

file name : IMOS\_DWM-SOTS\_KF\_20230529\_SAZ47\_FV01\_SAZ47-25-2023-McLane-PARFLUX-Mark78H-21-2000m\_END-20240324\_C-20251017.nc

Dimensions:

TIME (21)  
bnds (2)

Variables:

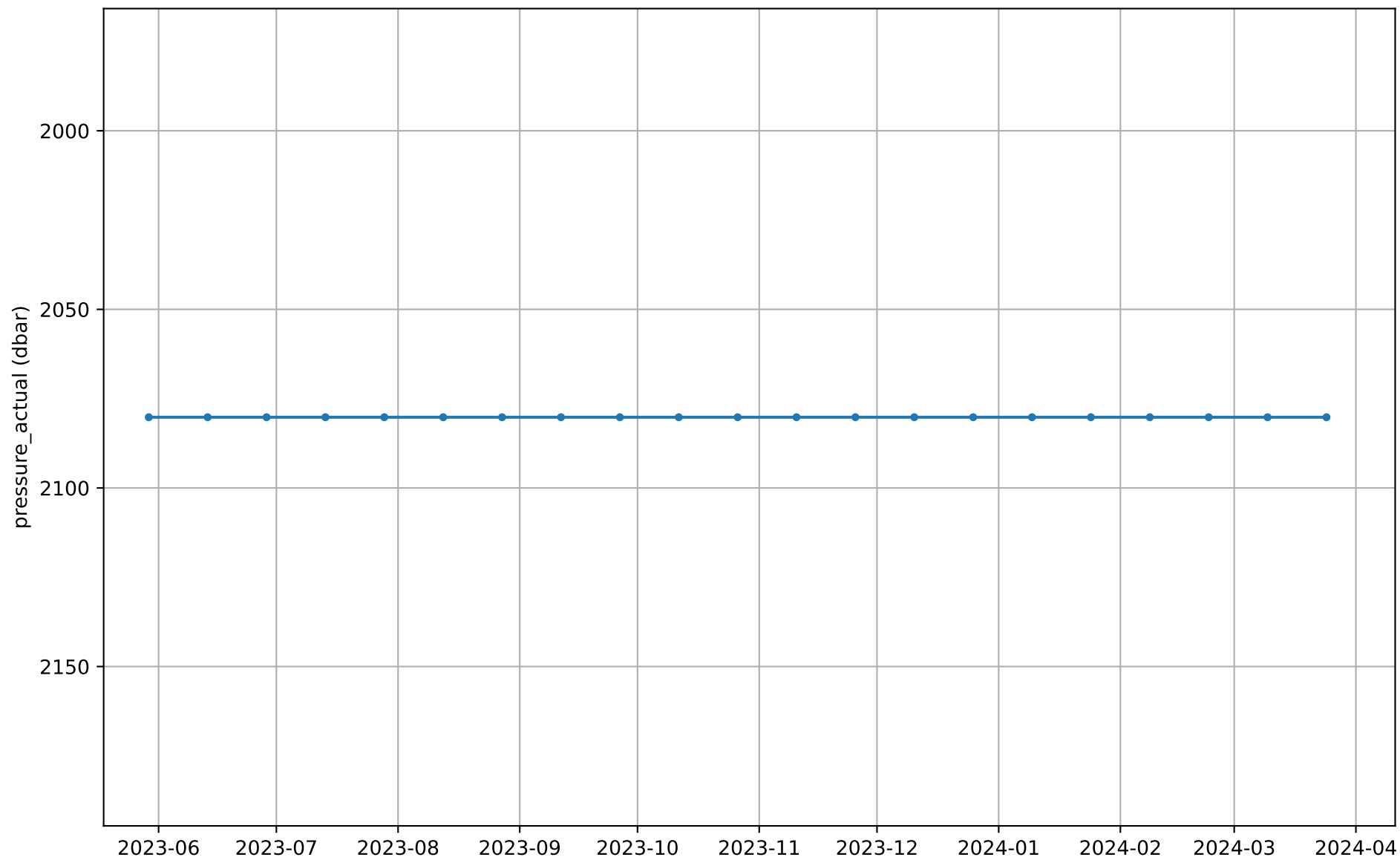
TIME ('TIME',) : long\_name = time of sample midpoint (days since 1950-01-01T00:00:00 UTC) : type float64  
TIME\_bnds ('TIME', 'bnds') : long\_name = time sample open, closed (days since 1950-01-01T00:00:00 UTC) : type float64  
NOMINAL\_DEPTH () : long\_name = nominal depth (m) : type float64  
LATITUDE () : long\_name = latitude of anchor (degrees north) : type float64  
LONGITUDE () : long\_name = longitude of anchor (degrees east) : type float64  
pressure\_actual ('TIME',) : long\_name = actual pressure (dbar) : type float32  
sample ('TIME',) : long\_name = sample number (1) : type float32  
sample\_quality\_control ('TIME',) : long\_name = quality flag for sample number : type int8  
mass\_flux ('TIME',) : long\_name = particulate total mass flux (mg m-2 d-1) : type float32  
mass\_flux\_uncertainty ('TIME',) : long\_name = uncertainty for particulate total mass flux (mg m-2 d-1) : type float32  
mass\_flux\_quality\_control ('TIME',) : long\_name = quality flag for particulate total mass flux : type int8  
SAL\_BRINE ('TIME',) : long\_name = sample supernatant practical salinity (1) : type float32  
SAL\_BRINE\_uncertainty ('TIME',) : long\_name = uncertainty for sample supernatant practical salinity (1) : type float32  
SAL\_BRINE\_quality\_control ('TIME',) : long\_name = quality flag for sample supernatant practical salinity : type int8  
pH\_BRINE ('TIME',) : long\_name = sample supernatant pH NBS scale (1) : type float32  
pH\_BRINE\_uncertainty ('TIME',) : long\_name = uncertainty for sample supernatant pH NBS scale (1) : type float32  
pH\_BRINE\_quality\_control ('TIME',) : long\_name = quality flag for sample supernatant pH NBS scale : type int8  
PC\_mass\_flux ('TIME',) : long\_name = particulate total carbon mass flux (mg m-2 d-1) : type float32  
PC\_mass\_flux\_uncertainty ('TIME',) : long\_name = uncertainty for particulate total carbon mass flux (mg m-2 d-1) : type float32  
PC\_mass\_flux\_quality\_control ('TIME',) : long\_name = quality flag for particulate total carbon mass flux : type int8  
PN\_mass\_flux ('TIME',) : long\_name = particulate total nitrogen mass flux (mg m-2 d-1) : type float32  
PN\_mass\_flux\_uncertainty ('TIME',) : long\_name = uncertainty for particulate total nitrogen mass flux (mg m-2 d-1) : type float32  
PN\_mass\_flux\_quality\_control ('TIME',) : long\_name = quality flag for particulate total nitrogen mass flux : type int8  
POC\_mass\_flux ('TIME',) : long\_name = particulate organic carbon mass flux (mg m-2 d-1) : type float32  
POC\_mass\_flux\_uncertainty ('TIME',) : long\_name = uncertainty for particulate organic carbon mass flux (mg m-2 d-1) : type float32  
POC\_mass\_flux\_quality\_control ('TIME',) : long\_name = quality flag for particulate organic carbon mass flux : type int8  
PIC\_mass\_flux ('TIME',) : long\_name = particulate inorganic carbon mass flux (mg m-2 d-1) : type float32  
PIC\_mass\_flux\_uncertainty ('TIME',) : long\_name = uncertainty for particulate inorganic carbon mass flux (mg m-2 d-1) : type float32  
PIC\_mass\_flux\_quality\_control ('TIME',) : long\_name = quality flag for particulate inorganic carbon mass flux : type int8  
BSi\_mass\_flux ('TIME',) : long\_name = particulate biogenic silicon mass flux (mg m-2 d-1) : type float32  
BSi\_mass\_flux\_uncertainty ('TIME',) : long\_name = uncertainty for particulate biogenic silicon mass flux (mg m-2 d-1) : type float32  
BSi\_mass\_flux\_quality\_control ('TIME',) : long\_name = quality flag for particulate biogenic silicon mass flux : type int8

