GPS timestamps and UHDAS

- For a GPS device, we have
  - UHDAS clock time when the message came in ($PYRTM)
  - GGA (NMEA ascii) time

$PYRTM,2018,321.6111238,7.2692157 (14:40:01.09) $INGGA,144001.10,6759.823526,N,00517.812805,E,xxx*7C
$PYRTM,2018,321.6111354,7.2692273 (14:40:02.09) $INGGA,144002.10,6759.824811,N,00517.808622,E,xxx*76
$PYRTM,2018,321.6111469,7.2692389 (14:40:03.09) $INGGA,144003.10,6759.826123,N,00517.804919,E,xxx*55

Plot this	learn this
- INGGA (now - previous)	Are there missing messages?
- PYRTM (now-previous)	Do the timestamps vary from 1Hz?
- INGGA-PYRTM	Does the computer clock match GGA?

Examples showing

- **Good**:
  - all GGA messages coming in, no gaps
  - Computer clock is stable
  - It's OK if it is drifting, just not being jerked around
- **OK**:
  - Buffered messages (latency, then “catchup”)
- **Bad**
  - missing GGA messages
- **Ugly**:
  - computer clock jerked around
  - GGA messages step backwards or repeat (sawtooth)

Pelican Furuno

$GPGGA,024233,2857.2530,N,08912.9878
$GPGGA,024234,2857.2529,N,08912.9875
$GPGGA,024235,2857.2529,N,08912.9872
$GPGGA,024235,2857.2531,N,08912.9870 duplicate times
$GPGGA,024236,2857.2533,N,08912.9866
this message is missing
$GPGGA,024238,2857.2534,N,08912.9860
$GPGGA,024239,2857.2534,N,08912.9856
$GPGGA,024239,2857.2535,N,08912.9856 duplicate times
this message is missing
$GPGGA,024241,2857.2534,N,08912.9856
$GPGGA,024242,2857.2533,N,08912.9854
$GPGGA,024243,2857.2534,N,08912.9849
$GPGGA,024243,2857.2535,N,08912.9844 duplicate times
this message is missing
$GPGGA,024245,2857.2537,N,08912.9840

Notes:

- Names are not hidden to protect the innocent
- all variables are plotted against time

