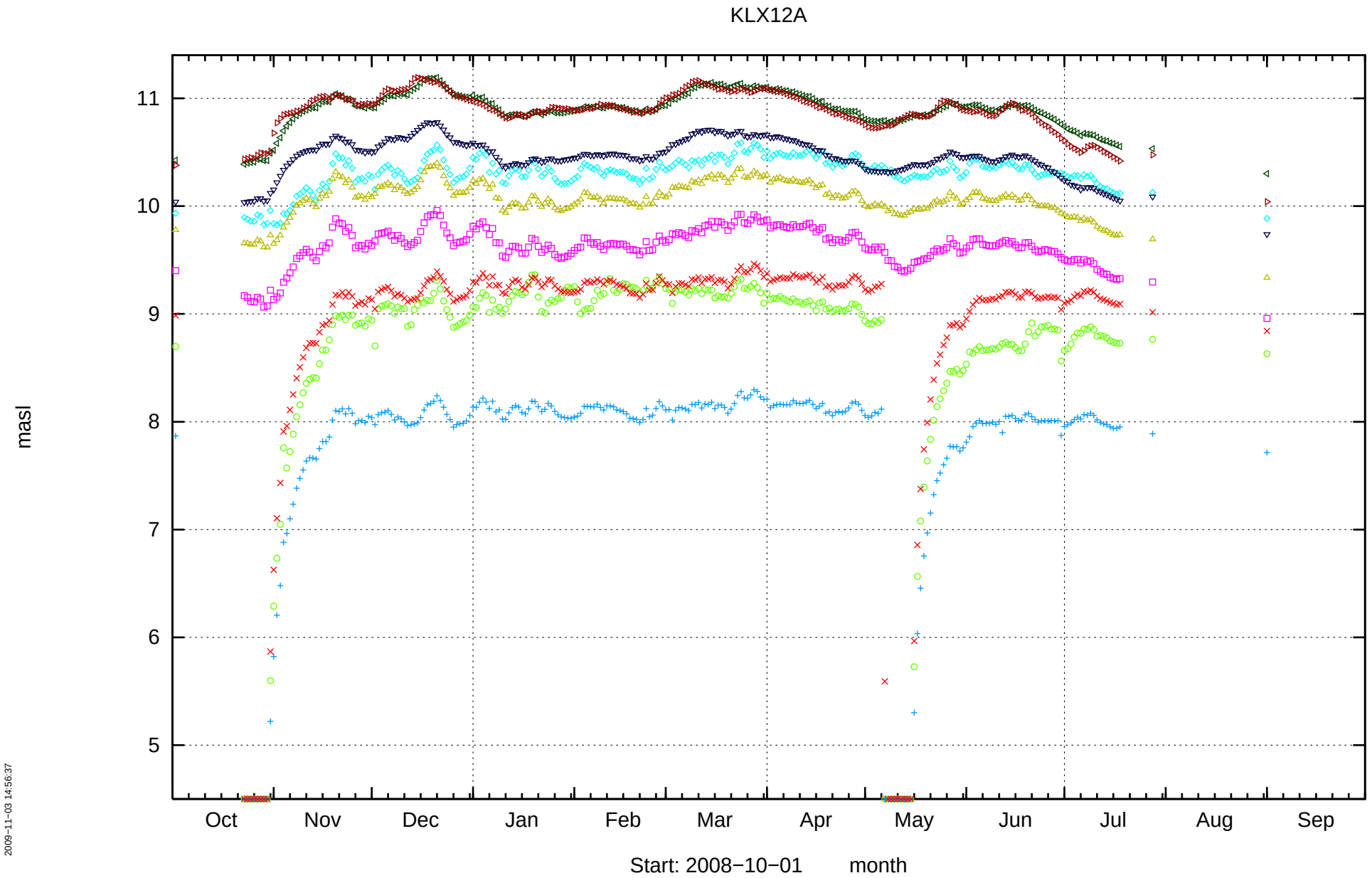

KLX09G
masl
16
15
14
13
12
11
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:36

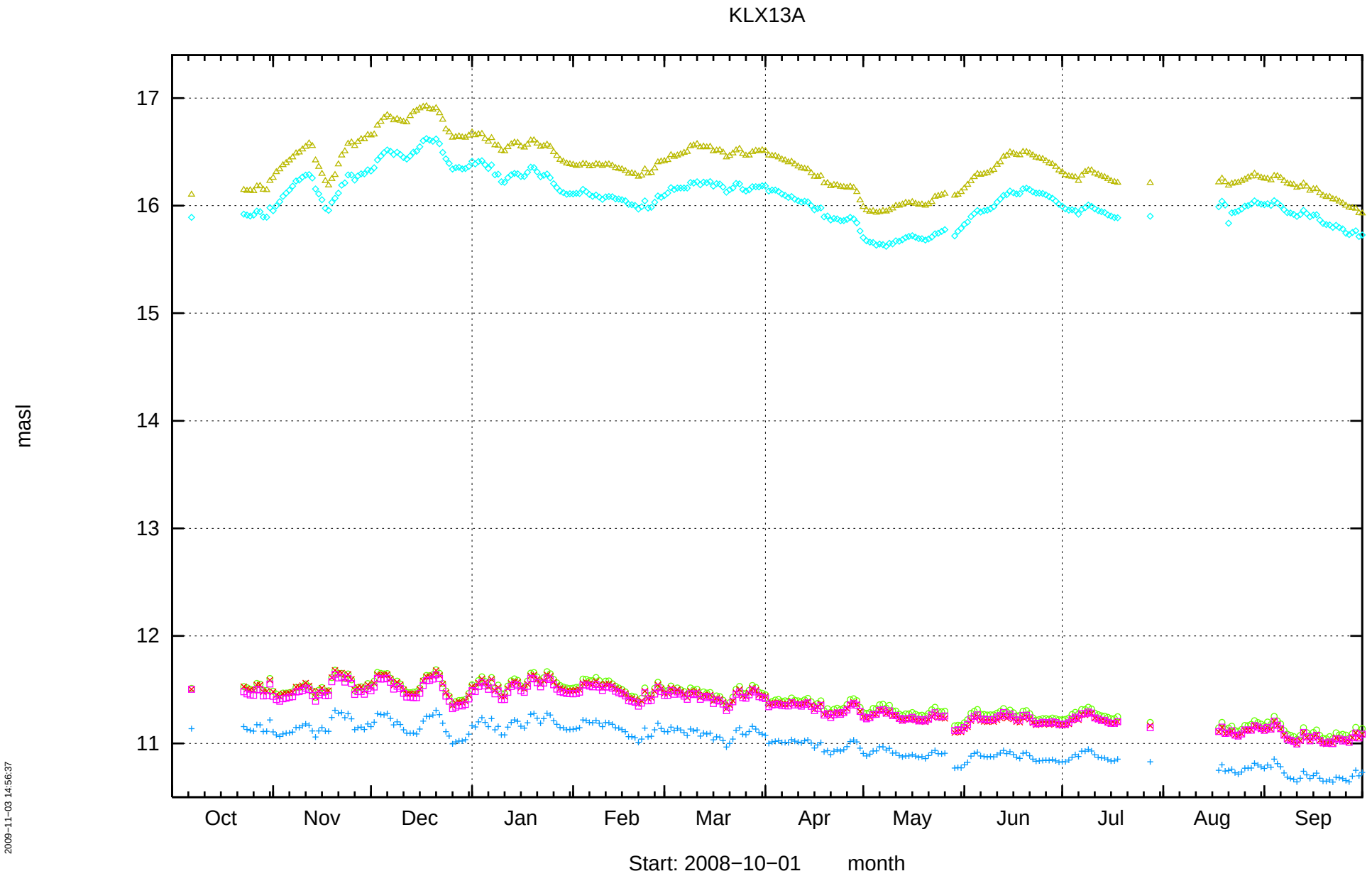

KLX10
masl
12
10
8
6
4
2
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:37

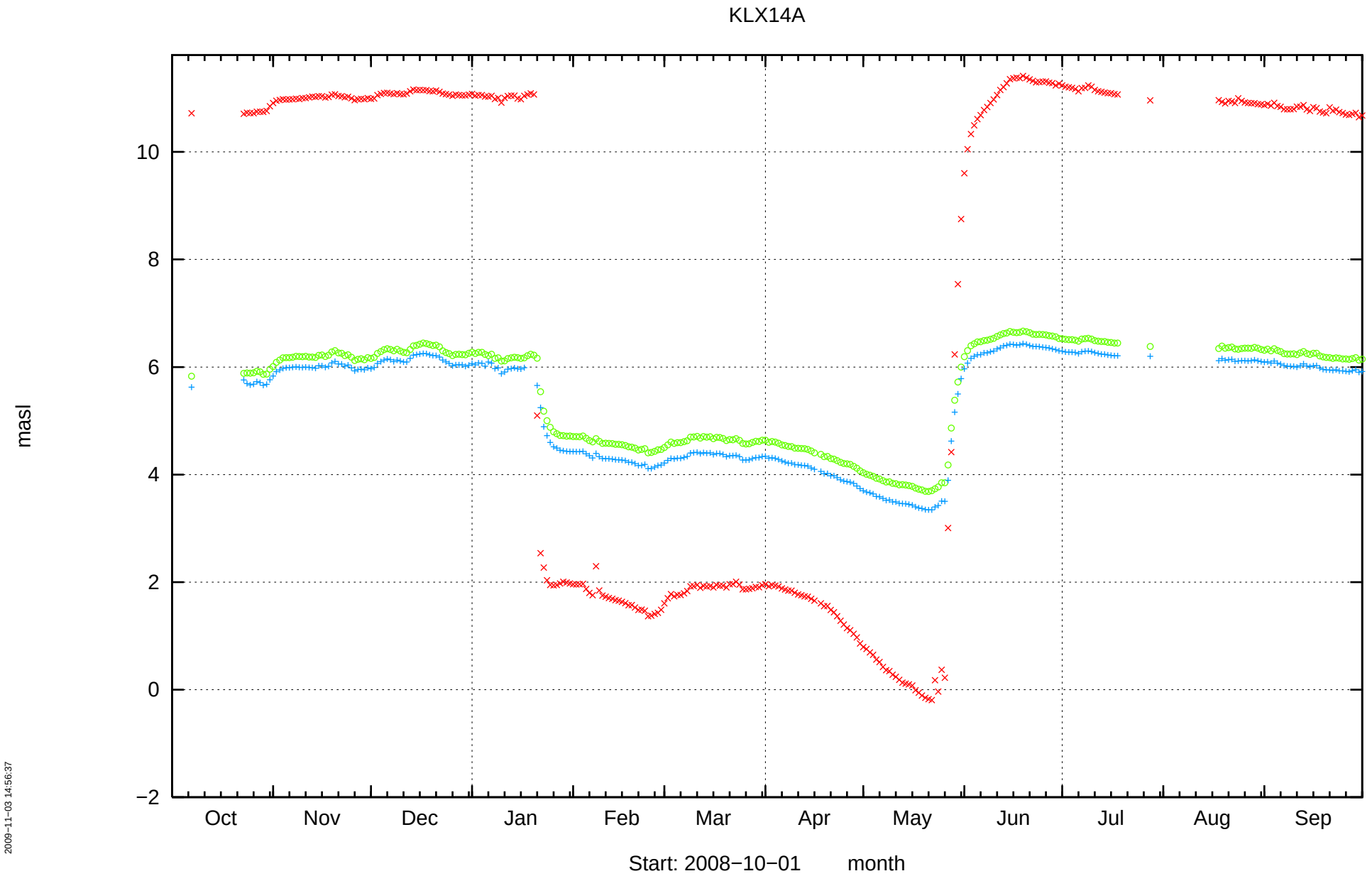

KLX10C
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:37

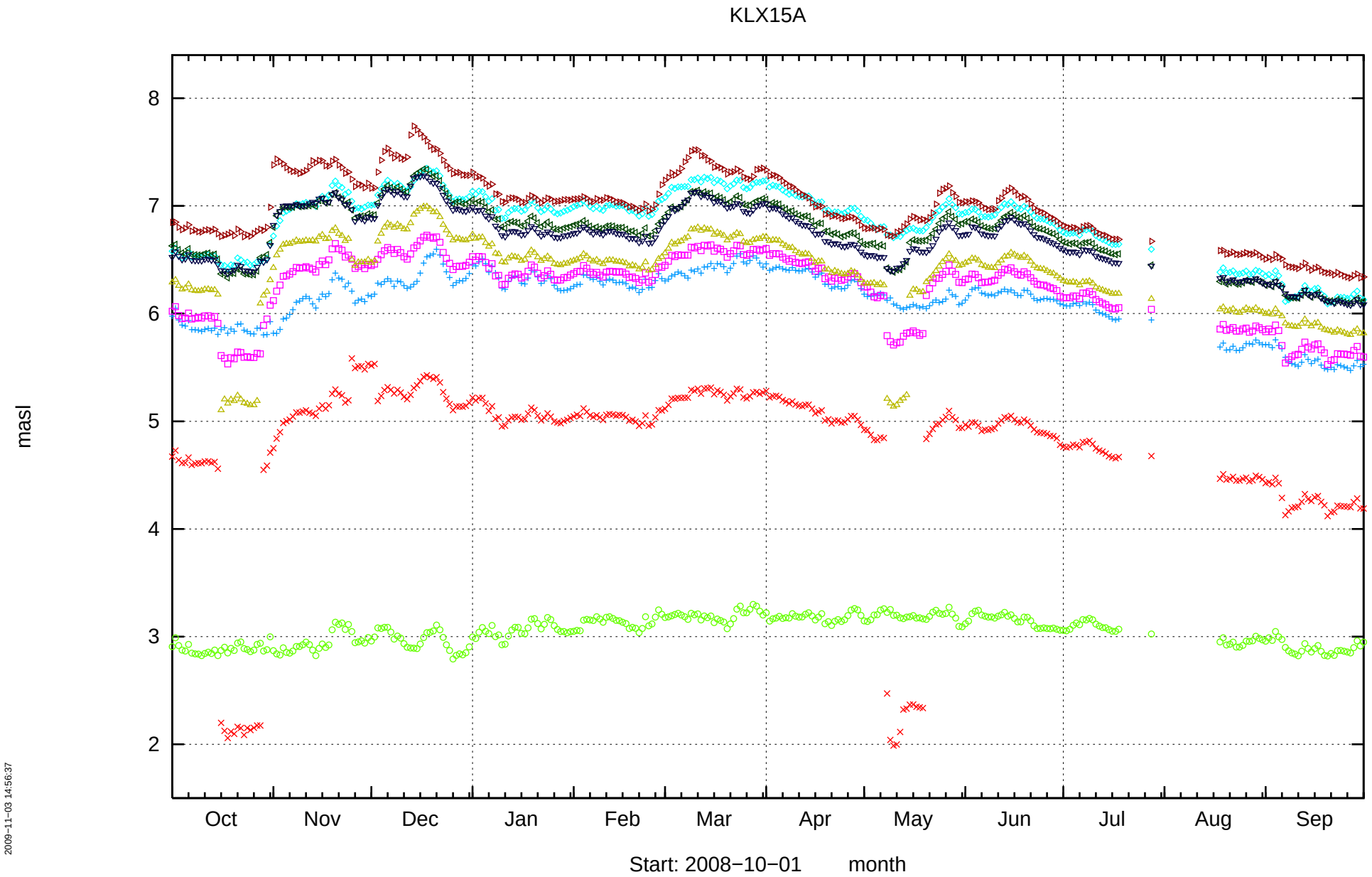

KLX11A
masl
20
15
10
5
0
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:37

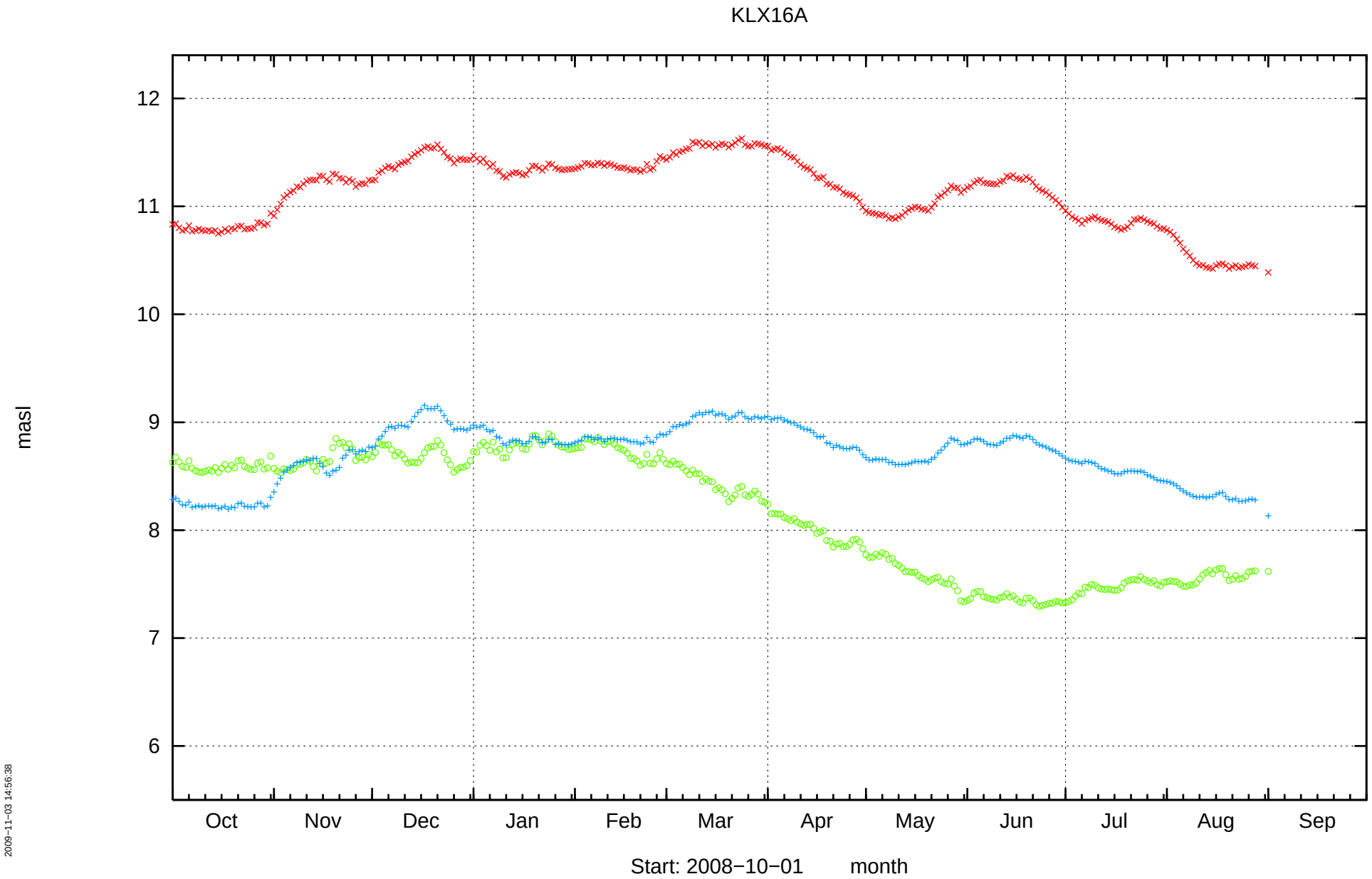

KLX11E
masl
18
16
14
12
10
8
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:37

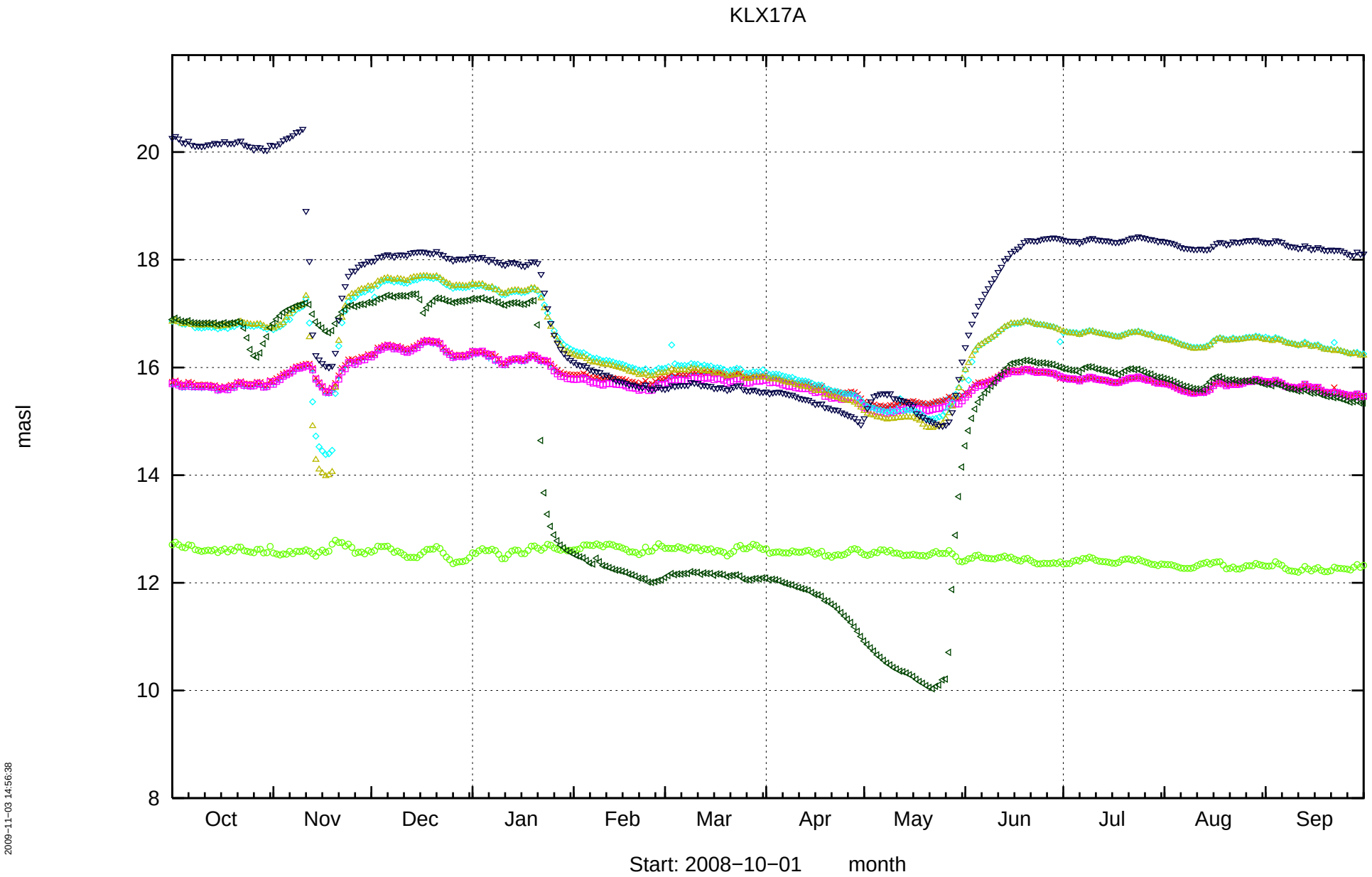

KLX12A
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:37

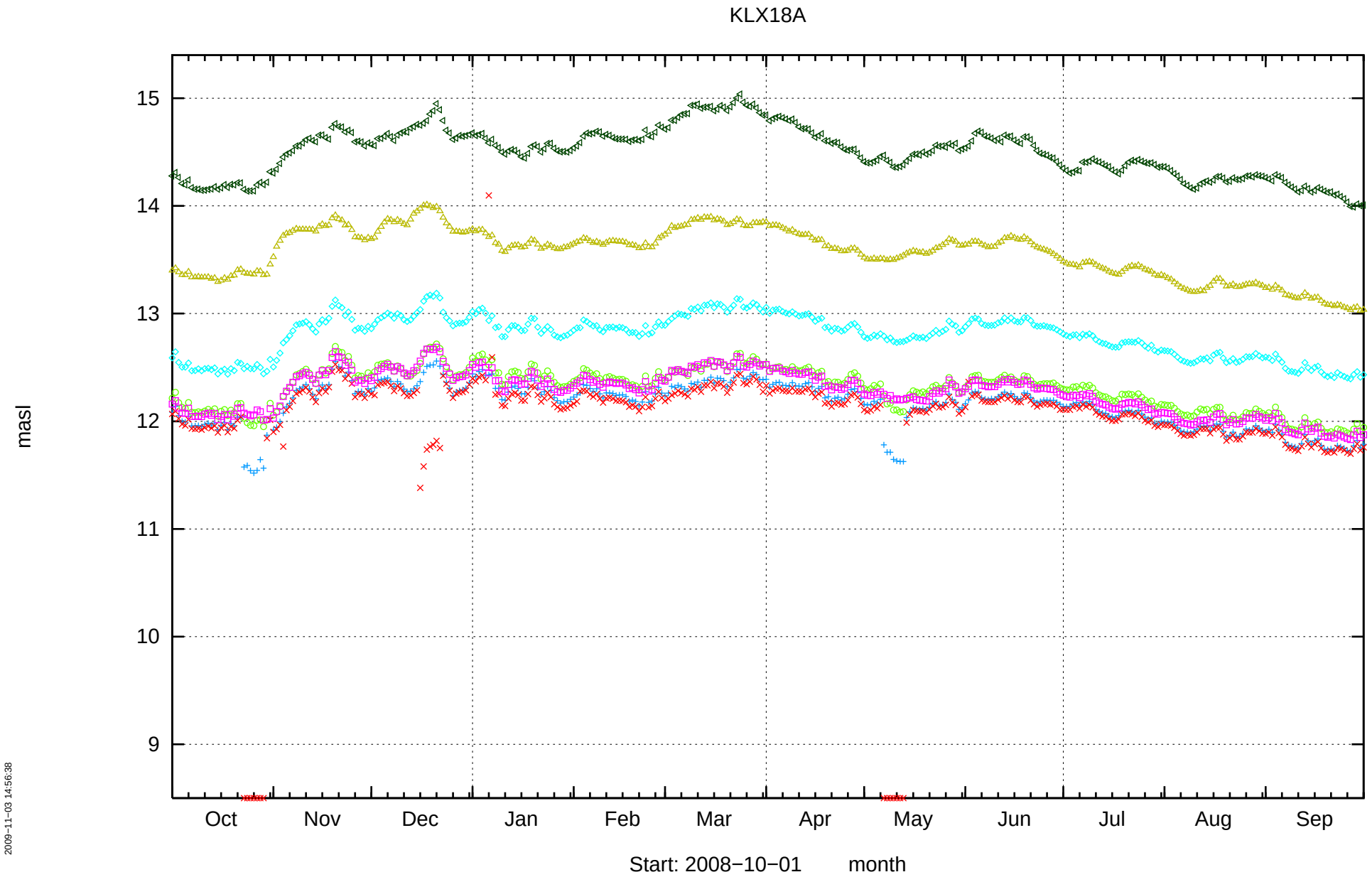

KLX13A
masl
17
16
15
14
13
12
11
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:37

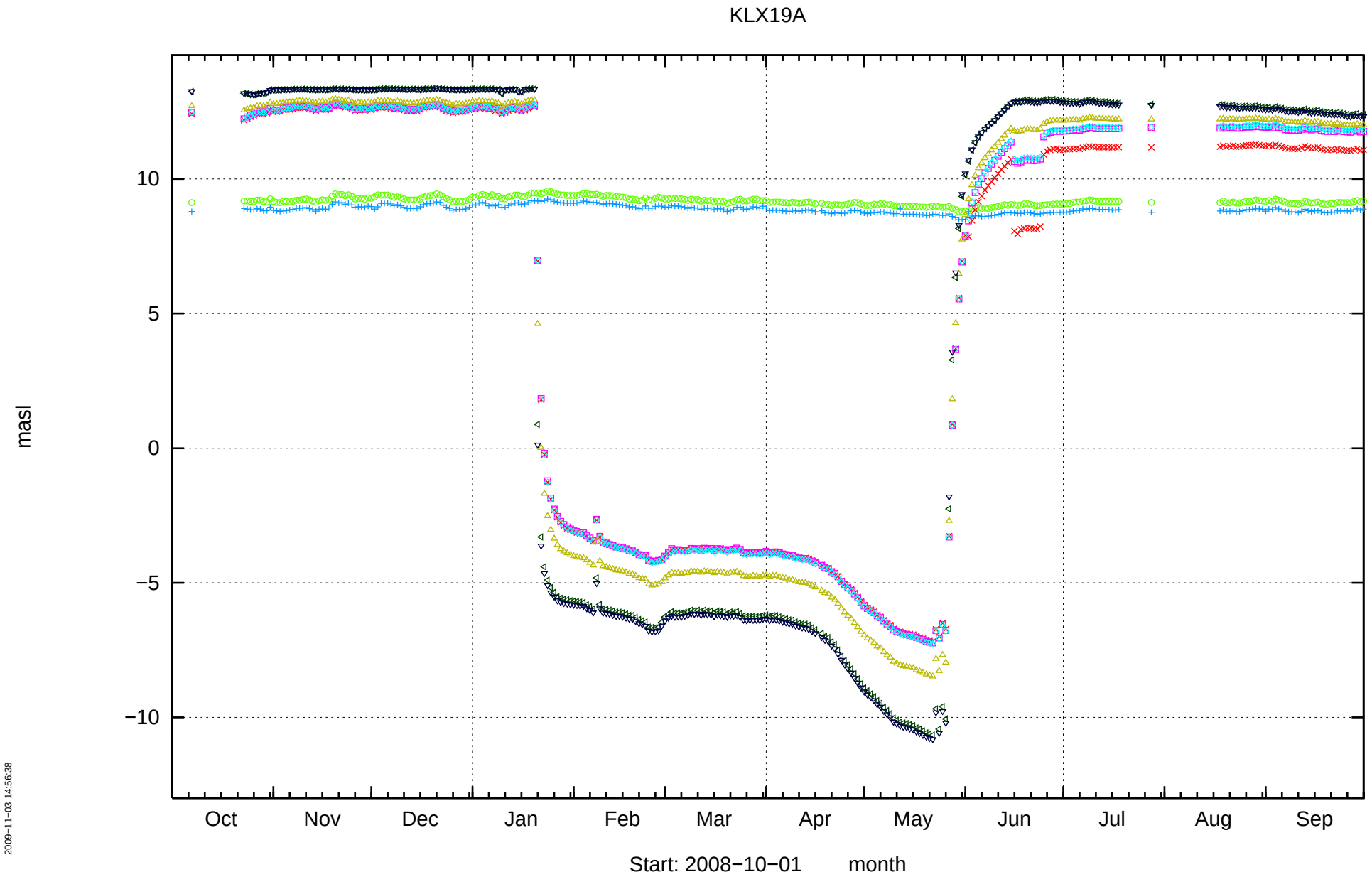

KLX14A
masl
10
8
6
4
2
0
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:37

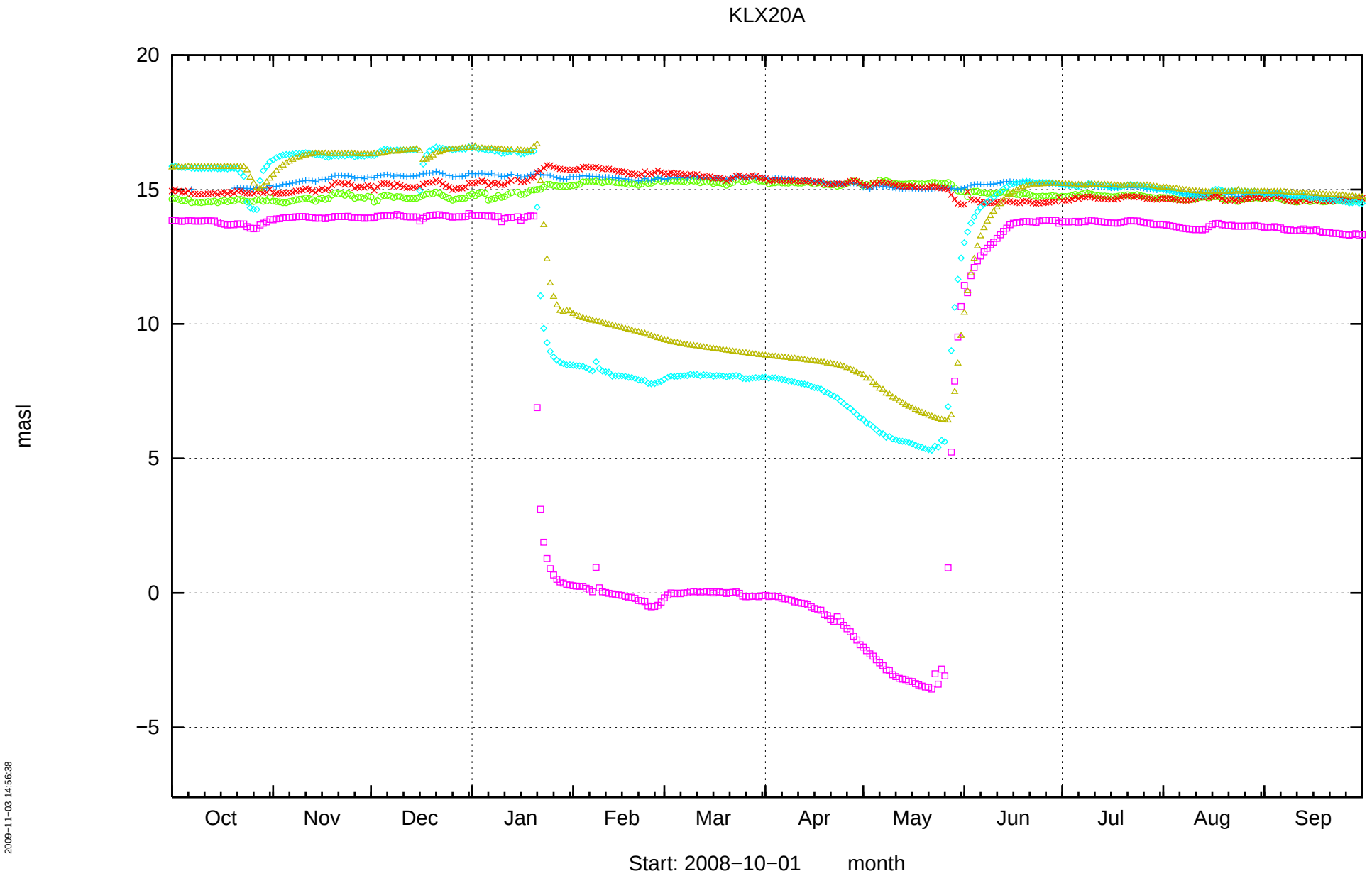

KLX15A
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:37

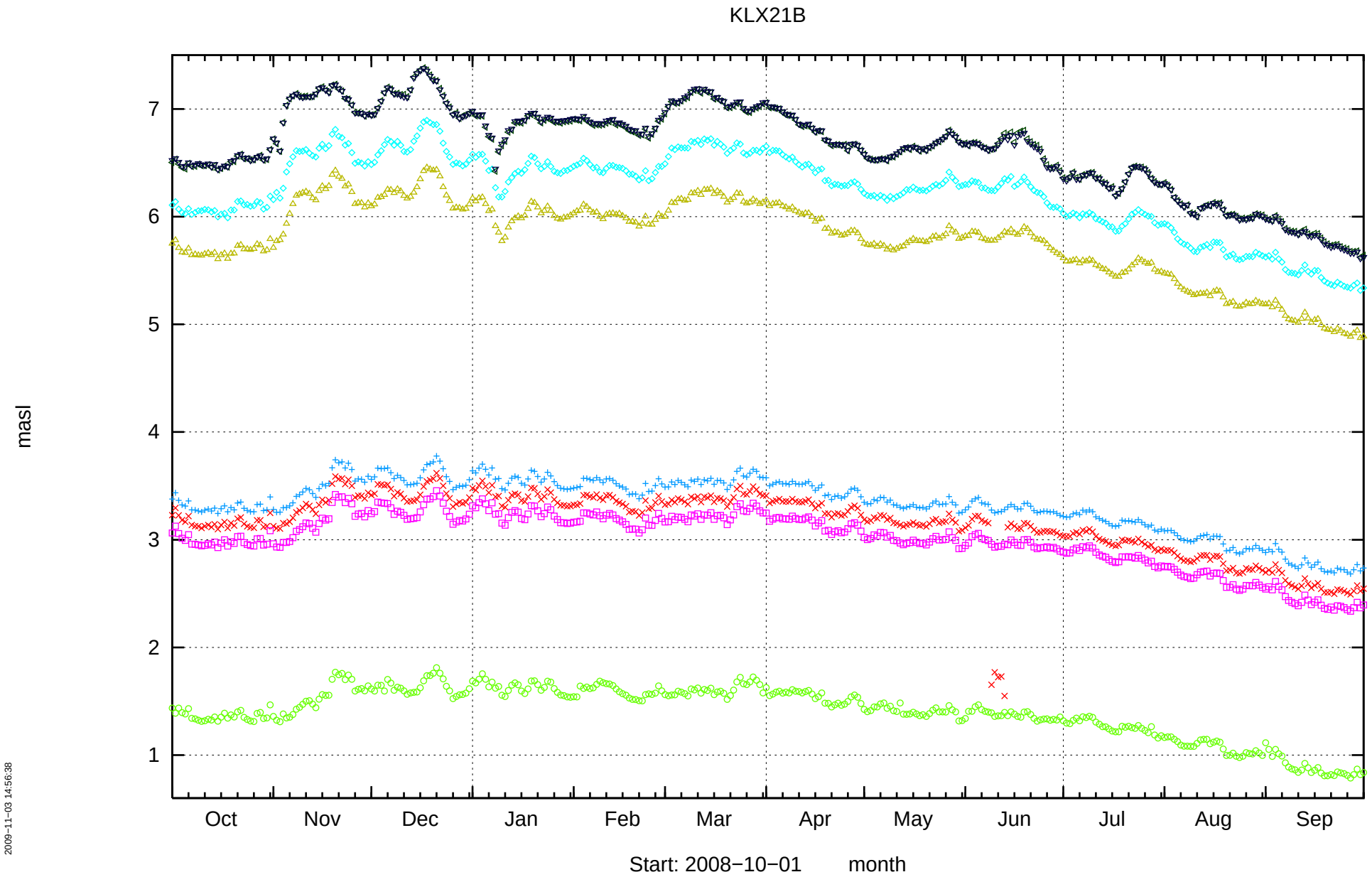

KLX16A
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:38

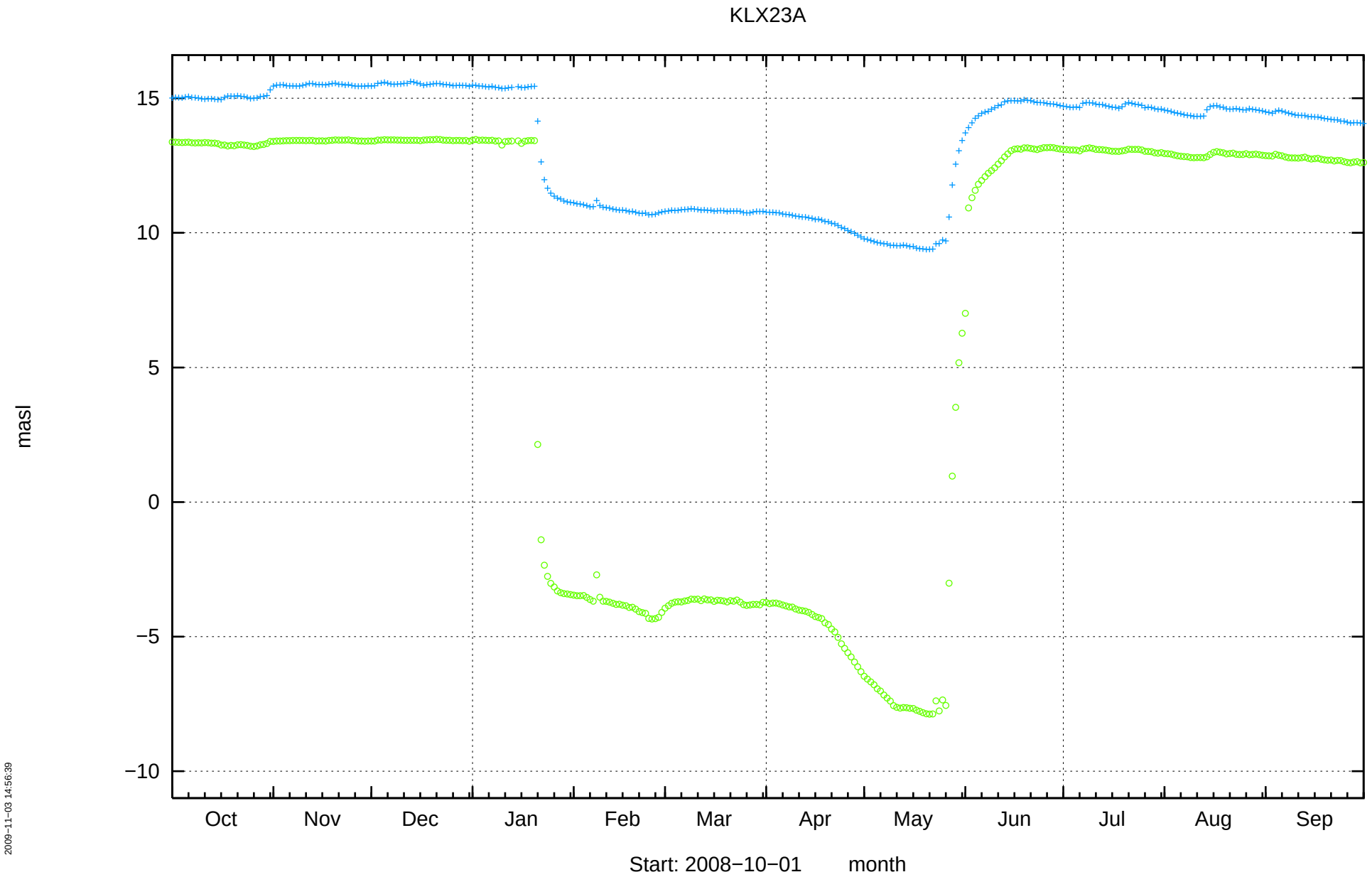

KLX17A
masl
20
18
16
14
12
10
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:38

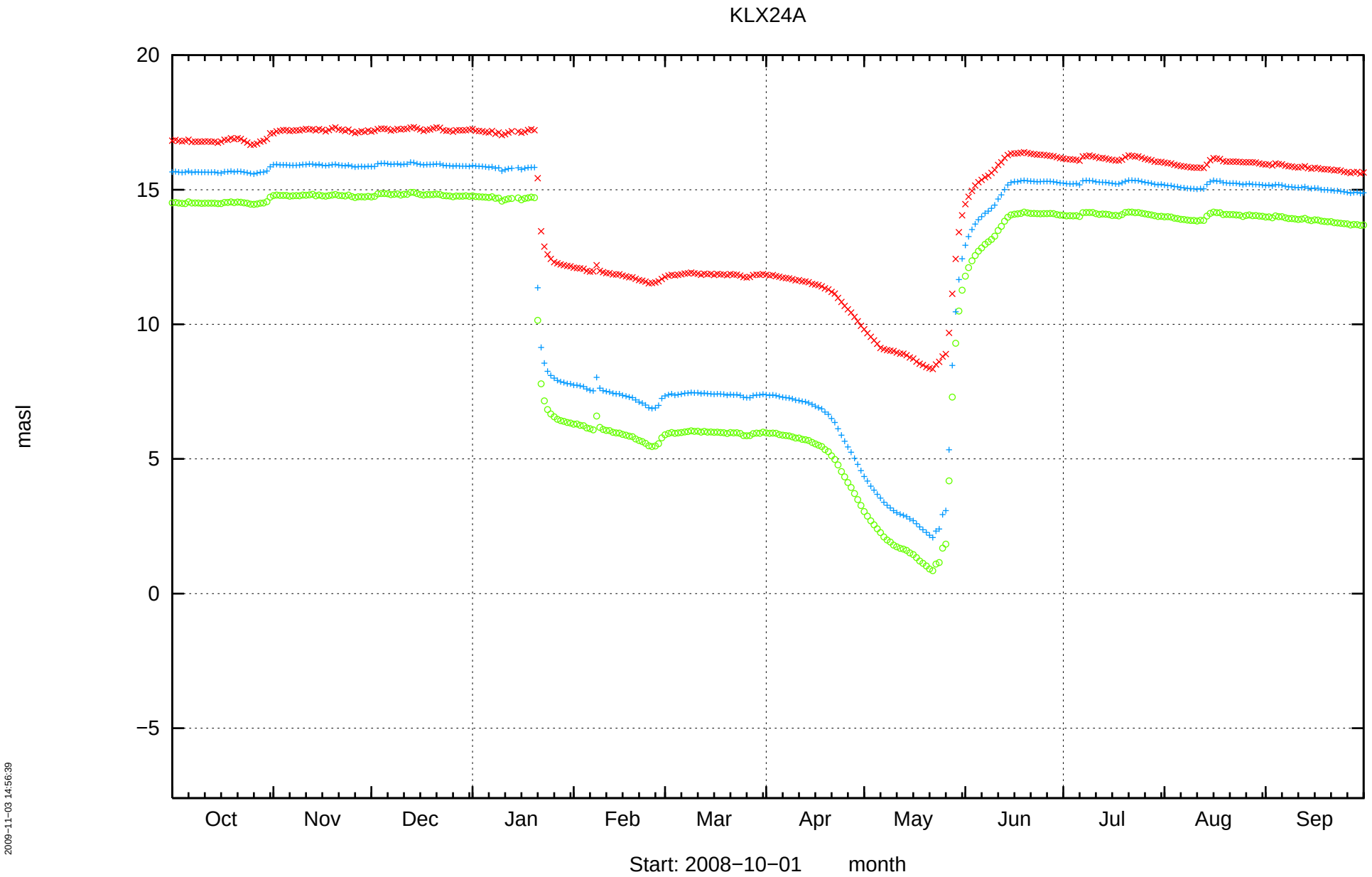

KLX18A
masl
15
14
13
12
11
10
9
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:38