abstract : Oceanographic and meteorological data from the Southern Ocean Time Series observatory in the Southern Ocean southwest of Tasmania.  
acknowledgement : Any users of IMOS data are required to clearly acknowledge the source of the material derived from IMOS in the format: "Data was sourced from the Integrated Marine Observing System (IMOS) - IMOS is a national collaborative research infrastructure, supported by the Australian Government."  
author : Cathryn Wynn-Edwards  
author\_email : cathryn.wynn-edwards@csiro.au  
cdm\_data\_type : Station  
citation : Integrated Marine Observing System. [year-of-data-download], [Title], [Data access URL], accessed [date- of-access]  
comment\_archive : zooplankton > lmm archived, photos available on request, 3/10 of sample archived  
comment\_data\_qc\_report : Wynn-Edwards, CA, Davies, DM, Shadwick, EH, Trull, TW (2020) Southern Ocean Time Series. SOTS Quality assessment and control report. Sediment trap particle fluxes Version 1.0. CSIRO, Australia. DOI: 10.26198/5dfad21358a8d (<http://dx.doi.org/10.26198/5dfad21358a8d>)  
comment\_generating\_script : SAZxls2trapNetCDF  
comment\_instrument : trap area, PARFLUX = 0.5 m<sup>2</sup>, IRS = 0.16 m<sup>2</sup>  
comment\_time : time is sample mid point  
comment\_uncertainty : Mass flux uncertainty estimates are based on weighing errors only (uniformly 0.06%), and do not include sample splitting errors (~3%) or trap collection efficiency variations. Chemical component flux uncertainty estimates combine the mass flux uncertainty and the analytical uncertainty for the component, based on variations in working standards and duplicate samples over long periods. These are uniformly 1.9% for PIC, 2.8% for POC, 2.1% for PC, 3.8% for PN, and 4.9% for BSi. All uncertainty estimates are 95% confidence intervals (1.96 standard deviations). Further details are available in Wynn-Edwards et al., 2020  
contributor\_name : Gemma Woodward  
contributor\_role : sample processing  
Conventions : CF-1.6,IMOS-1.4  
data\_centre : Australian Ocean Data Network (AODN)  
data\_centre\_email : info@aodn.org.au  
data\_mode : D  
date\_created : 2025-10-17T03:52:17Z  
deployment\_code : SAZ47-25-2023  
disclaimer : Data, products and services from IMOS are provided "as is" without any warranty as to fitness for a particular purpose.  
distribution\_statement : Data may be re-used, provided that related metadata explaining the data has been reviewed by the user, and the data is appropriately acknowledged.  
Data, products and services from IMOS are provided as is without any warranty as to fitness for a particular purpose.  
featureType : timeSeries  
file\_version : Level 1 - Quality Controlled Data  
geospatial\_lat\_max : -46.90882  
geospatial\_lat\_min : -46.90882  
geospatial\_lat\_units : degrees\_north  
geospatial\_lon\_max : 141.69232  
geospatial\_lon\_min : 141.69232  
geospatial\_lon\_units : degrees\_east  
geospatial\_vertical\_max : 2000.0  
geospatial\_vertical\_min : 2000.0  
geospatial\_vertical\_positive : down  
geospatial\_vertical\_units : metres  
history : 2025-10-17 03:52:17 : created from : 2023\_saz25\_47\_sed.xlsx datestamp : 2025-10-17 14:16:58  
institution : CSIRO; Australian Antarctic Program Partnership  
institution\_address : CSIRO Marine Laboratories, Castray Esp, Hobart, Tasmania 7001, Australia; 20 Castray Esplanade, Hobart Tasmania 7000, Australia  
instrument : McLane-PARFLUX-Mark78H-21  
instrument\_serial\_number : frame# 14182-01, controller# 11741-01 and Motor # 14182-01 Cup set Ex21  
keywords : Oceans->Ocean Chemistry->Biogeochemical Cycles; mass\_flux; SAL\_BRINE; pH\_BRINE; PC\_mass\_flux; PN\_mass\_flux; POC\_mass\_flux; PIC\_mass\_flux; BSi\_mass\_flux  
license : <http://creativecommons.org/licenses/by/4.0/>  
Metadata\_Conventions : Unidata Dataset Discovery v1.0  
Mooring : SAZ mooring  
naming\_authority : IMOS  
platform\_code : SAZ  
platform\_deployment\_cruise\_ExpoCode : 096U20230510  
platform\_deployment\_cruise\_name : IN2023\_V03

platform\_deployment\_ship\_ICES : 096U  
platform\_deployment\_ship\_name : RV Investigator  
platform\_recovery\_cruise\_ExpoCode : 096U20240330  
platform\_recovery\_cruise\_name : IN2024\_V02  
platform\_recovery\_ship\_ICES : 096U  
platform\_recovery\_ship\_name : RV Investigator  
principal\_investigator : Elizabeth Shadwick  
principal\_investigator\_email : Elizabeth.Shadwick@csiro.au  
project : Integrated Marine Observing System (IMOS)  
references : Particle flux QC report: <http://www.imos.org.au> <http://dx.doi.org/10.26198/5dfad21358a8d>; SOTS annual reports: <https://catalogue-imos.aodn.org.au/geonetwork/srv/eng/catalog.search#/metadata/afcl66ce-6b34-44d9-b64c-8bb10fd43a07>  
site\_code : SOTS  
source : Moorings  
standard\_name\_vocabulary : NetCDF Climate and Forecast (CF) Metadata Convention Standard Name Table 67  
time\_coverage\_end : 2024-03-24T12:00:00Z  
time\_coverage\_start : 2023-05-29T12:00:00Z  
time\_deployment\_end : 2024-04-11T00:00:00Z  
time\_deployment\_start : 2023-05-18T00:00:00Z  
title : Oceanographic and meteorological data from the Southern Ocean Time Series observatory in the Southern Ocean southwest of Tasmania.  
voyage\_deployment : [https://www.cmar.csiro.au/data/trawler/survey\\_details.cfm?survey=IN2023\\_V03](https://www.cmar.csiro.au/data/trawler/survey_details.cfm?survey=IN2023_V03)  
voyage\_deployment\_start\_date : 10-May-2023  
voyage\_recovery : [https://www.cmar.csiro.au/data/trawler/survey\\_details.cfm?survey=IN2024\\_V02](https://www.cmar.csiro.au/data/trawler/survey_details.cfm?survey=IN2024_V02)  
voyage\_recovery\_start\_date : 30-Mar-2024