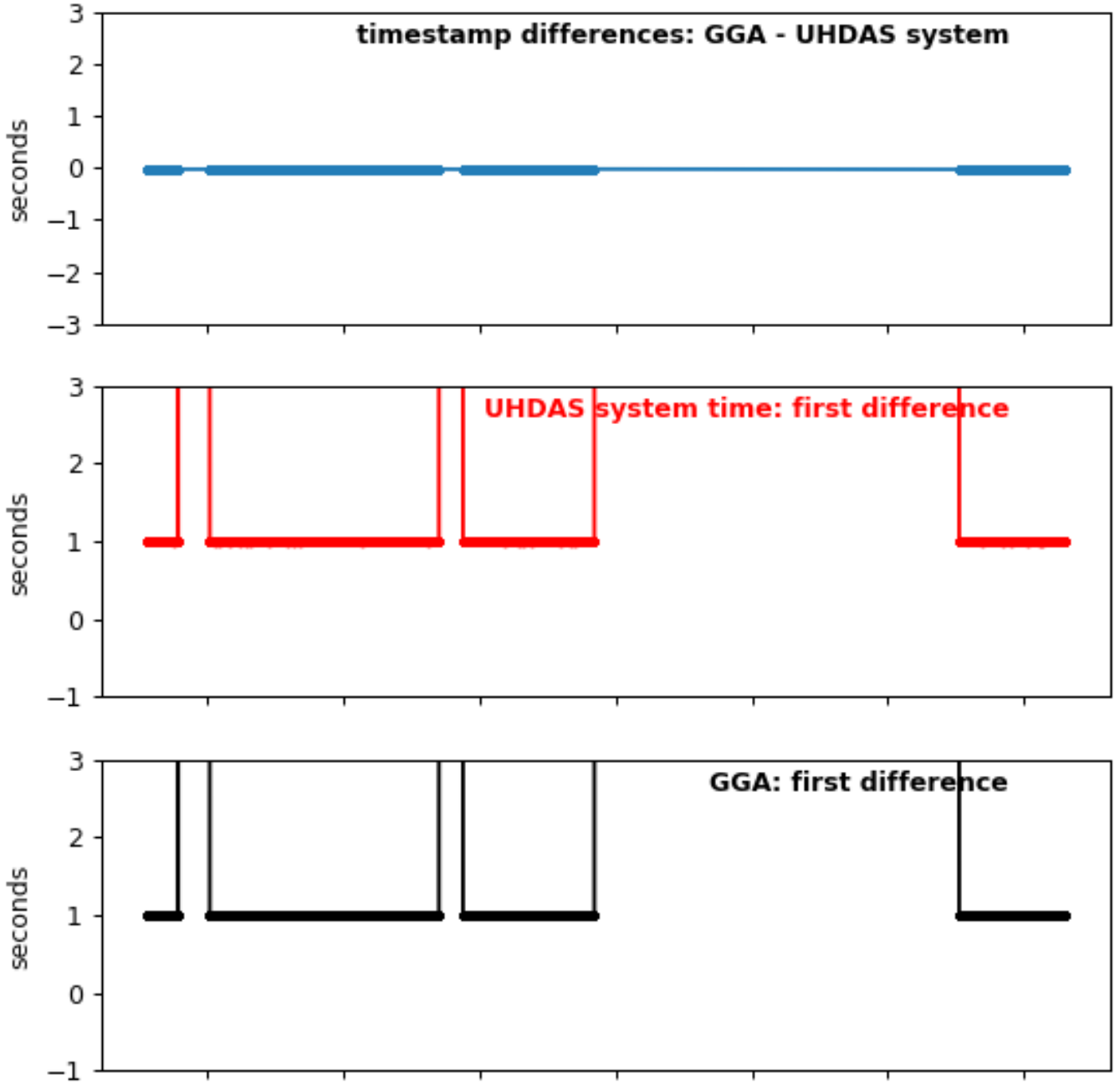
Revelle

- Seapath is fine (**good**)
- GP90 consistently buffering (**OK**)
- ADU5 erratically buffering, gaps in time (**ugly**)