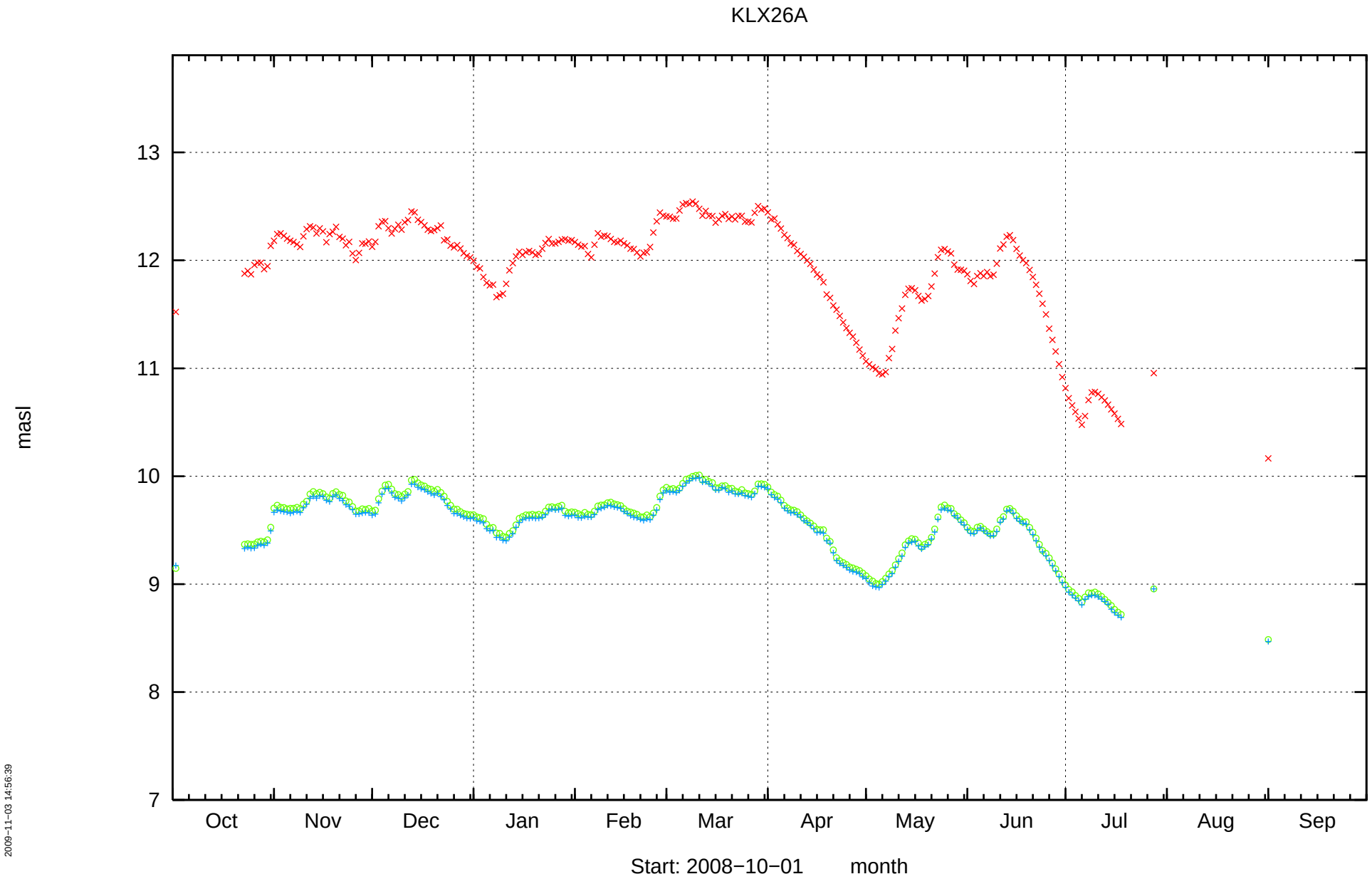

KLX19A
masl
10
5
0
−5
−10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:38

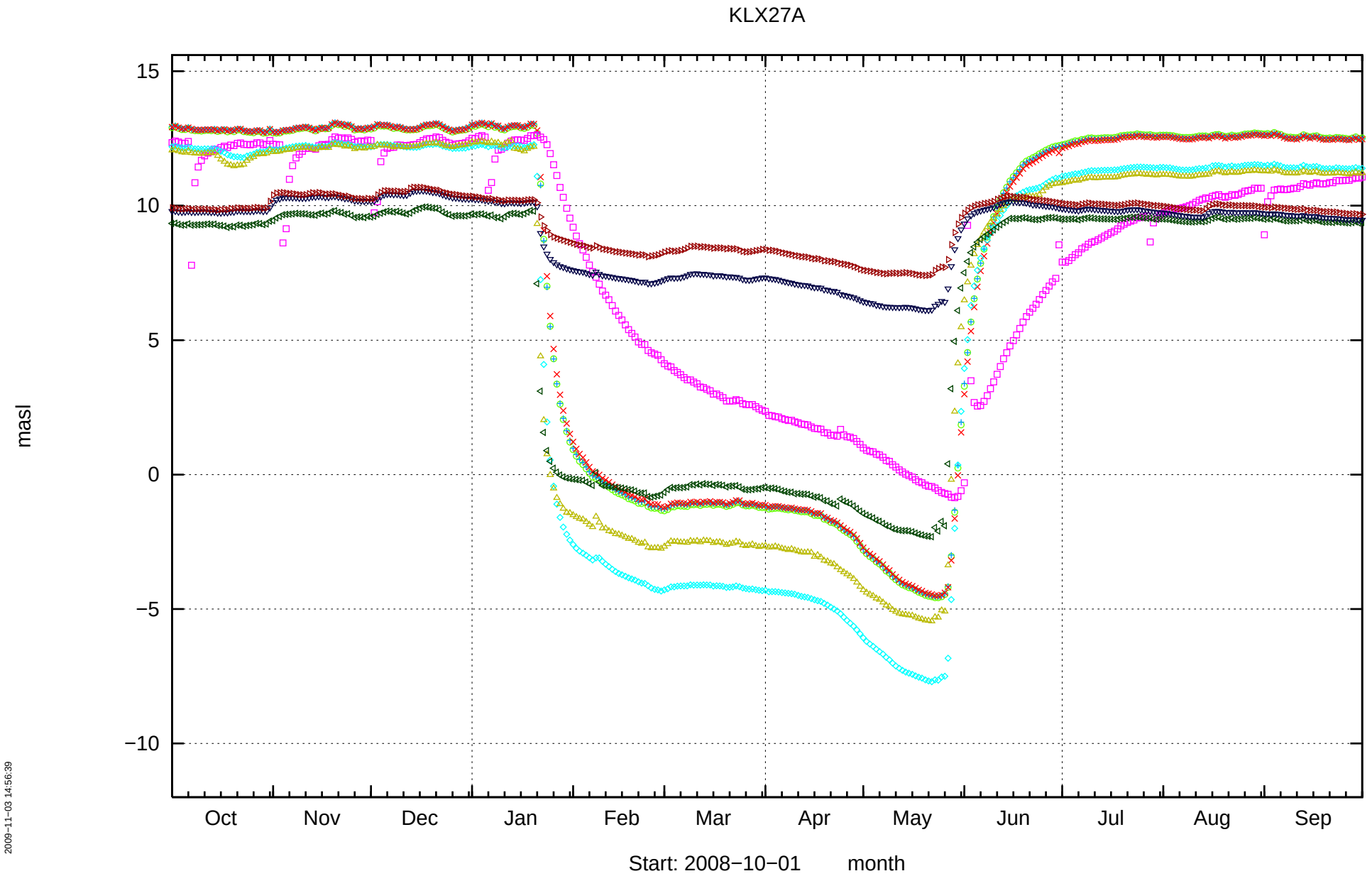

KLX20A
masl
20
15
10
5
0
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:38

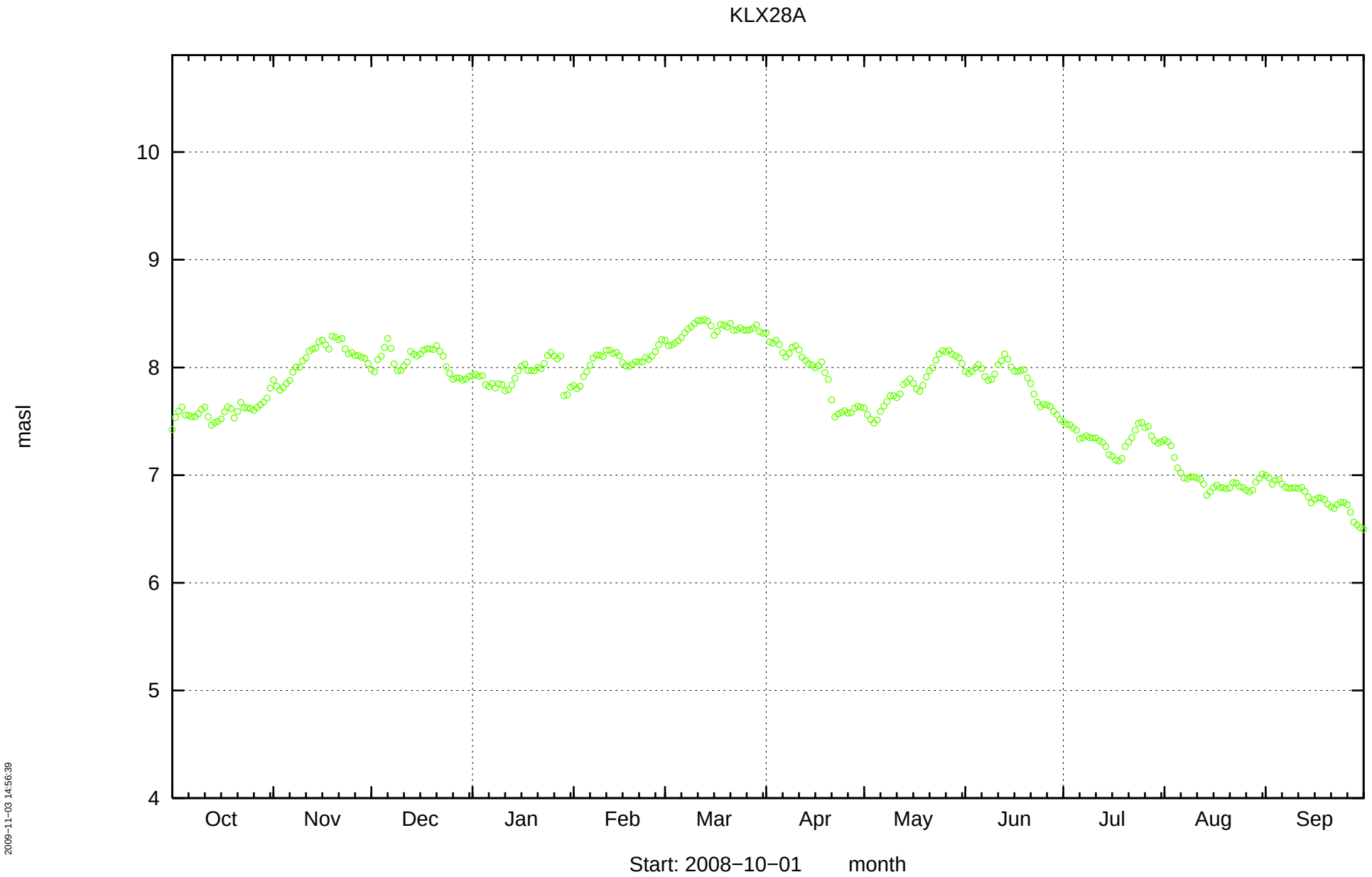

KLX21B
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:38

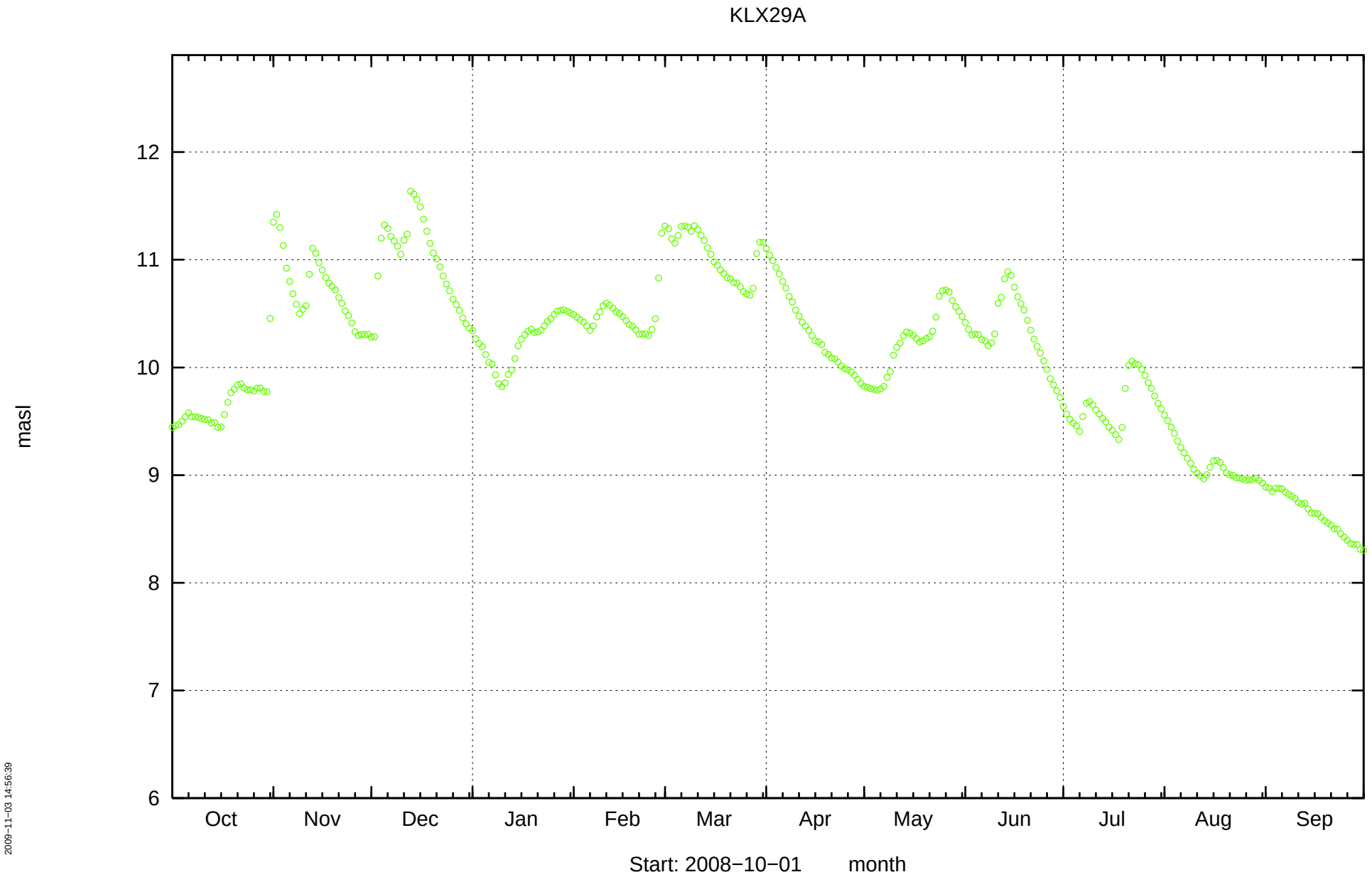

KLX23A
masl
15
10
5
0
−5
−10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

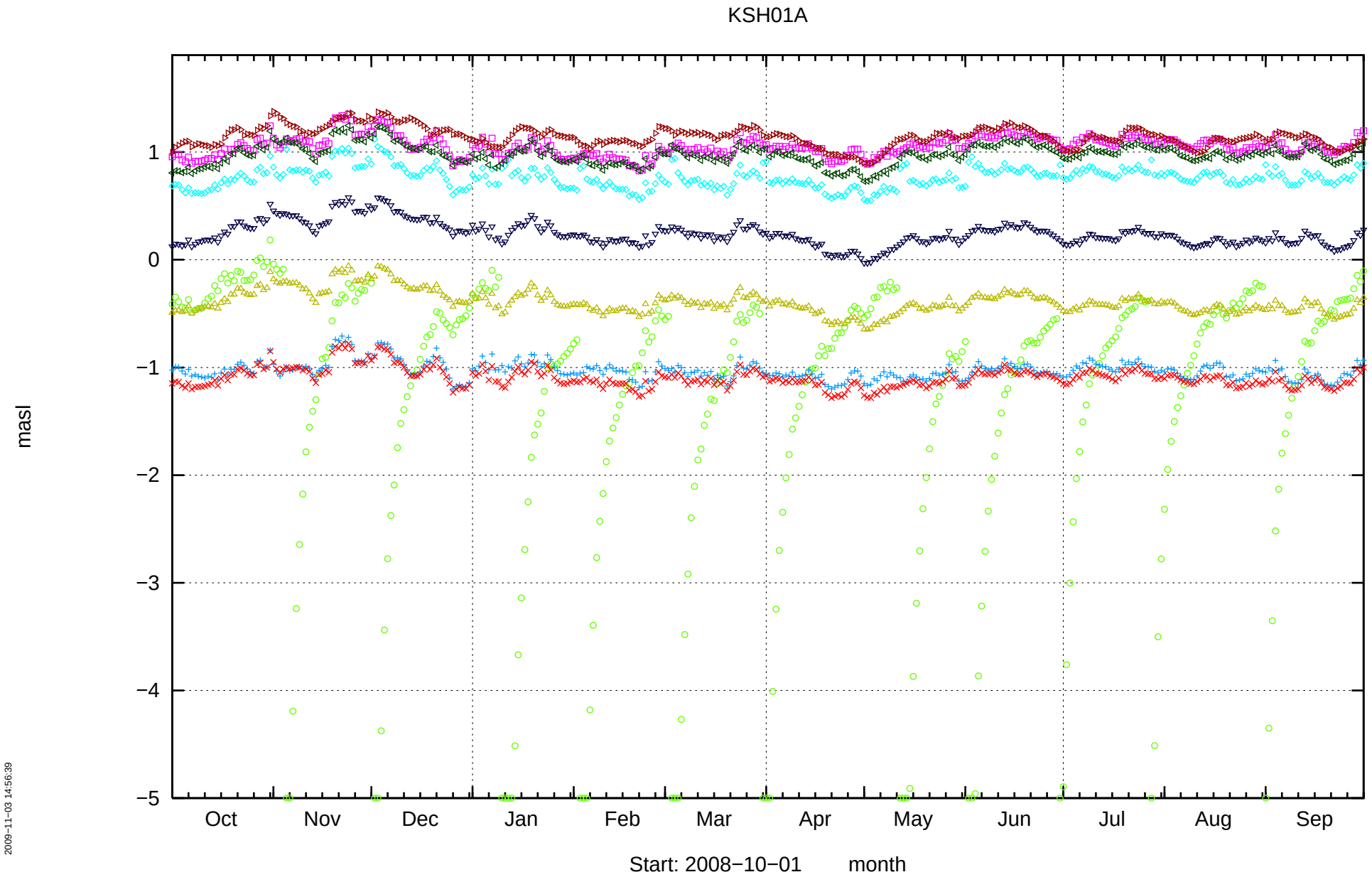

KLX24A
20
15
10
5
0
−5
masl
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

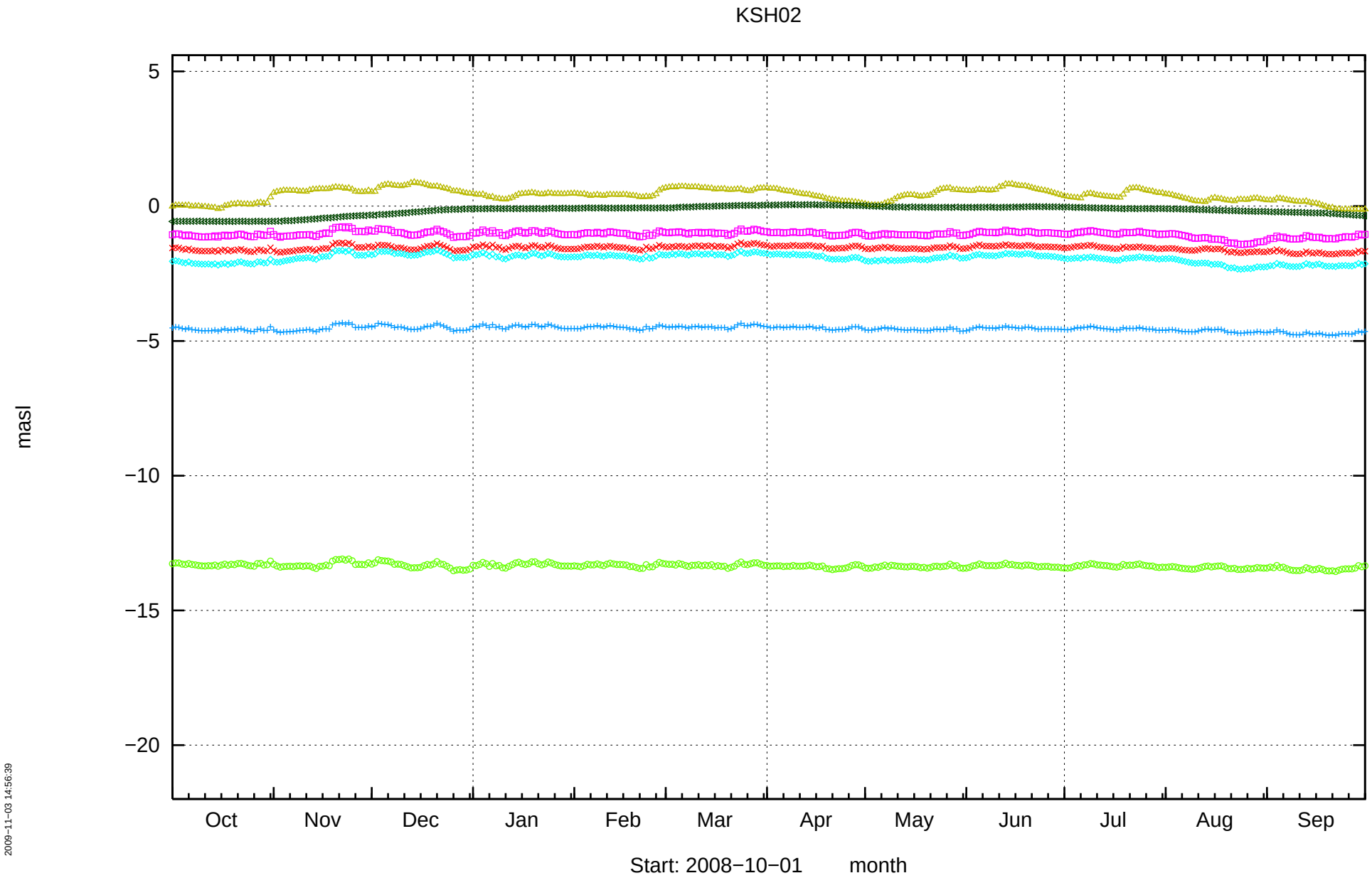

KLX26A
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:39

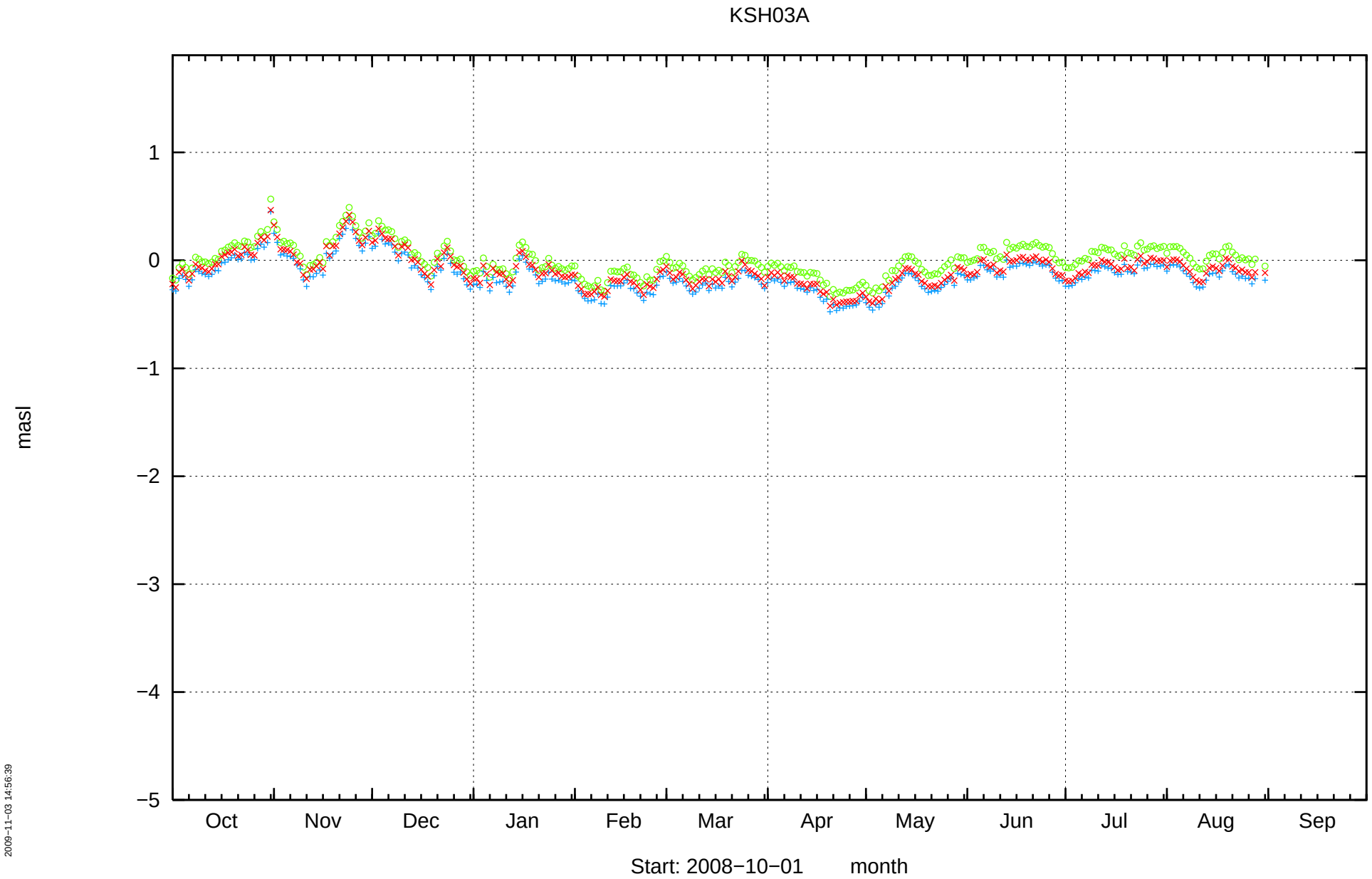

KLX27A
masl
15
10
5
0
−5
−10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

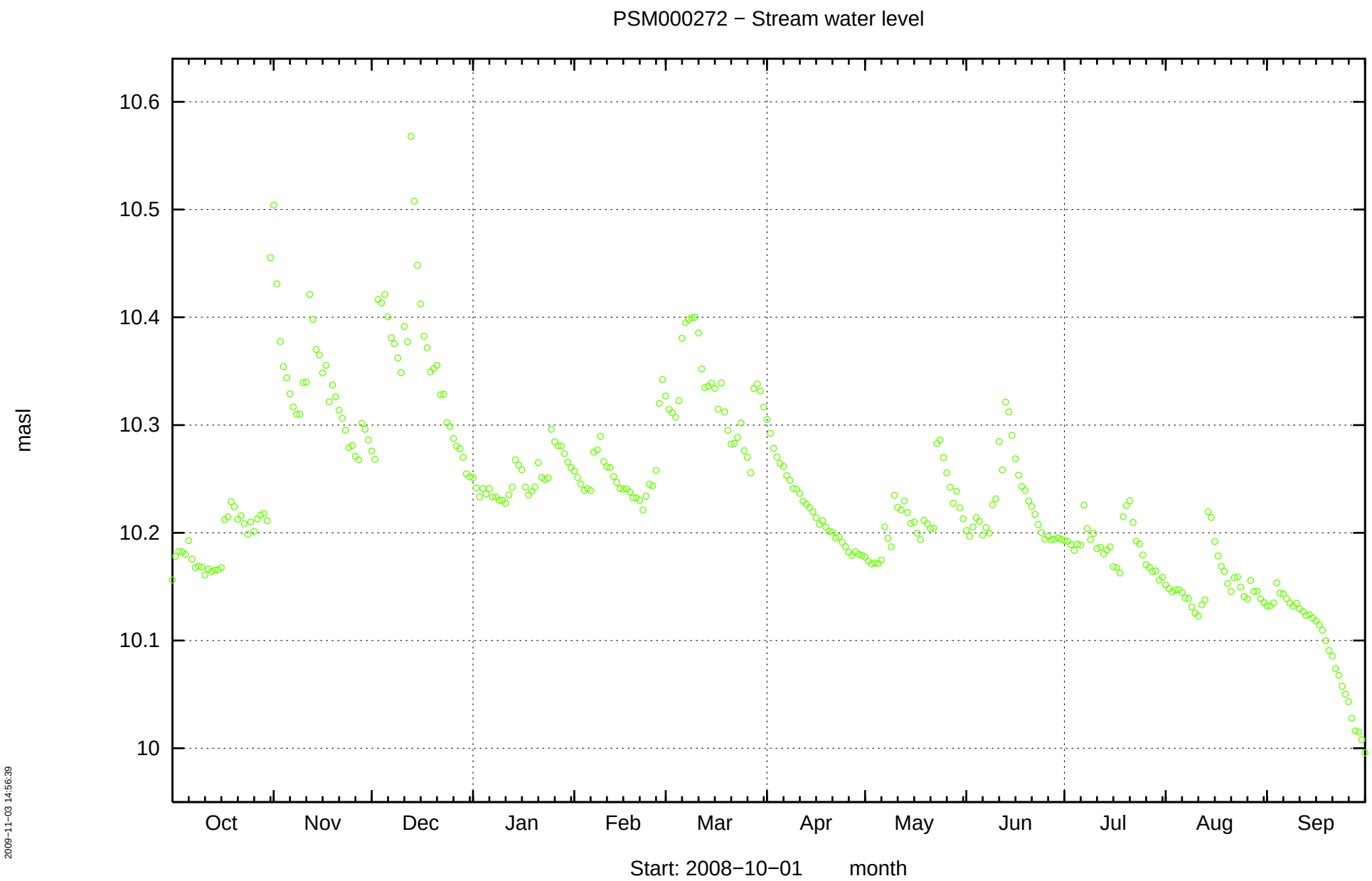

KLX28A
masl
10
9
8
7
6
5
4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

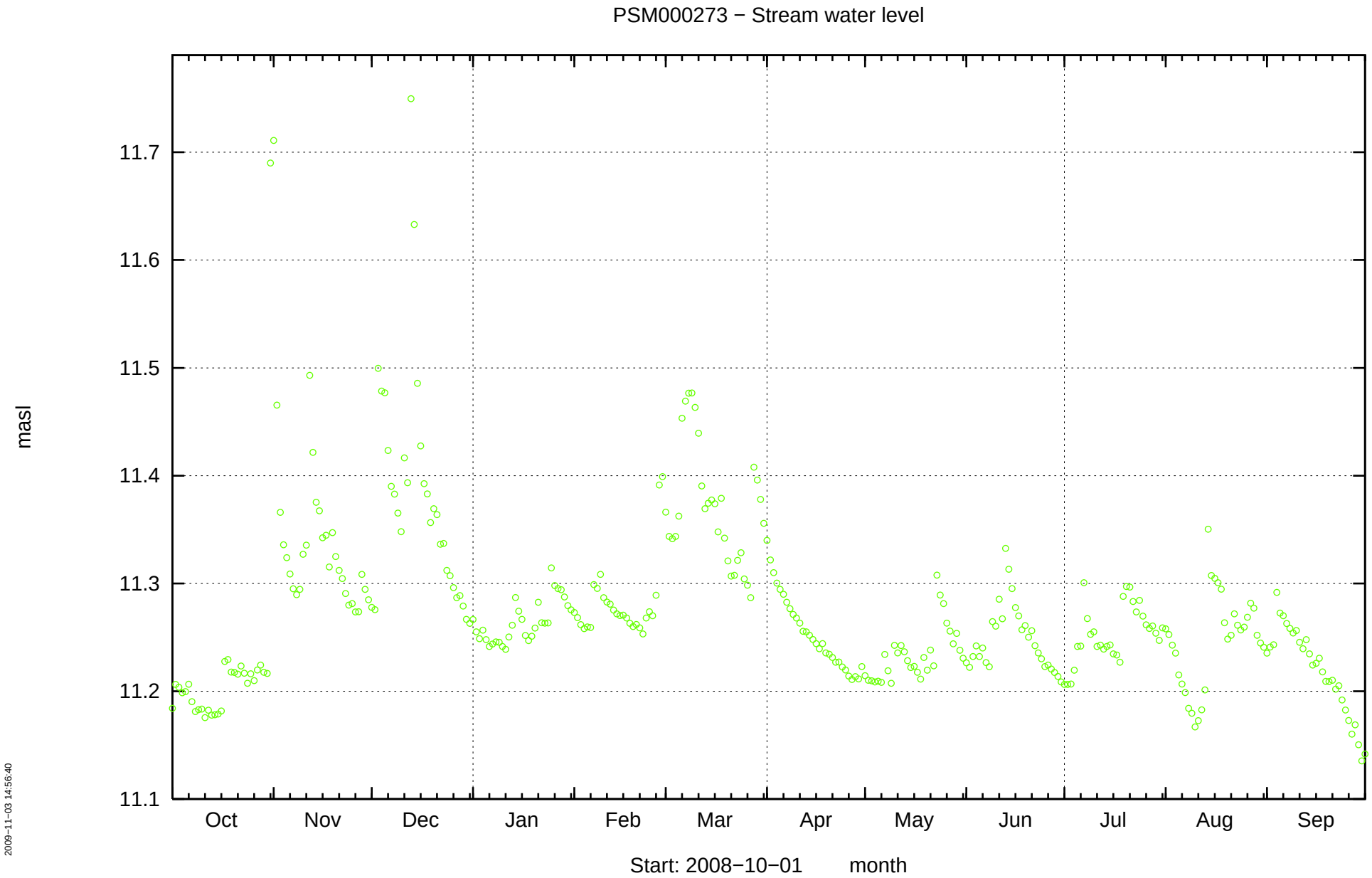

KLX29A
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

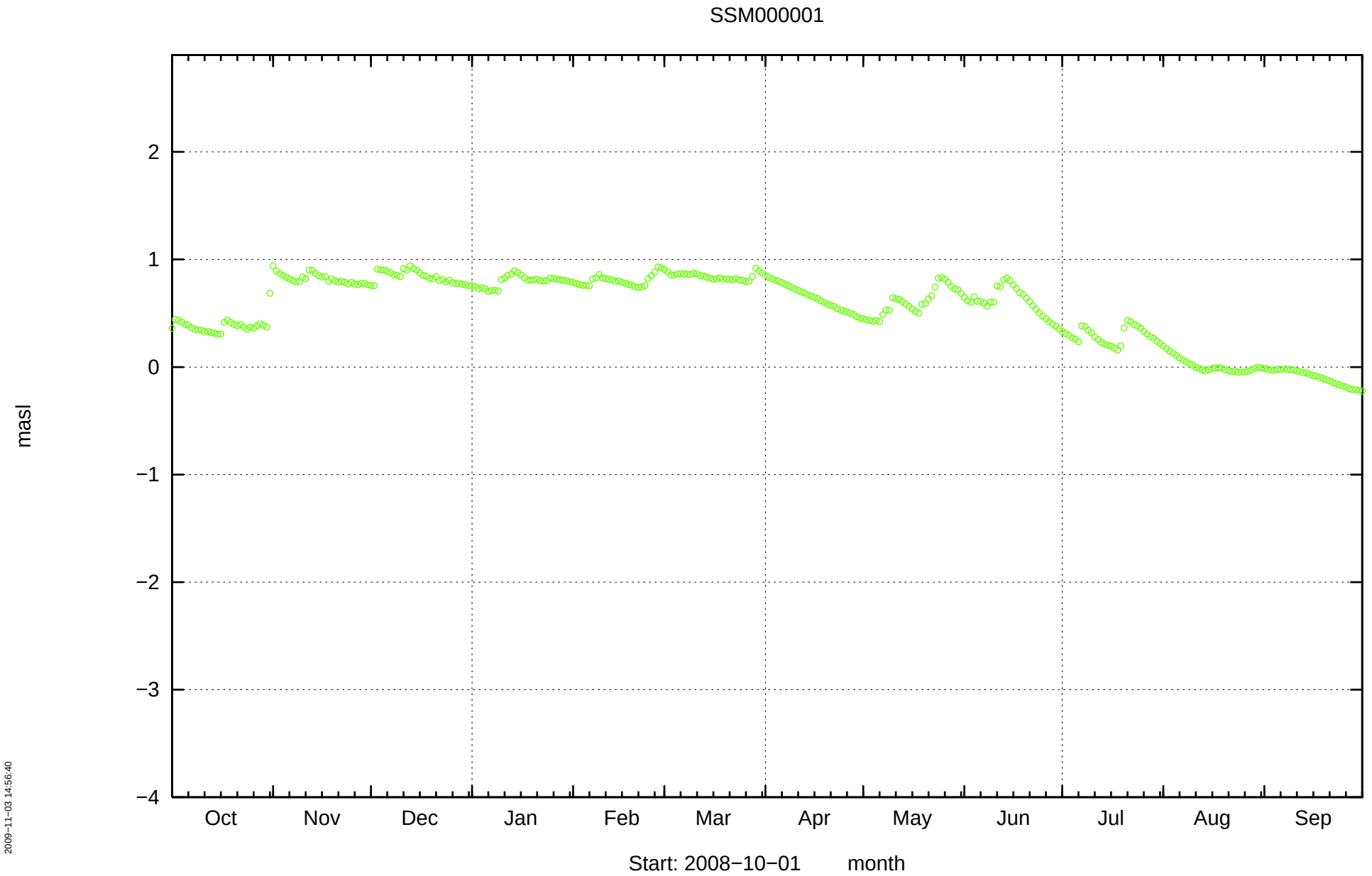

KSH01A
masl
1
0
−1
−2
−3
−4
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

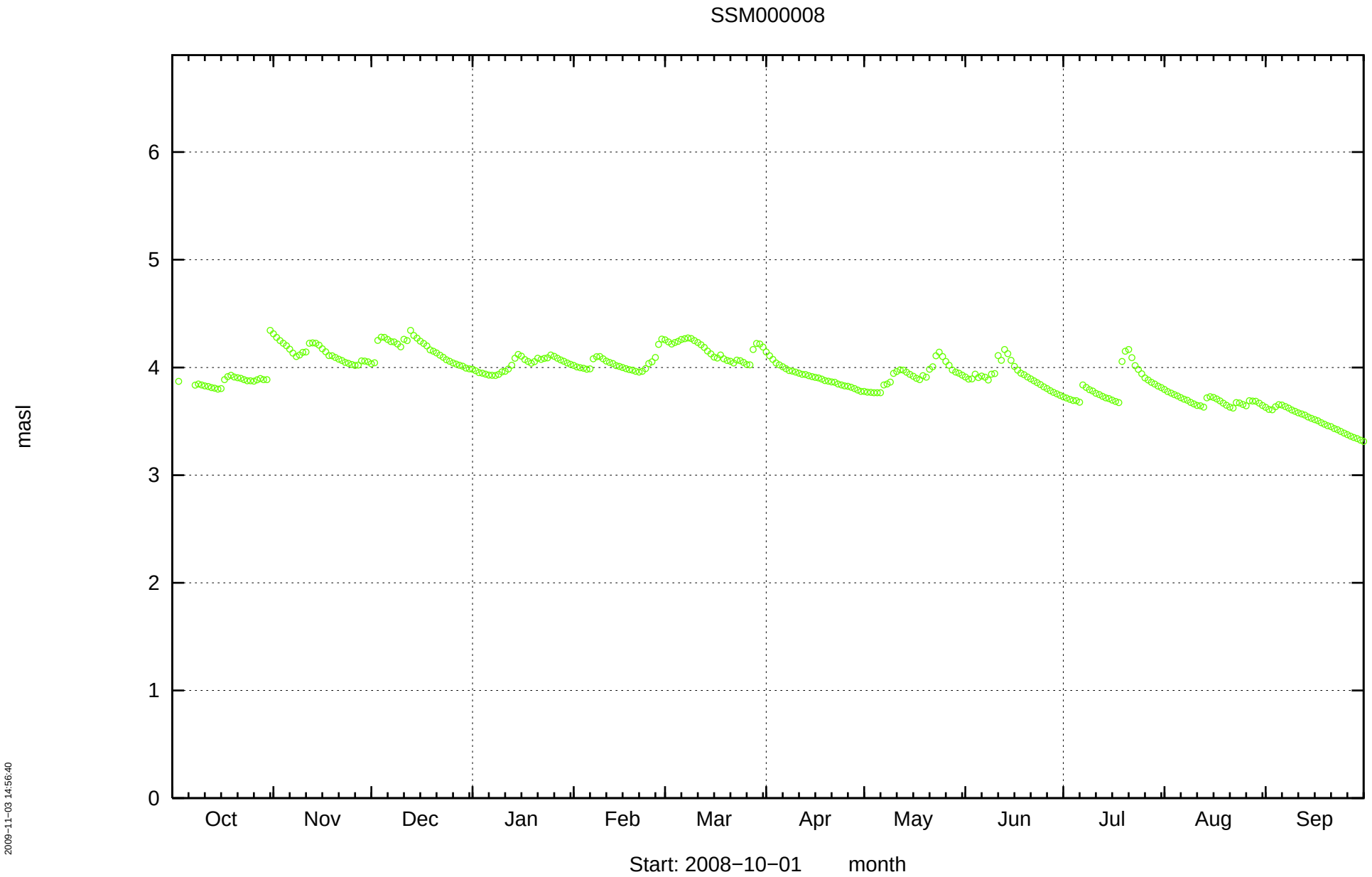

KSH02
5
0
−5
−10
−15
−20
masl
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

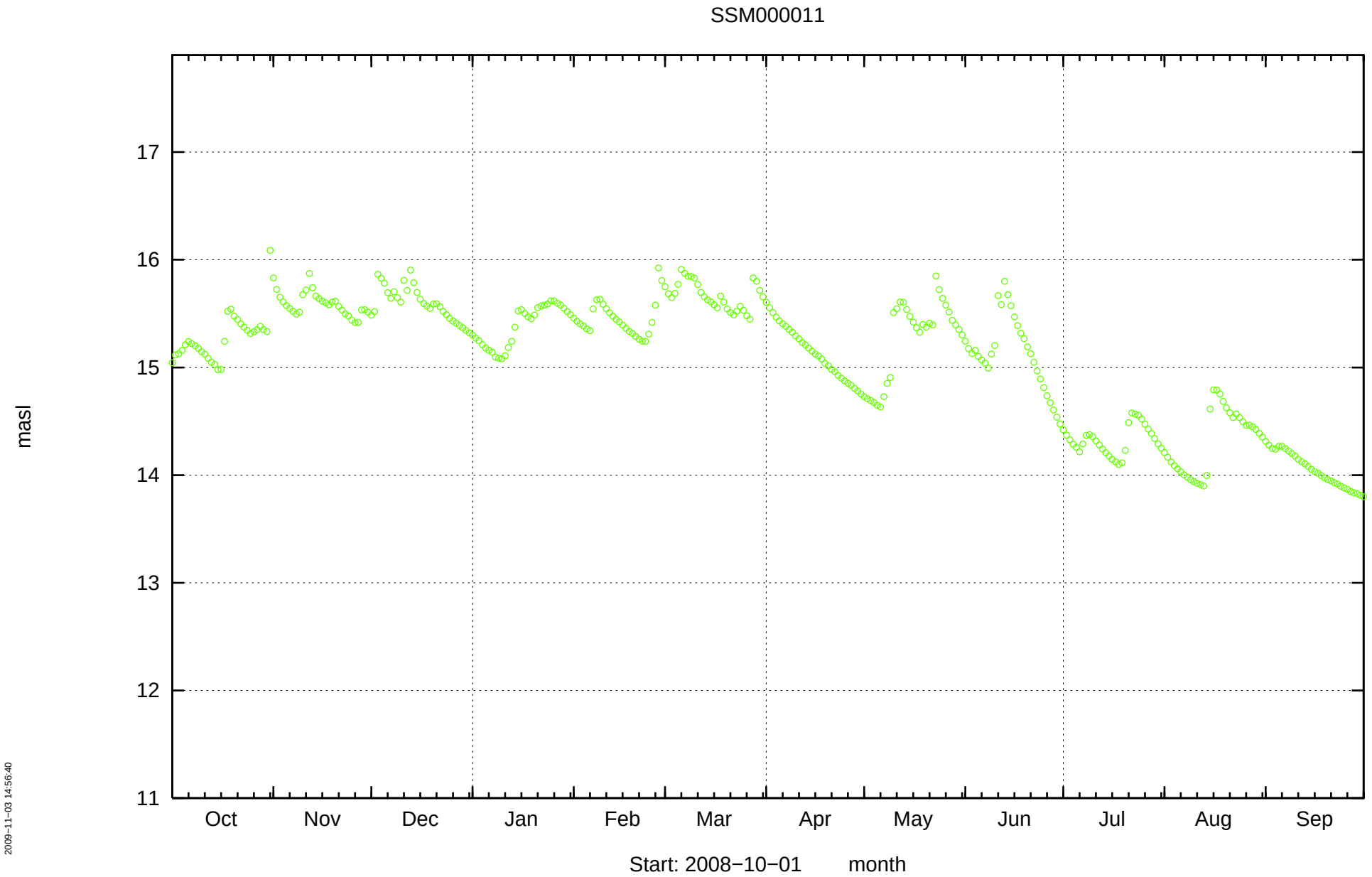

KSH03A
masl
1
0
−1
−2
−3
−4
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