Variable : pressure\_actual('TIME',)  
\_FillValue : nan  
long\_name : actual pressure  
units : dbar  
uncertainty : 3  
comment : actual  
comment\_method : pressure from nearest instrument on mooring, extrapolated to trap position  
valid\_min : -2.0  
valid\_max : 12000.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH

SAZ47-25-2023



—●— n (u m)

Variable : sample('TIME',)

\_FillValue : nan

\_long\_name : sample number

units : 1

comment\_sample : cup 2 had remains of a large fish in it, which is likely the cause of elevated %PC and %PN results. This sample is therefore flagged 2, probably good.

coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH

ancillary\_variables : sample\_quality\_control

AUX : sample\_quality\_control('TIME',)

\_FillValue : 127

\_long\_name : quality flag for sample number

quality\_control\_conventions : IMOS standard flags

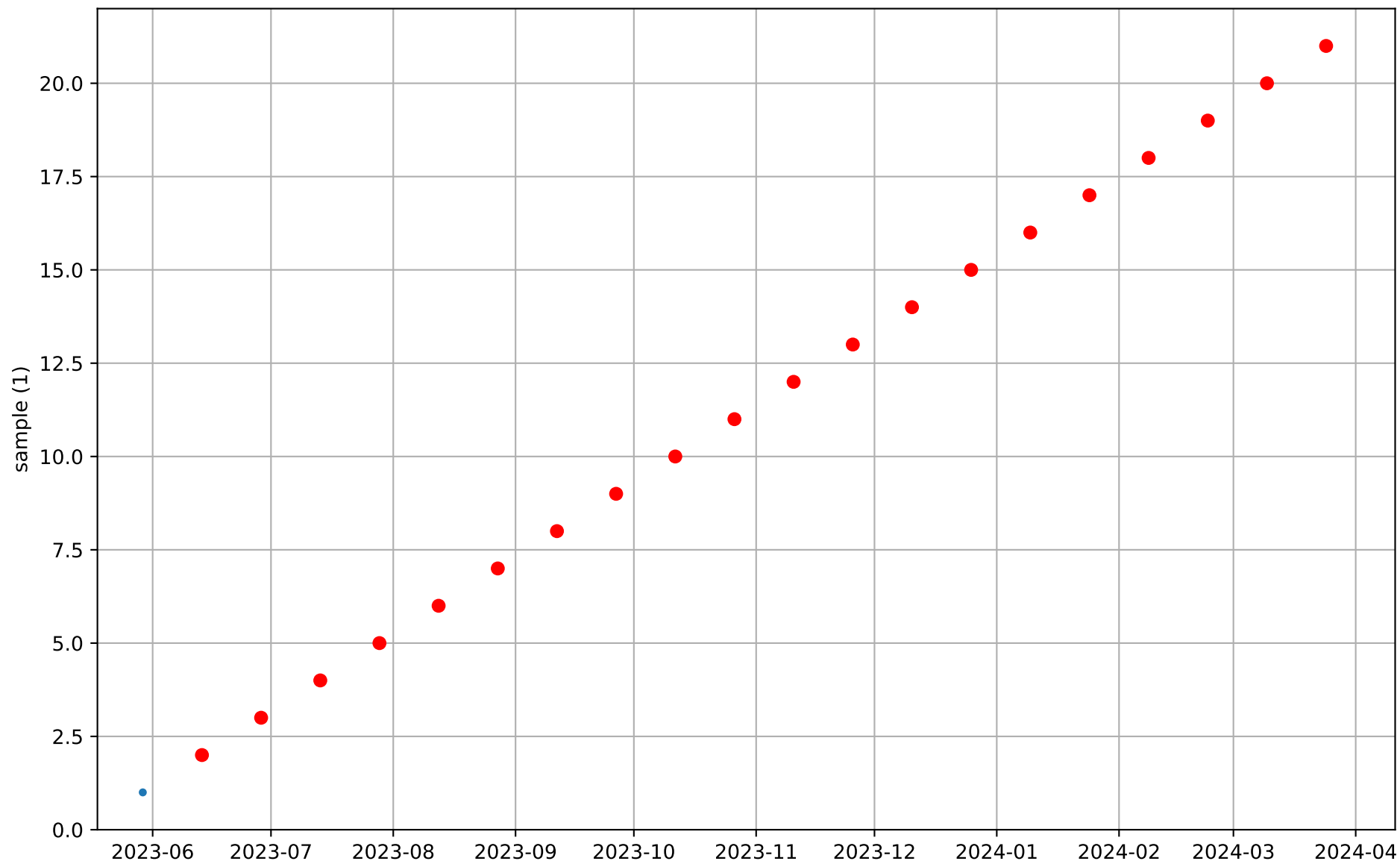
valid\_min : 0

valid\_max : 9

flag\_values : [0 1 2 3 4 9]

flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

n (u m)

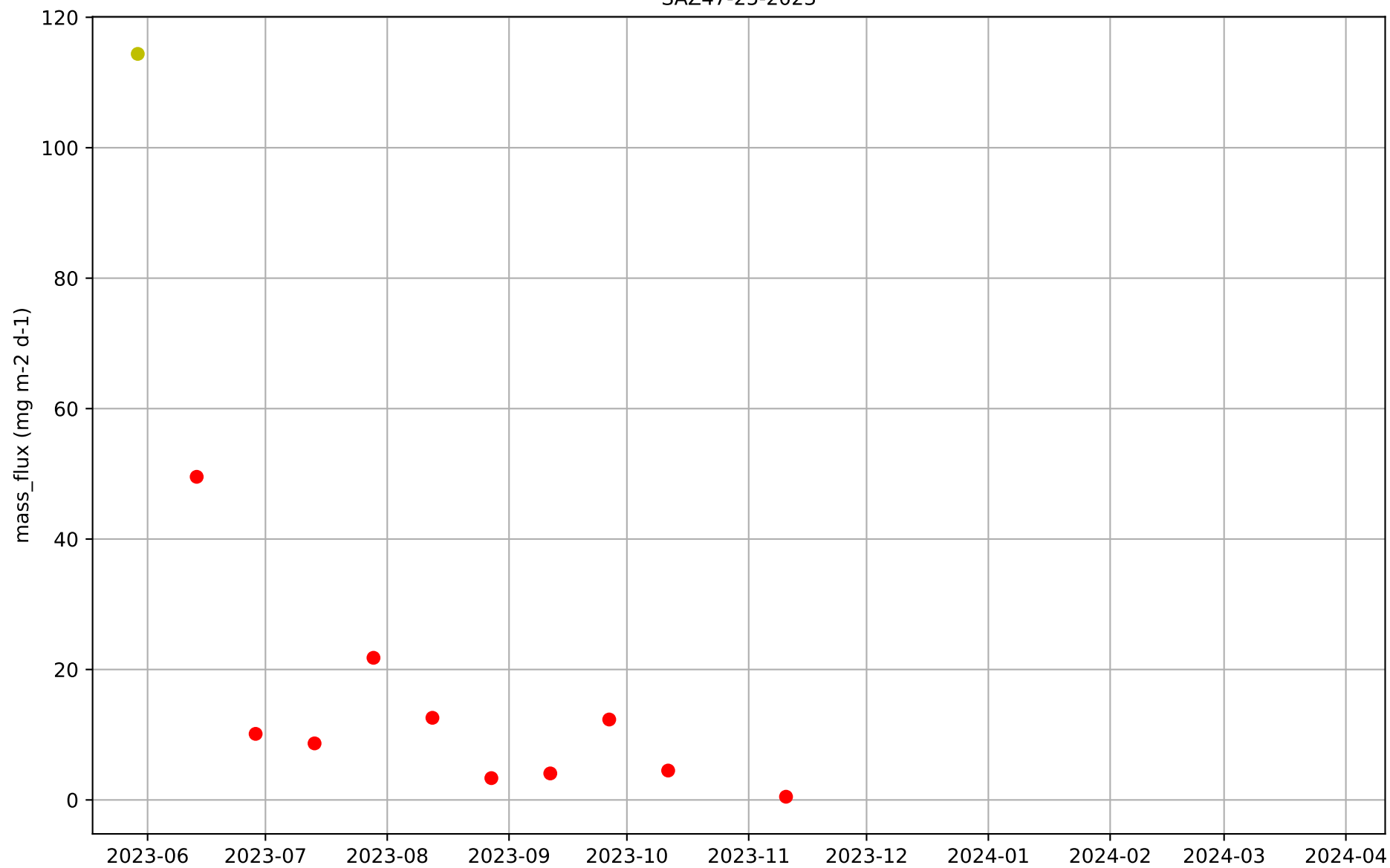
```
Variable : mass_flux('TIME',)
_FillValue : nan
Long_name : particulate total mass flux
units : mg m-2 d-1
relative_uncertainty : 0.0006
comment : <1mm
comment_method : dry wt 60C
valid_min : -10.0
valid_max : 1000.0
coordinates : TIME LATITUDE LONGITUDE NOMINAL_DEPTH
ancillary_variables : mass_flux_uncertainty mass_flux_quality_control

AUX : mass_flux_uncertainty('TIME',)
_FillValue : nan
units : mg m-2 d-1
long_name : uncertainty for particulate total mass flux

AUX : mass_flux_quality_control('TIME',)
_FillValue : 127
Long_name : quality flag for particulate total mass flux
quality_control_conventions : IMOS standard flags
valid_min : 0
valid_max : 9
flag_values : [0 1 2 3 4 9]
flag_meanings : unknown good_data probably_good_data probably_bad_data bad_data missing_value
```



SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

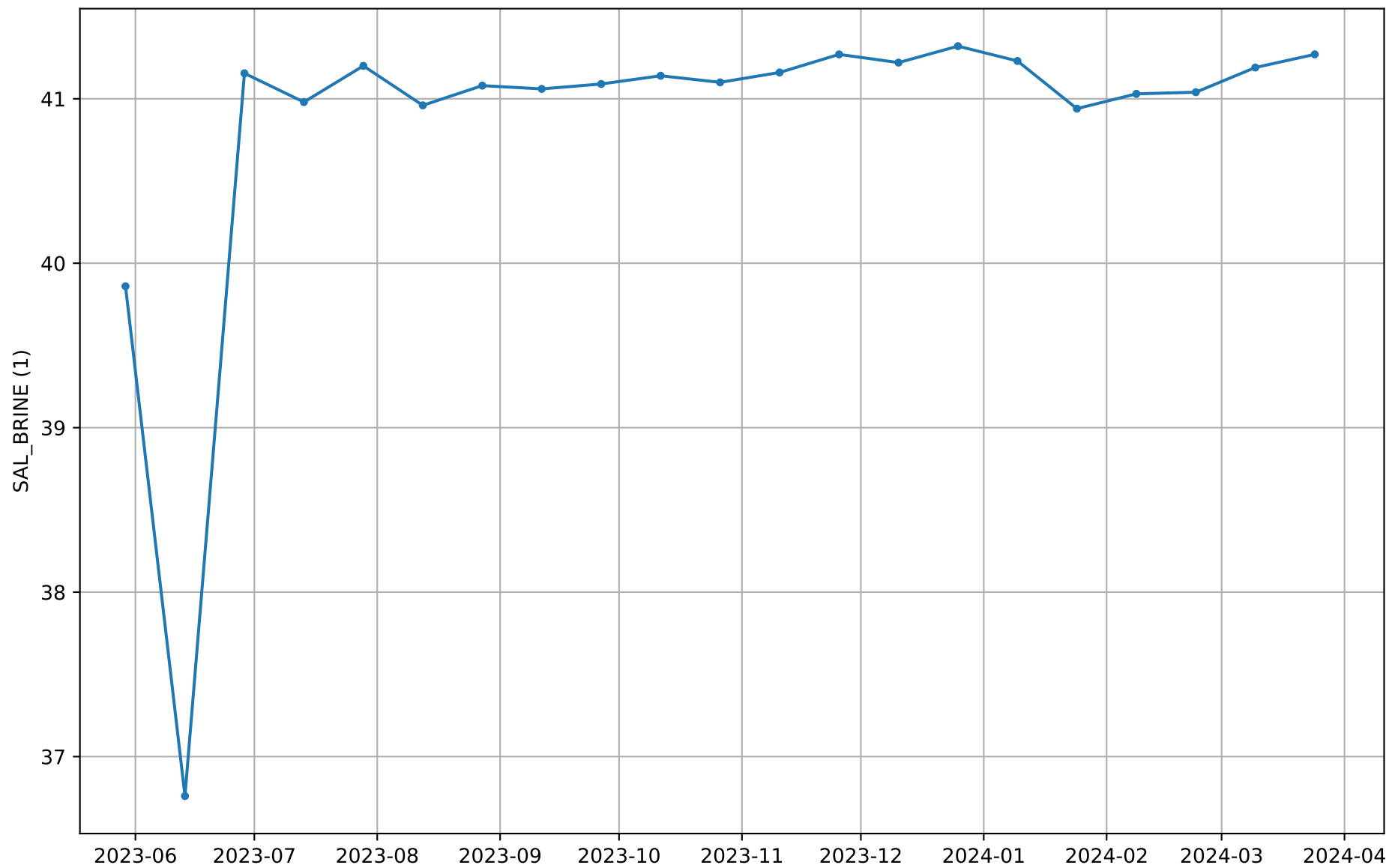
n (u m)

Variable : SAL\_BRINE('TIME',)  
\_FillValue : nan  
long\_name : sample supernatant practical salinity  
units : 1  
relative\_uncertainty : 0.022  
comment : supernatant  
comment\_method : Supernatant salinity measured as conductivity on recovery as indicator of brine washout  
valid\_min : 20.0  
valid\_max : 60.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH  
ancillary\_variables : SAL\_BRINE\_uncertainty SAL\_BRINE\_quality\_control

AUX : SAL\_BRINE\_uncertainty('TIME',)  
\_FillValue : nan  
units : 1  
long\_name : uncertainty for sample supernatant practical salinity

AUX : SAL\_BRINE\_quality\_control('TIME',)  
\_FillValue : 127  
long\_name : quality flag for sample supernatant practical salinity  
quality\_control\_conventions : IMOS standard flags  
valid\_min : 0  
valid\_max : 9  
flag\_values : [0 1 2 3 4 9]  
flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