ntpd=True

RR1812_from_SIO

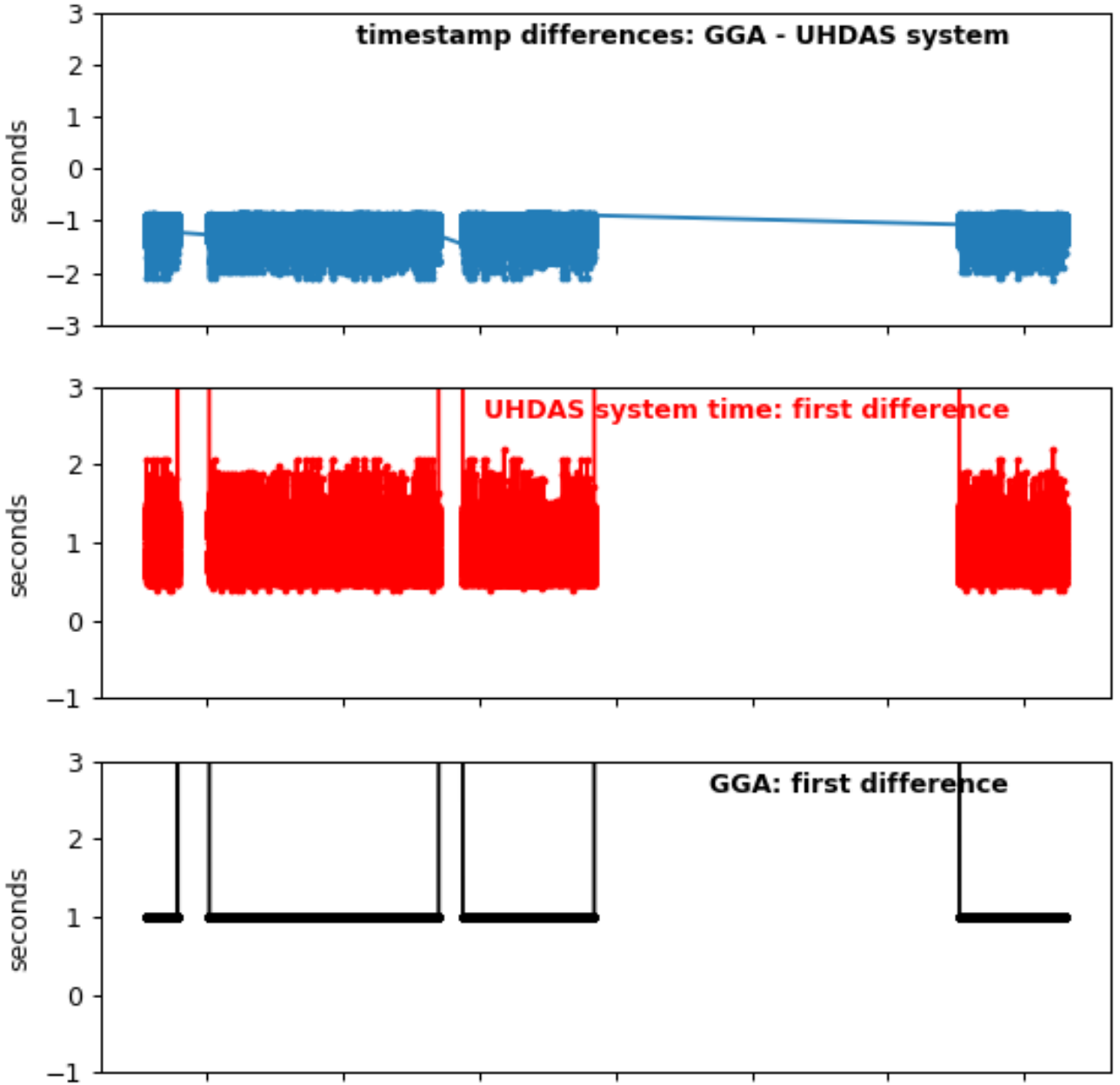
GPS=Seapath



ntpd=True

RR1812_from_SIO

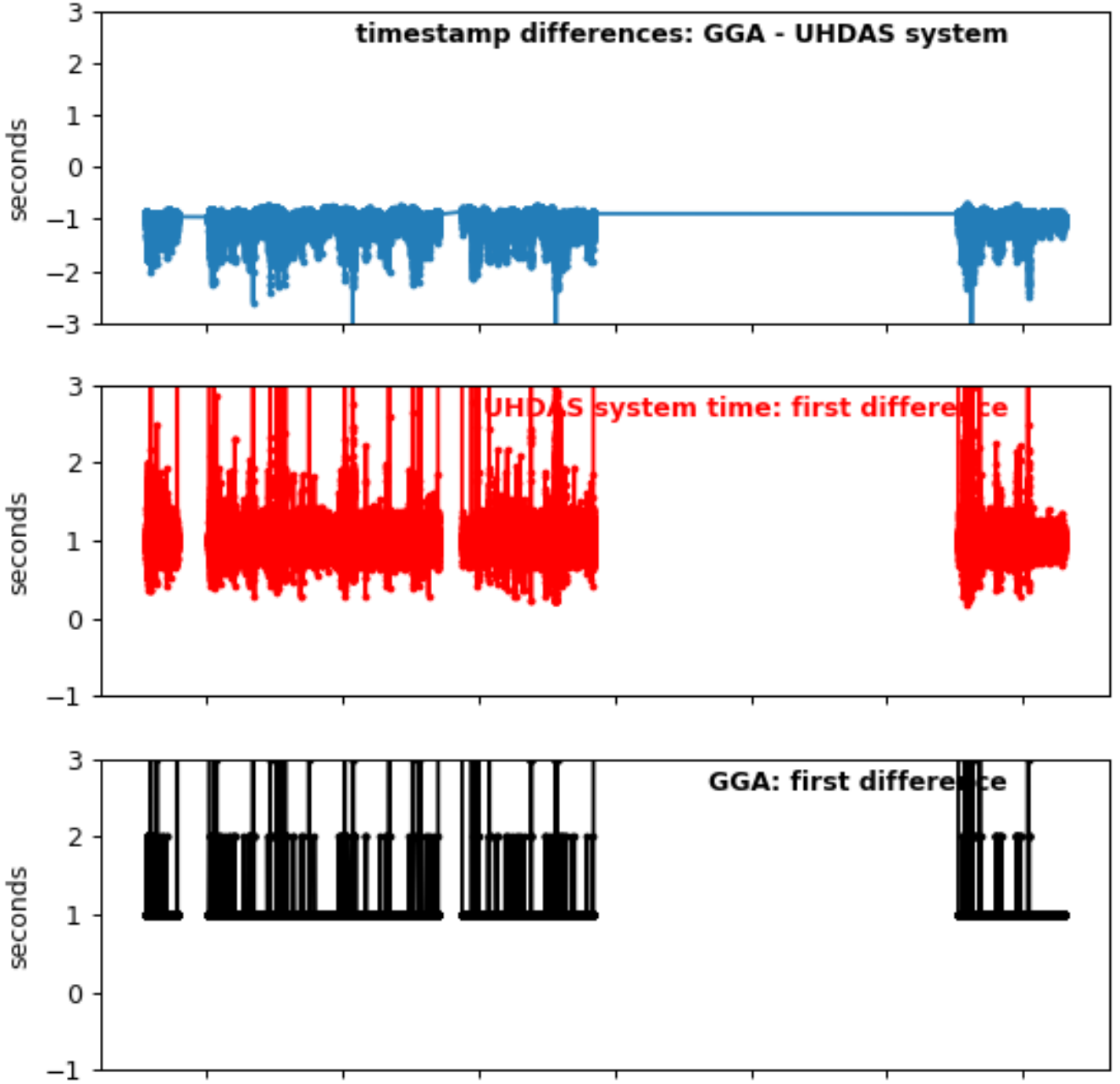
GPS=GP90