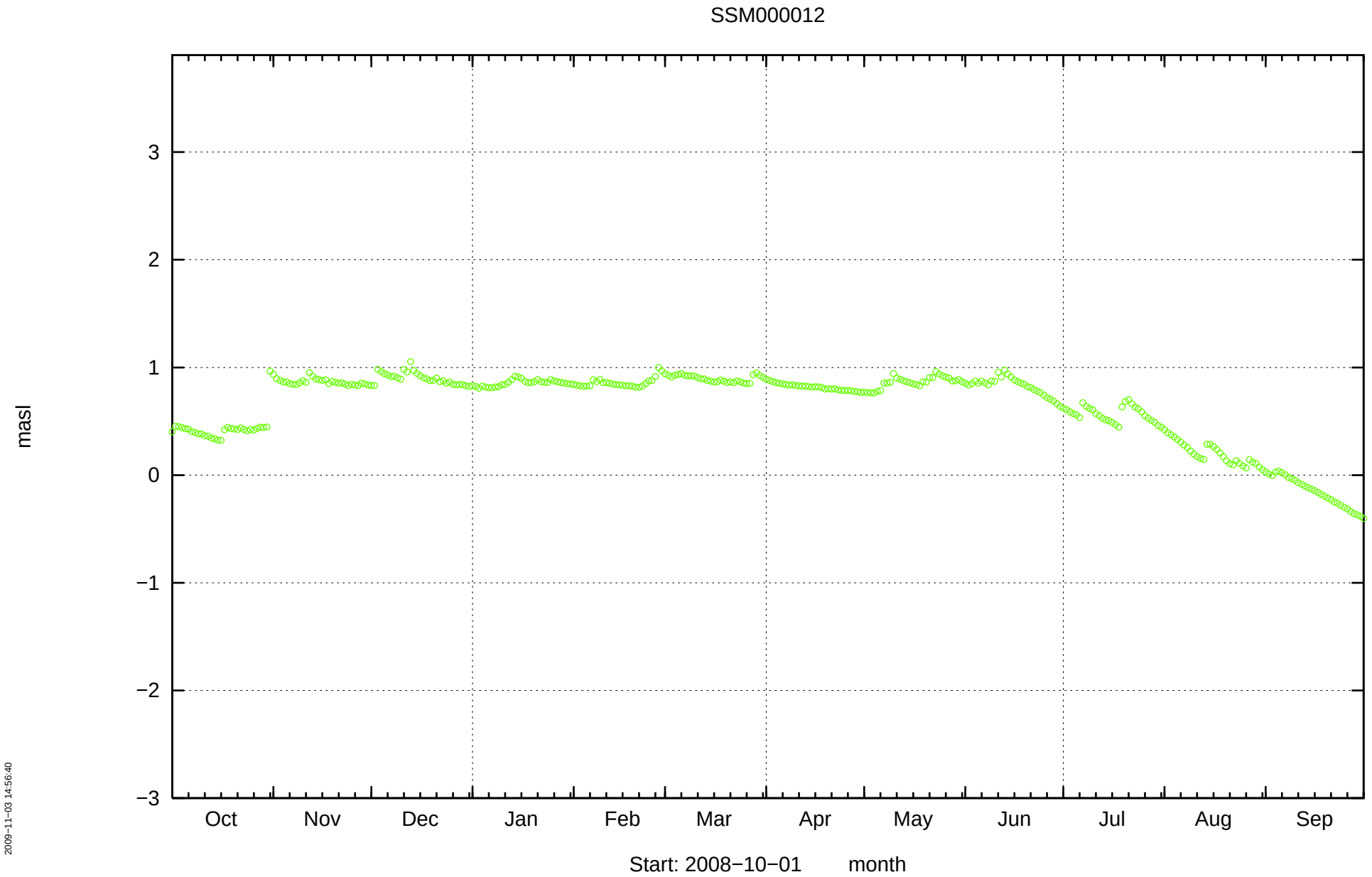

PSM000272 − Stream water level
masl
10.6
10.5
10.4
10.3
10.2
10.1
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:39

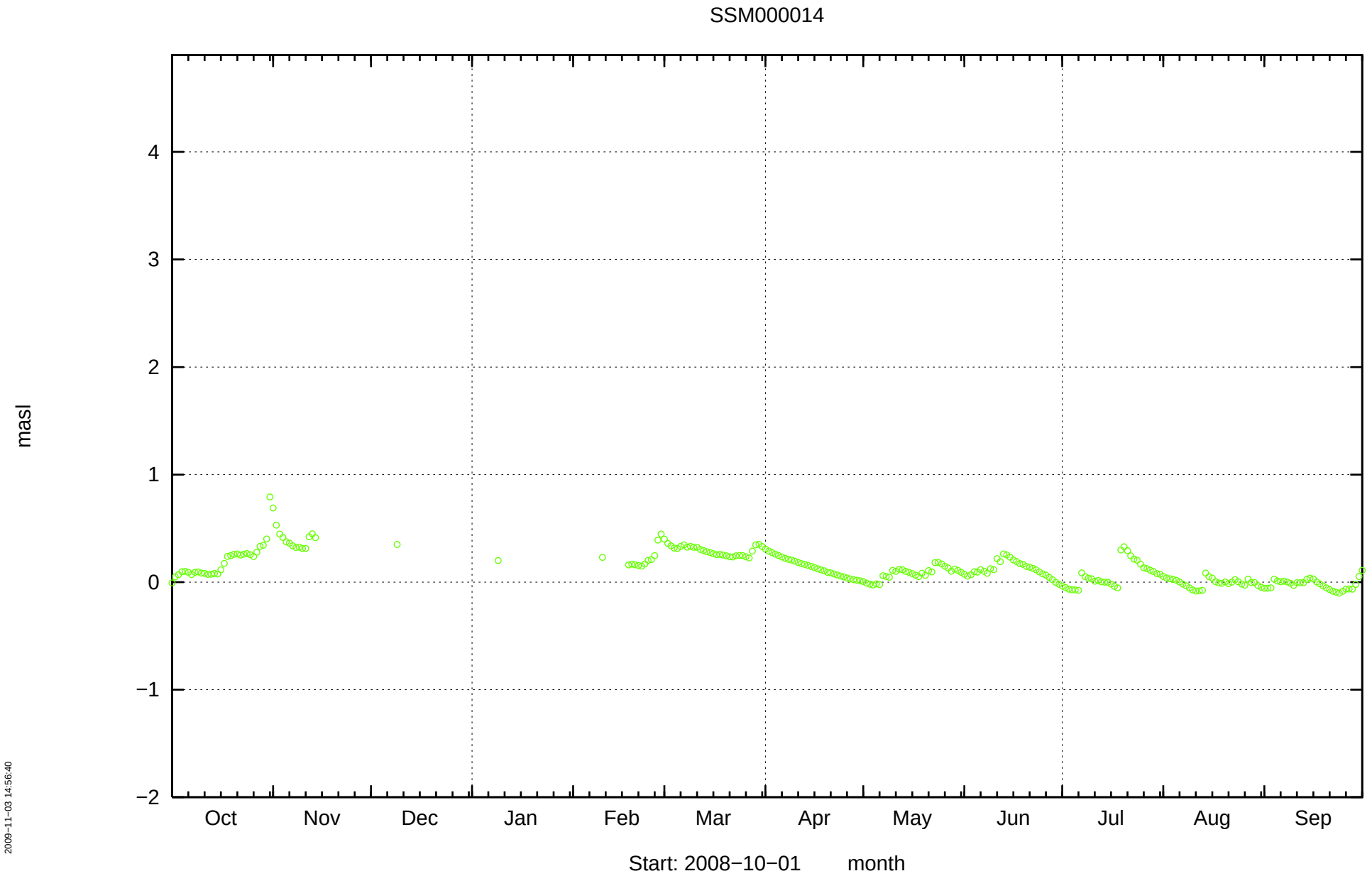

PSM000273 − Stream water level
masl
11.7
11.6
11.5
11.4
11.3
11.2
11.1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

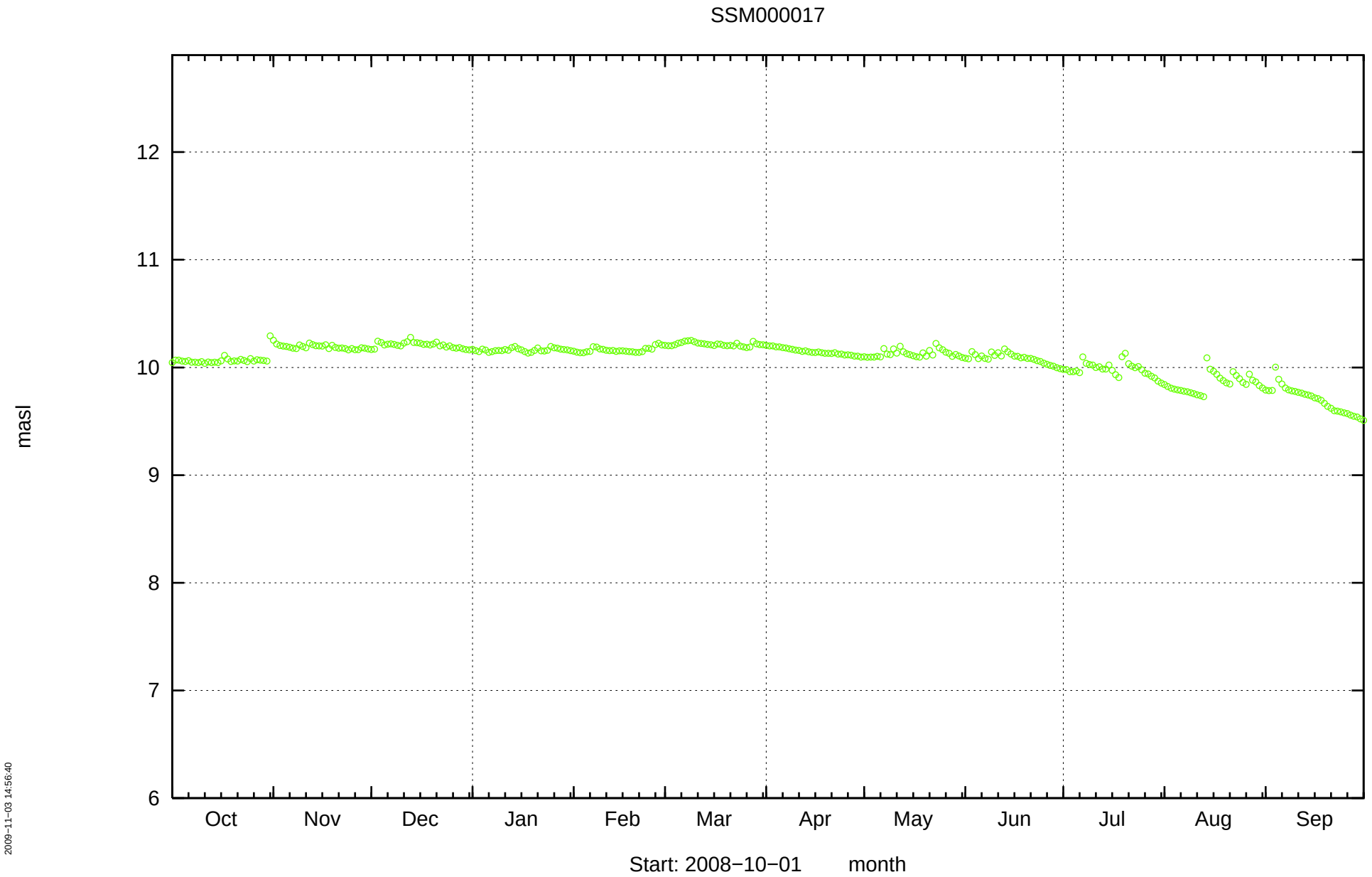

SSM000001
masl
2
1
0
−1
−2
−3
−4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

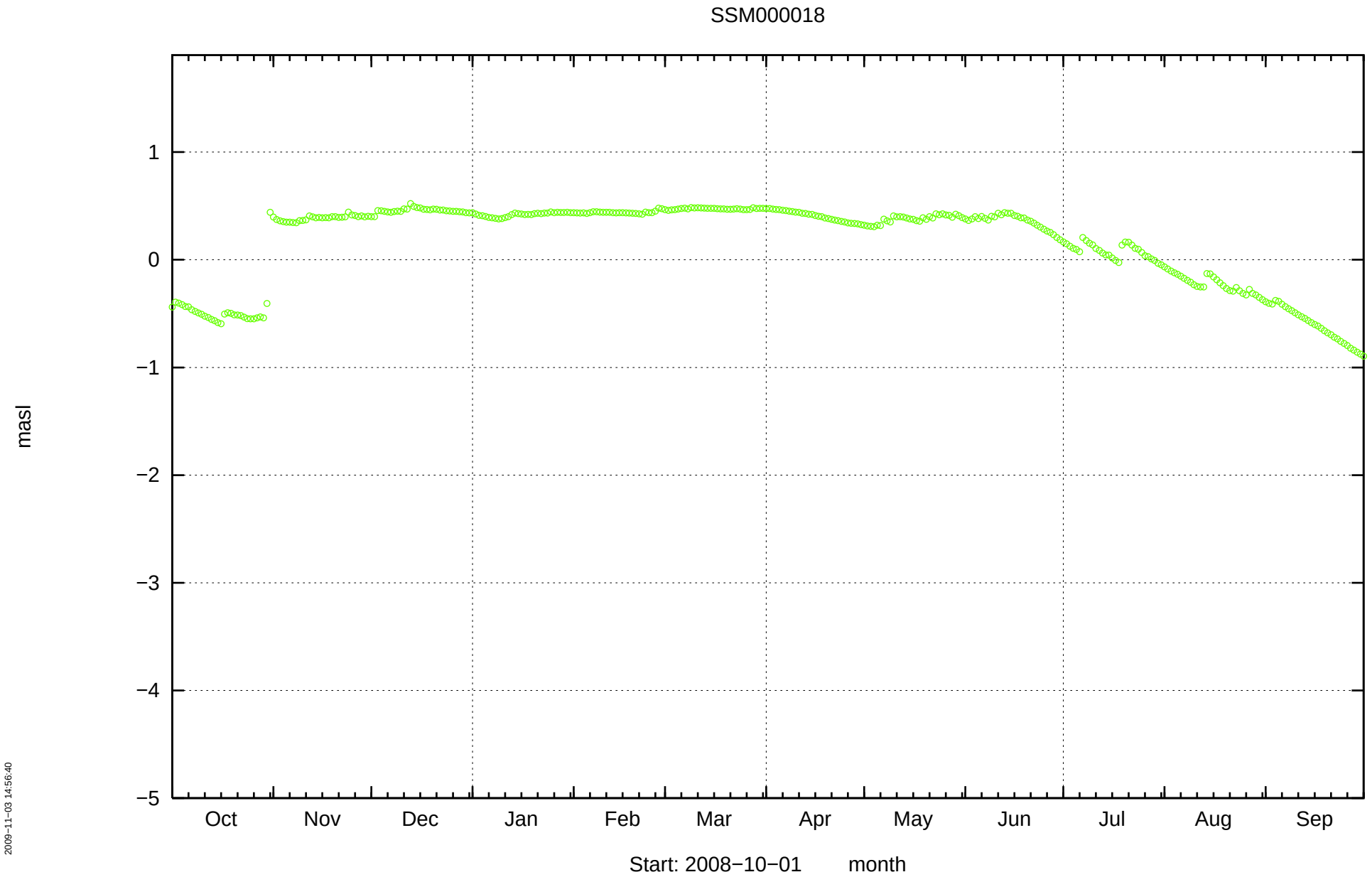

SSM000008
masl
6
5
4
3
2
1
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

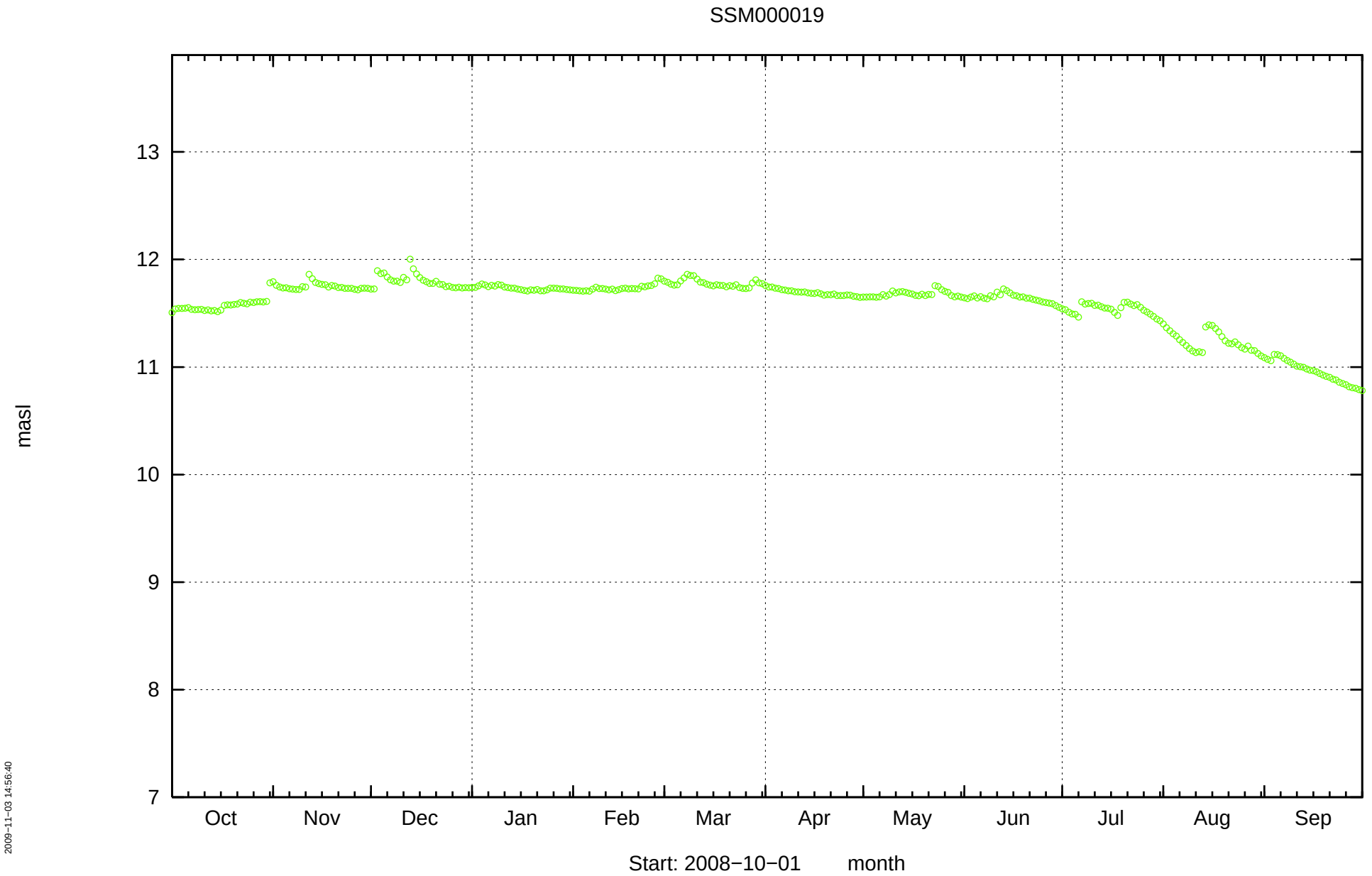

SSM000011
masl
17
16
15
14
13
12
11
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

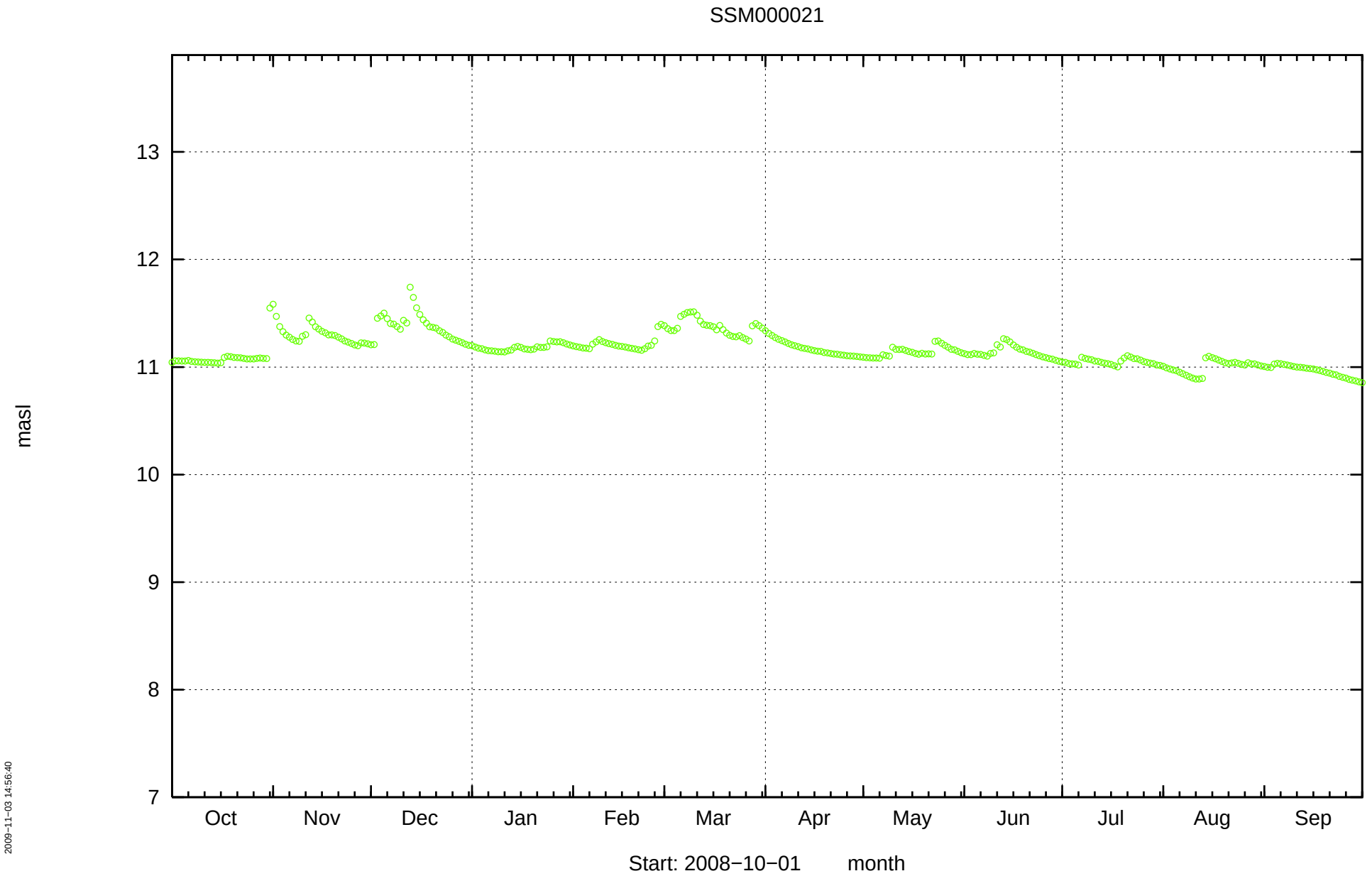

SSM000012
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

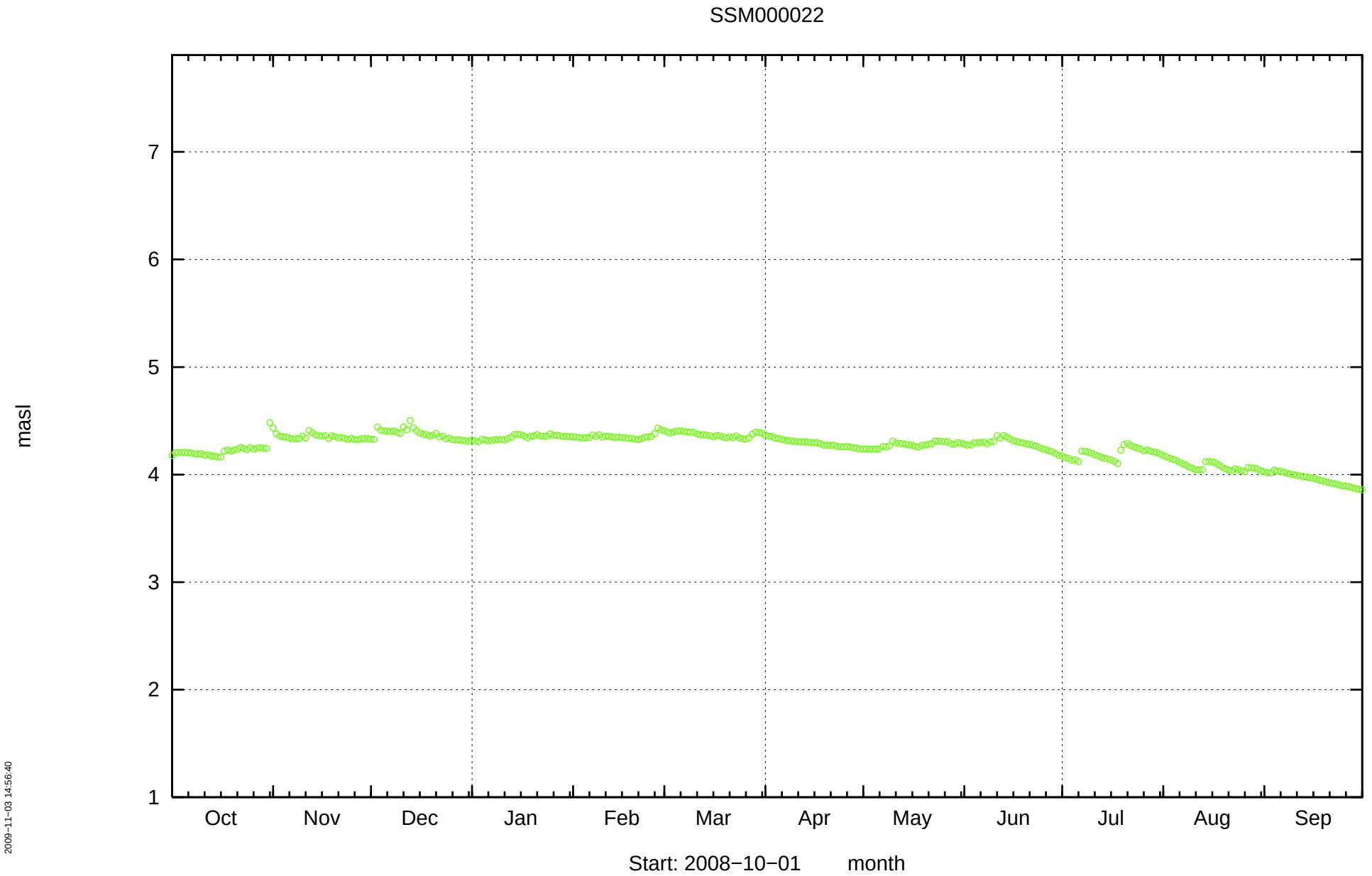

SSM000014
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

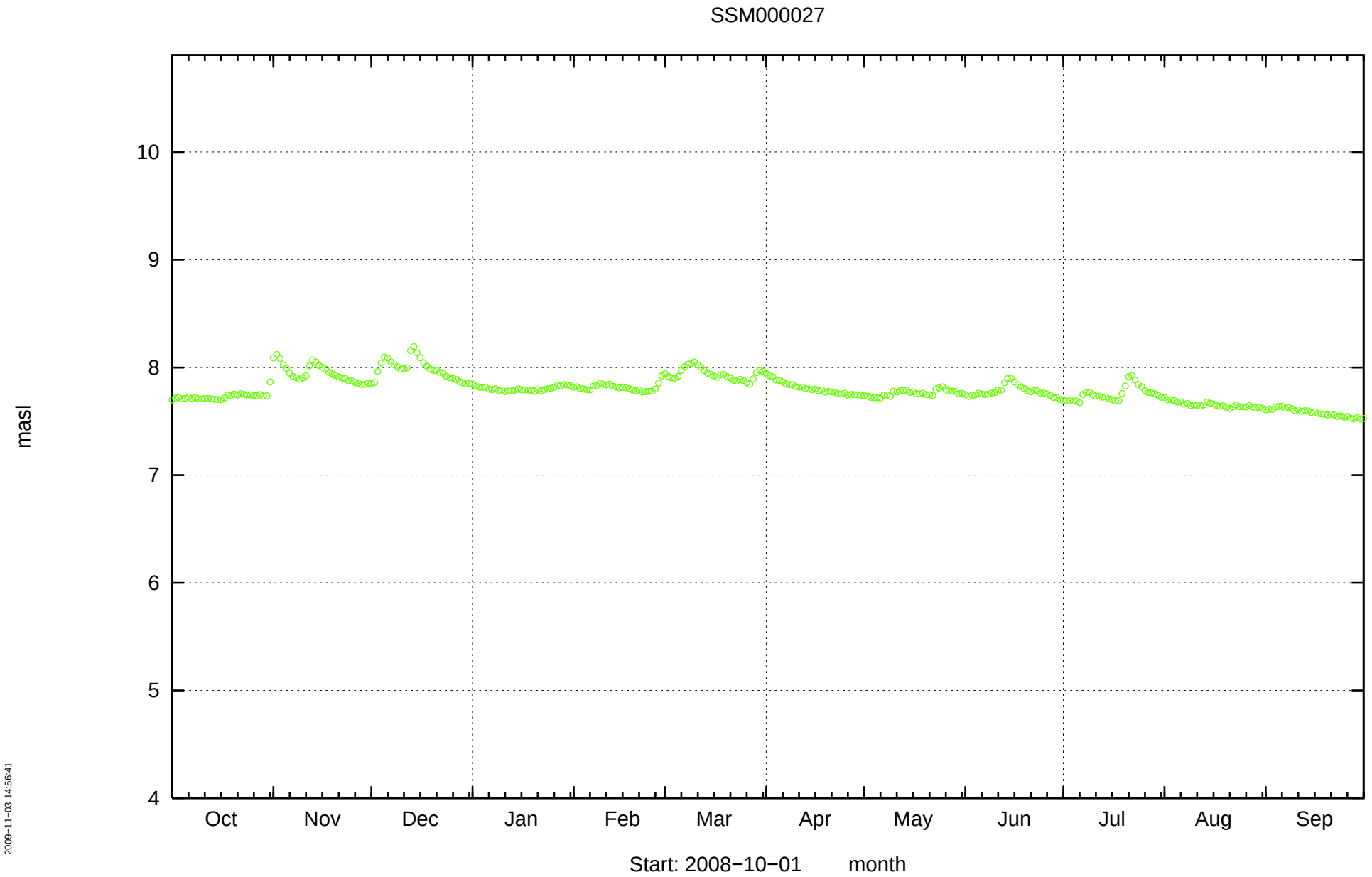

SSM000017
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

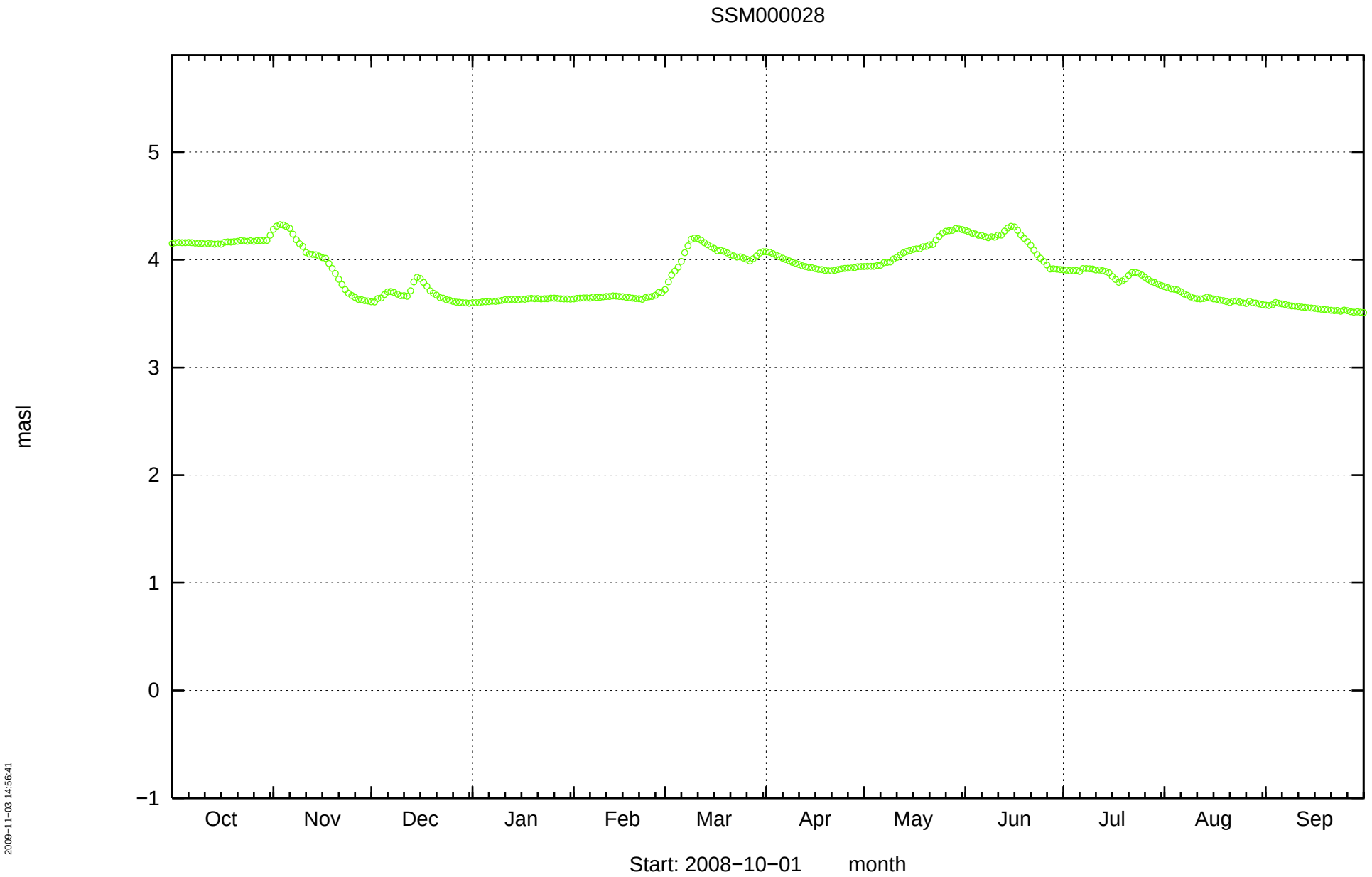

SSM000018
masl
1
0
−1
−2
−3
−4
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

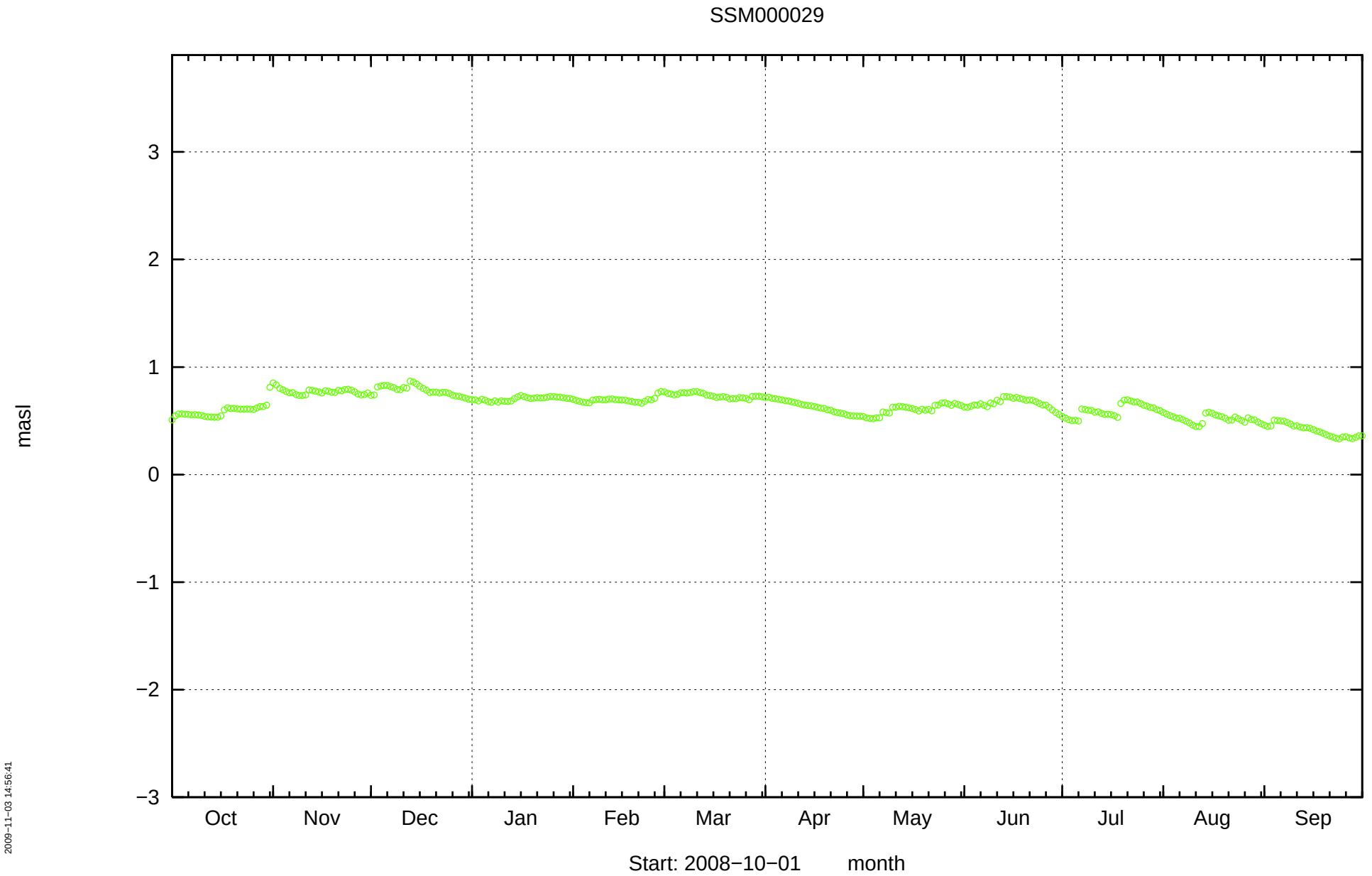

SSM000019
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

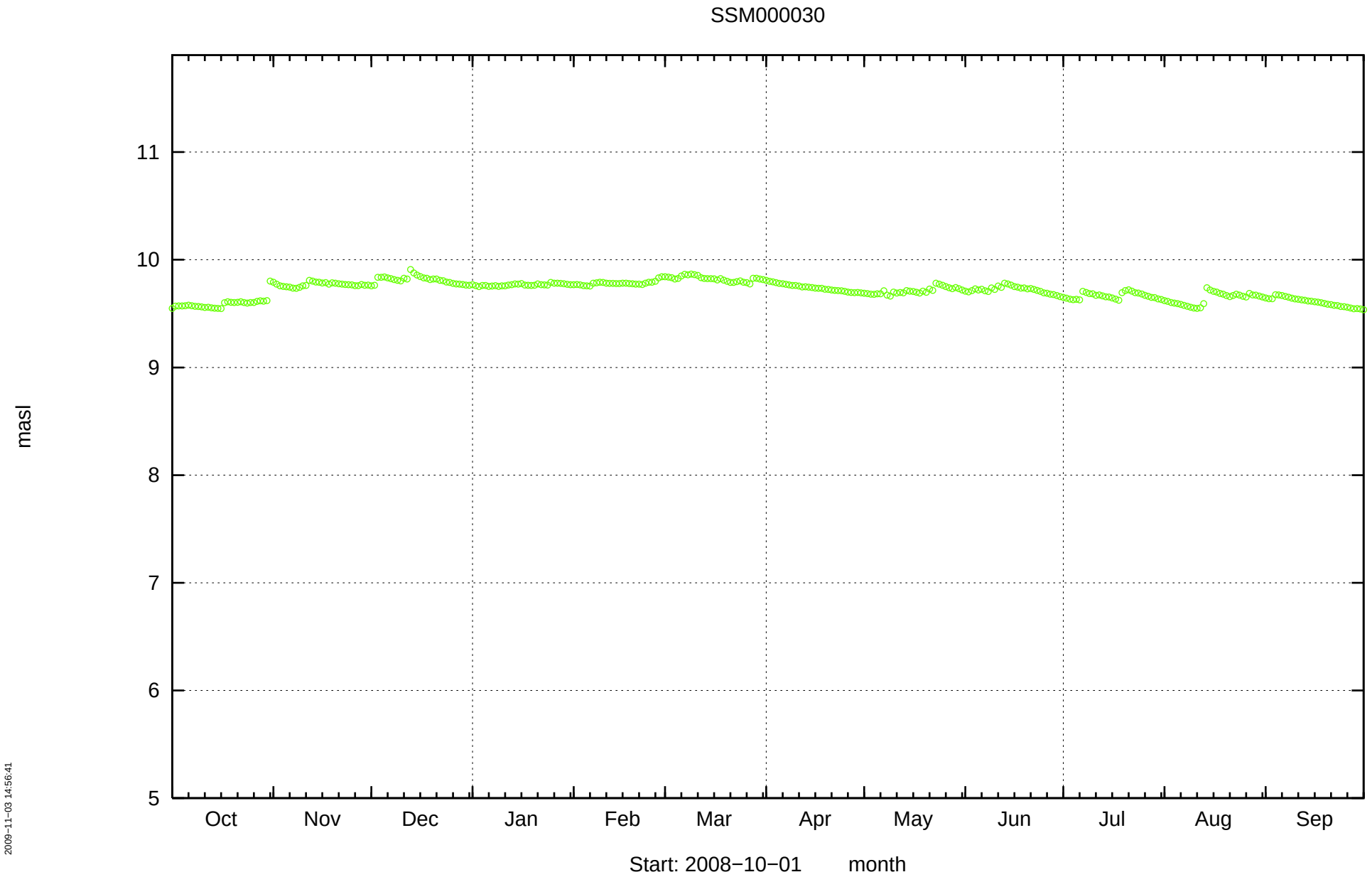

SSM000021
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

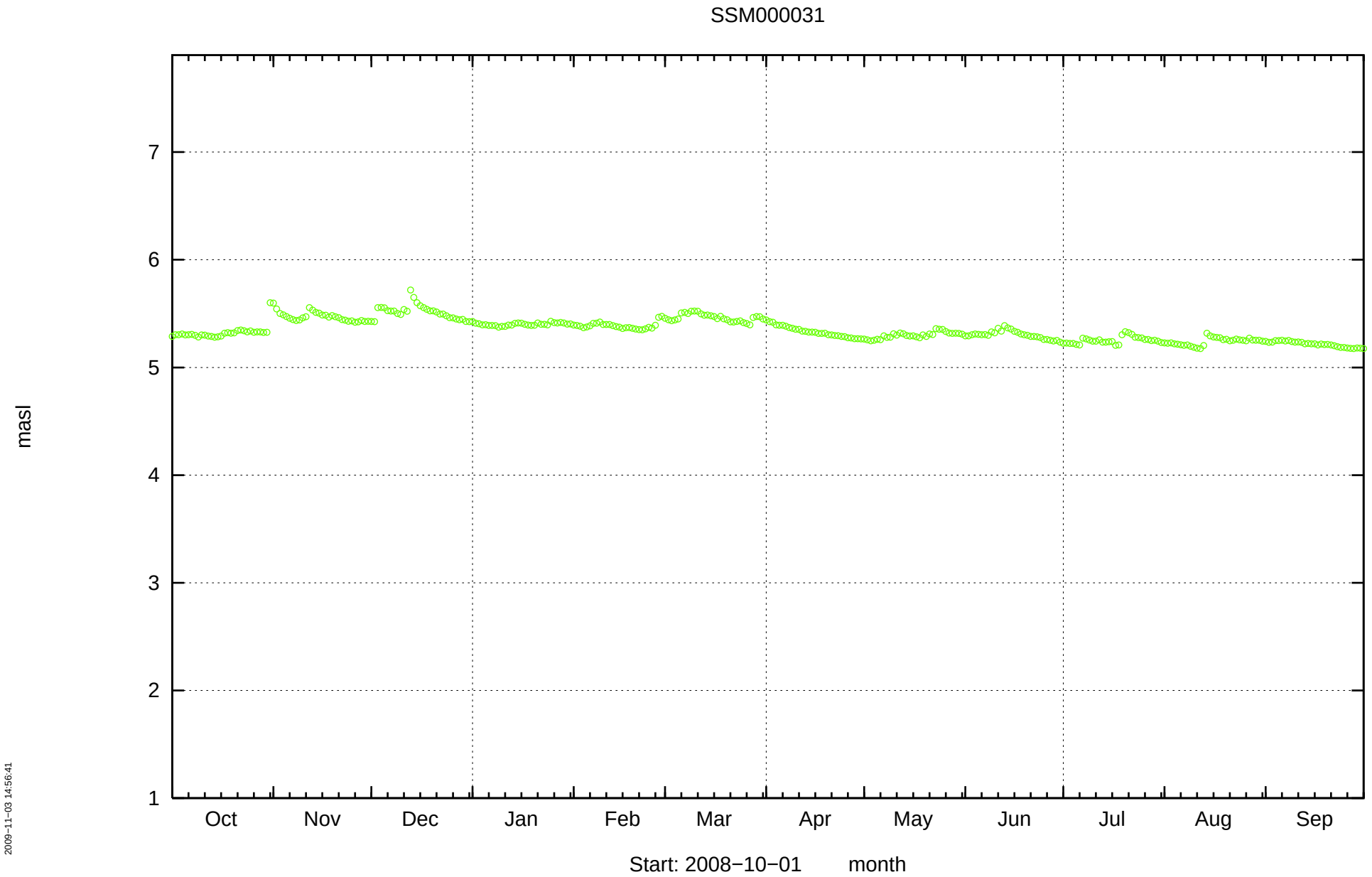

SSM000022
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:40

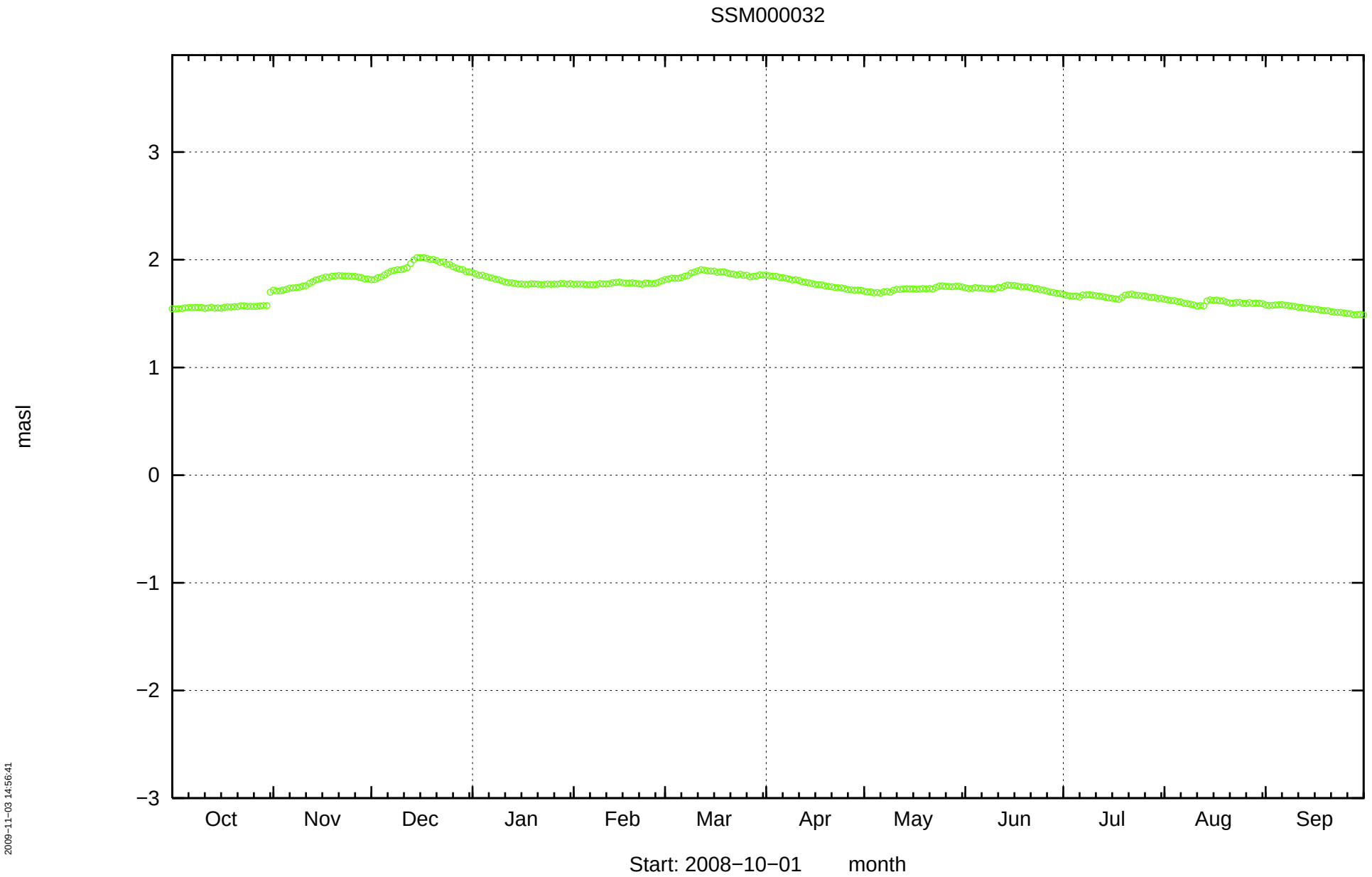

SSM000027
masl
10
9
8
7
6
5
4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:41