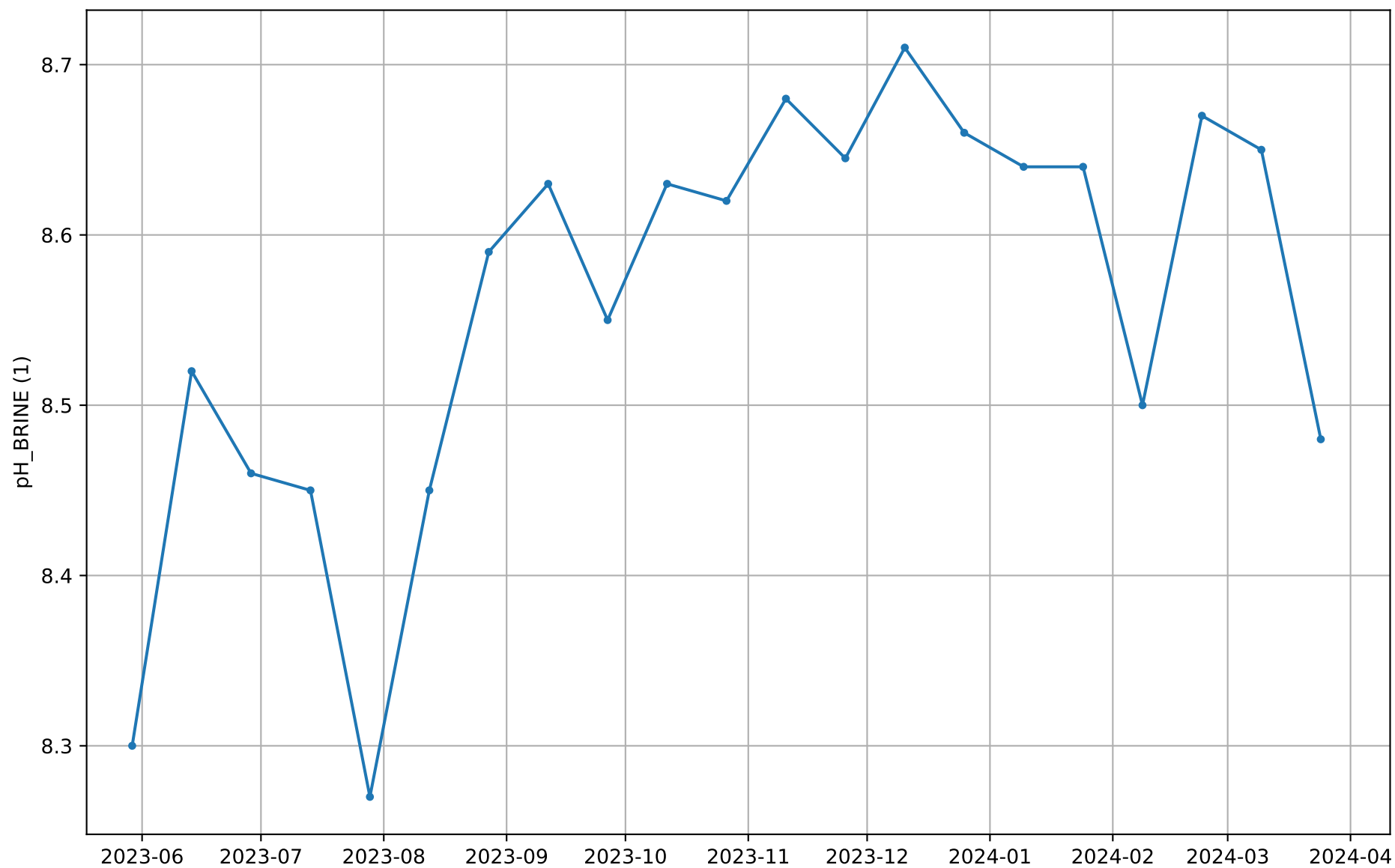
—●— n (u m)

Variable : pH\_BRINE('TIME',)  
\_FillValue : nan  
long\_name : sample supernatant pH NBS scale  
units : 1  
relative\_uncertainty : 0.029  
comment : supernatant  
comment\_method : Supernatant pH measured potentiometrically on recovery as indicator of brine washout  
valid\_min : 2.0  
valid\_max : 12.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH  
ancillary\_variables : pH\_BRINE\_uncertainty pH\_BRINE\_quality\_control

AUX : pH\_BRINE\_uncertainty('TIME',)  
\_FillValue : nan  
units : 1  
long\_name : uncertainty for sample supernatant pH NBS scale

AUX : pH\_BRINE\_quality\_control('TIME',)  
\_FillValue : 127  
long\_name : quality flag for sample supernatant pH NBS scale  
quality\_control\_conventions : IMOS standard flags  
valid\_min : 0  
valid\_max : 9  
flag\_values : [0 1 2 3 4 9]  
flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

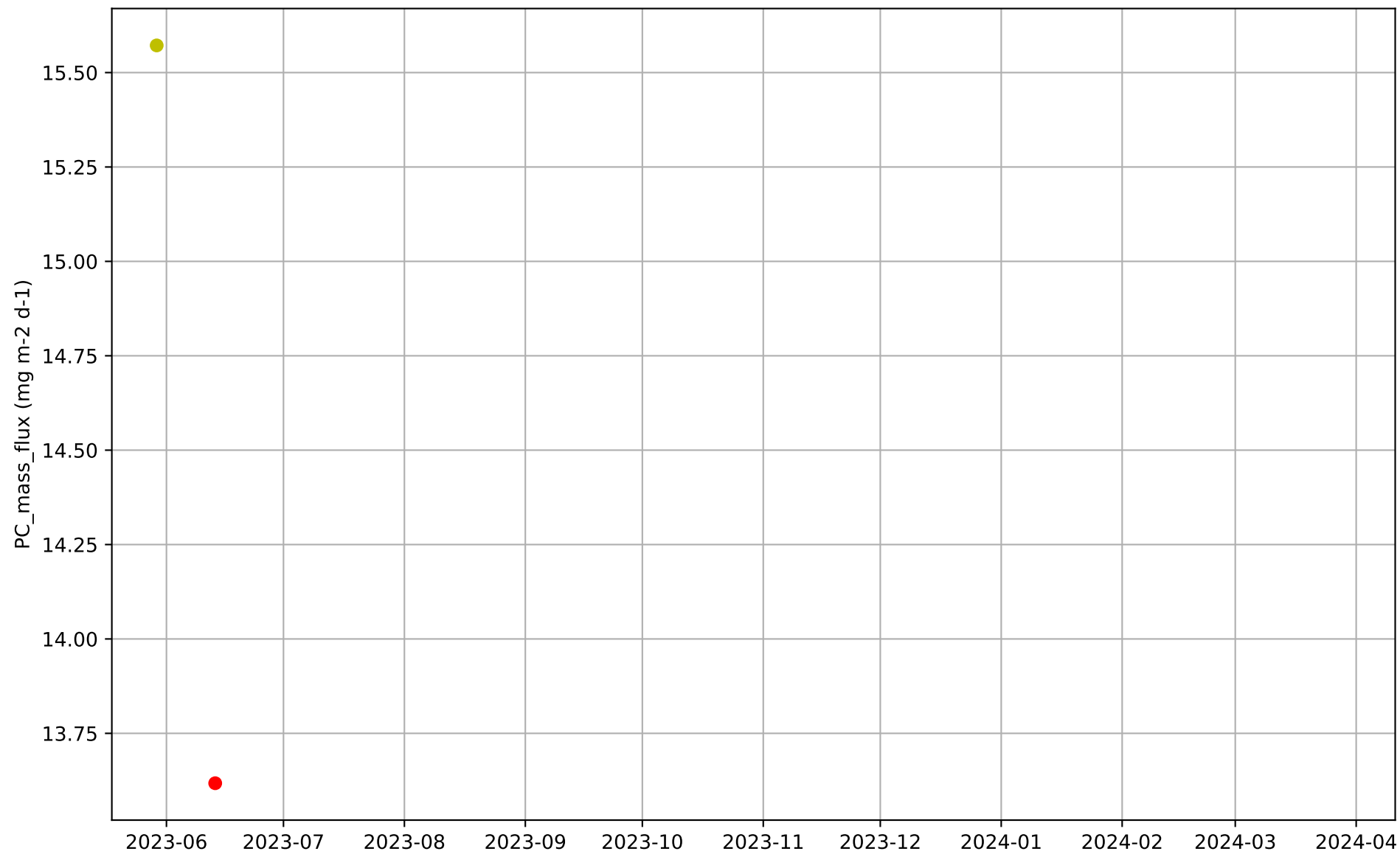
—●— n (u m)

```
Variable : PC_mass_flux('TIME',)
_FillValue : nan
Long_name : particulate total carbon mass flux
units : mg m-2 d-1
relative_uncertainty : 0.021
comment : <1mm
comment_method : elemental analyser total carbon
valid_min : -1.0
valid_max : 100.0
coordinates : TIME LATITUDE LONGITUDE NOMINAL_DEPTH
ancillary_variables : PC_mass_flux_uncertainty PC_mass_flux_quality_control

AUX : PC_mass_flux_uncertainty('TIME',)
_FillValue : nan
units : mg m-2 d-1
long_name : uncertainty for particulate total carbon mass flux

AUX : PC_mass_flux_quality_control('TIME',)
_FillValue : 127
Long_name : quality flag for particulate total carbon mass flux
quality_control_conventions : IMOS standard flags
valid_min : 0
valid_max : 9
flag_values : [0 1 2 3 4 9]
flag_meanings : unknown good_data probably_good_data probably_bad_data bad_data missing_value
```