ntpd=True

RR1812_from_SIO

GPS=ADU5



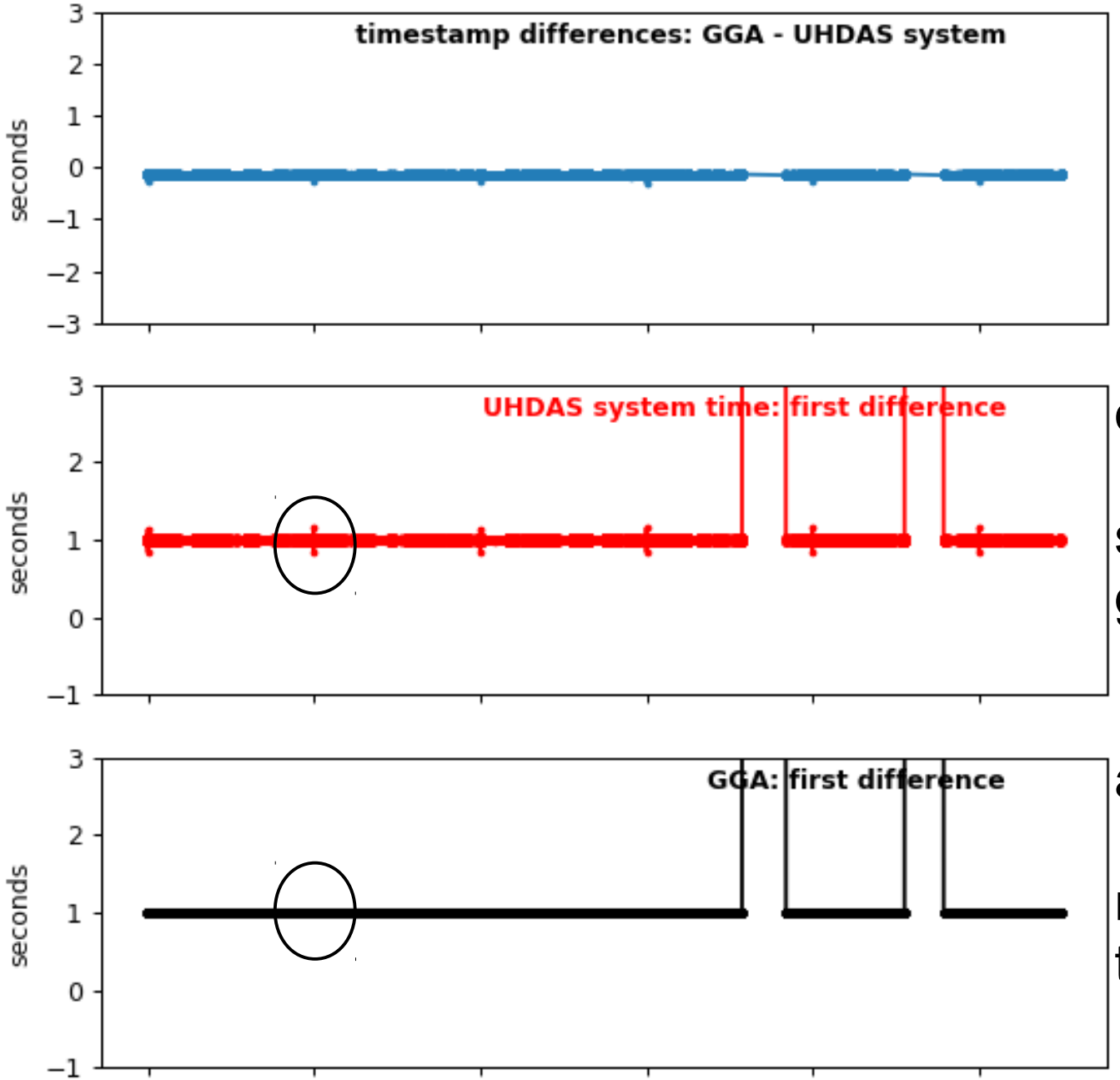
Atlantis

- CNAV was **good**
- GPS-1850 buffering (for a chunk of time) (**OK**)