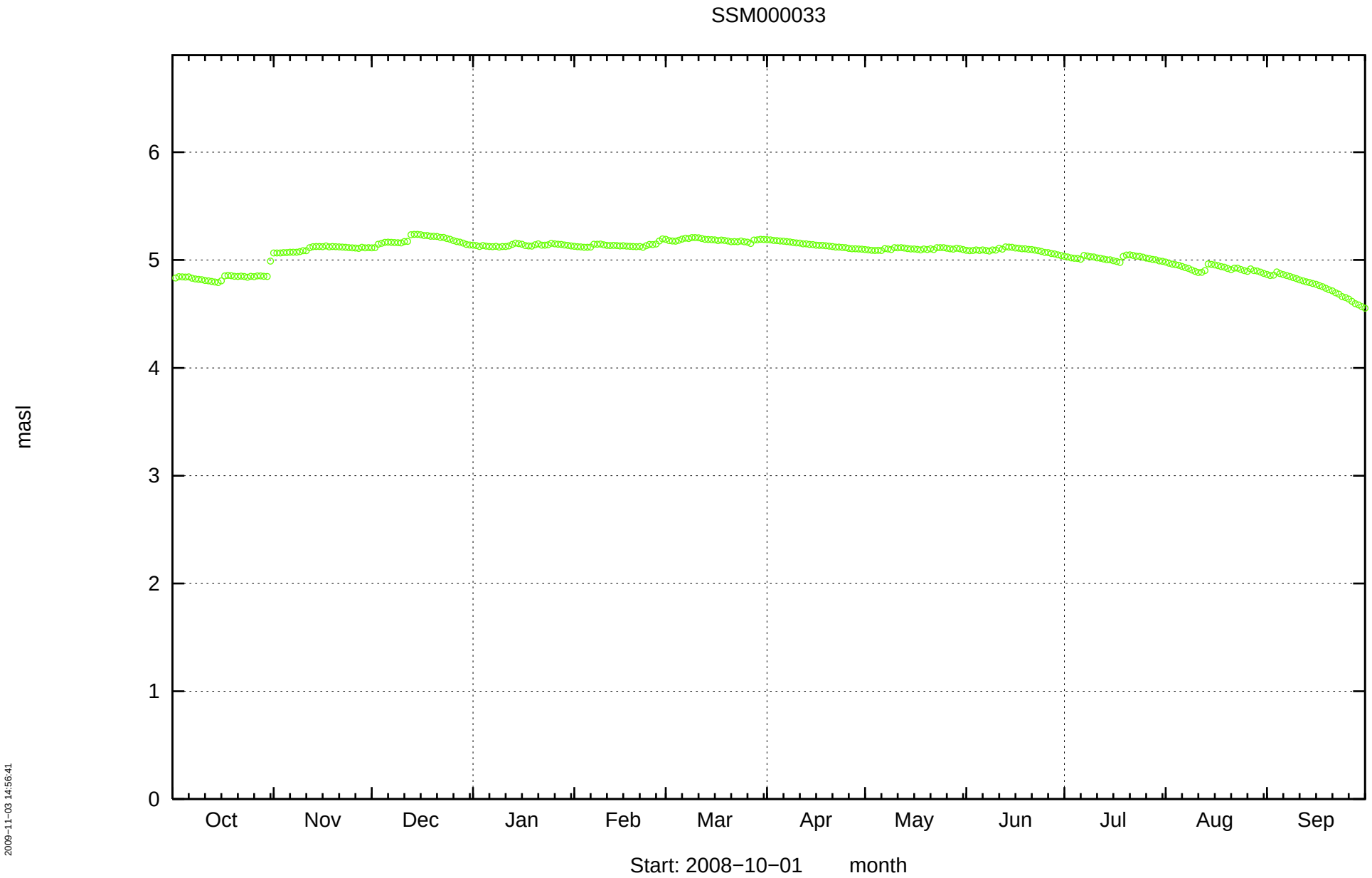

SSM000028
masl
5
4
3
2
1
0
−1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:41

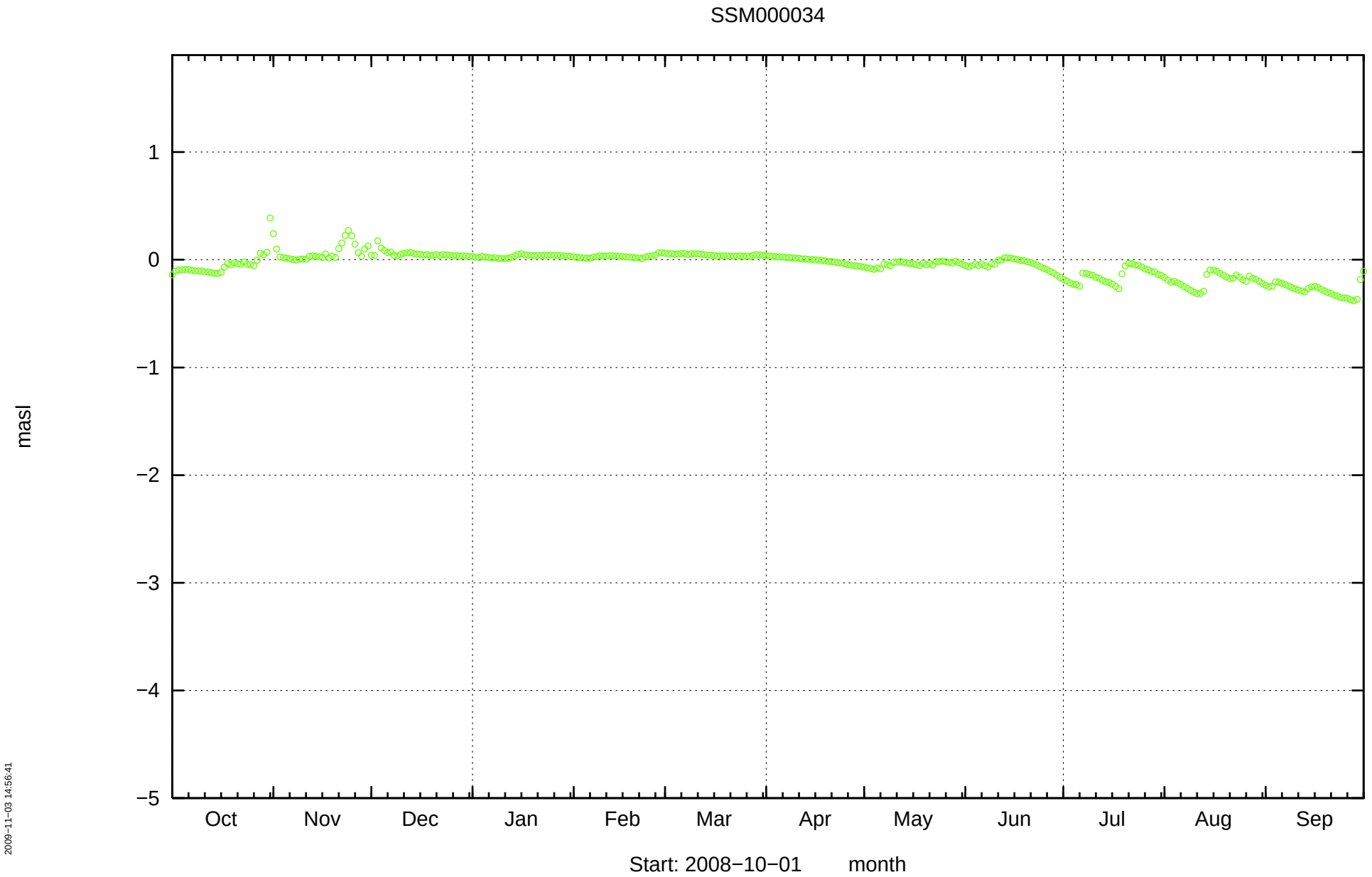

SSM000029
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:41

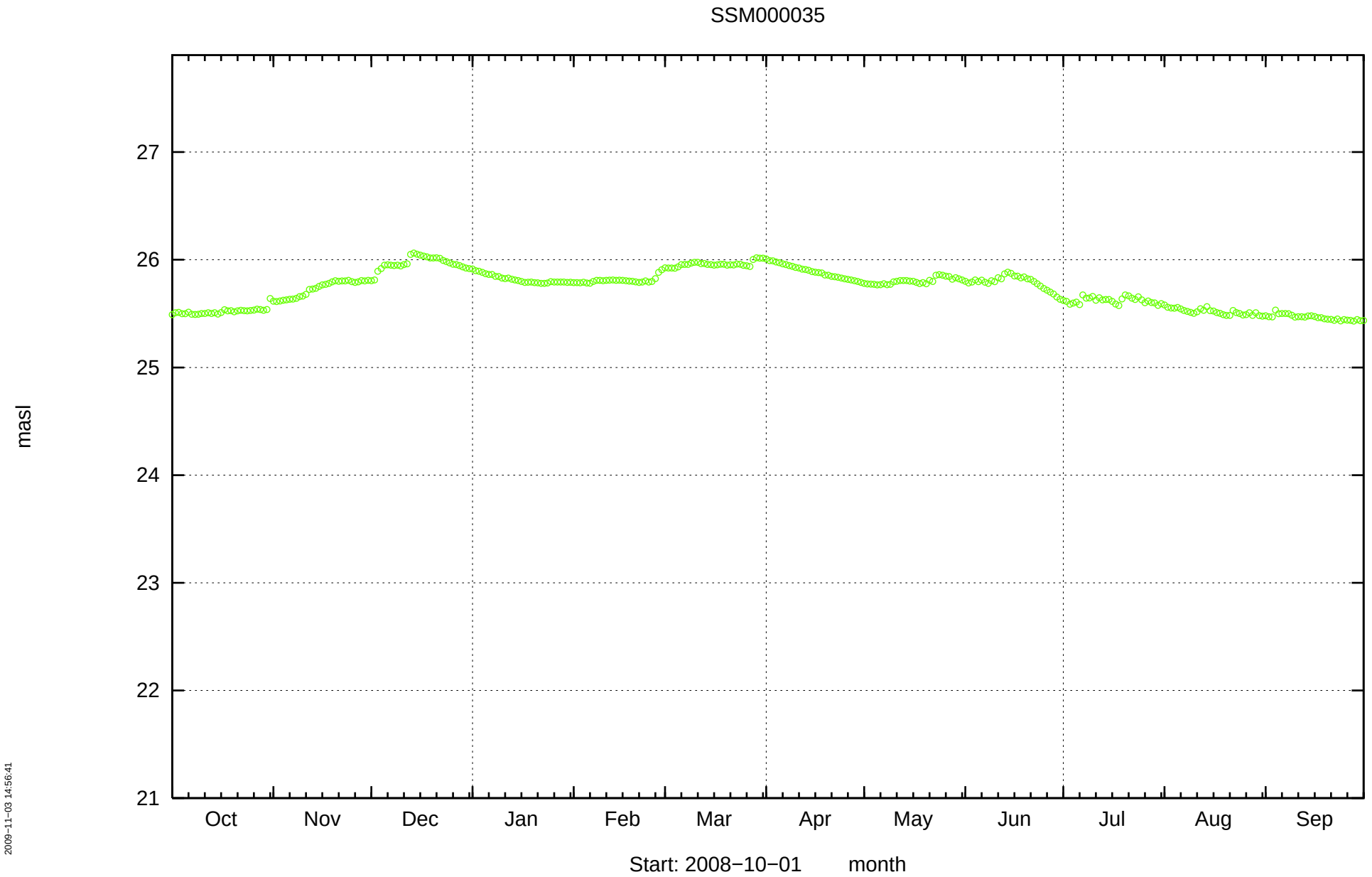

SSM000030
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:41

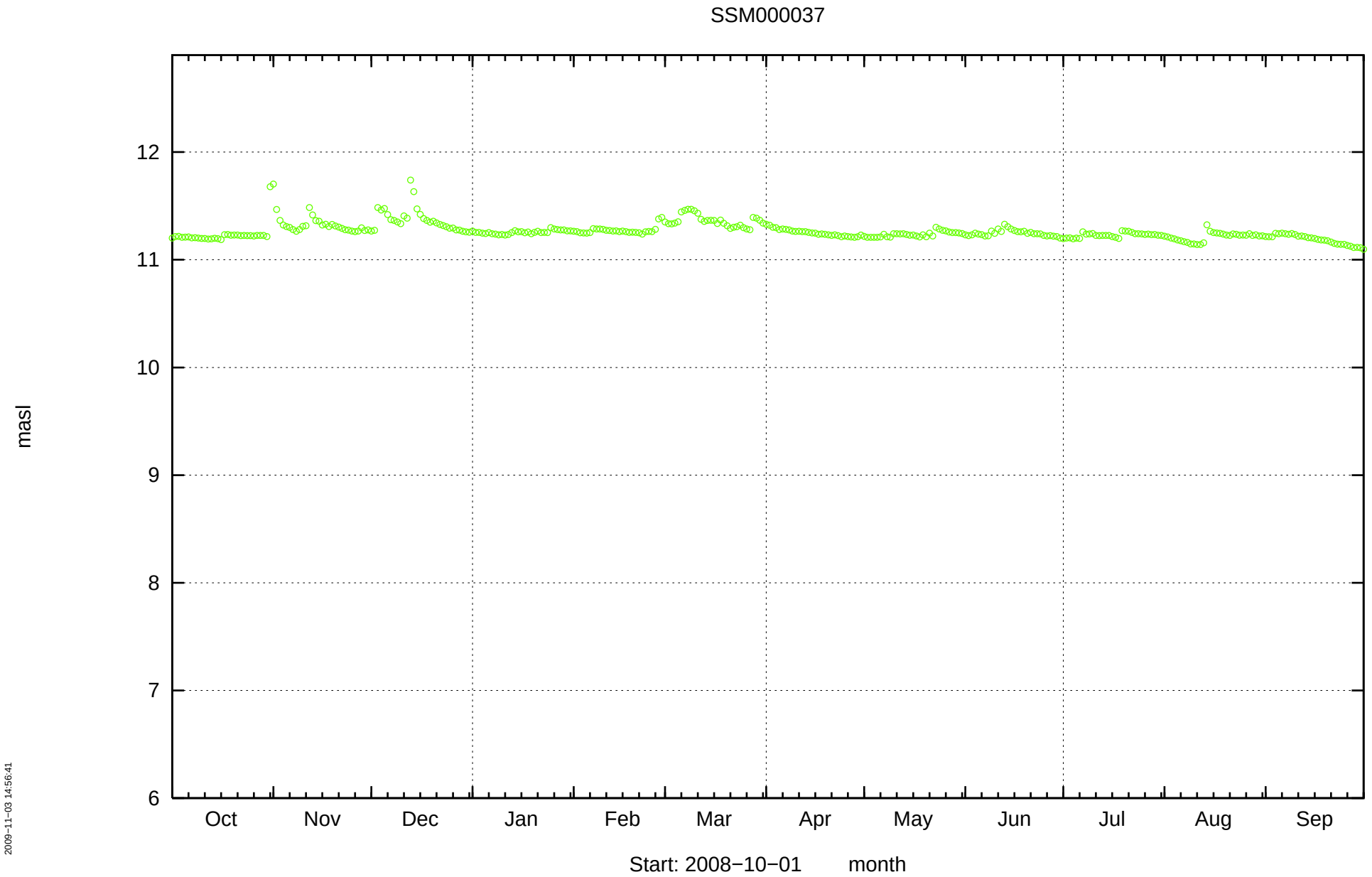

SSM000031
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:41

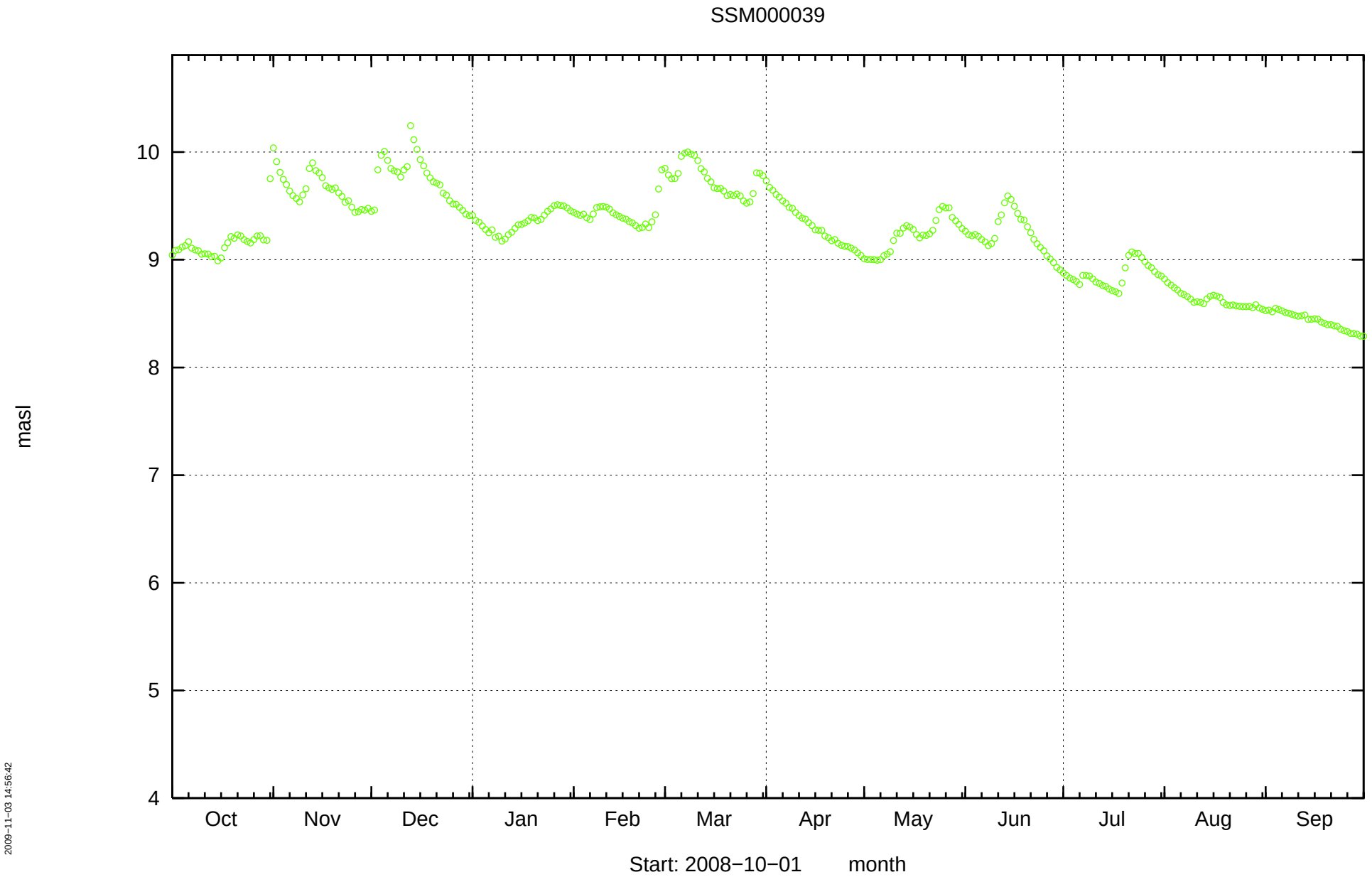

SSM000032
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:41

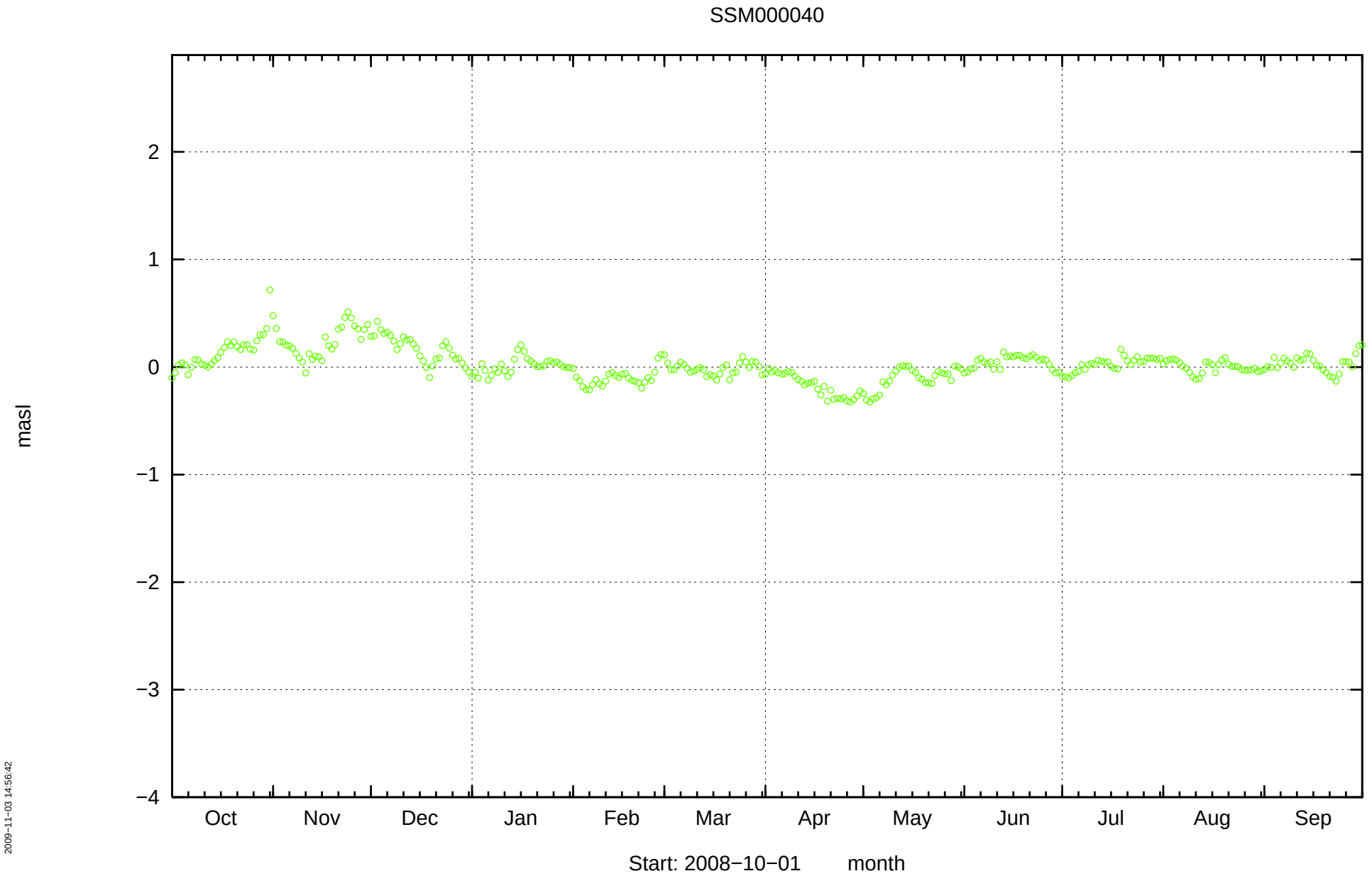

SSM000033
masl
6
5
4
3
2
1
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:41

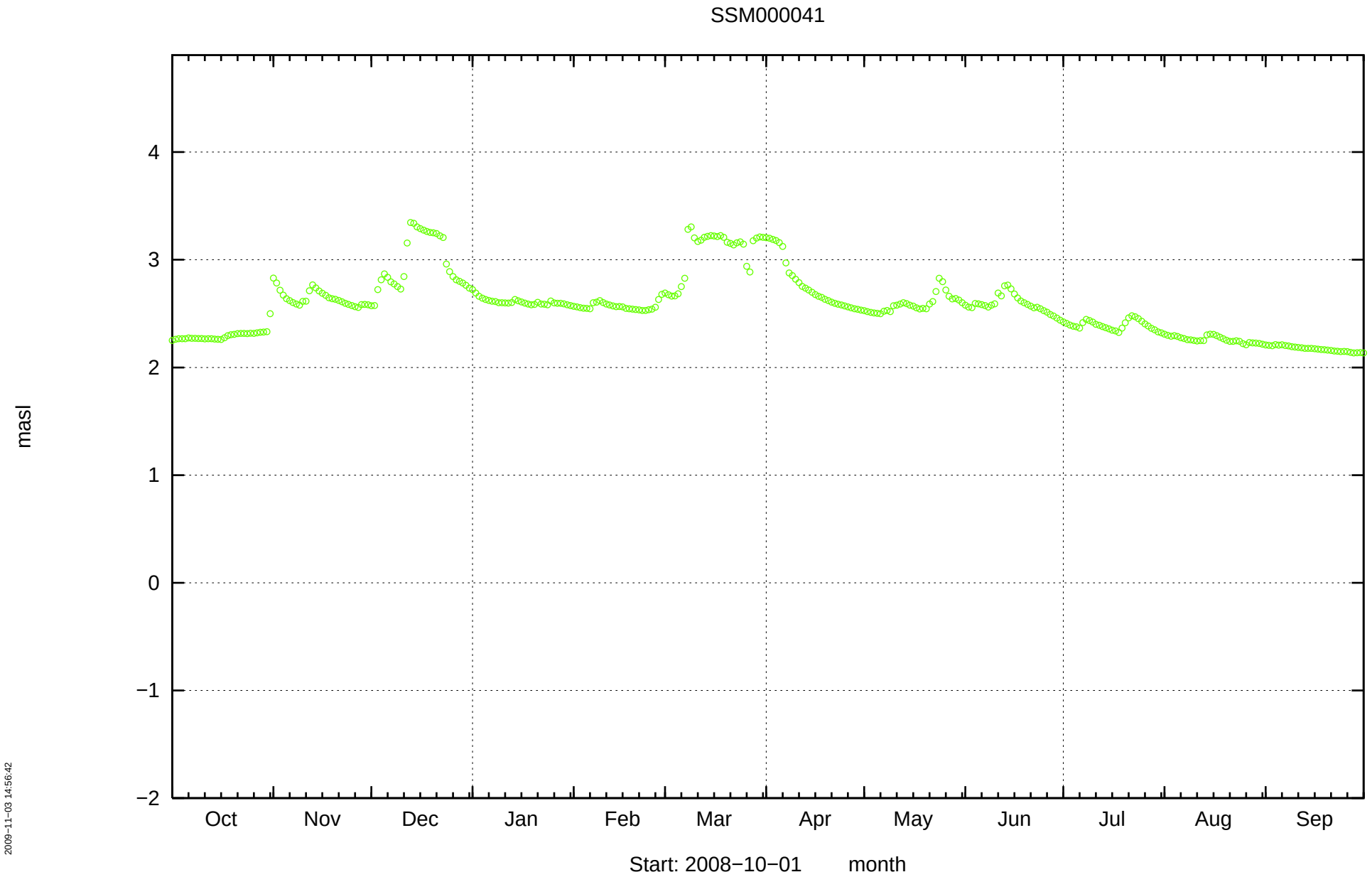

SSM000034
masl
1
0
−1
−2
−3
−4
−5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:41

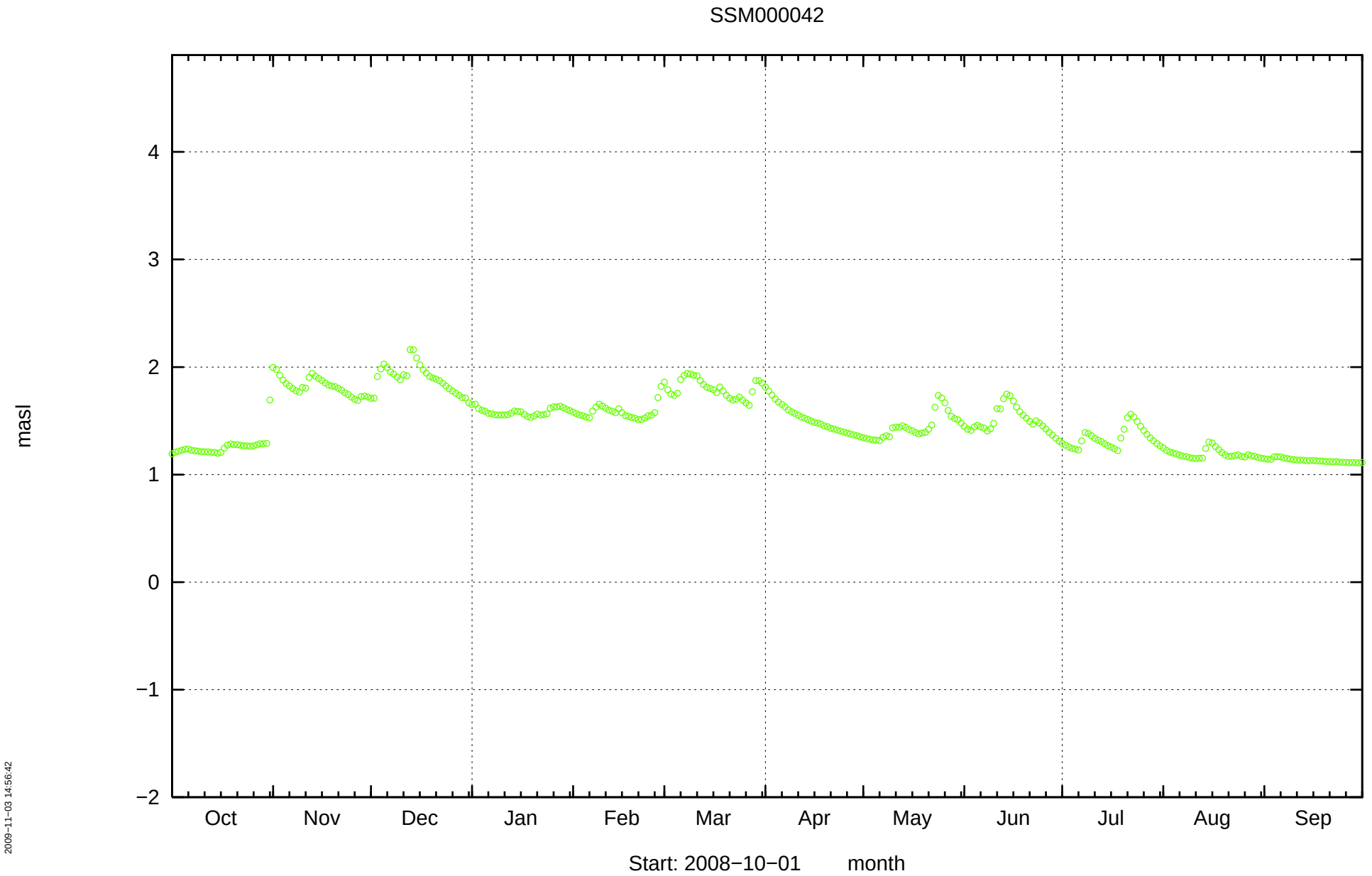

SSM000035
masl
27
26
25
24
23
22
21
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:41

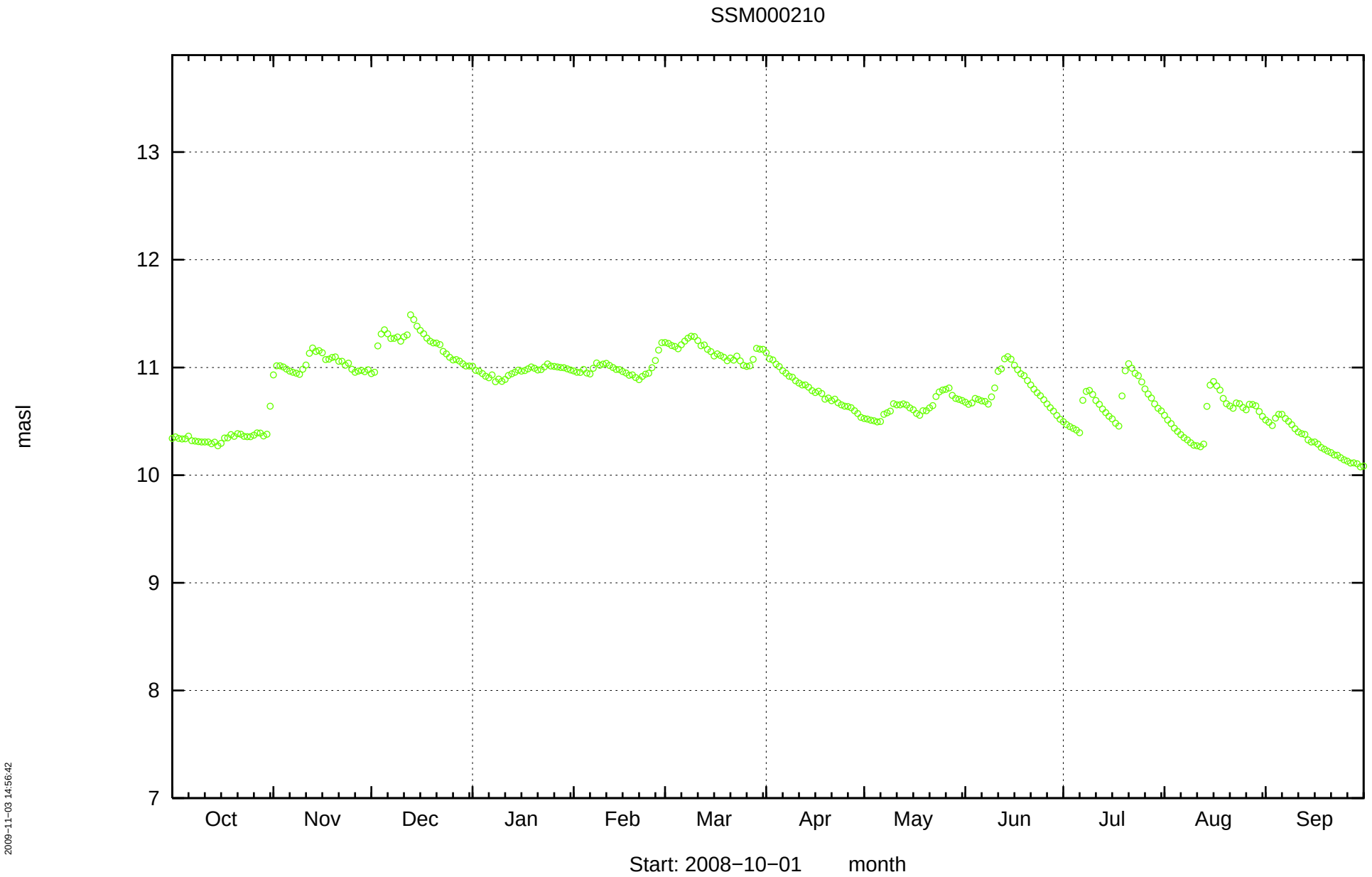

SSM000037
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:41

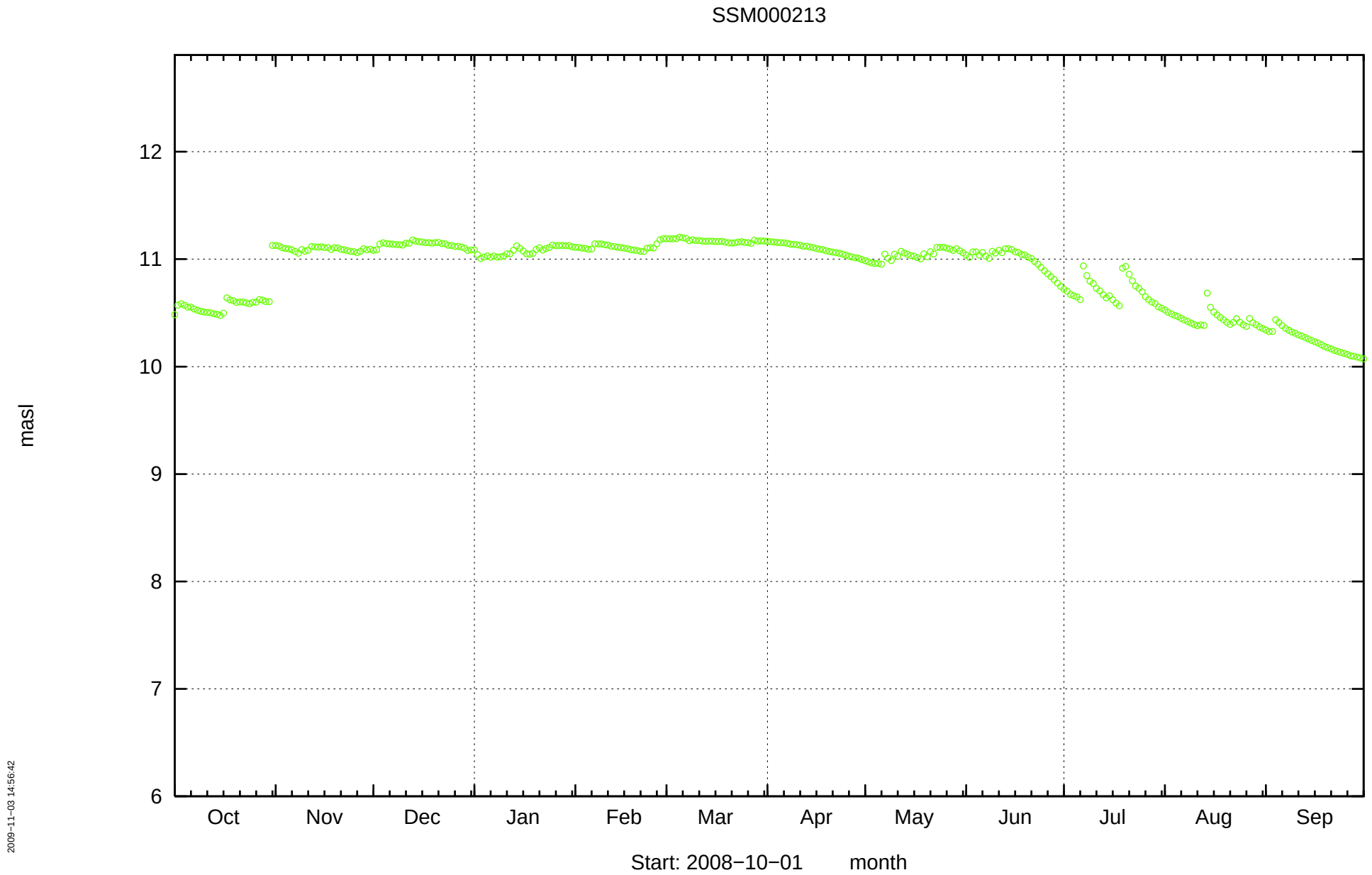

SSM000039
masl
10
9
8
7
6
5
4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:42