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

—●— n (u m)

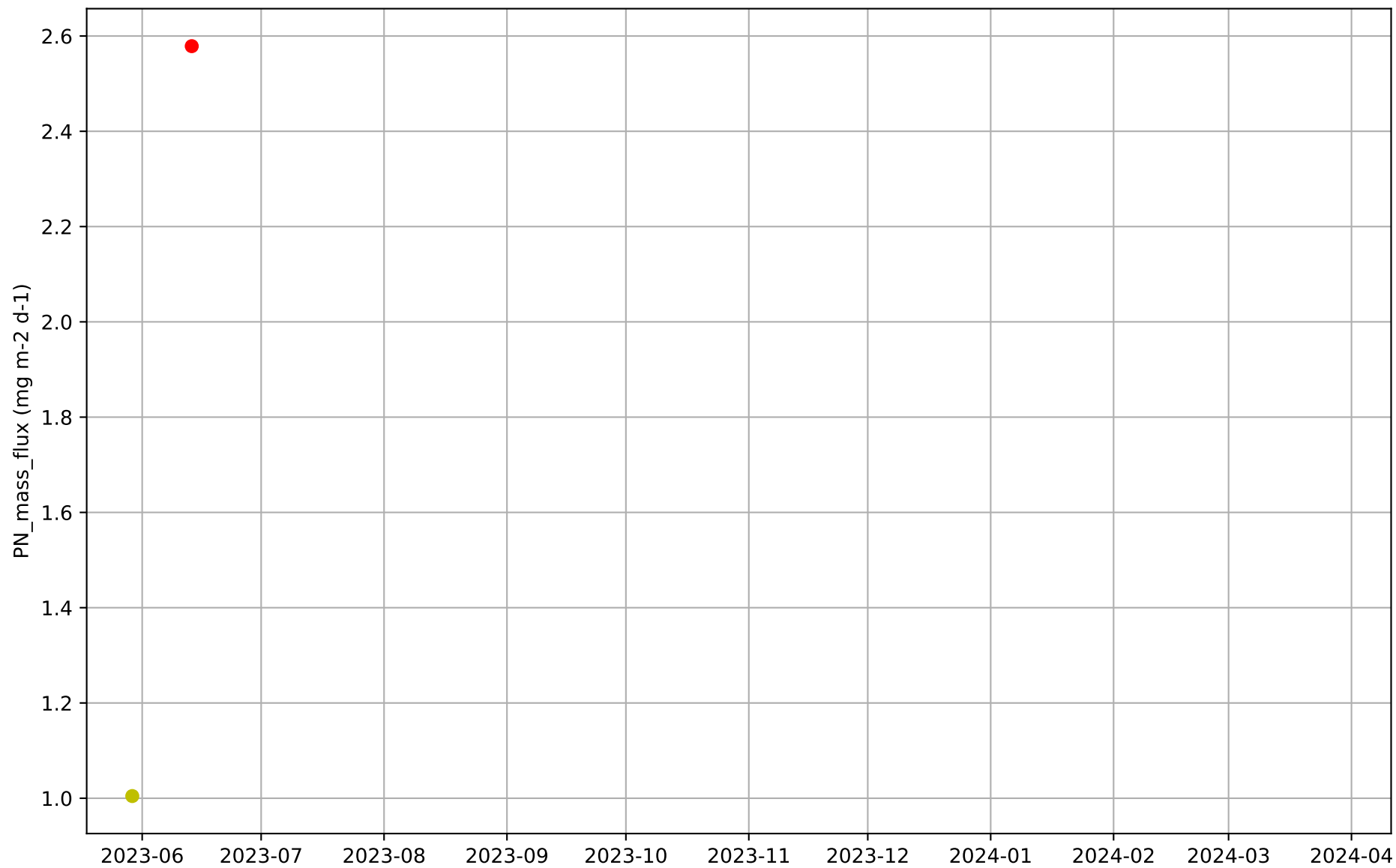
Variable : PN\_mass\_flux('TIME',)  
\_FillValue : nan  
long\_name : particulate total nitrogen mass flux  
units : mg m-2 d-1  
relative\_uncertainty : 0.038  
comment : <1mm  
comment\_method : elemental analyser total nitrogen  
valid\_min : -1.0  
valid\_max : 100.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH  
ancillary\_variables : PN\_mass\_flux\_uncertainty PN\_mass\_flux\_quality\_control

AUX : PN\_mass\_flux\_uncertainty('TIME',)  
\_FillValue : nan  
units : mg m-2 d-1  
long\_name : uncertainty for particulate total nitrogen mass flux

AUX : PN\_mass\_flux\_quality\_control('TIME',)  
\_FillValue : 127  
long\_name : quality flag for particulate total nitrogen mass flux  
quality\_control\_conventions : IMOS standard flags  
valid\_min : 0  
valid\_max : 9  
flag\_values : [0 1 2 3 4 9]  
flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value



SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

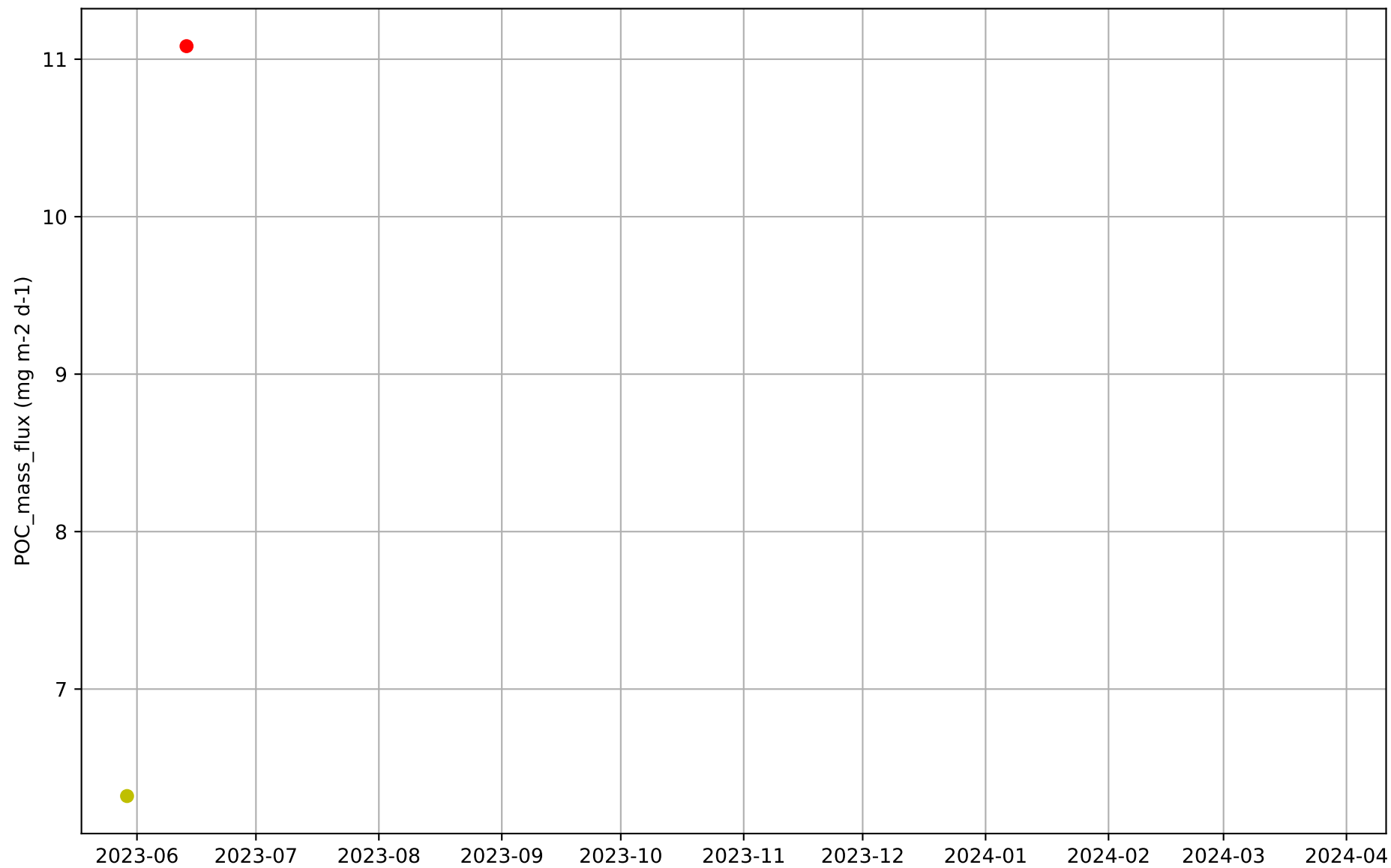
—●— n (u m)

Variable : POC\_mass\_flux('TIME',)  
\_FillValue : nan  
long\_name : particulate organic carbon mass flux  
units : mg m-2 d-1  
relative\_uncertainty : 0.028  
comment : <1mm  
comment\_method : particulate total carbon minus particulate inorganic carbon  
valid\_min : -1.0  
valid\_max : 100.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH  
ancillary\_variables : POC\_mass\_flux\_uncertainty POC\_mass\_flux\_quality\_control

AUX : POC\_mass\_flux\_uncertainty('TIME',)  
\_FillValue : nan  
units : mg m-2 d-1  
long\_name : uncertainty for particulate organic carbon mass flux

AUX : POC\_mass\_flux\_quality\_control('TIME',)  
\_FillValue : 127  
long\_name : quality flag for particulate organic carbon mass flux  
quality\_control\_conventions : IMOS standard flags  
valid\_min : 0  
valid\_max : 9  
flag\_values : [0 1 2 3 4 9]  
flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

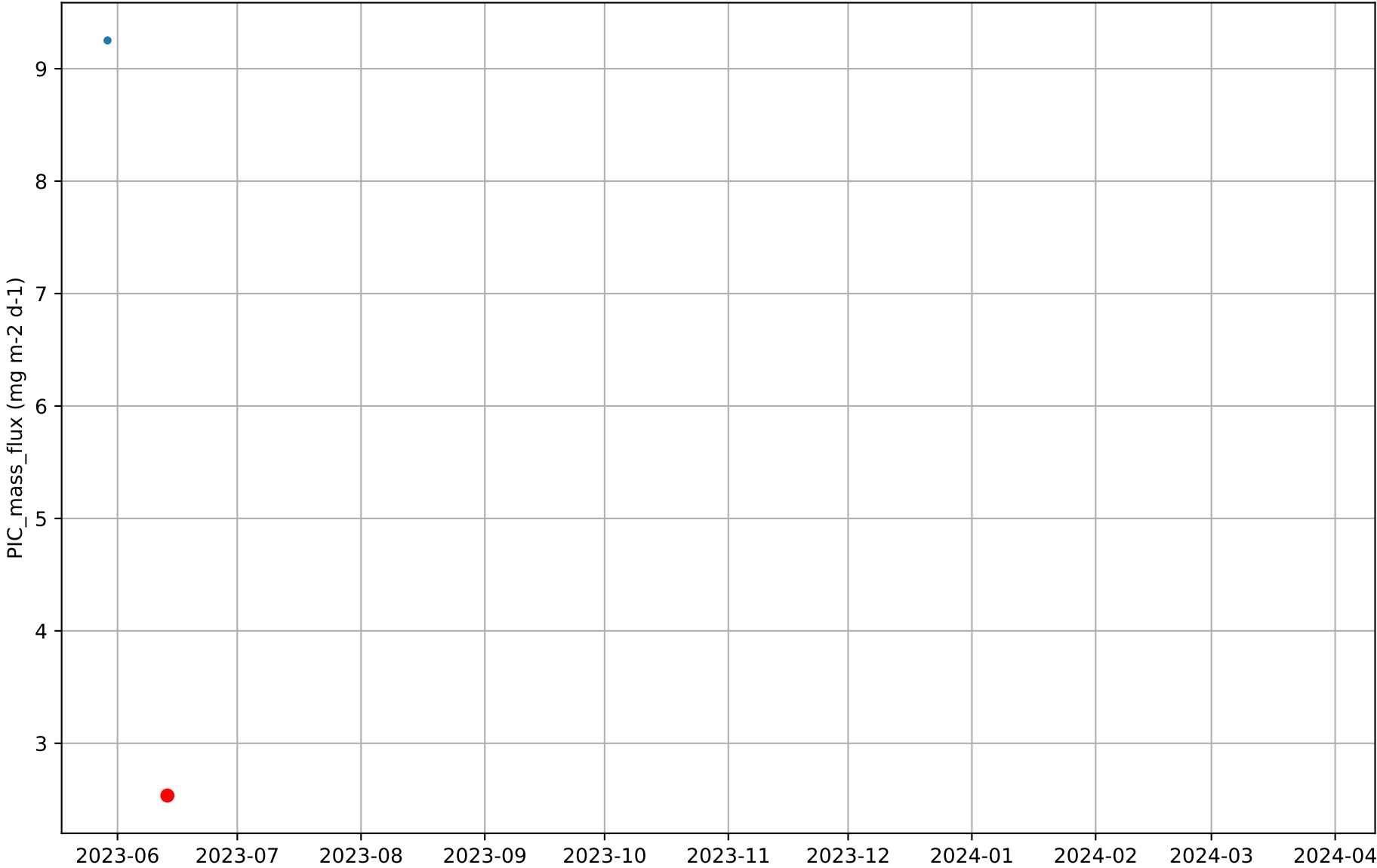
—●— n (u m)