ntpd=True

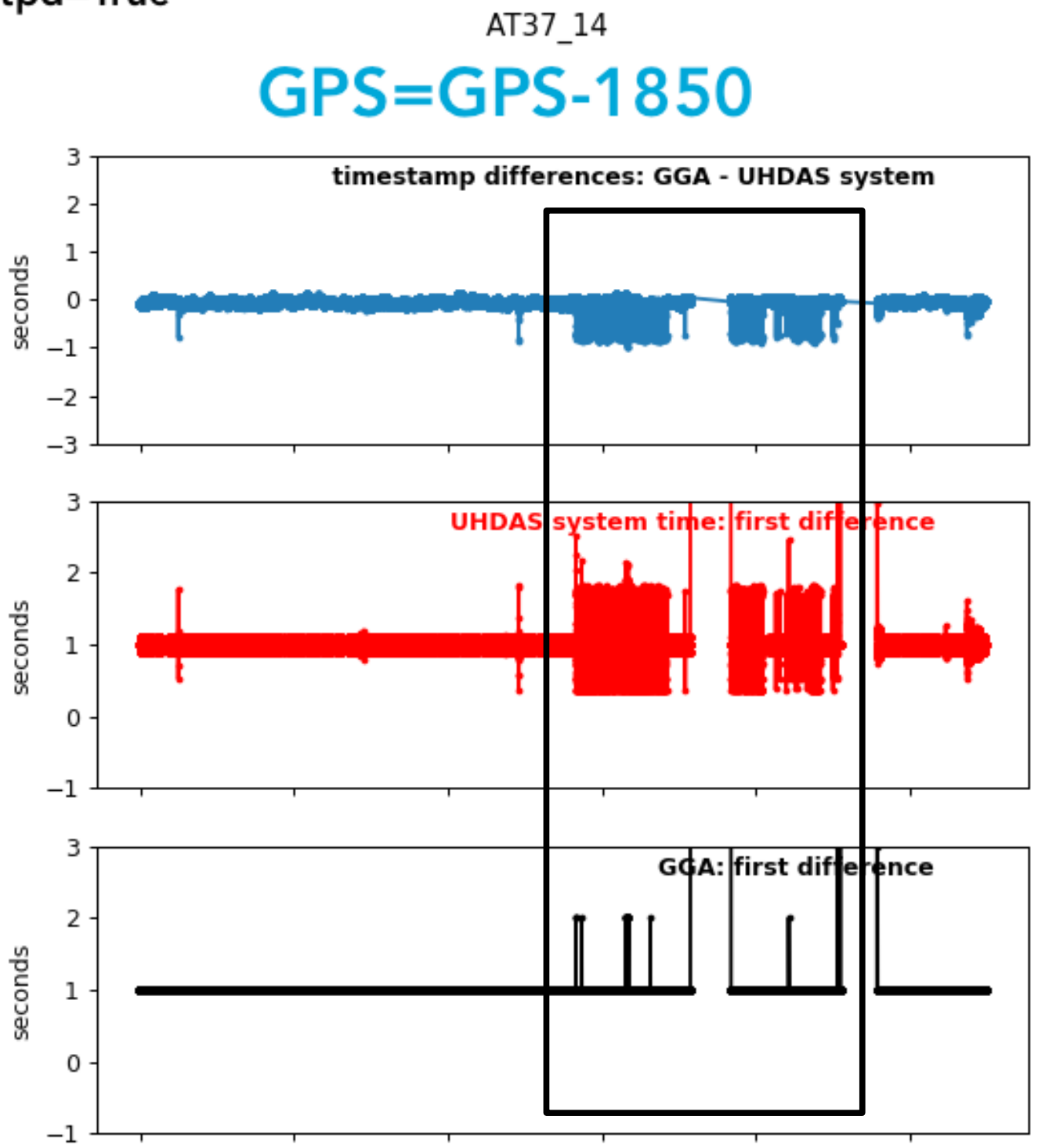
AT37_14

GPS=CNAV



one message per day
is a little late
so there is a longer gap
and a shorter gap
in the UHDAS times
all GGA messages arrive
no gaps in GGA times