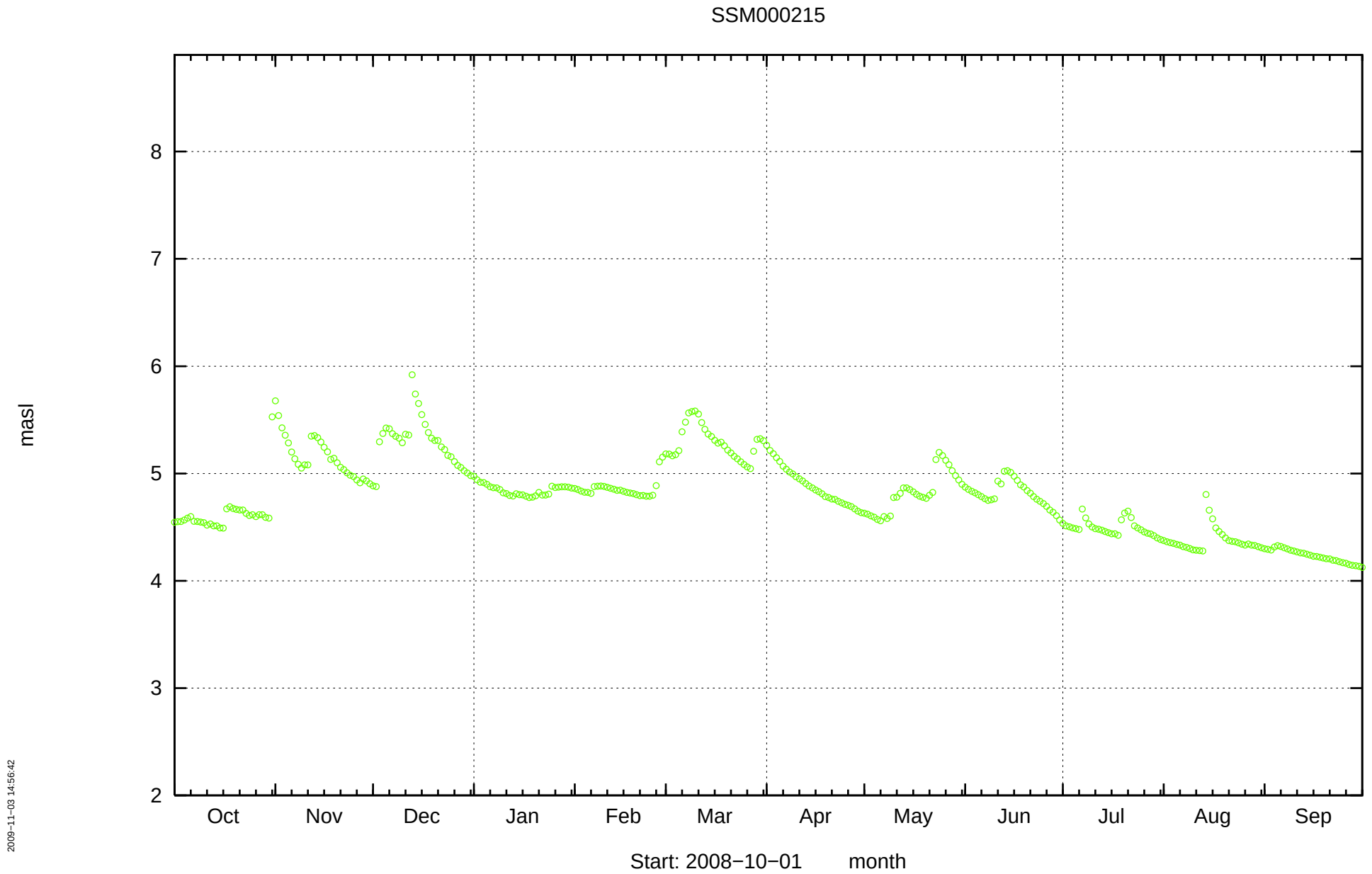

SSM000040
masl
2
1
0
−1
−2
−3
−4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:42

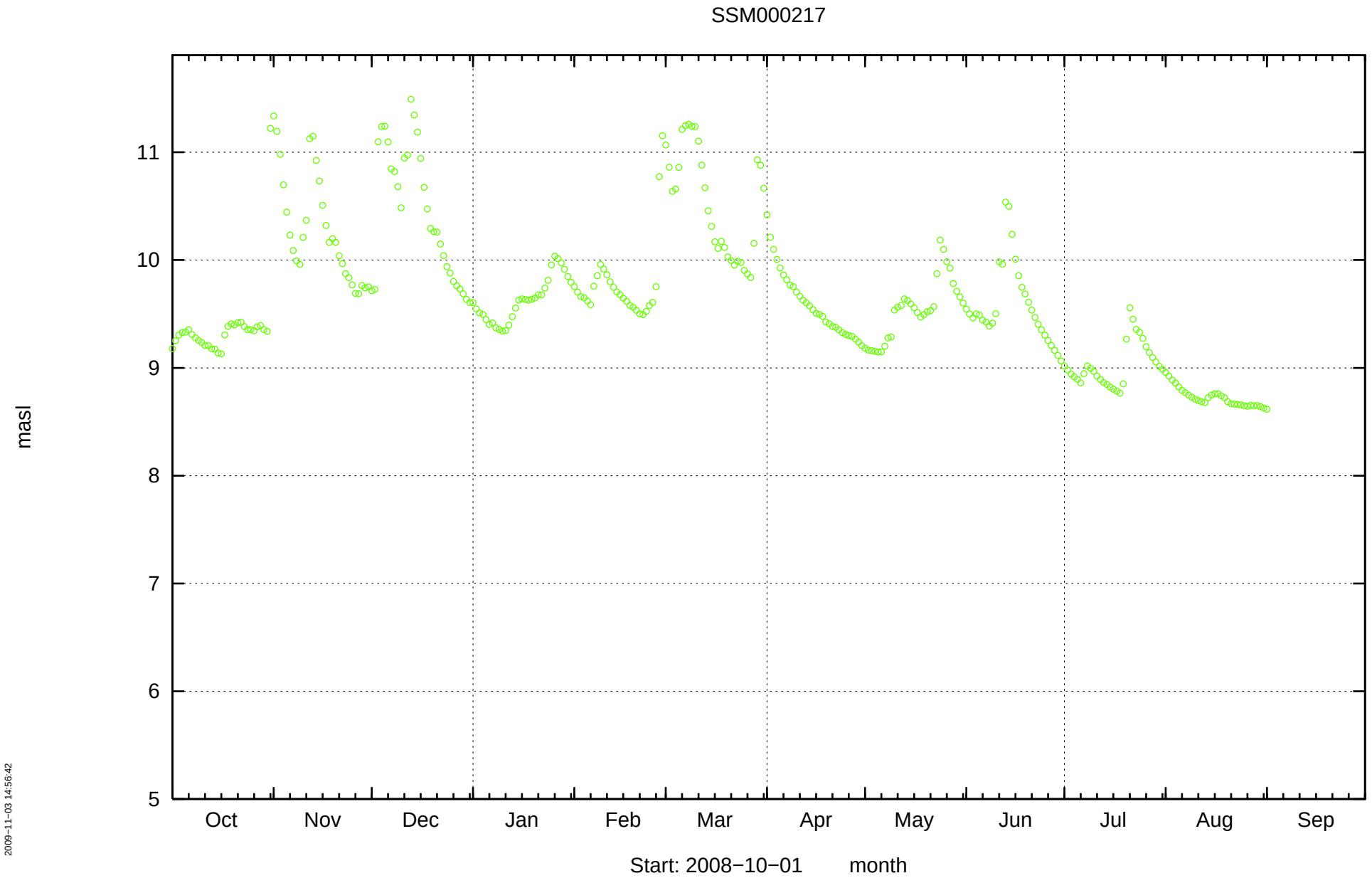

SSM000041
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:42

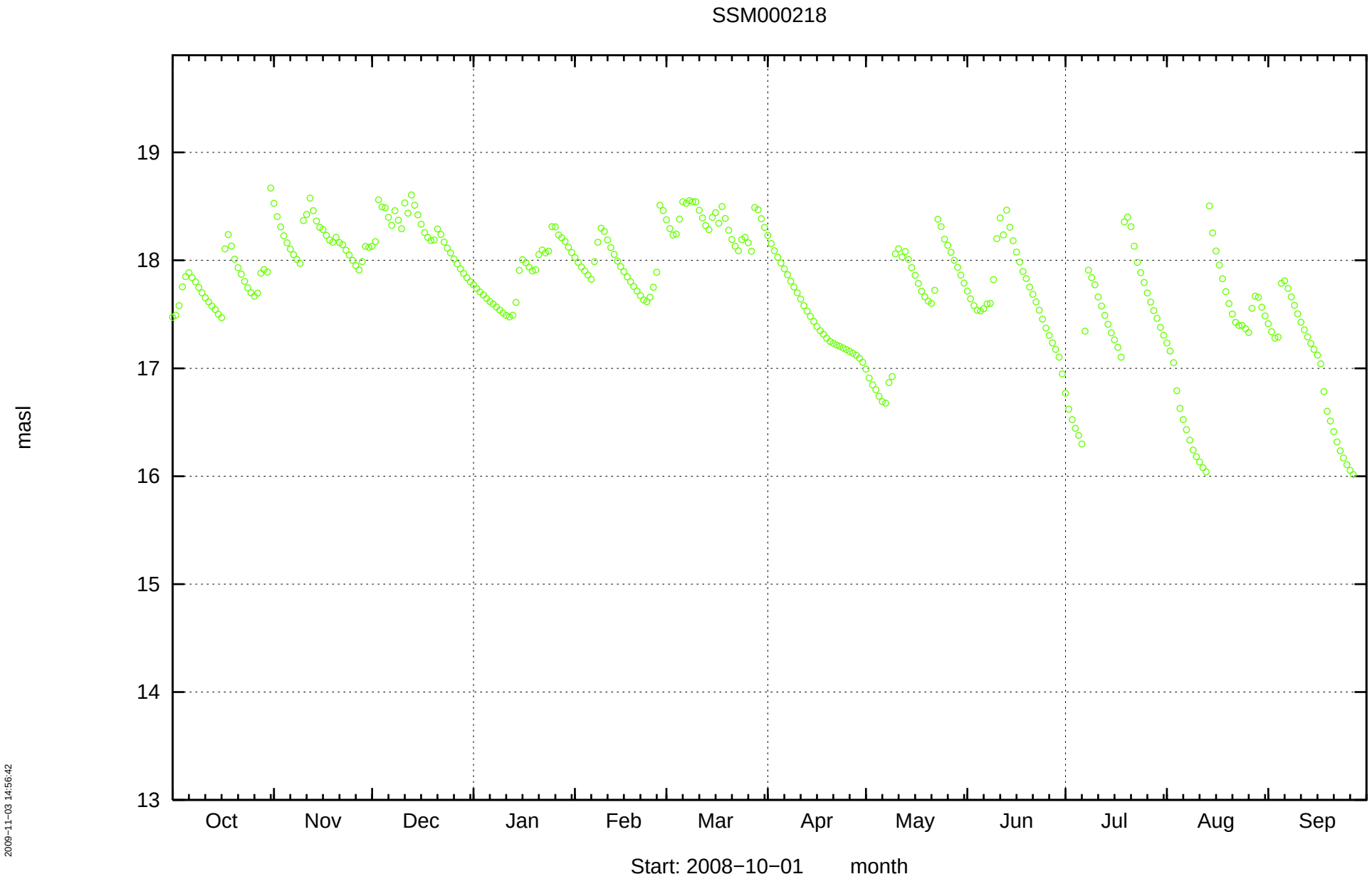

SSM000042
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:42

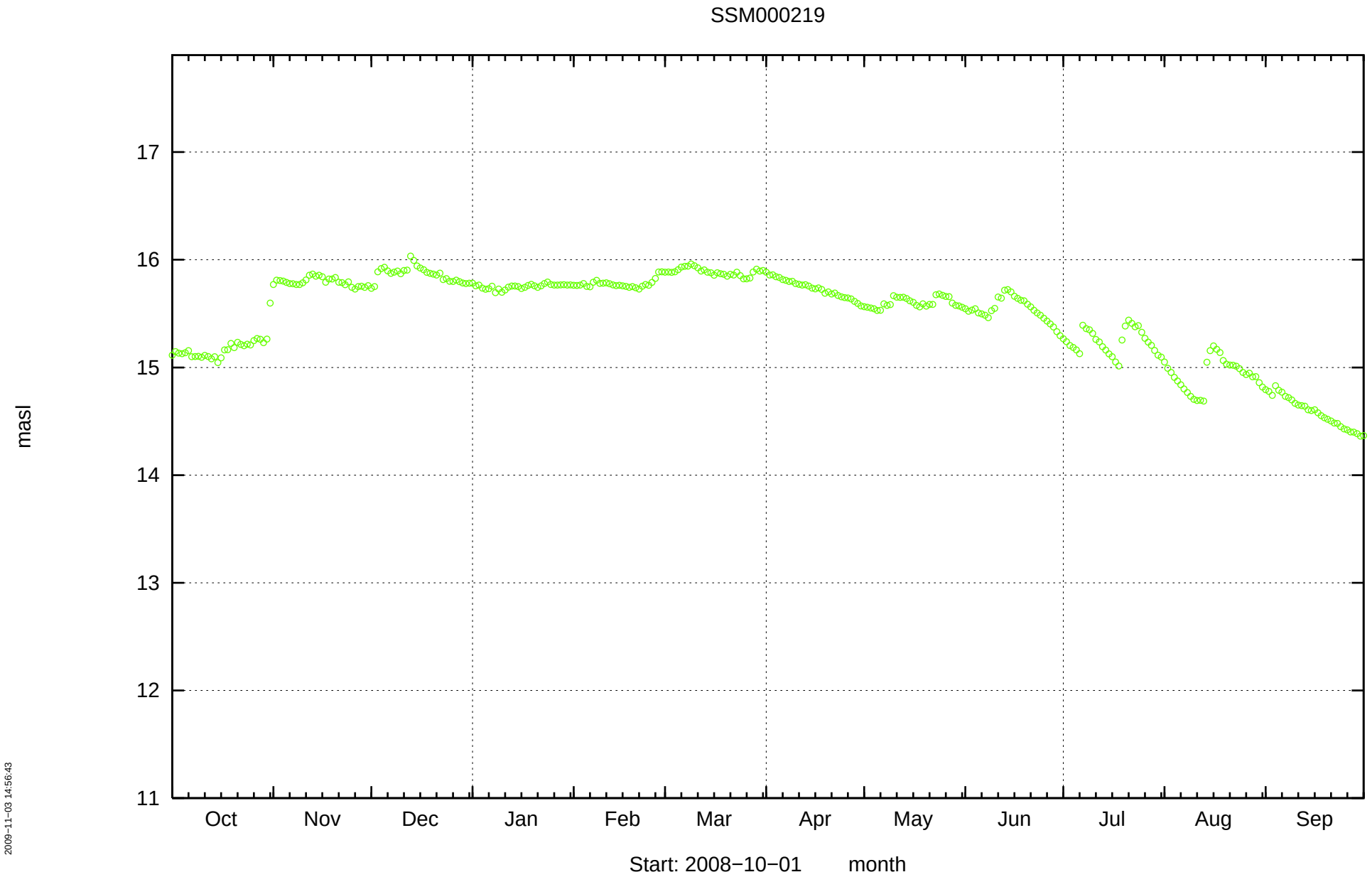

SSM000210
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:42

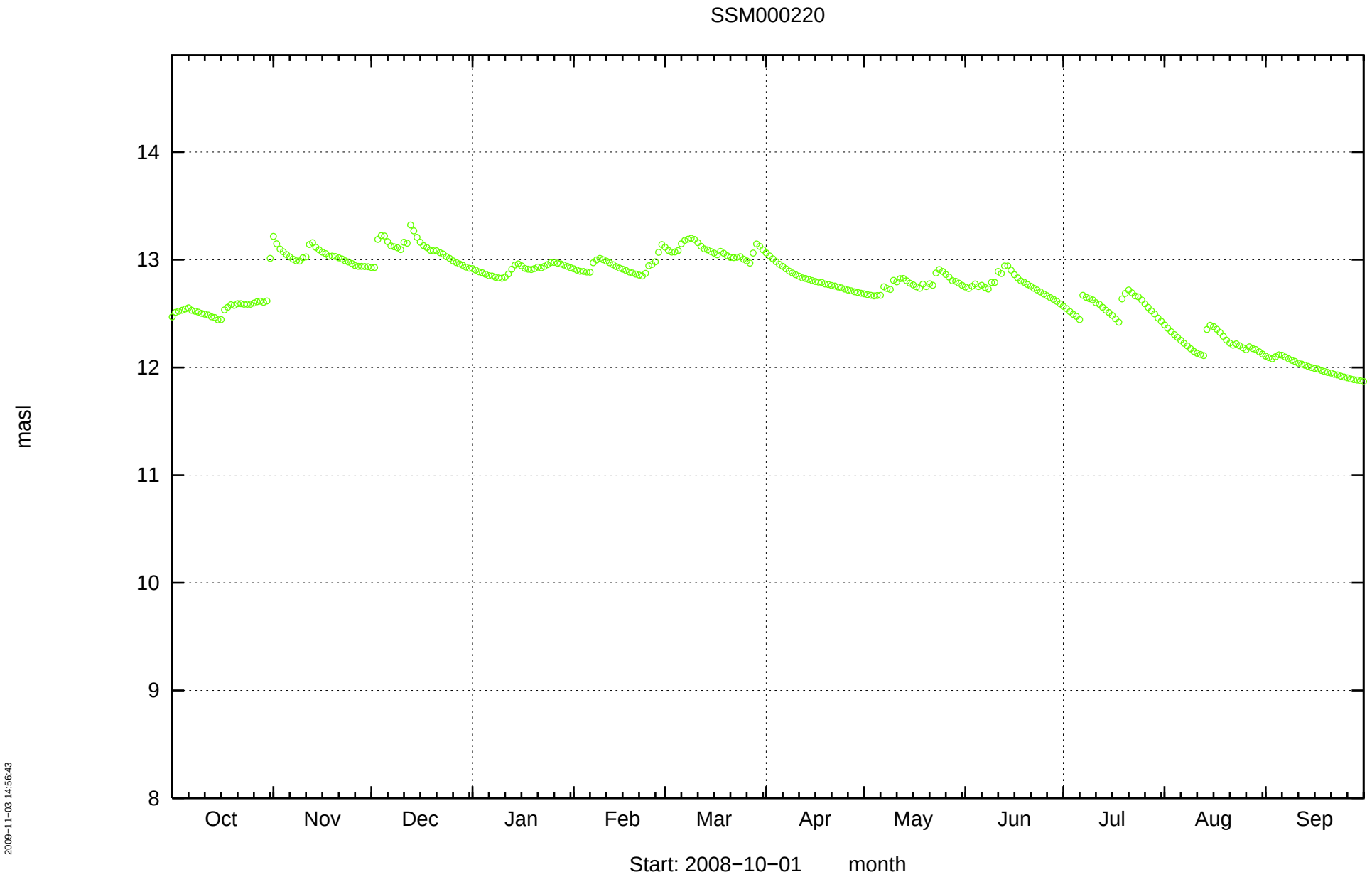

SSM000213
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:42

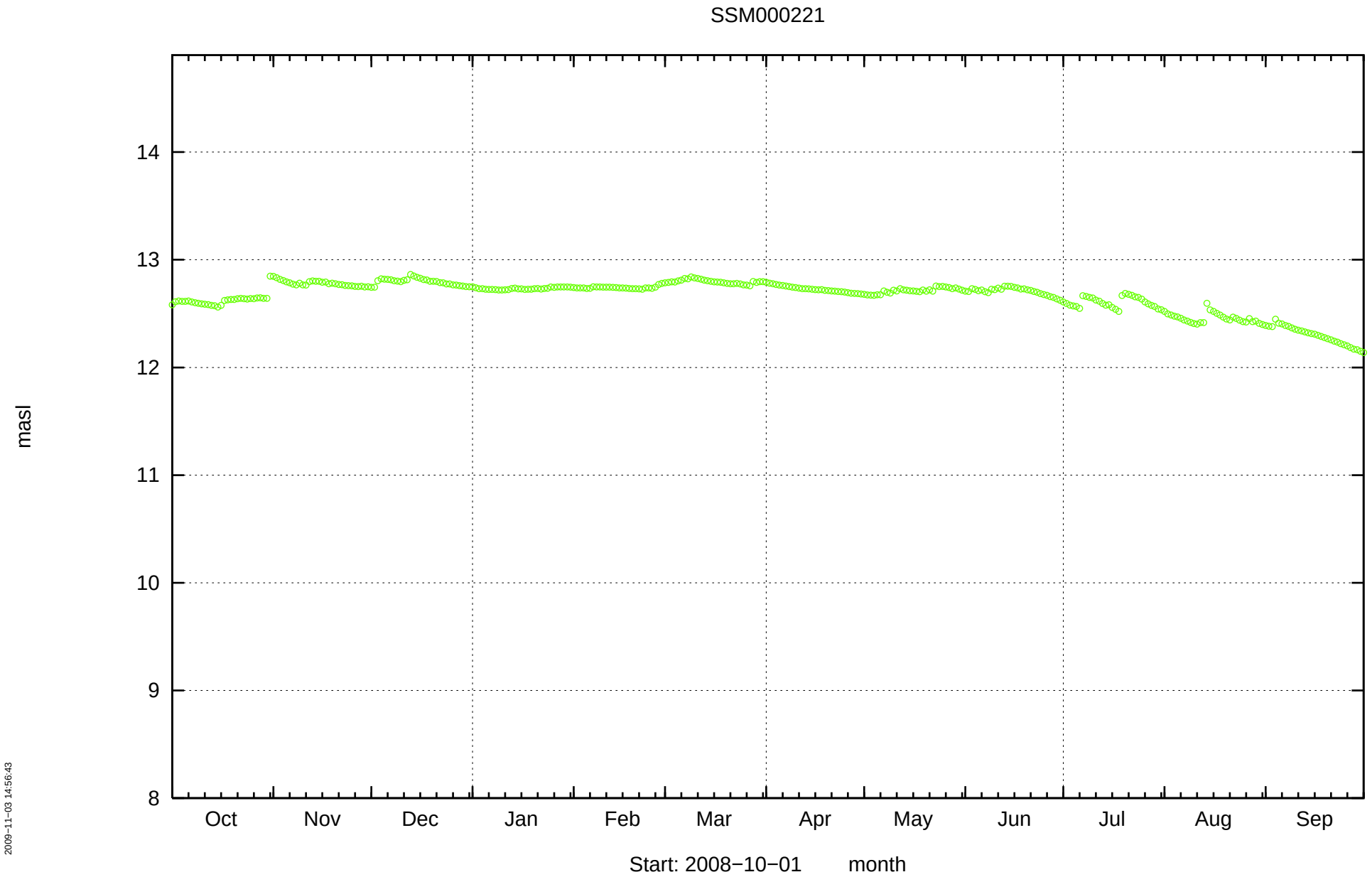

SSM000215
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:42

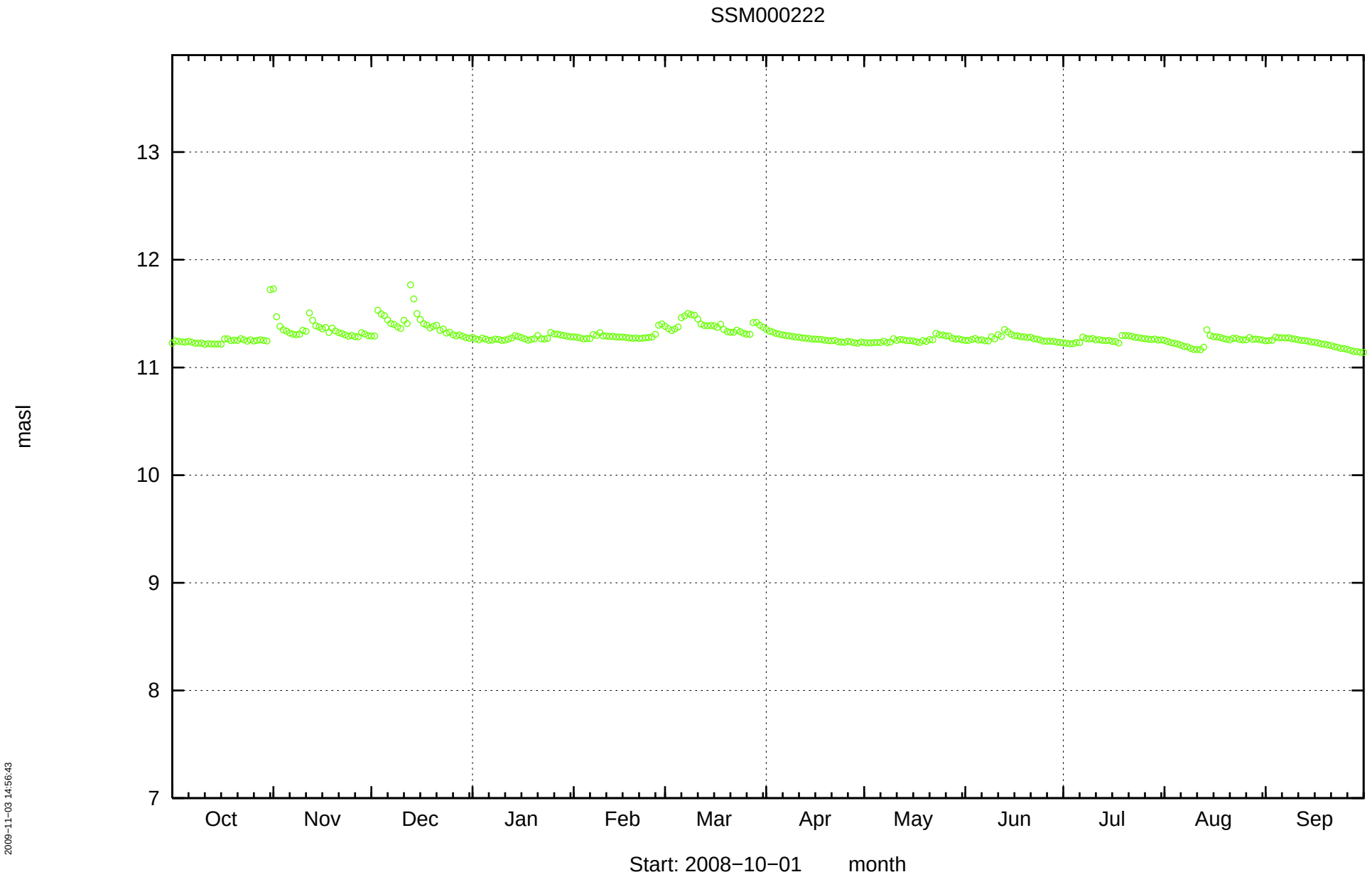

SSM000217
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:42

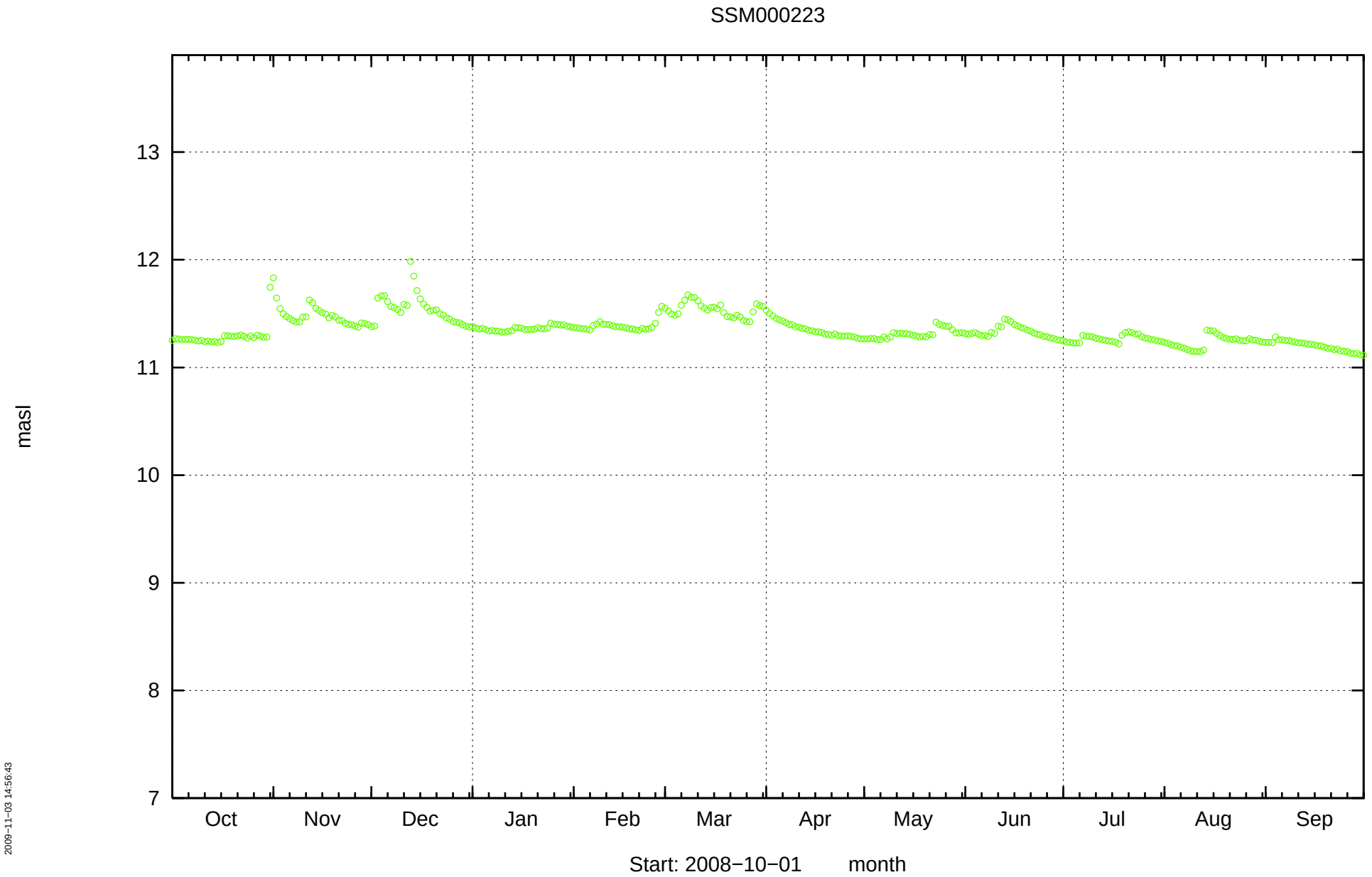

SSM000218
masl
19
18
17
16
15
14
13
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:42

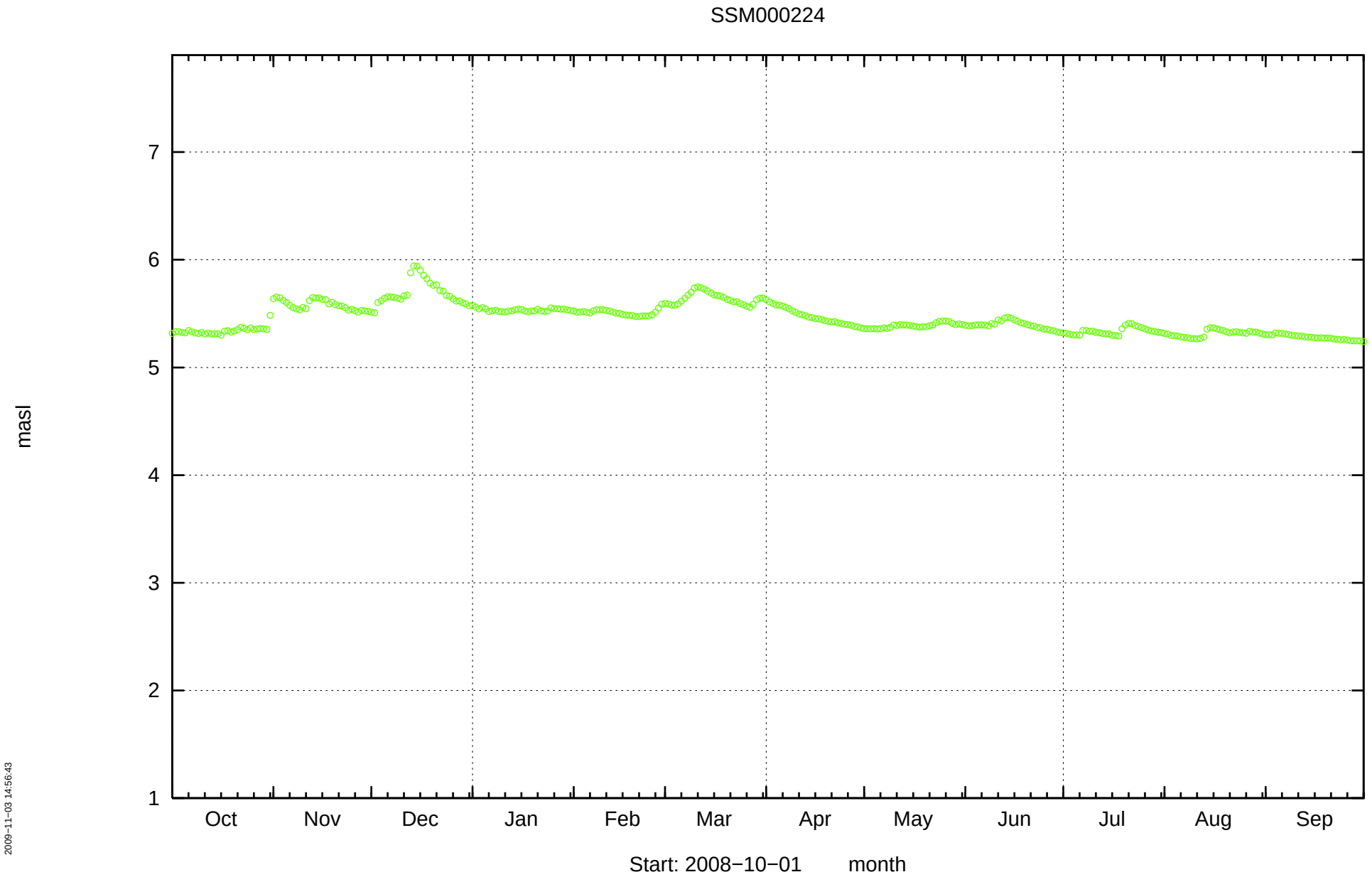

SSM000219
masl
17
16
15
14
13
12
11
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:43