Variable : PIC\_mass\_flux('TIME',)  
\_FillValue : nan  
long\_name : particulate inorganic carbon mass flux  
units : mg m-2 d-1  
relative\_uncertainty : 0.019  
comment : <1mm  
comment\_method : closed system acidification and coulometry of evolved carbon dioxide  
valid\_min : -1.0  
valid\_max : 100.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH  
ancillary\_variables : PIC\_mass\_flux\_uncertainty PIC\_mass\_flux\_quality\_control

AUX : PIC\_mass\_flux\_uncertainty('TIME',)  
\_FillValue : nan  
units : mg m-2 d-1  
long\_name : uncertainty for particulate inorganic carbon mass flux

AUX : PIC\_mass\_flux\_quality\_control('TIME',)  
\_FillValue : 127  
long\_name : quality flag for particulate inorganic carbon mass flux  
quality\_control\_conventions : IMOS standard flags  
valid\_min : 0  
valid\_max : 9  
flag\_values : [0 1 2 3 4 9]  
flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

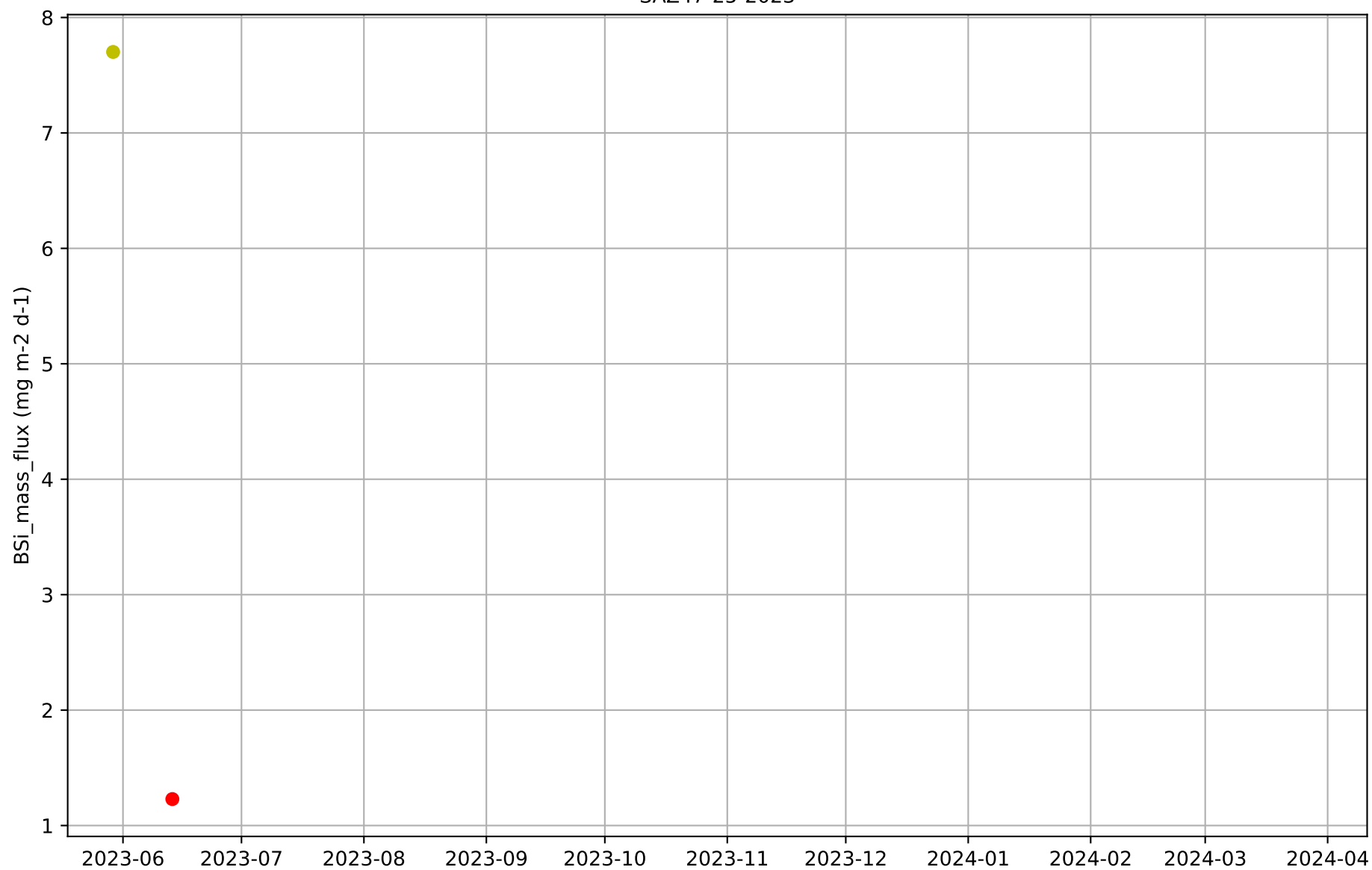
n (u m)

Variable : BSi\_mass\_flux('TIME',)  
\_FillValue : nan  
long\_name : particulate biogenic silicon mass flux  
units : mg m-2 d-1  
relative\_uncertainty : 0.049  
comment : <1mm  
comment\_method : alkaline digest and segmented-flow spectrometry  
valid\_min : -1.0  
valid\_max : 100.0  
coordinates : TIME LATITUDE LONGITUDE NOMINAL\_DEPTH  
ancillary\_variables : BSi\_mass\_flux\_uncertainty BSi\_mass\_flux\_quality\_control

AUX : BSi\_mass\_flux\_uncertainty('TIME',)  
\_FillValue : nan  
units : mg m-2 d-1  
long\_name : uncertainty for particulate biogenic silicon mass flux

AUX : BSi\_mass\_flux\_quality\_control('TIME',)  
\_FillValue : 127  
long\_name : quality flag for particulate biogenic silicon mass flux  
quality\_control\_conventions : IMOS standard flags  
valid\_min : 0  
valid\_max : 9  
flag\_values : [0 1 2 3 4 9]  
flag\_meanings : unknown good\_data probably\_good\_data probably\_bad\_data bad\_data missing\_value

SAZ47-25-2023



cyan: QC=2 (pgood); yellow : QC=3 (pbad); red : QC=4 (bad); QC=4,6,9 no line

n (u m)