ntpd=True



Latencies and short arrival times at UHDAS so there is buffering of the messages

A few gaps in GGA messages

Hugh Sharp

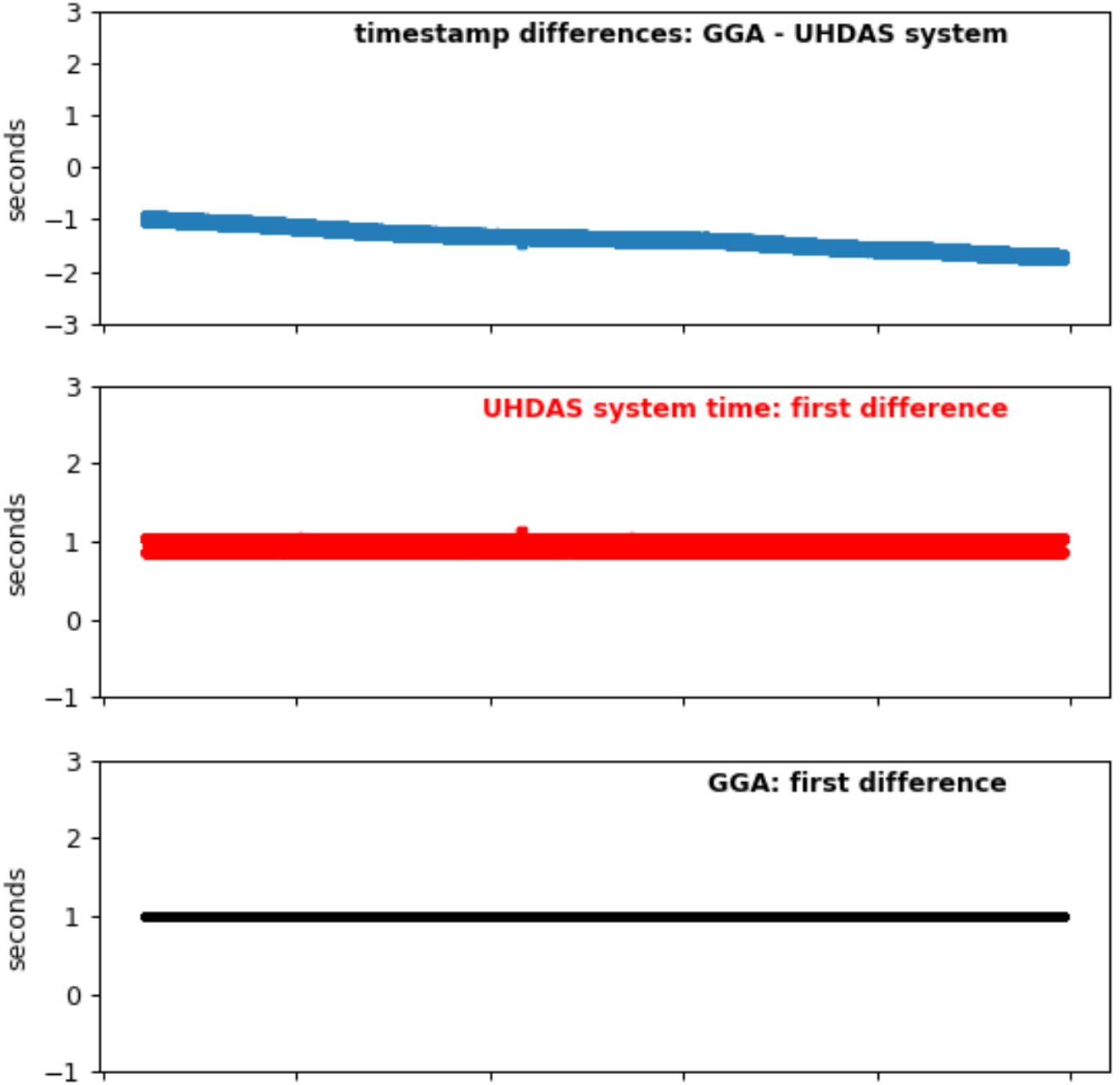
- no NTP – computer clock is drifting
- no problem
- no buffering