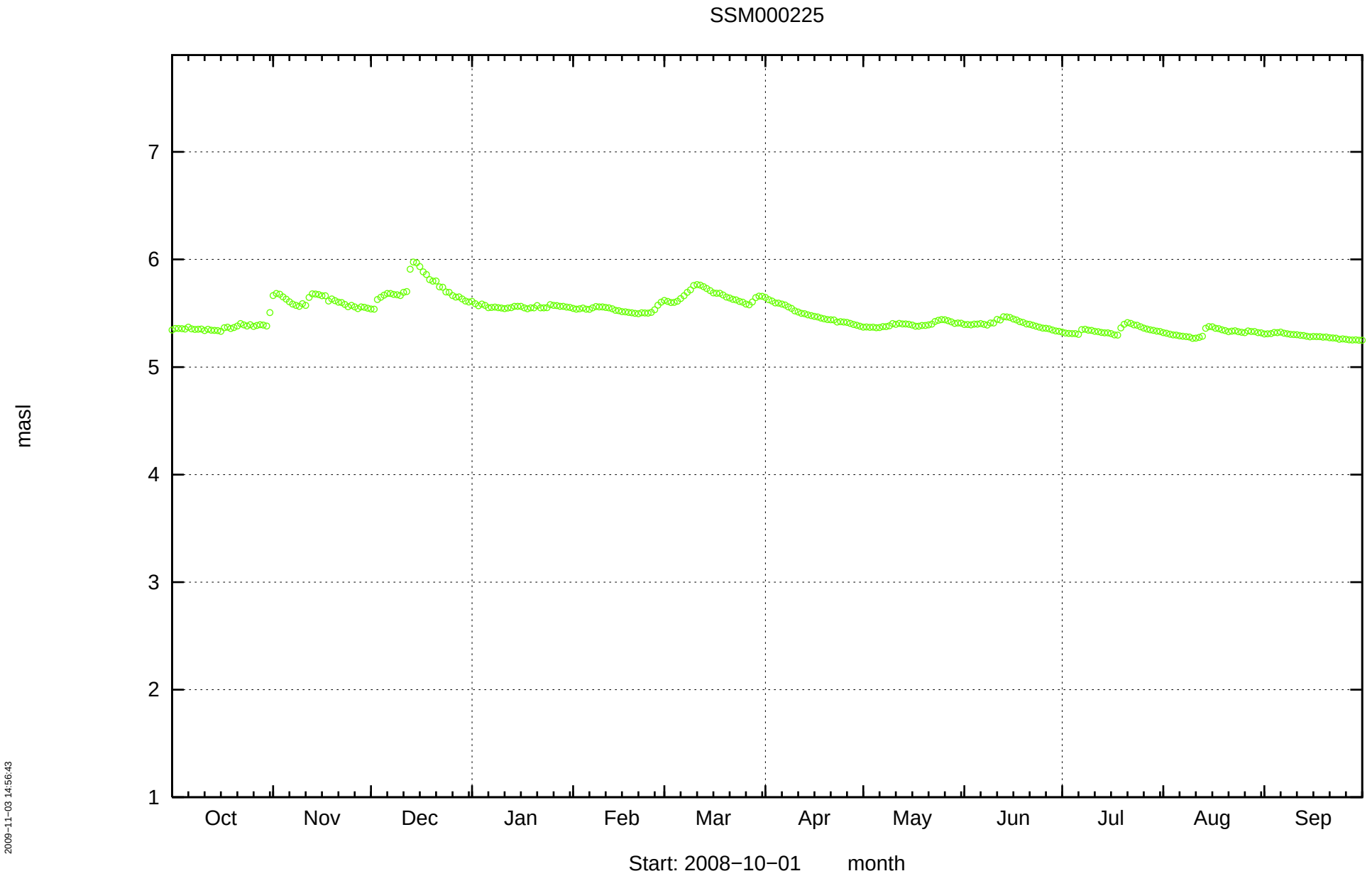

SSM000220
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:43

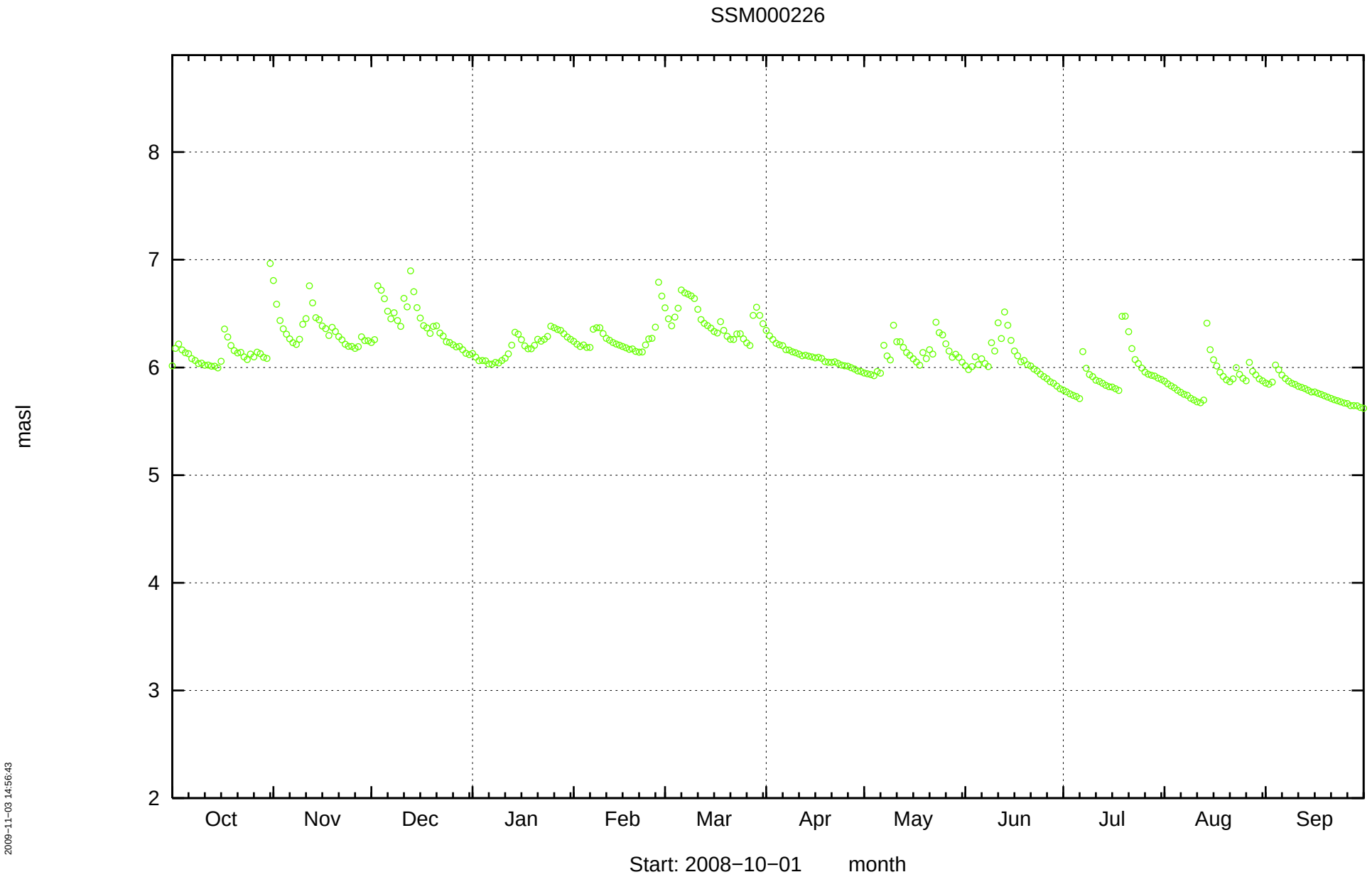

SSM000221
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:43

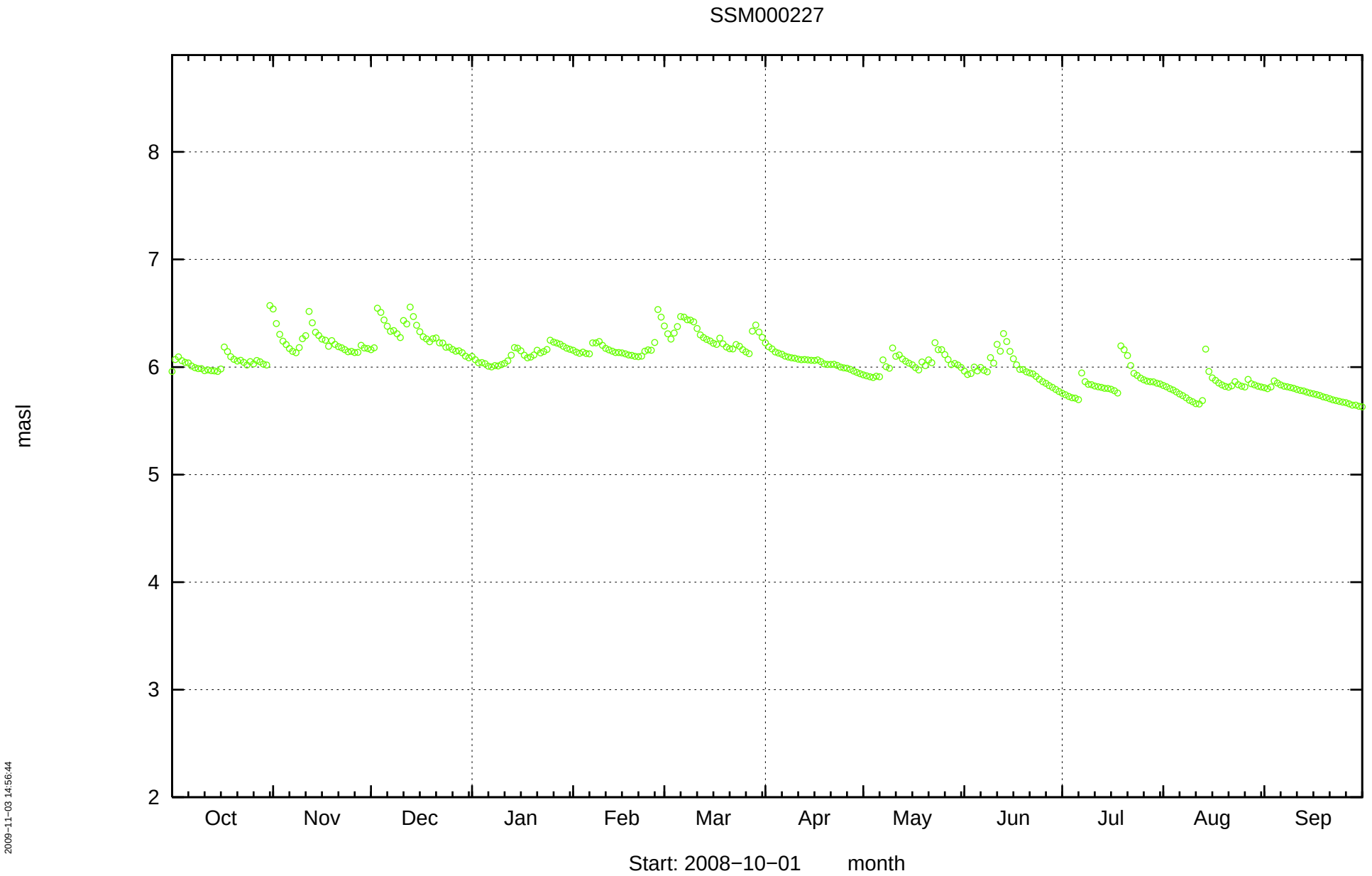

SSM000222
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:43

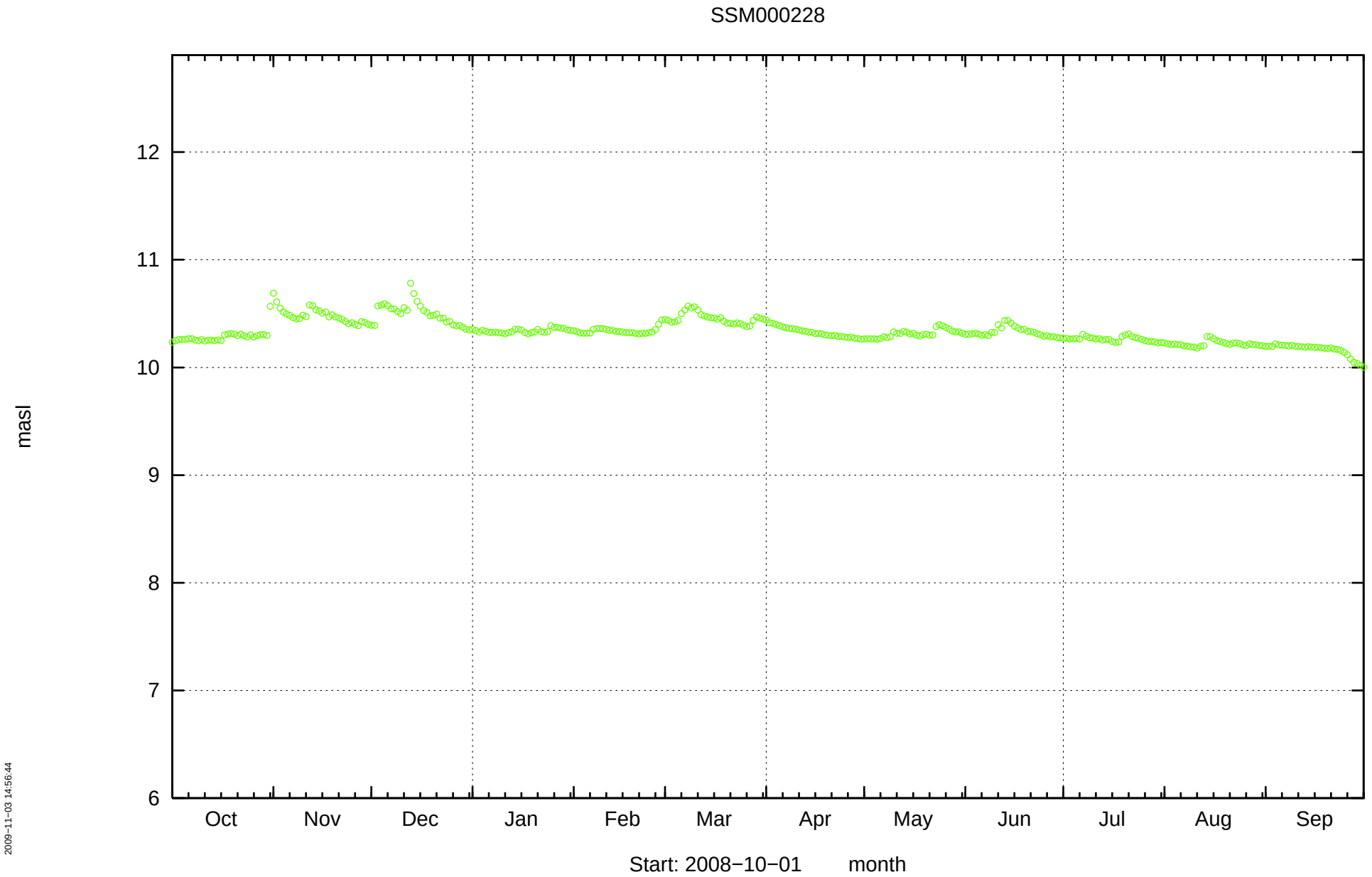

SSM000223
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:43

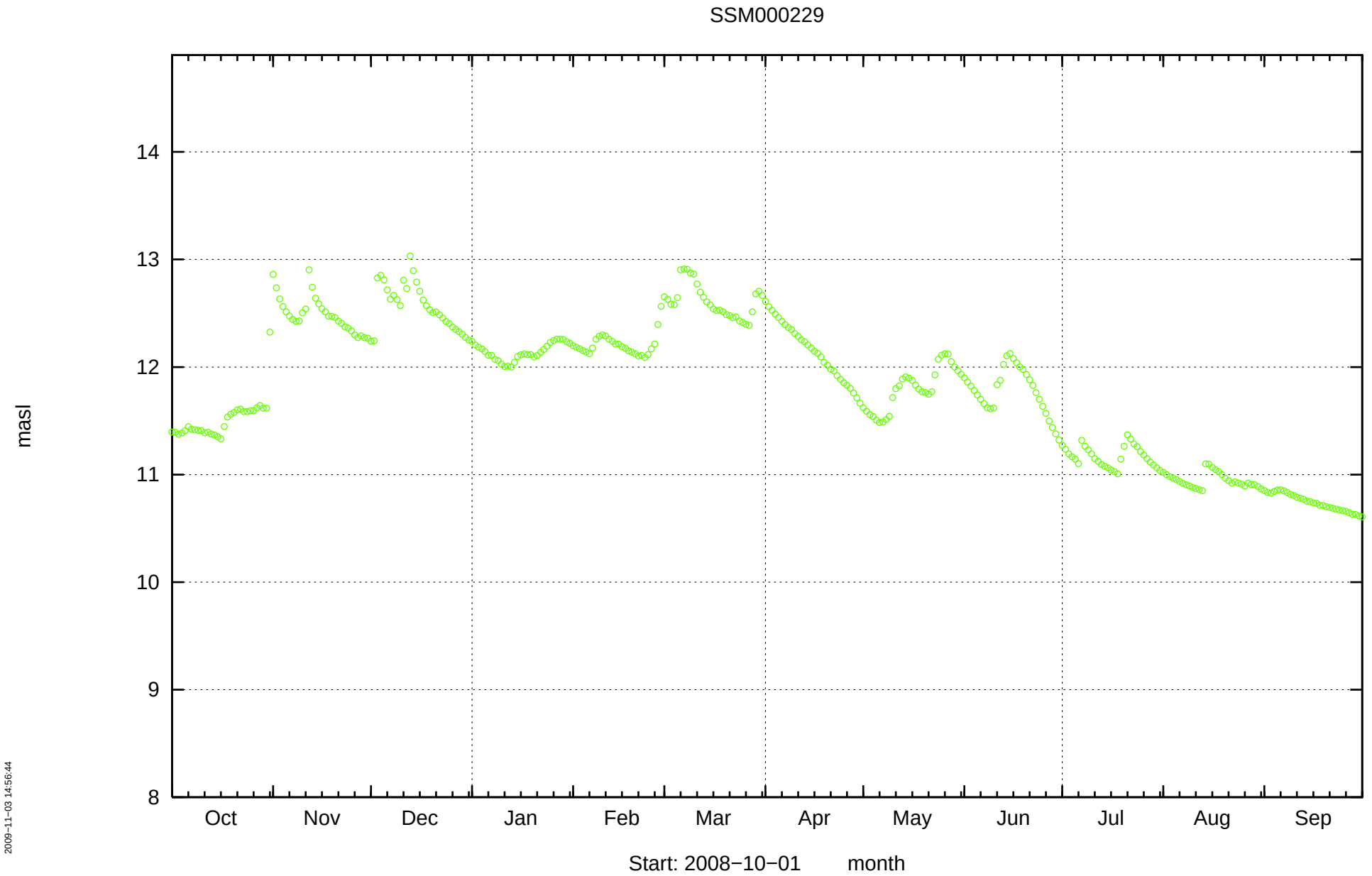

SSM000224
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:43

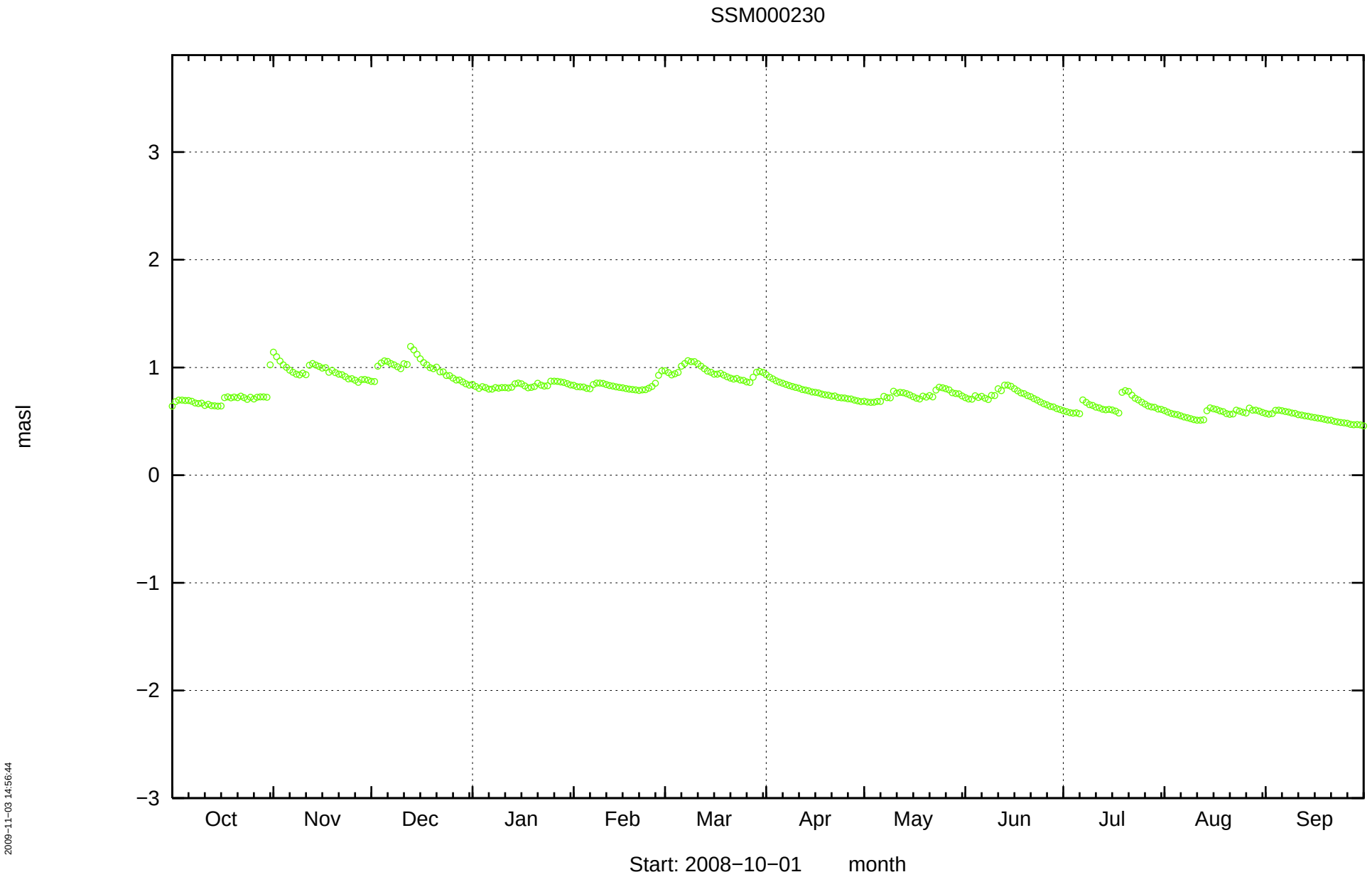

SSM000225
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:43

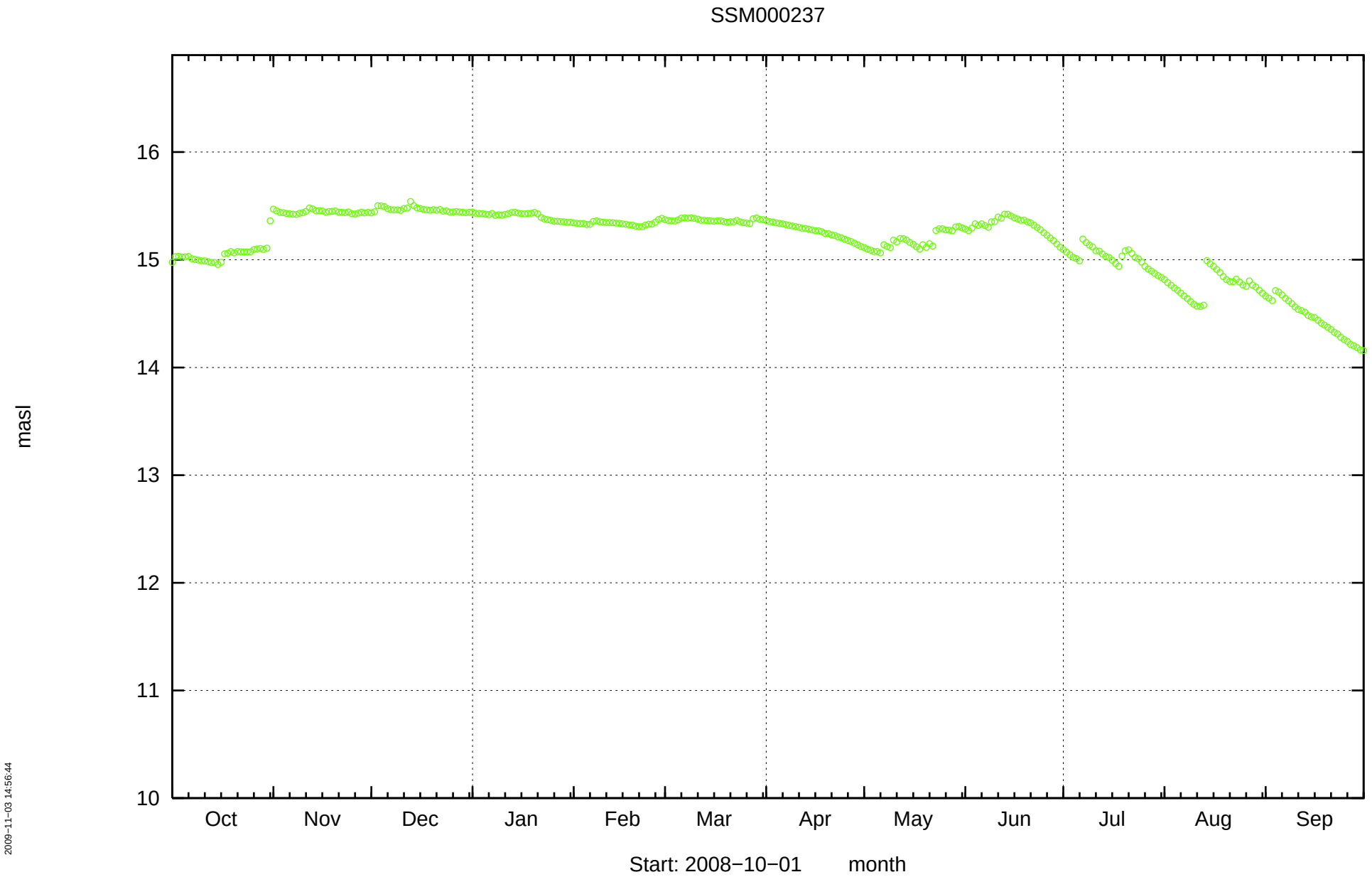

SSM000226
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:43

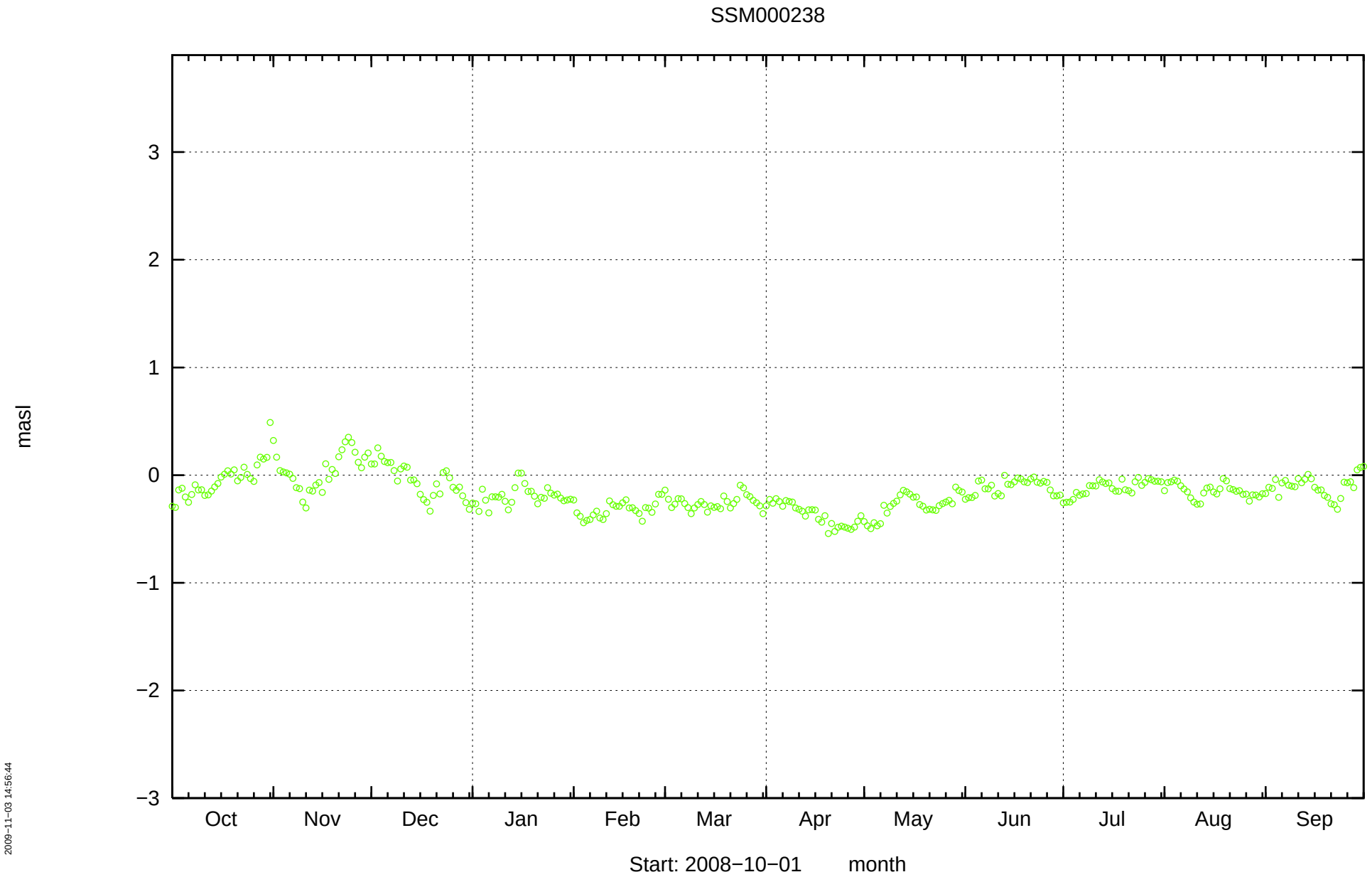

SSM000227
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:44

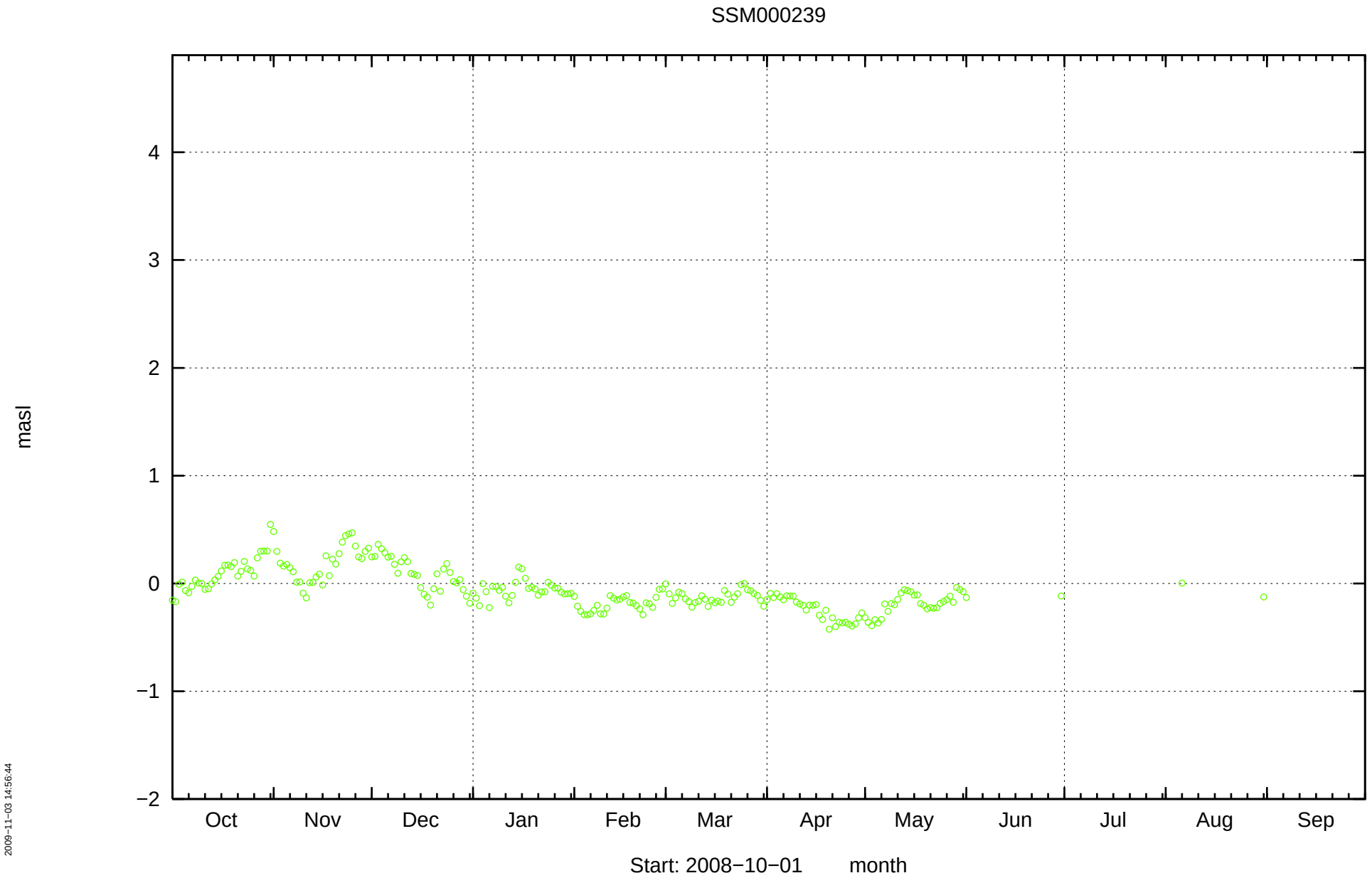

SSM000228
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:44

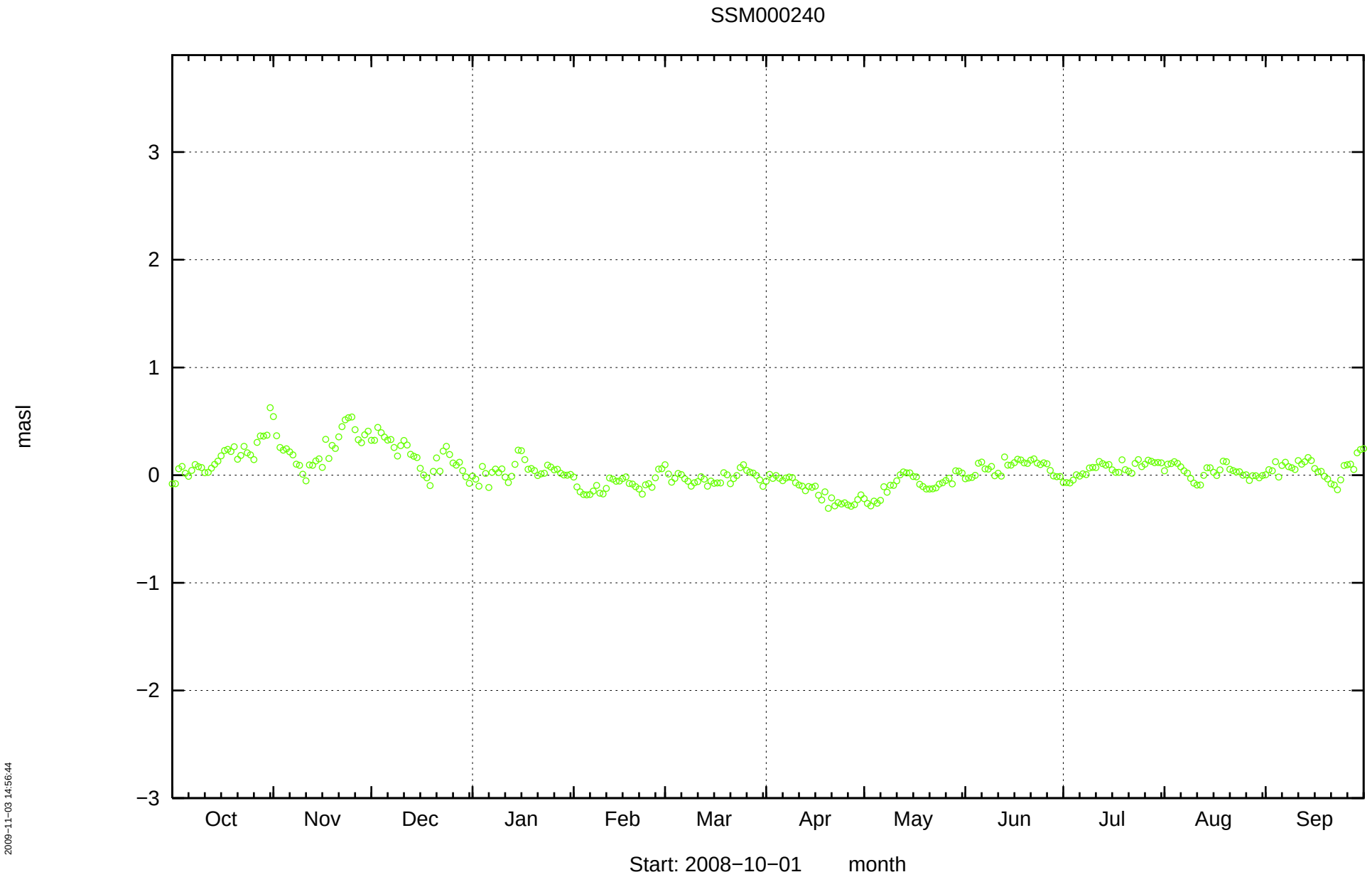

SSM000229
masl
14
13
12
11
10
9
8
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:44

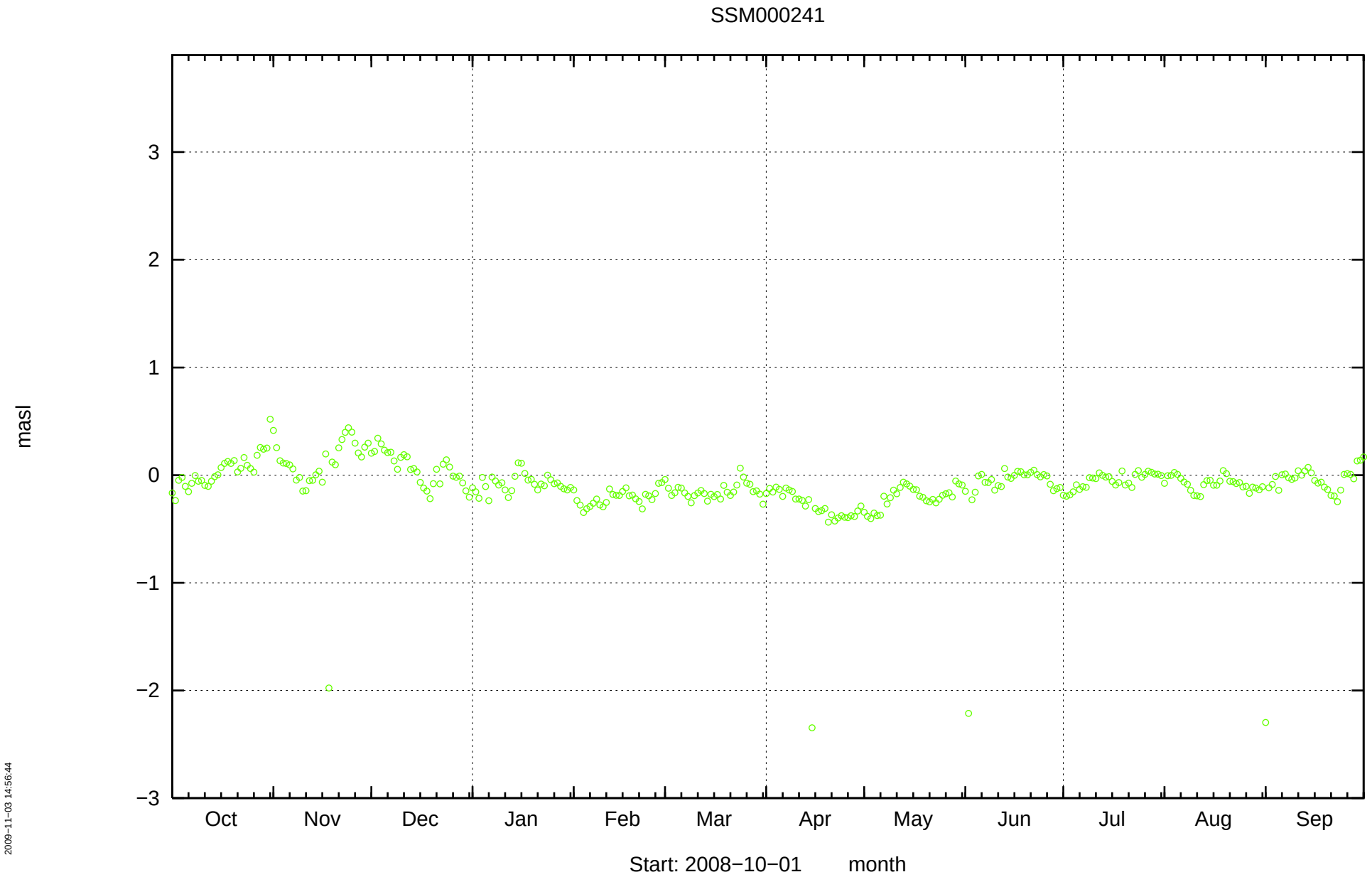

SSM000230
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:44

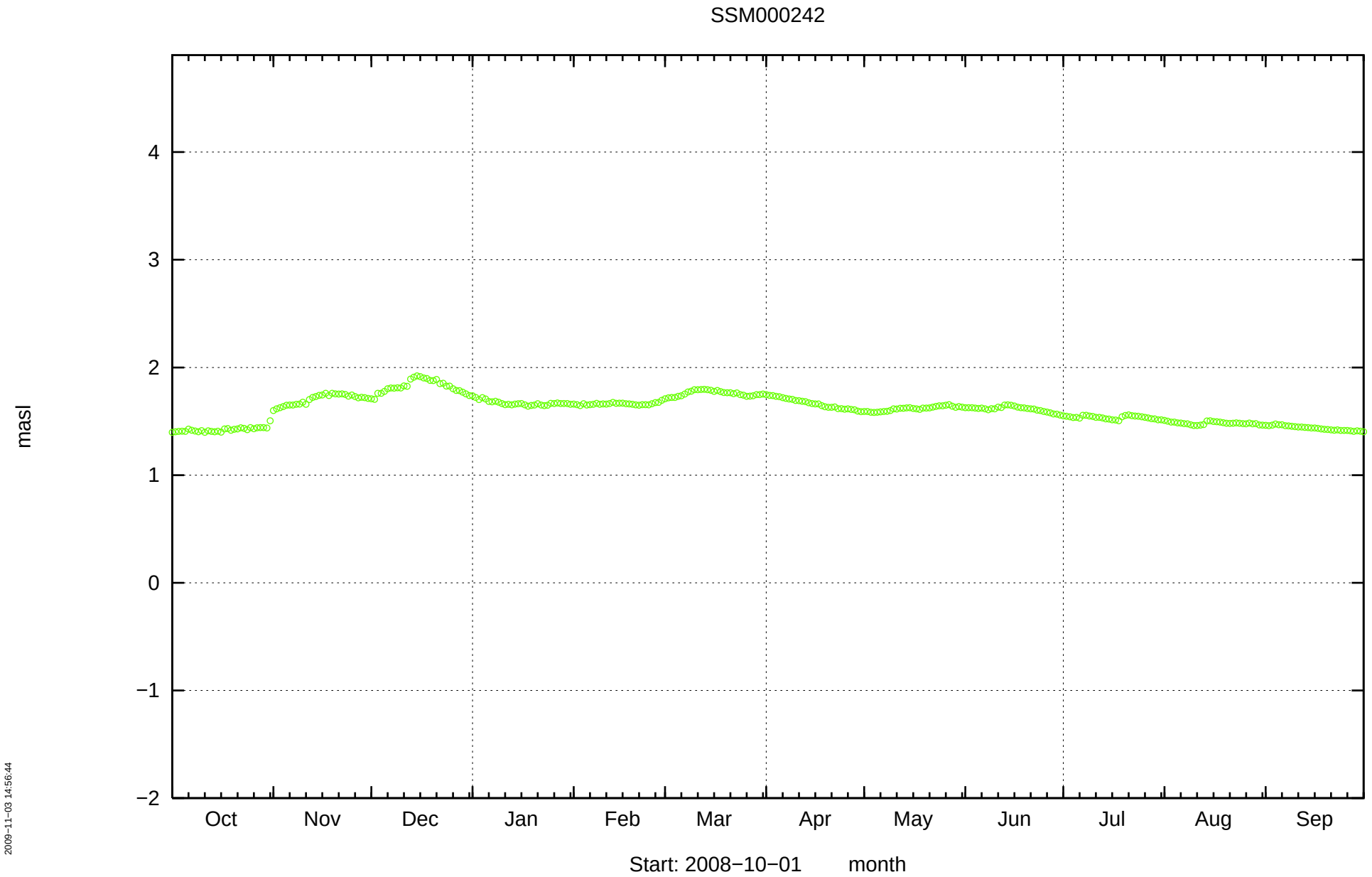

SSM000237
masl
16
15
14
13
12
11
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:44

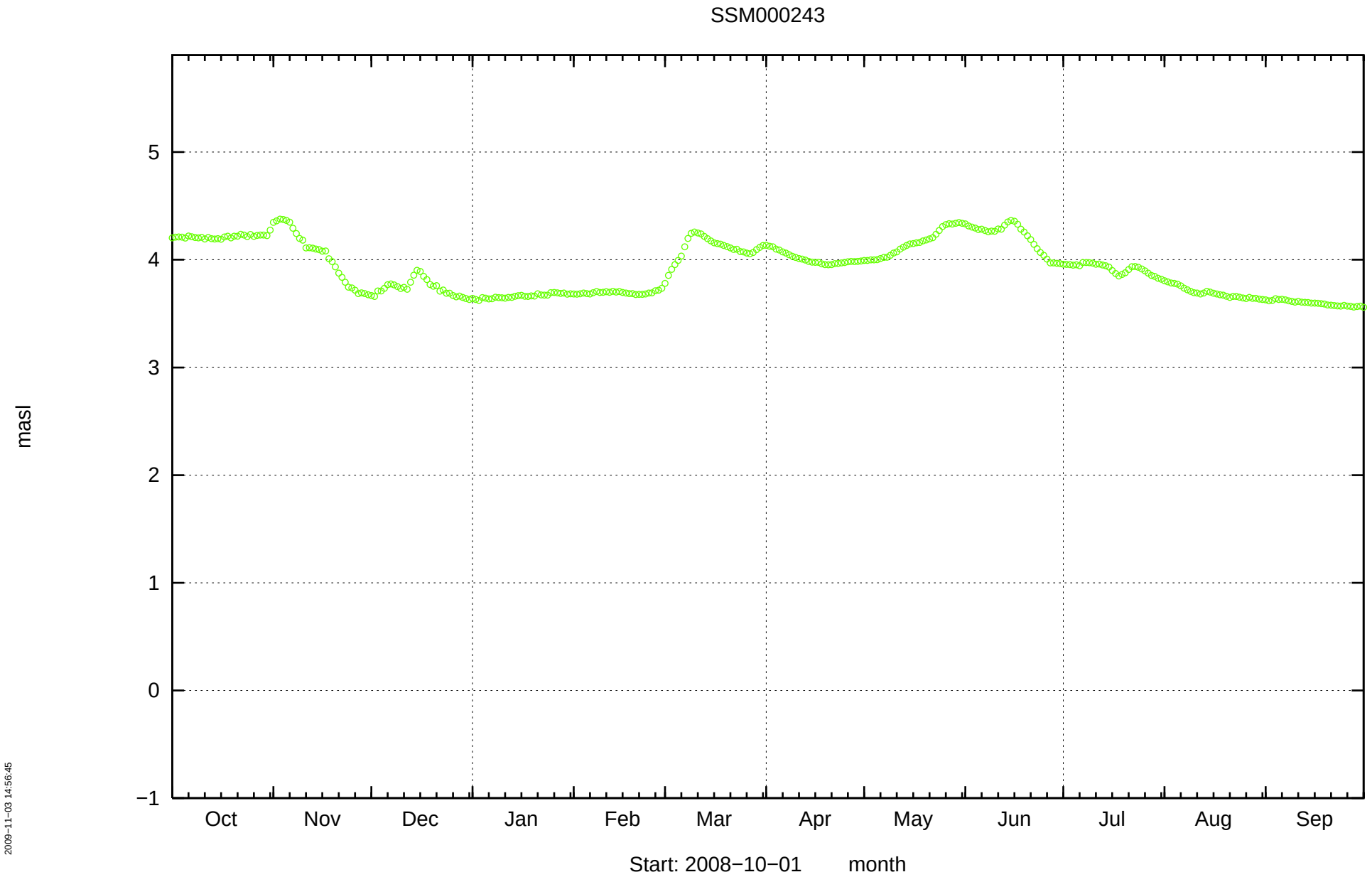

SSM000238
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:44

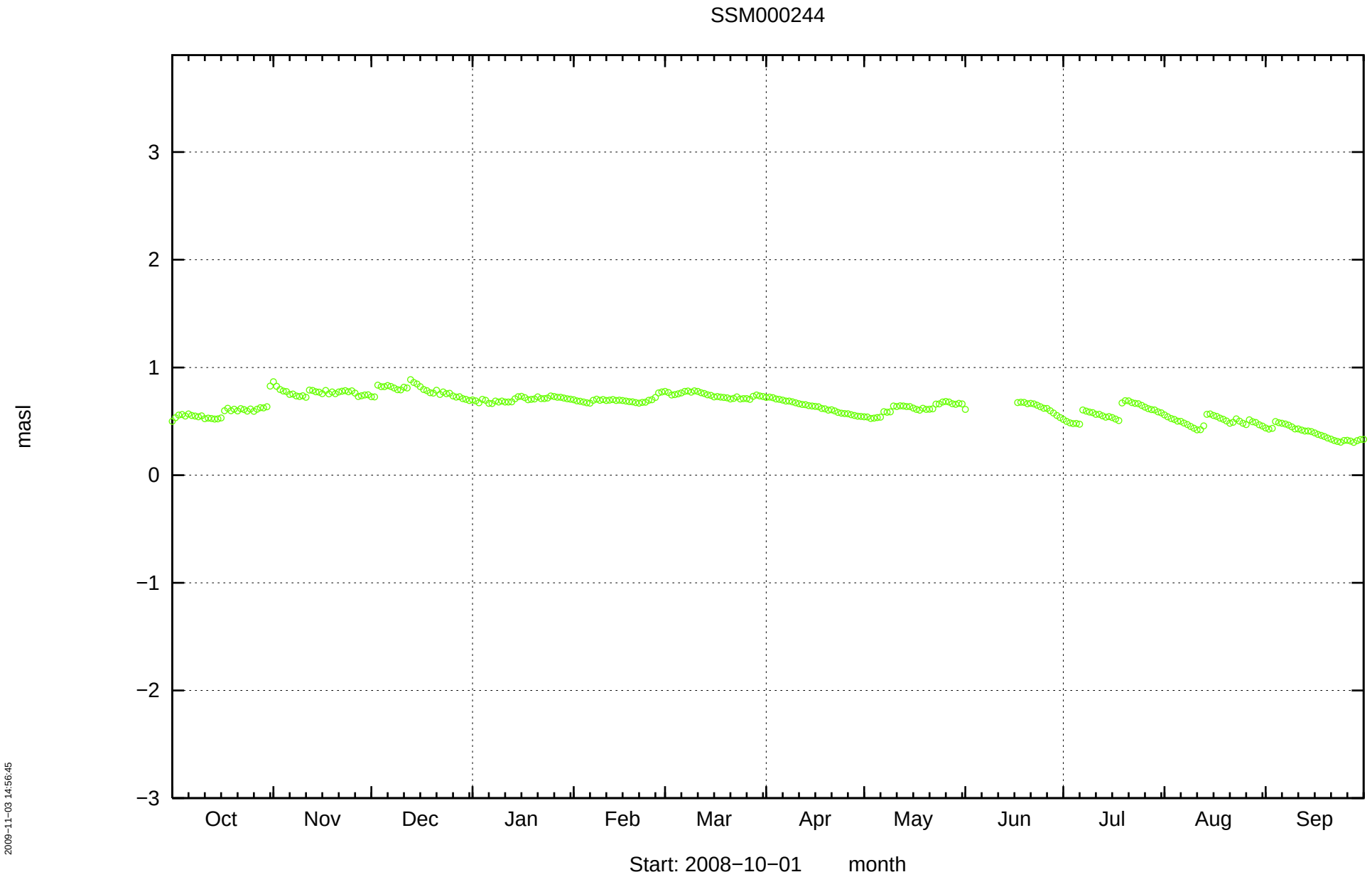

SSM000239
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:44

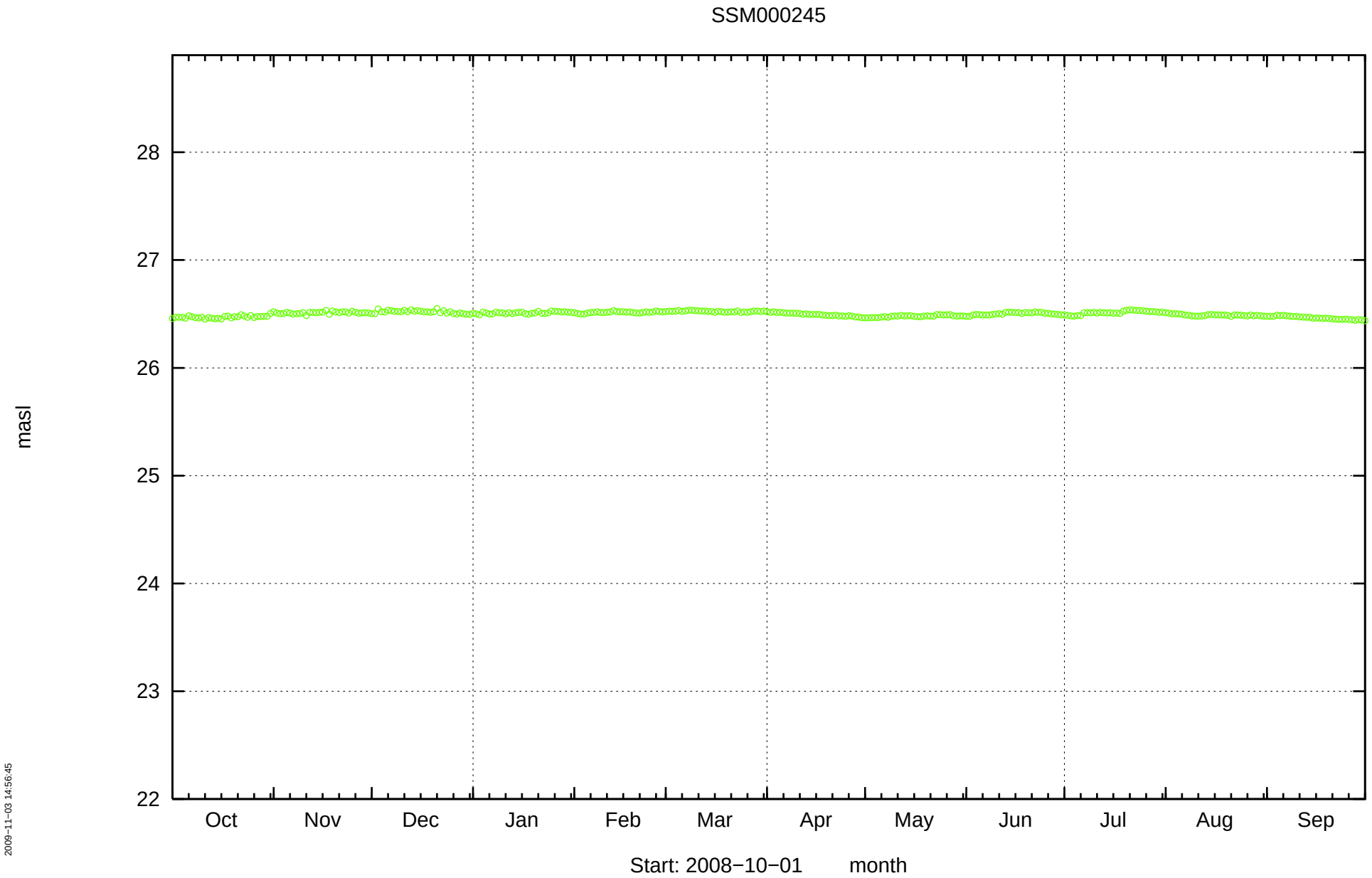

SSM000240
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:44

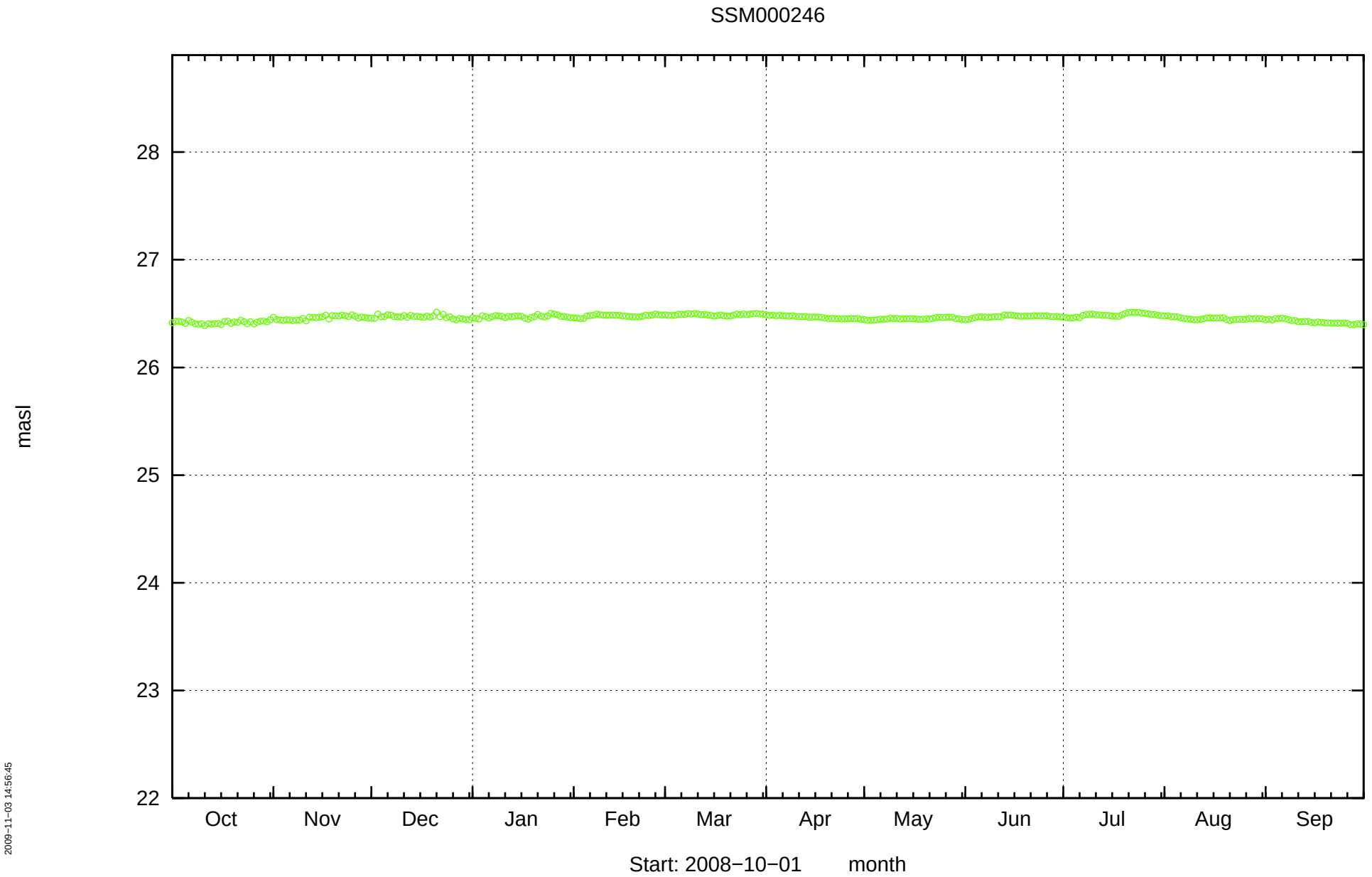

SSM000241
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:44

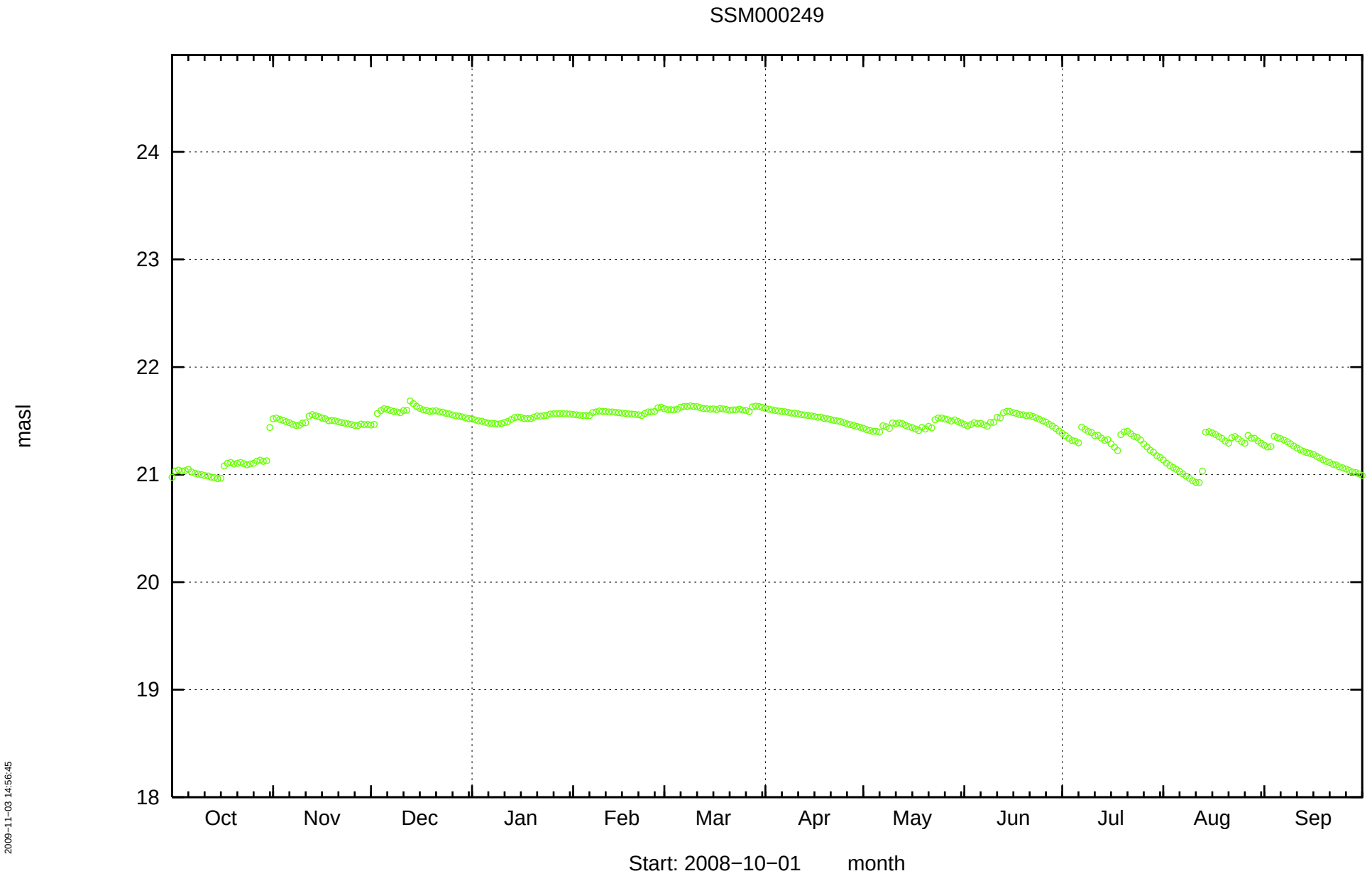

SSM000242
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:44

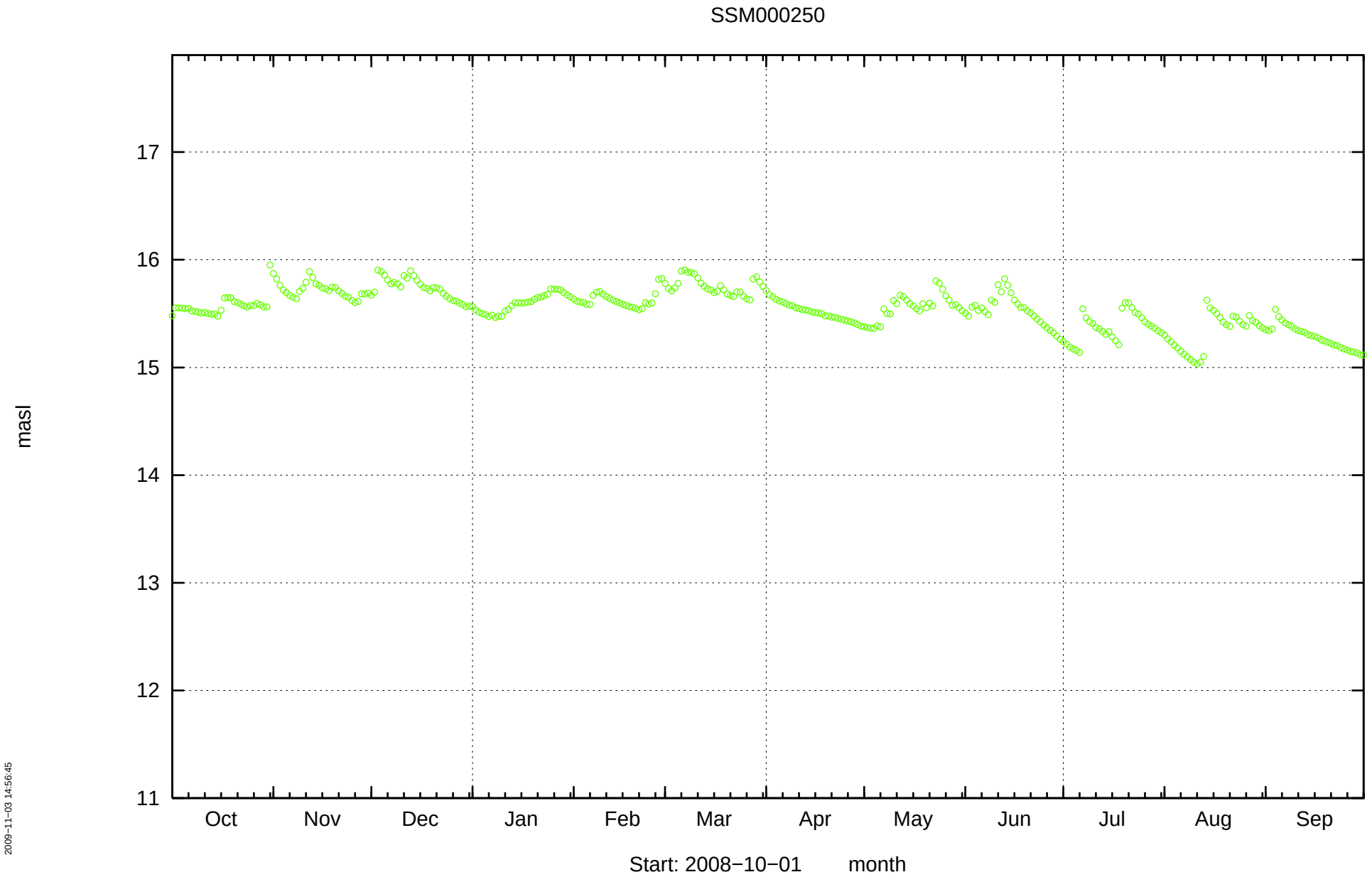

SSM000243
masl
5
4
3
2
1
0
−1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

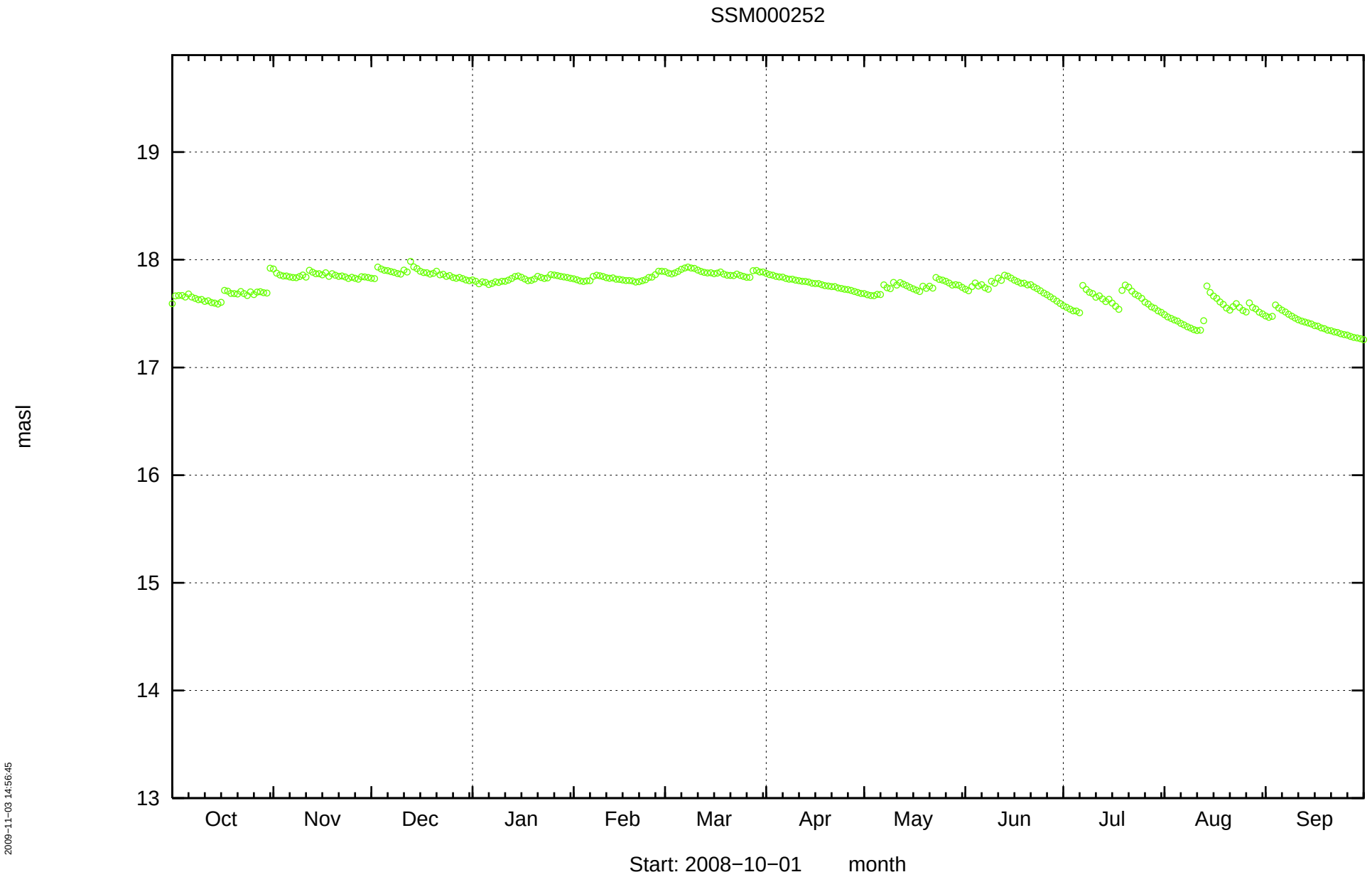

SSM000244
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

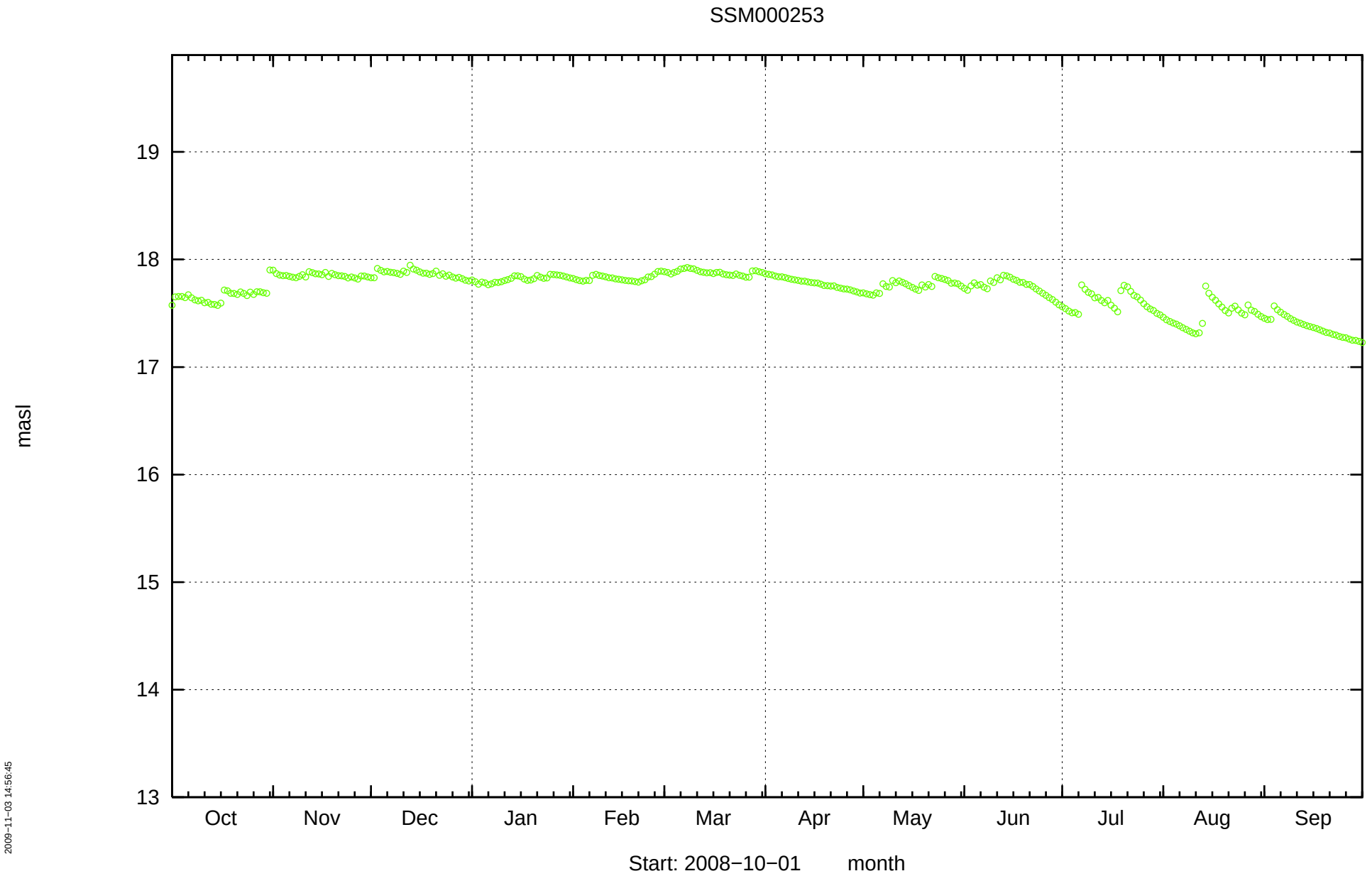

SSM000245
masl
28
27
26
25
24
23
22
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

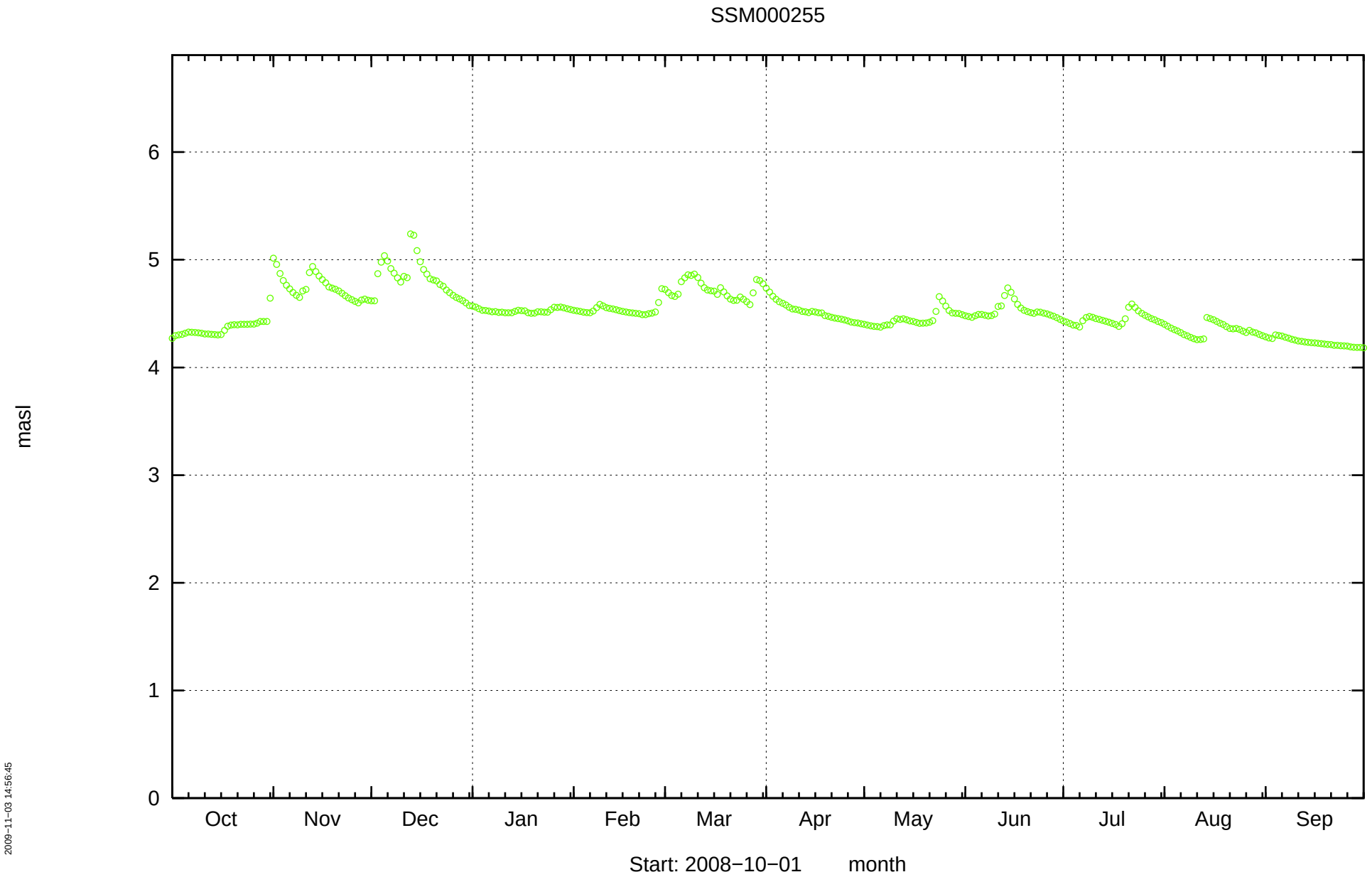

SSM000246
masl
28
27
26
25
24
23
22
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:45

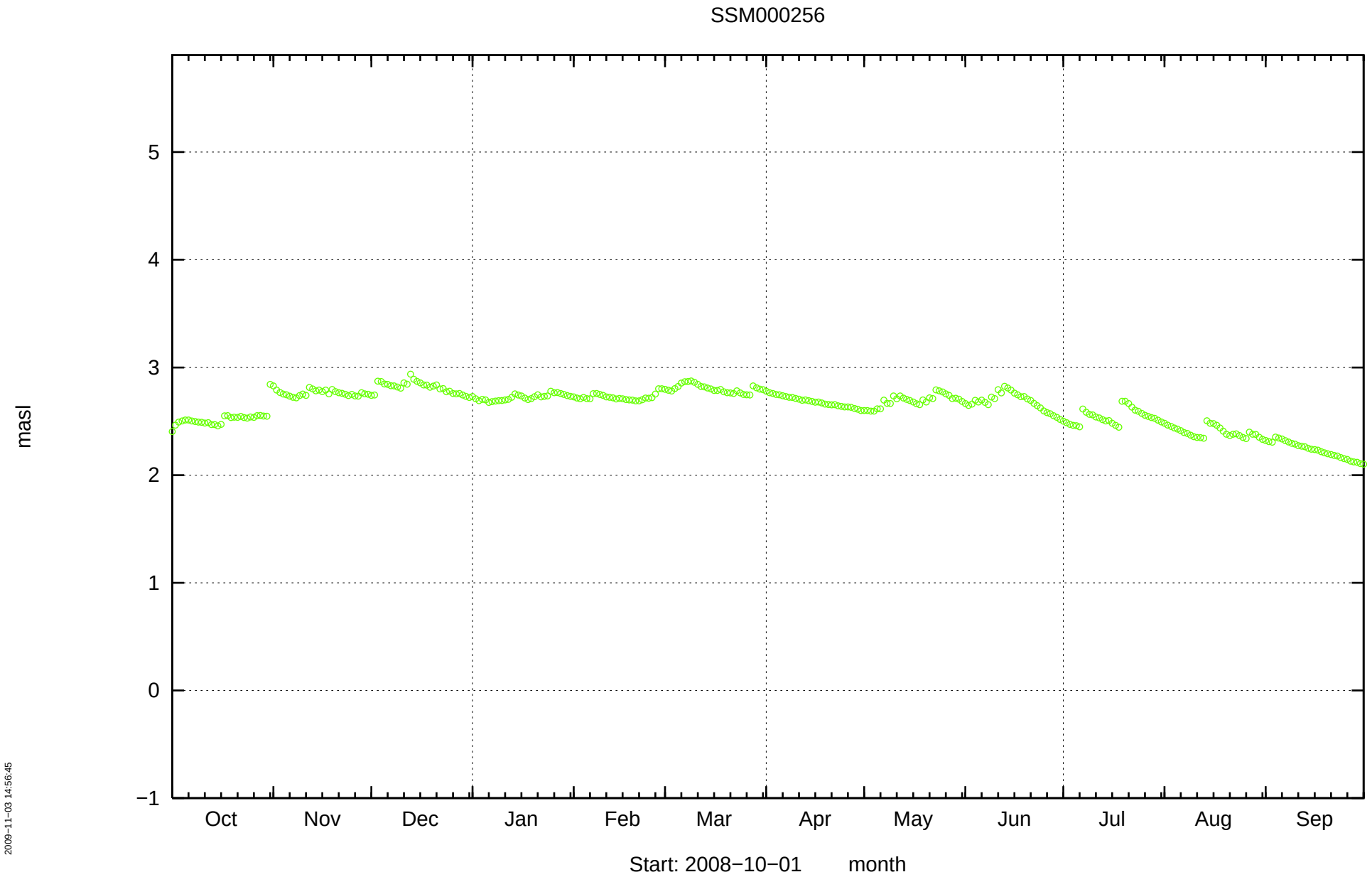

SSM000249
masl
24
23
22
21
20
19
18
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

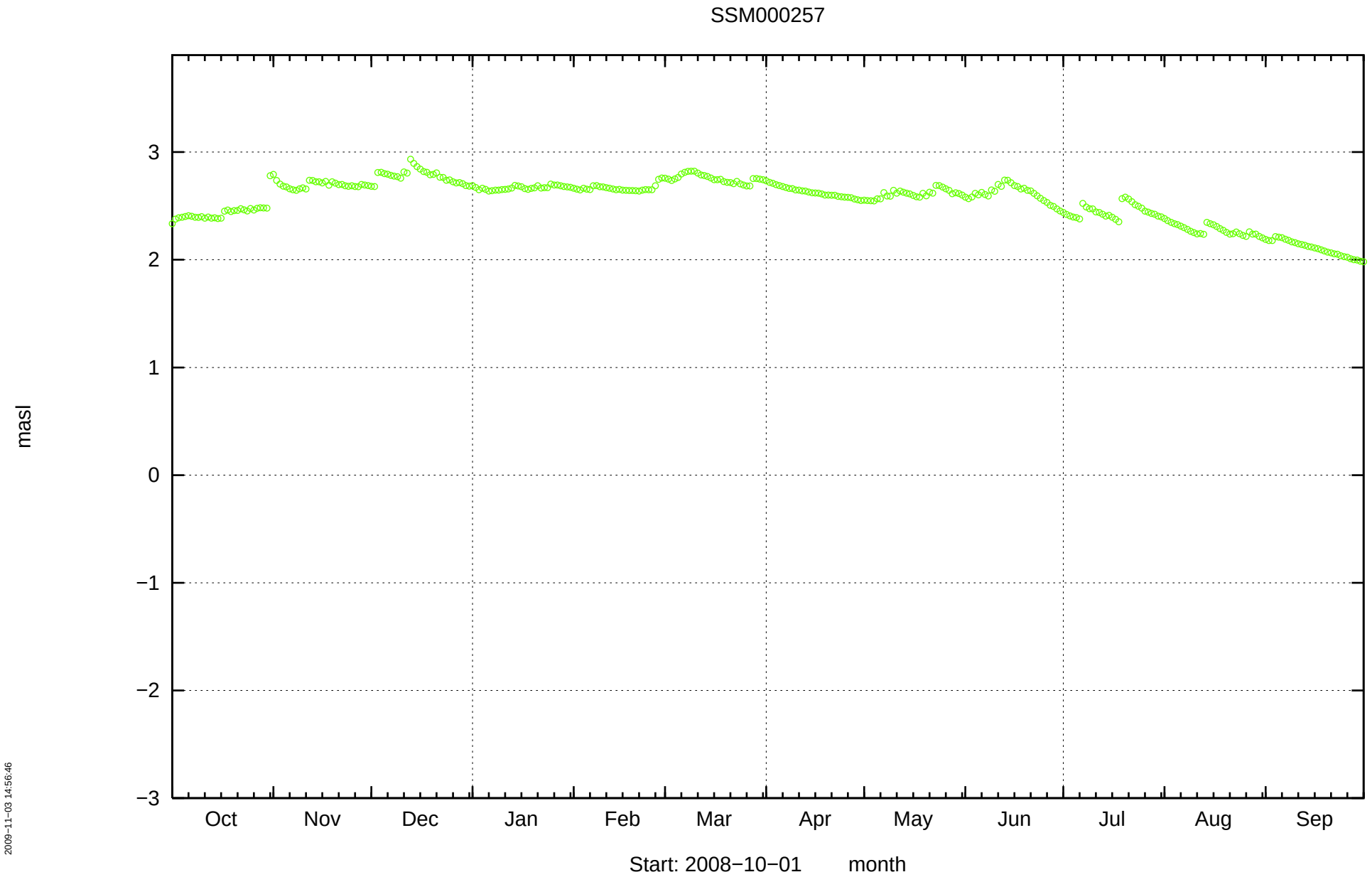

SSM000250
masl
17
16
15
14
13
12
11
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

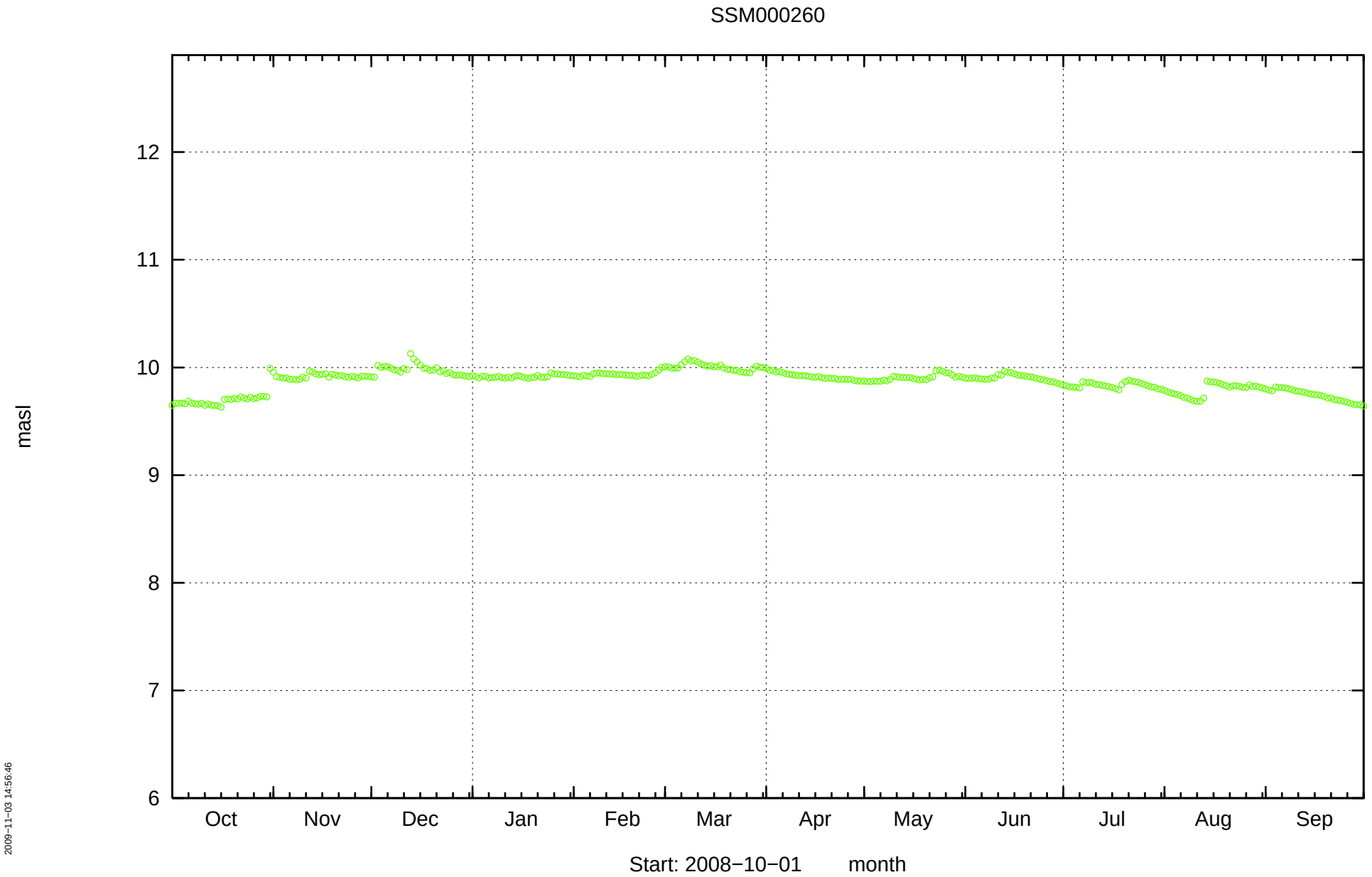

SSM000252
masl
19
18
17
16
15
14
13
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

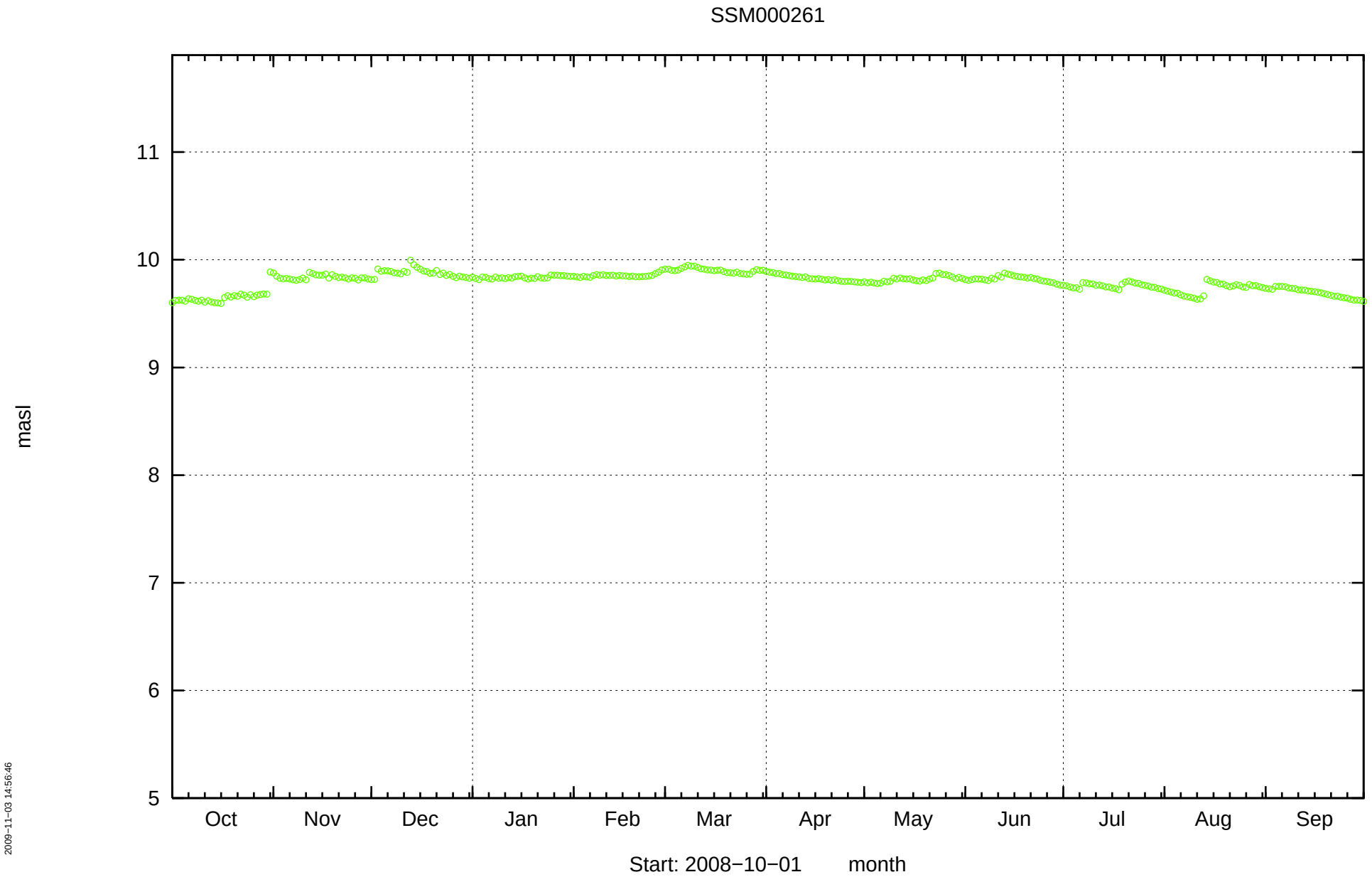

SSM000253
masl
19
18
17
16
15
14
13
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

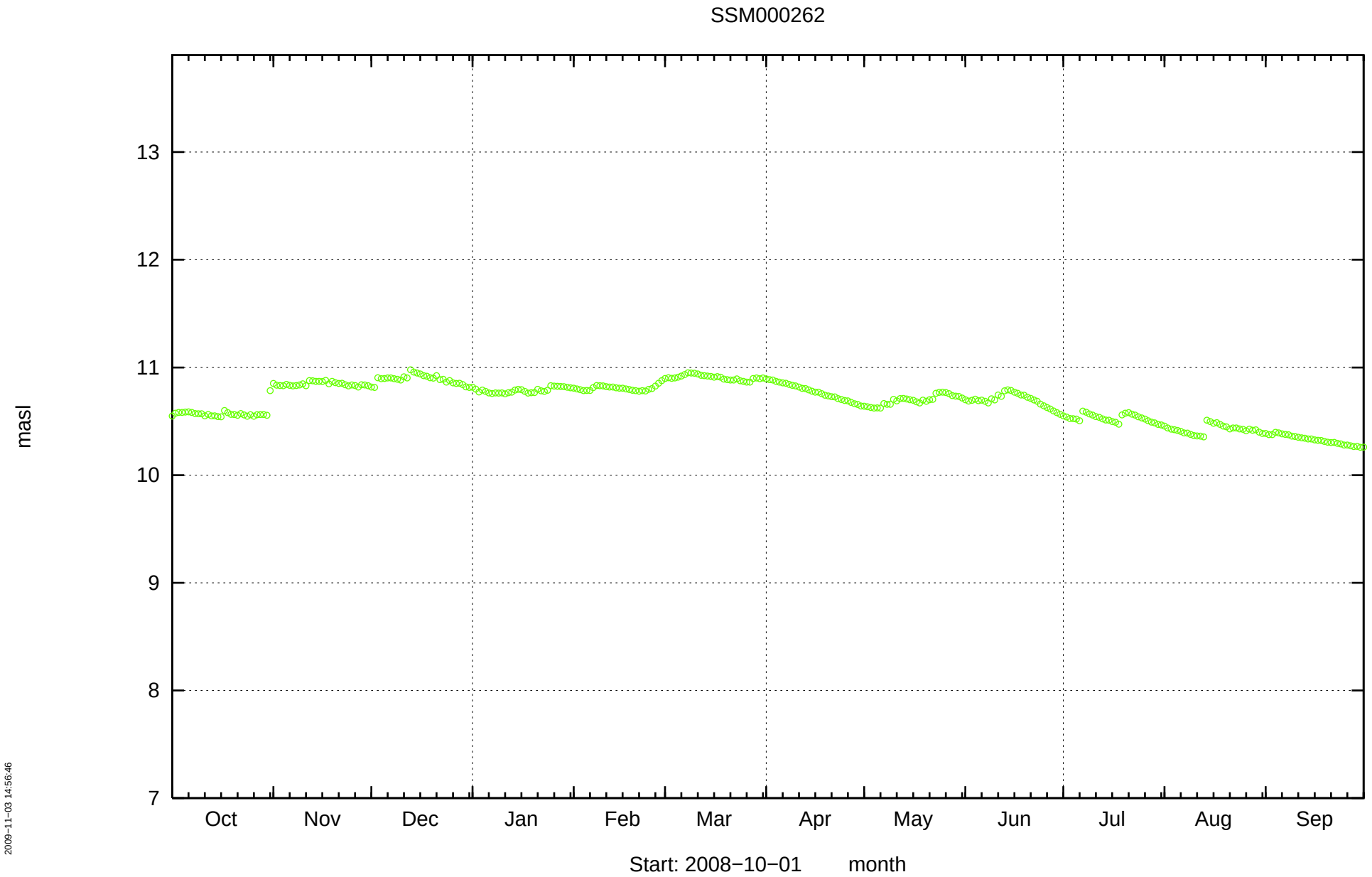

SSM000255
masl
6
5
4
3
2
1
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

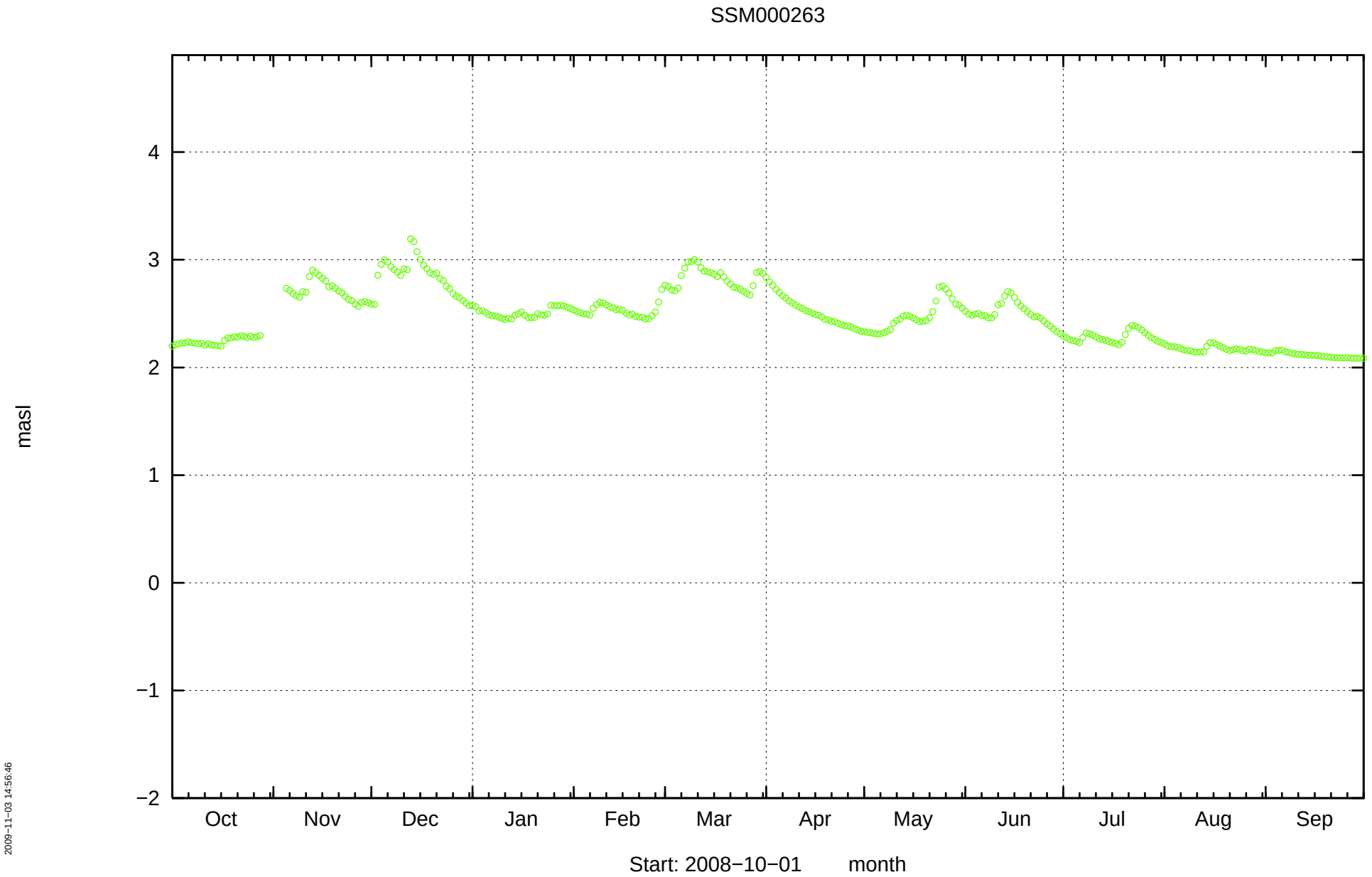

SSM000256
masl
5
4
3
2
1
0
−1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:45