good

ntpd=True

HRS1803_02_1m

GPS=Furuno



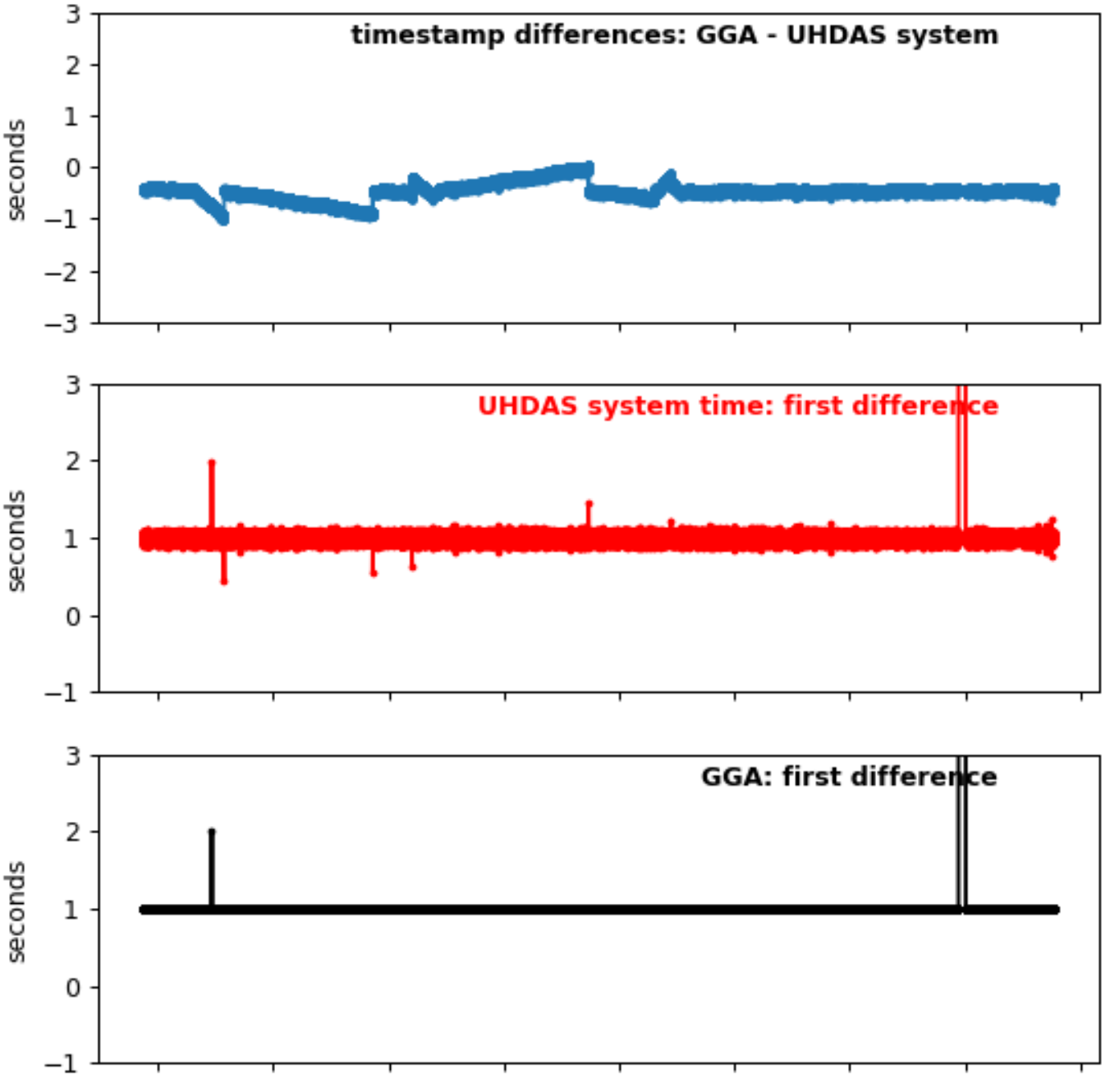
UHDAS clock drifting compared to GGA

Oceanus

- “GPS” feed **good**
- ADU5 feed **good**
- ADU800 – backwards time step (**ugly**)
- NTP was glitchy

  ugly (because of ntp)

oc1806a



jerky differences between UHDAS and GGA: ntp (server) was misbehaving?

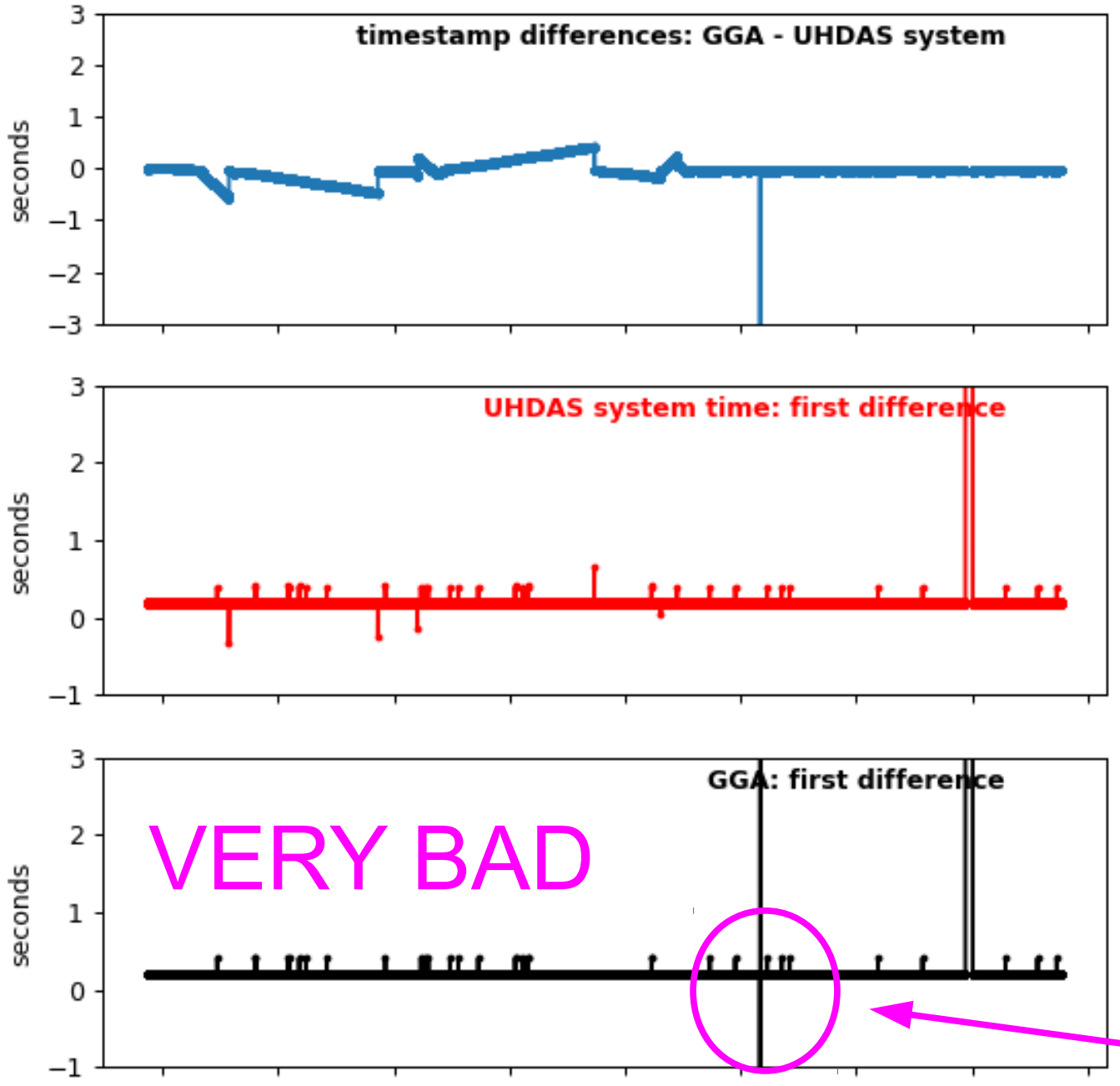
one missed message
a little wiggle in the arrival times