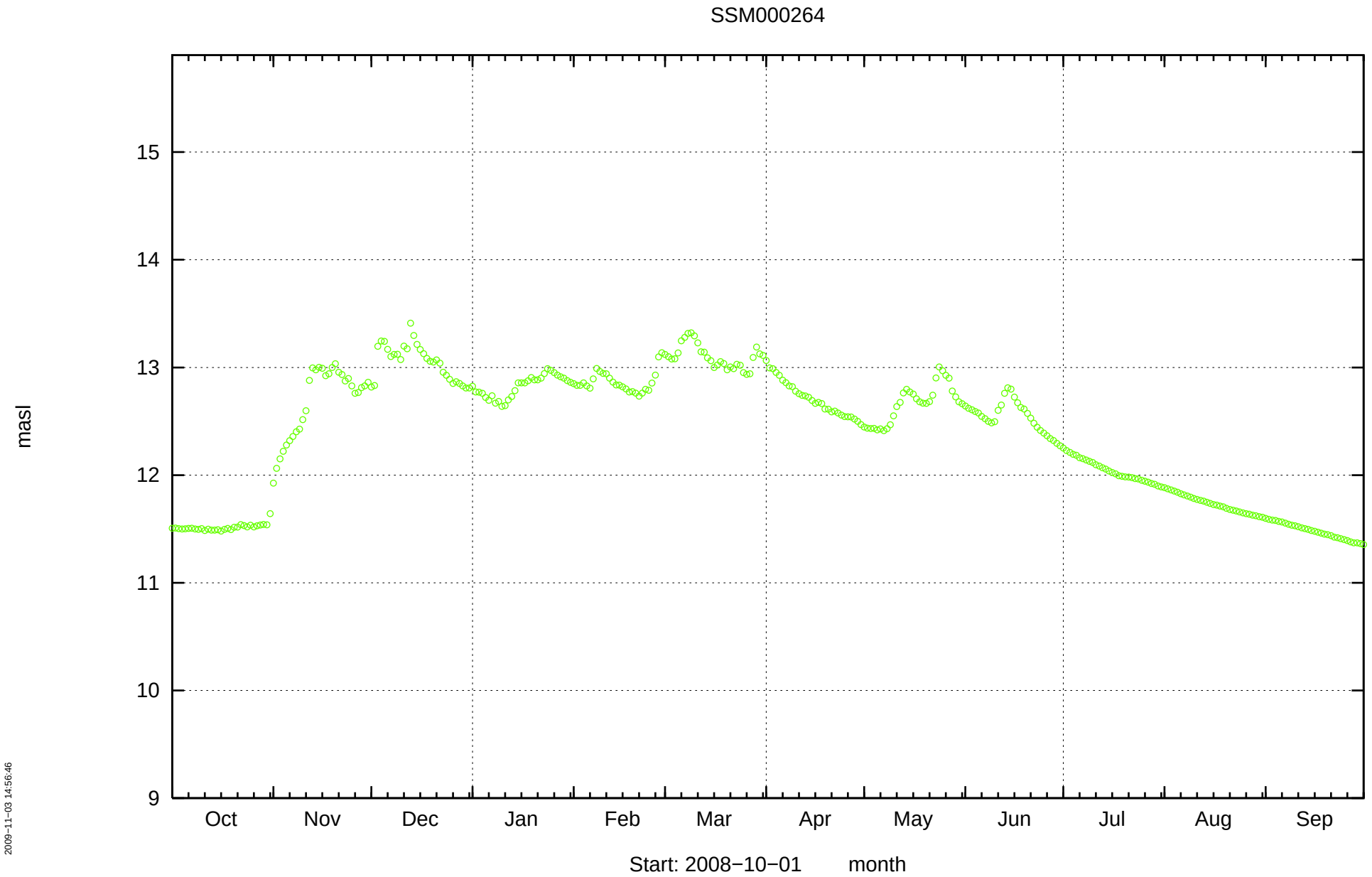

SSM000257
masl
3
2
1
0
−1
−2
−3
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46

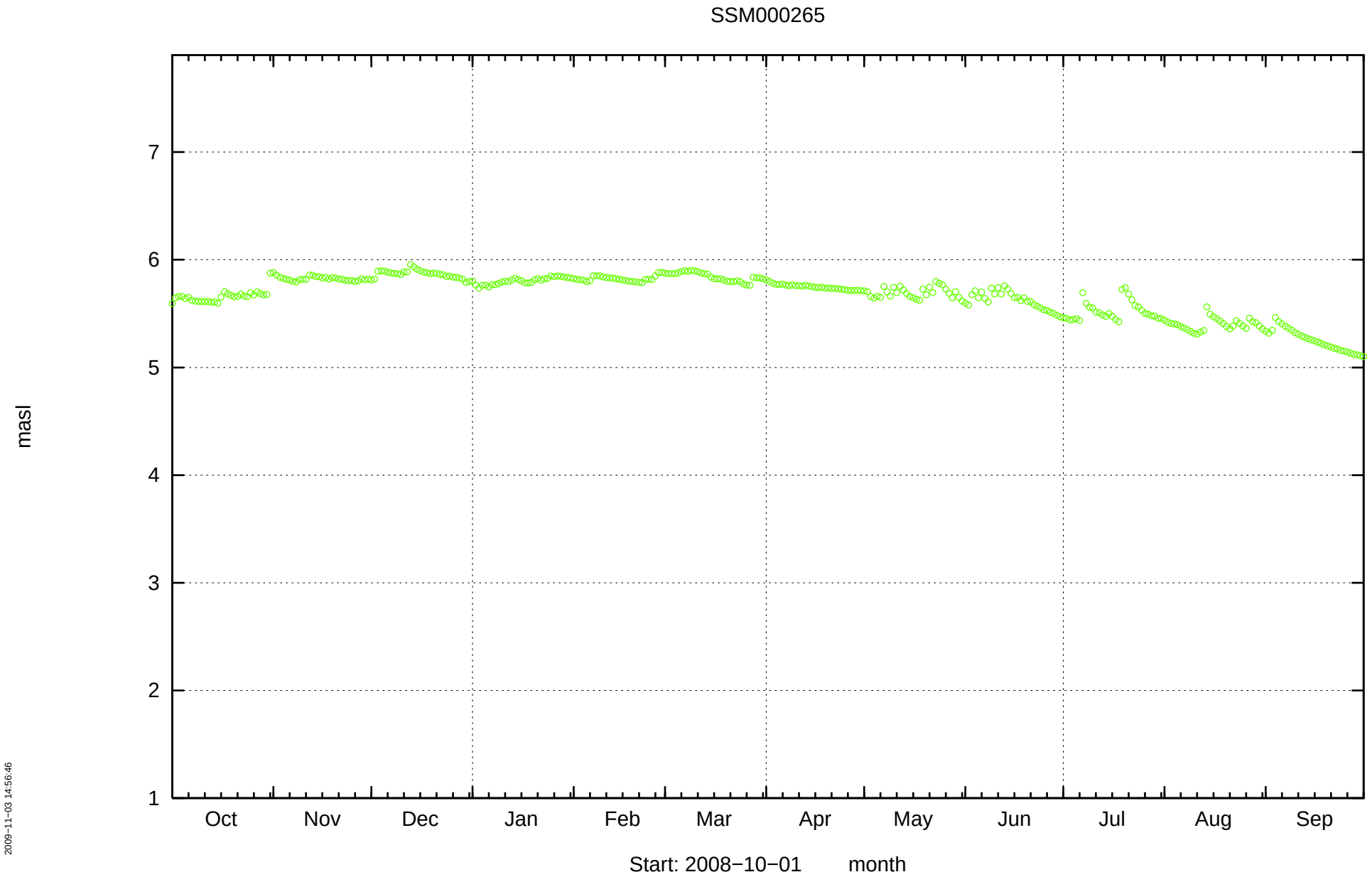

SSM000260
masl
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46

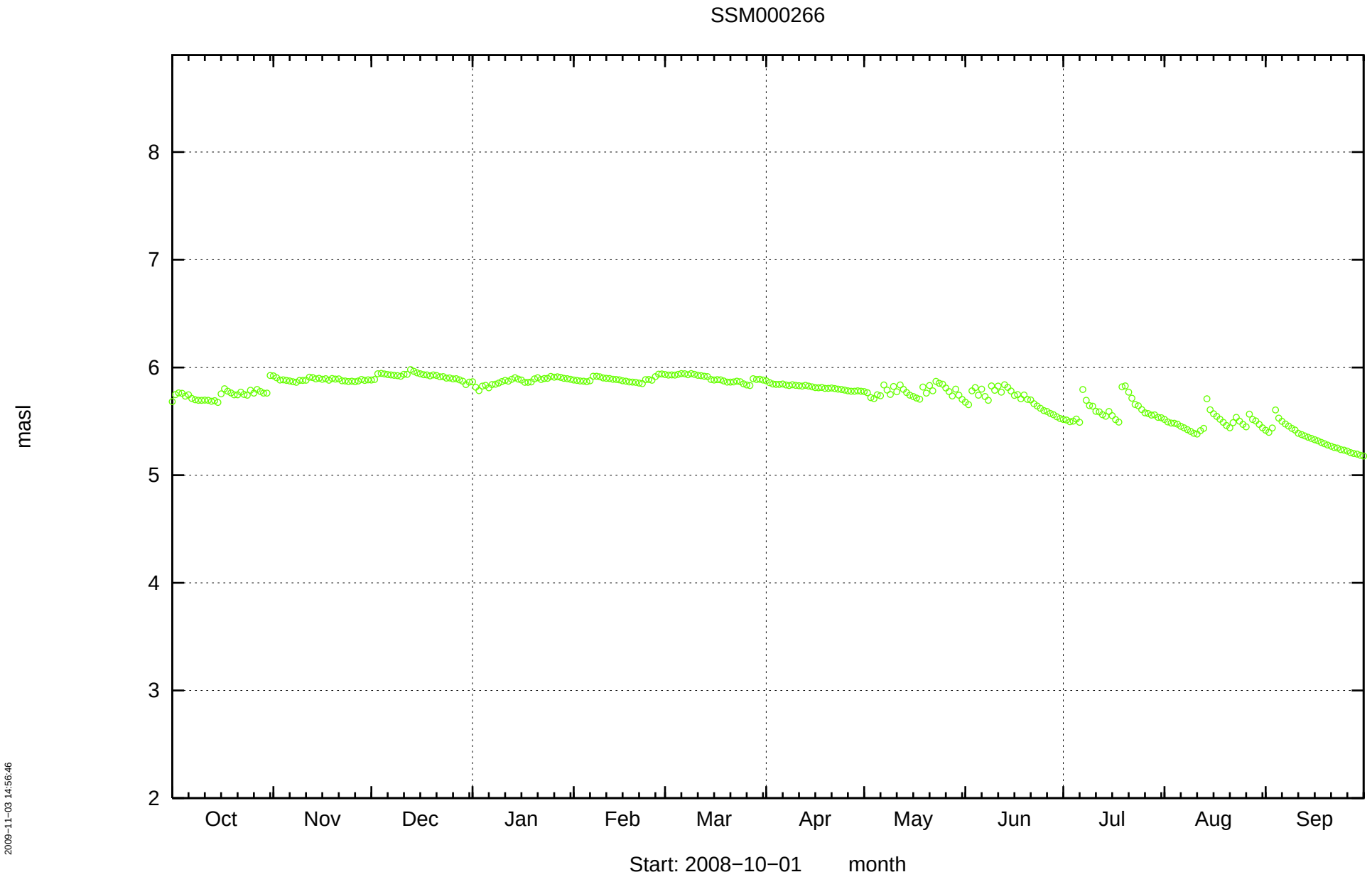

SSM000261
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46

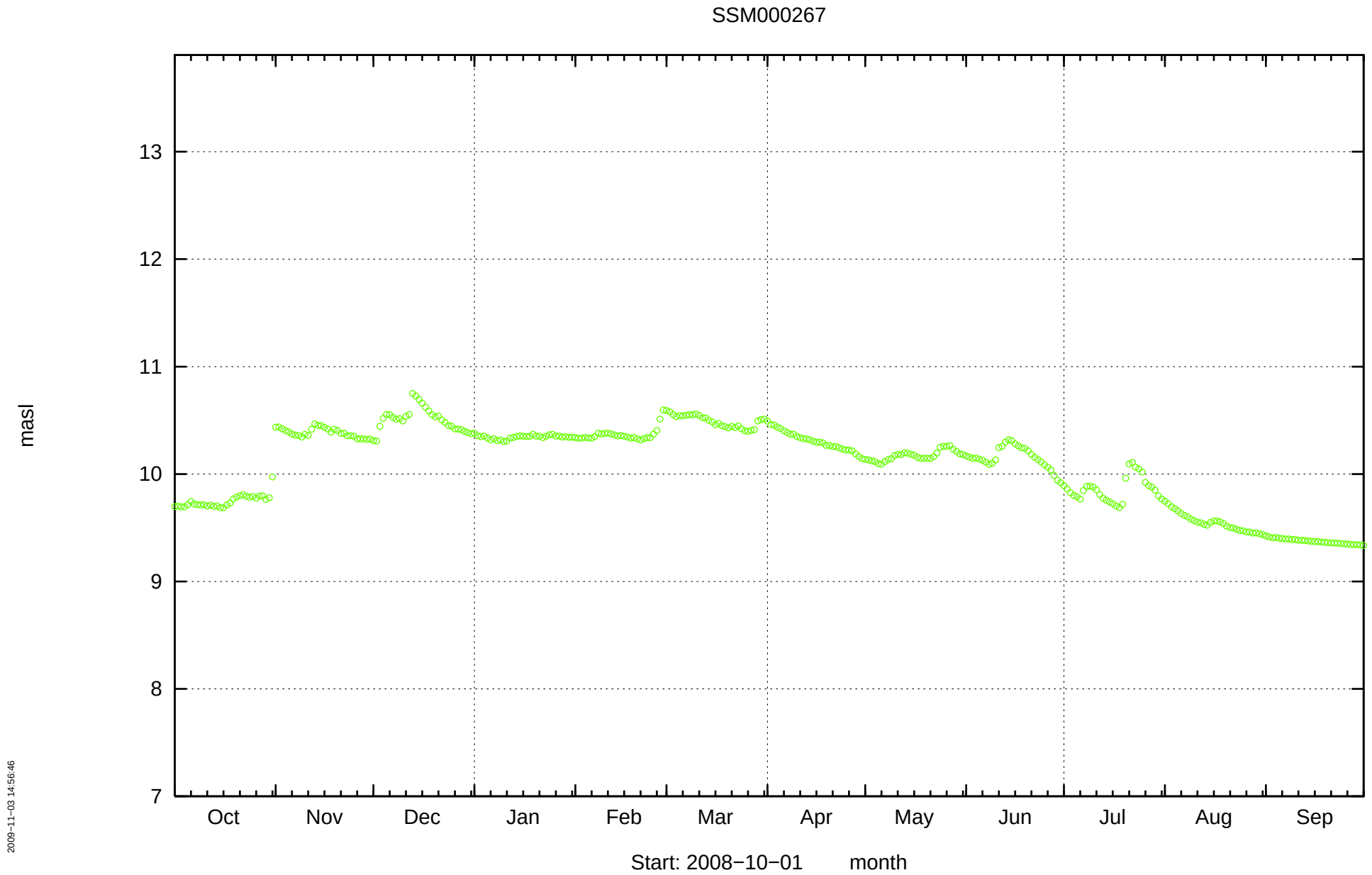

SSM000262
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46

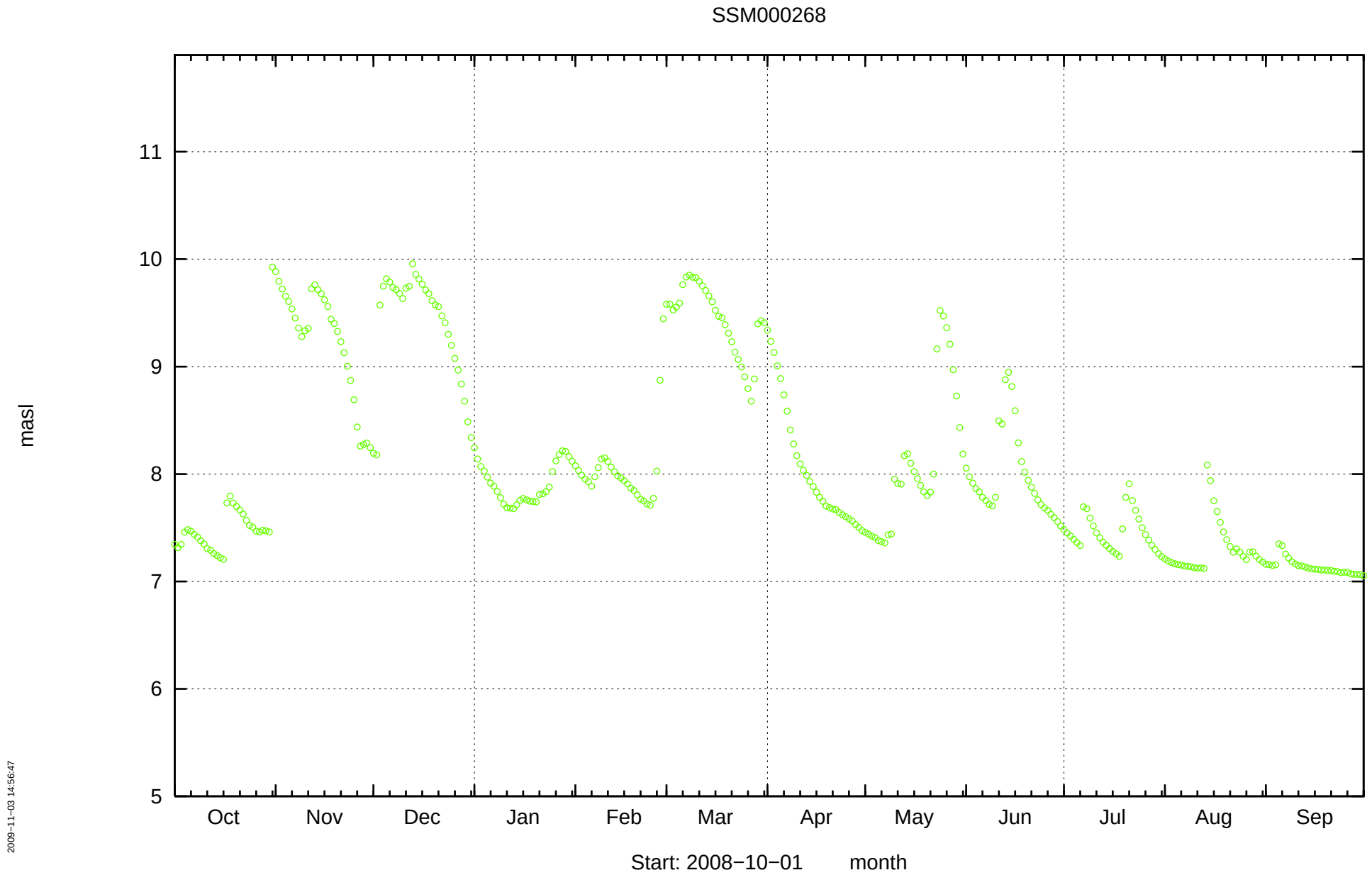

SSM000263
masl
4
3
2
1
0
−1
−2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46

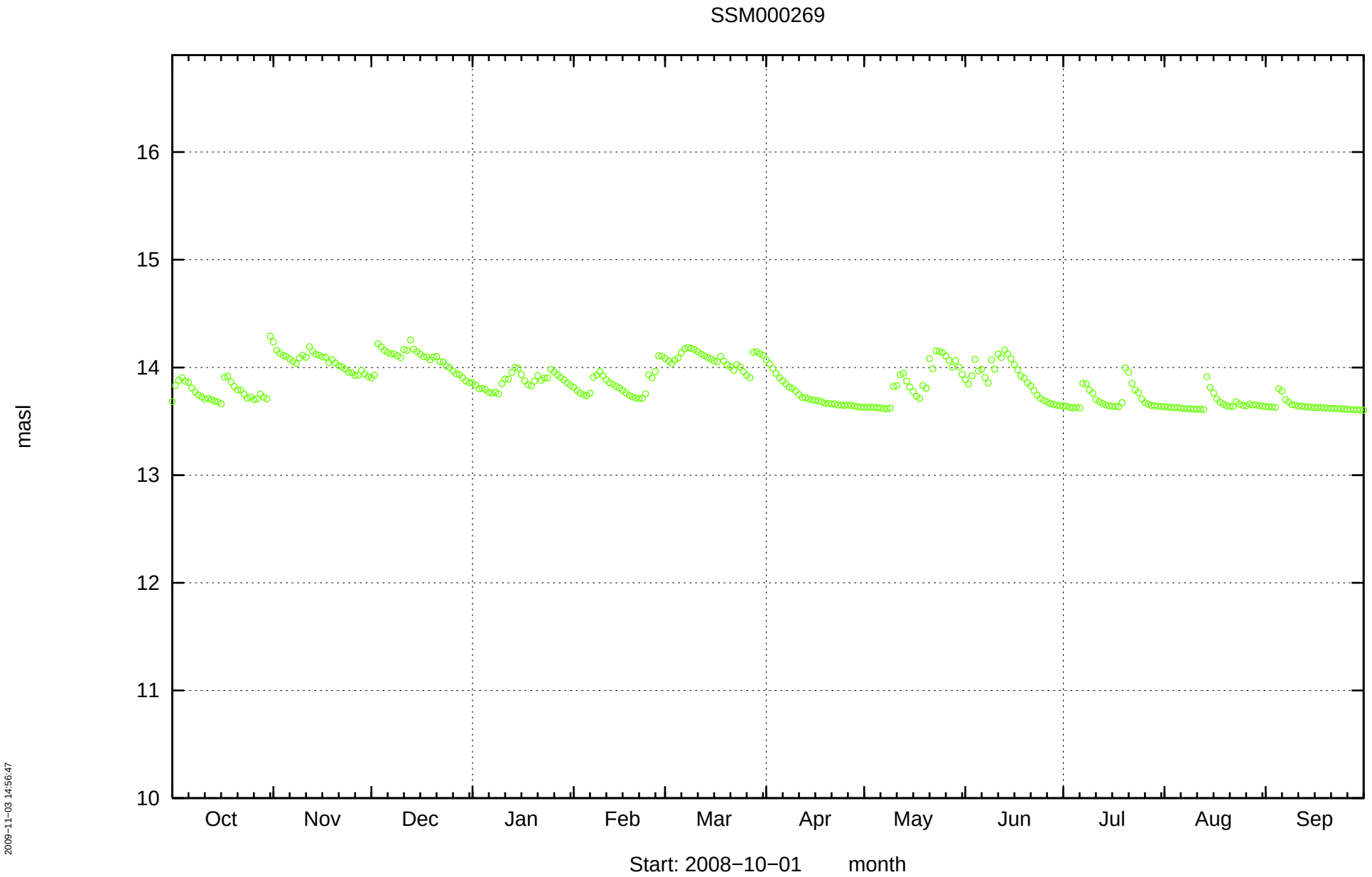

SSM000264
masl
15
14
13
12
11
10
9
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:46

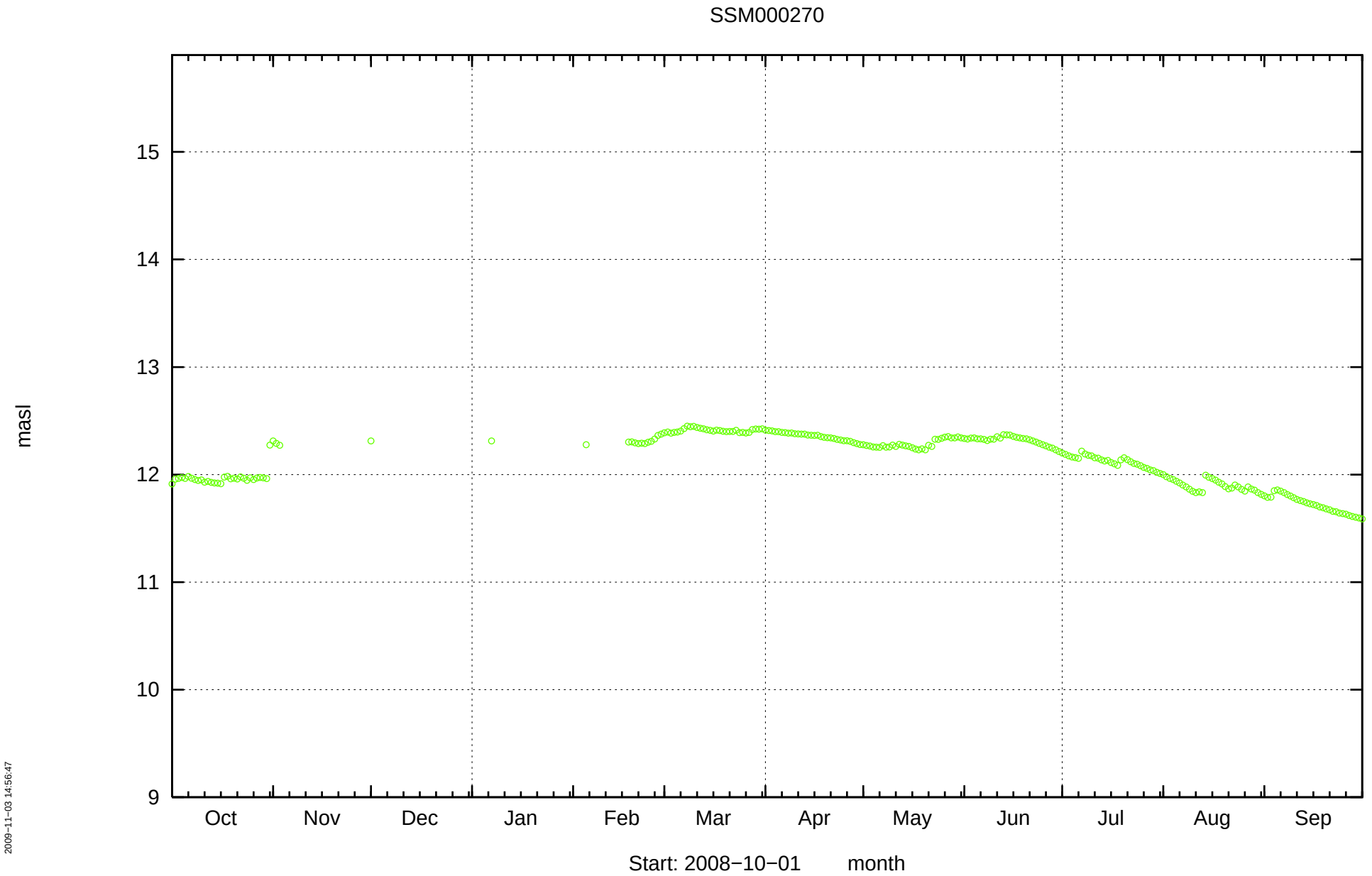

SSM000265
masl
7
6
5
4
3
2
1
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46

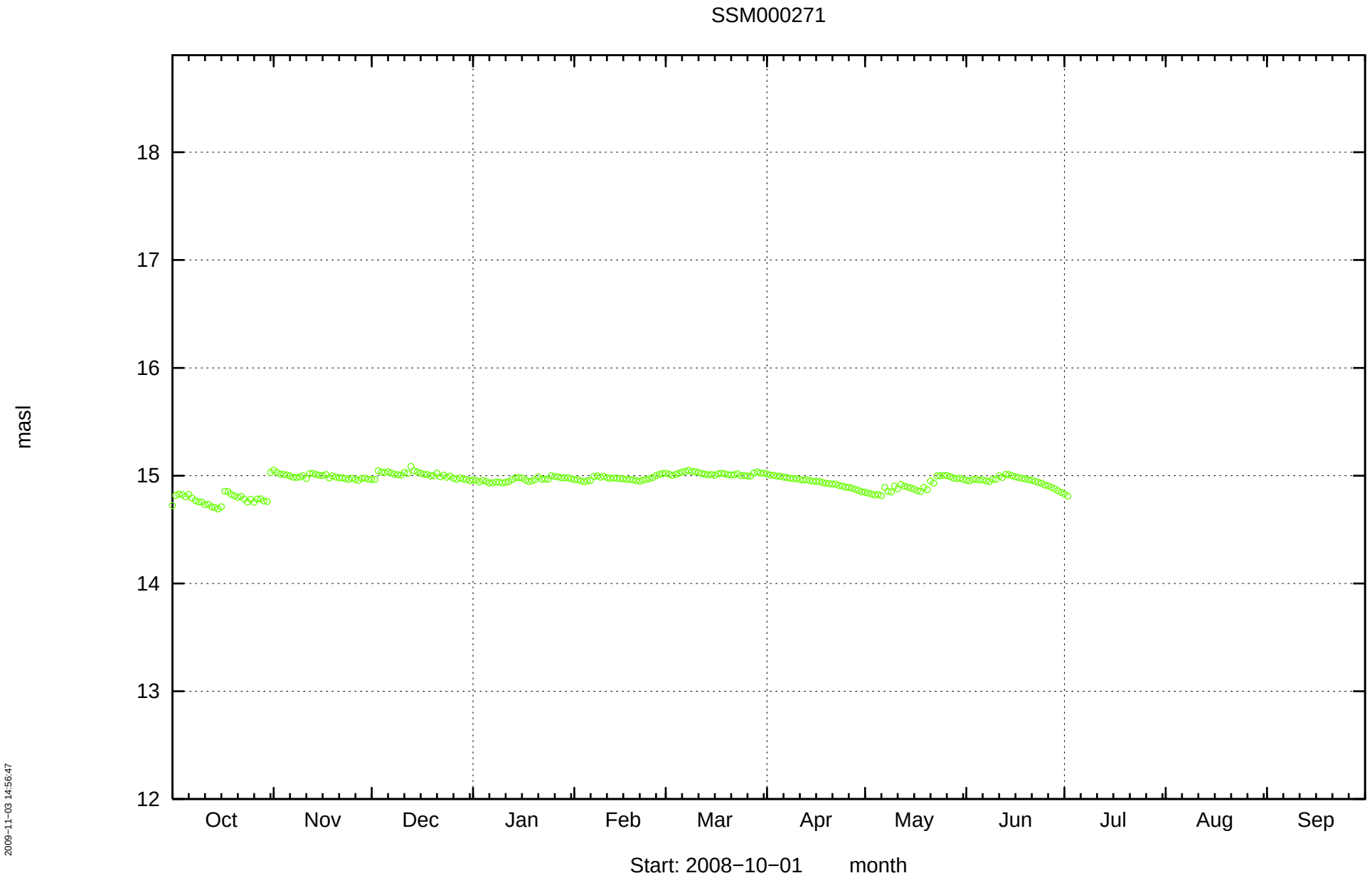

SSM000266
masl
8
7
6
5
4
3
2
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46


SSM000267
masl
13
12
11
10
9
8
7
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009−11−03 14:56:46


SSM000268
masl
11
10
9
8
7
6
5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:47


SSM000269
masl
16
15
14
13
12
11
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:47


SSM000270
masl
15
14
13
12
11
10
9
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:47


SSM000271
masl
18
17
16
15
14
13
12
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Start: 2008−10−01
month
2009-11-03 14:56:47

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. Not performed during the reported period.

- **Percussion drilling**: This is done with DTH-technology, which constantly flushes out borehole water and drill chips with air while drilling. Separate air-lifting operations are also included.

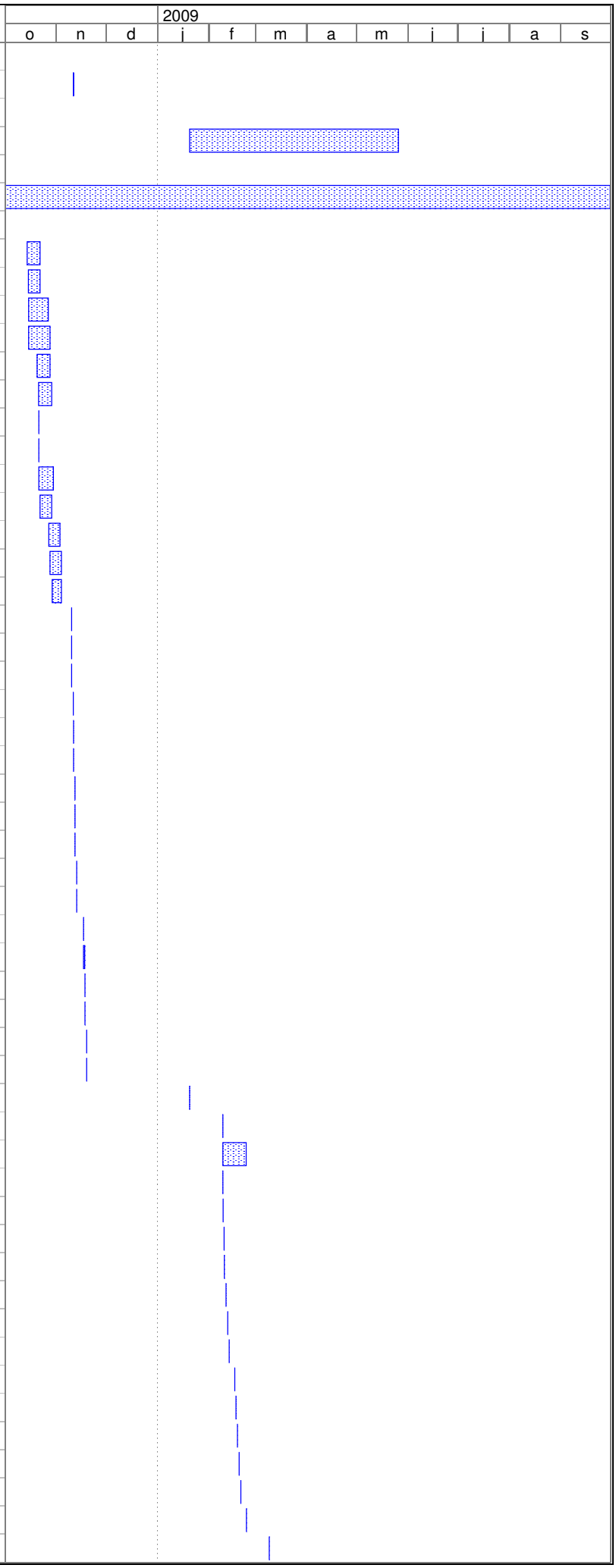
- **Pumping for drilling water supply**: Core drilling requires large amounts of drilling fluid and water is taken from a percussion hole for this purpose. Not performed during the reported period.

- **Pumping tests**: Conventional test for assessment of aquifer properties, including interference testing and flow logging (spinner and difference flow logging).

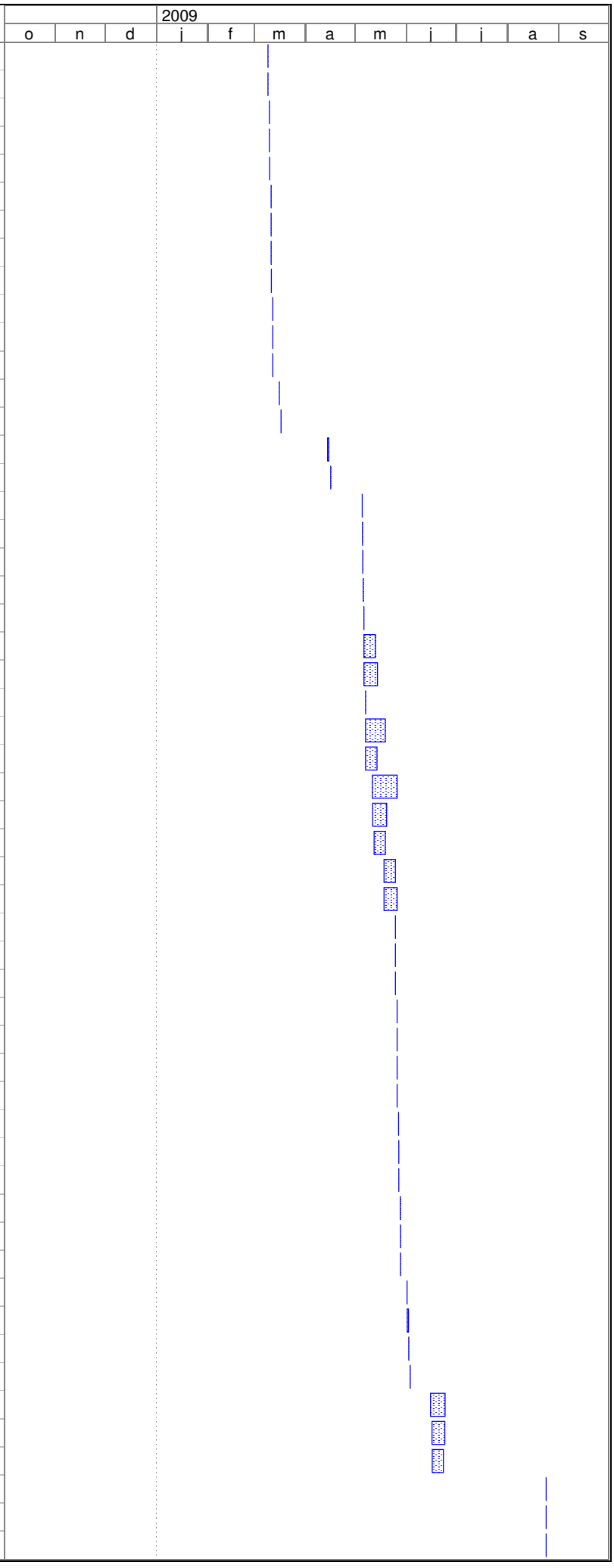
- **Pumping for water supply**: A site investigation borehole (HLX22) was taken into production as a water supply well for the village of Lilla Laxemar.

- **Water pumping**: Pumping for sampling of water for chemical analysis.

ID	Aktivitet	ID code
1	**Percussion drilling**	
2	Percussion drilling	HLX44
3	**Pumping tests**	
4	Radially converging Test Hole	HLX28
5	**Pumping for water supply**	
6	Pumping HLX22	HLX22
7	**Water pumping**	
8	Water sampling series	KLX19A
9	Water sampling series	HLX37
10	Water sampling series	KLX15A
11	Water sampling series	KLX15A
12	Water sampling series	KLX10
13	Water sampling series	KLX12A
14	Water sampling, class 1	KLX02
15	Water sampling, class 1	KLX02
16	Water sampling series	KLX10
17	Water sampling series	KLX18A
18	Water sampling series	KLX08
19	Water sampling series	HLX35
20	Water sampling series	HLX39
21	Near Surface GW Measurements	SSM000042
22	Near Surface GW Measurements	SSM000041
23	Near Surface GW Measurements	SSM000022
24	Near Surface GW Measurements	SSM000041
25	Near Surface GW Measurements	SSM000042
26	Near Surface GW Measurements	SSM000022
27	Near Surface GW Measurements	SSM000040
28	Near Surface GW Measurements	SSM000030
29	Near Surface GW Measurements	SSM000228
30	Near Surface GW Measurements	SSM000030
31	Near Surface GW Measurements	SSM000228
32	Near Surface GW Measurements	SSM000240
33	Near Surface GW Measurements	SSM000241
34	Near Surface GW Measurements	SSM000240
35	Near Surface GW Measurements	SSM000014
36	Near Surface GW Measurements	SSM000241
37	Near Surface GW Measurements	SSM000014
38	Water sampling, class 3	HLX28
39	Water sampling, class 5	KLX06
40	Chemmac measurement	KLX06
41	Water sampling, class 5	KLX06
42	Water sampling, class 5	KLX06
43	Water sampling, class 5	KLX06
44	Water sampling, class 5	KLX06
45	Water sampling, class 5	KLX06
46	Water sampling, class 5	KLX06
47	Water sampling, class 5	KLX06
48	Water sampling, class 5	KLX06
49	Water sampling, class 5	KLX06
50	Water sampling, class 5	KLX06
51	Water sampling, class 5	KLX06
52	Water sampling, class 5	KLX06
53	Water sampling, class 5	KLX06
54	Near Surface GW Measurements	SSM000022



ID	Aktivitet	ID code
55	Near Surface GW Measurements	SSM000042
56	Near Surface GW Measurements	SSM000041
57	Near Surface GW Measurements	SSM000022
58	Near Surface GW Measurements	SSM000042
59	Near Surface GW Measurements	SSM000041
60	Near Surface GW Measurements	SSM000030
61	Near Surface GW Measurements	SSM000228
62	Near Surface GW Measurements	SSM000014
63	Water sampling, class 3	HLX28
64	Near Surface GW Measurements	SSM000030
65	Near Surface GW Measurements	SSM000228
66	Near Surface GW Measurements	SSM000014
67	Near Surface GW Measurements	SSM000240
68	Near Surface GW Measurements	SSM000240
69	Near Surface GW Measurements	SSM000241
70	Near Surface GW Measurements	SSM000241
71	Water sampling, class 5	KLX06
72	Water sampling, class 5	KLX06
73	Water sampling, class 5	KLX06
74	Water sampling, class 5	KLX06
75	Water sampling, class 5	KLX06
76	Water sampling series	KLX18A
77	Water sampling series	KLX12A
78	Water sampling, class 5	KLX06
79	Water sampling series	KLX15A
80	Water sampling series	KLX15A
81	Water sampling series	KLX10
82	Water sampling series	KLX10
83	Water sampling series	KLX08
84	Water sampling series	HLX39
85	Water sampling series	HLX35
86	Near Surface GW Measurements	SSM000022
87	Near Surface GW Measurements	SSM000041
88	Near Surface GW Measurements	SSM000042
89	Near Surface GW Measurements	SSM000041
90	Near Surface GW Measurements	SSM000042
91	Near Surface GW Measurements	SSM000022
92	Water sampling, class 3	HLX28
93	Near Surface GW Measurements	SSM000030
94	Near Surface GW Measurements	SSM000228
95	Near Surface GW Measurements	SSM000014
96	Near Surface GW Measurements	SSM000014
97	Near Surface GW Measurements	SSM000030
98	Near Surface GW Measurements	SSM000228
99	Near Surface GW Measurements	SSM000240
100	Near Surface GW Measurements	SSM000241
101	Near Surface GW Measurements	SSM000240
102	Near Surface GW Measurements	SSM000241
103	Water sampling series	KLX19A
104	Water sampling series	HLX28
105	Water sampling series	HLX37
106	Near Surface GW Measurements	SSM000041
107	Near Surface GW Measurements	SSM000042
108	Near Surface GW Measurements	SSM000022



ID	Aktivitet	ID code	2009											
			o	n	d	j	f	m	a	m	j	j	a	s
109	Near Surface GW Measurements	SSM000022												
110	Near Surface GW Measurements	SSM000041												
111	Near Surface GW Measurements	SSM000042												
112	Near Surface GW Measurements	SSM000014												
113	Near Surface GW Measurements	SSM000228												
114	Near Surface GW Measurements	SSM000030												
115	Near Surface GW Measurements	SSM000014												
116	Near Surface GW Measurements	SSM000228												
117	Near Surface GW Measurements	SSM000030												
118	Near Surface GW Measurements	SSM000240												
119	Near Surface GW Measurements	SSM000241												
120	Near Surface GW Measurements	SSM000240												
121	Near Surface GW Measurements	SSM000241												