one missed message
one stop/start logging

ntpd=True

oc1806a

GPS=ADU800



jerky differences between UHDAS and GGA: ntp (server) was misbehaving?

one stop-start logging
a little wiggle in the arrival times

one missed message
one stop/start logging
one backwards timestamp

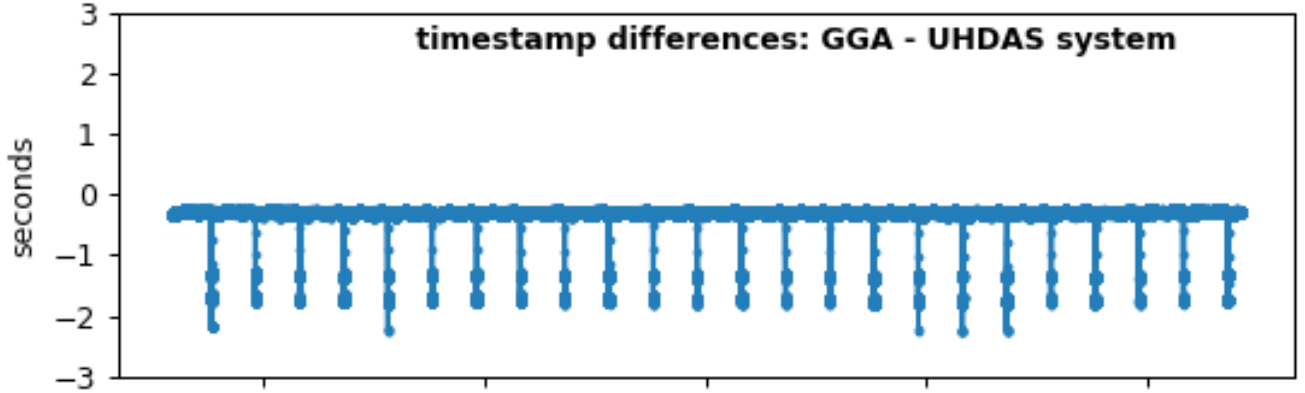
Healy

- Trimble: regular buffering of GGA messages
- **merely OK**

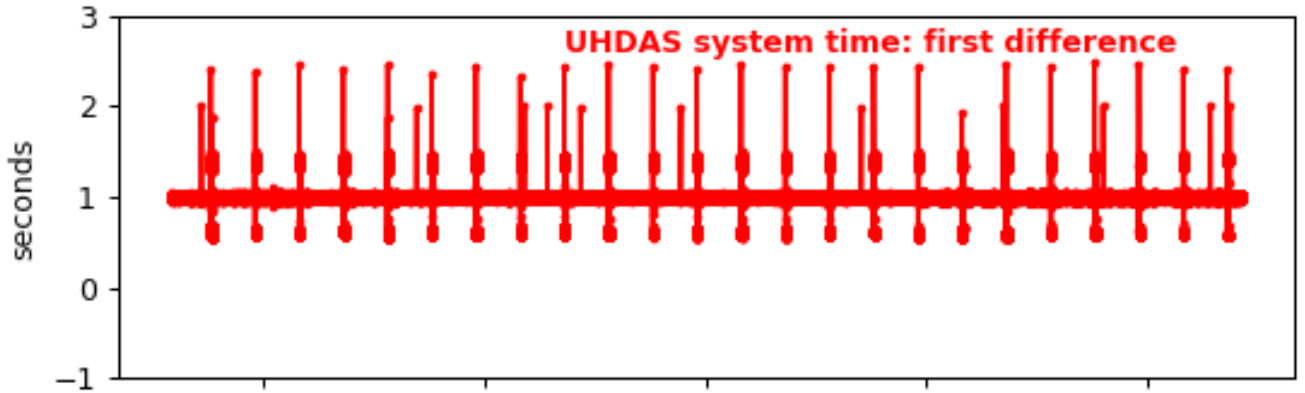
ntpd=True

HLY1803

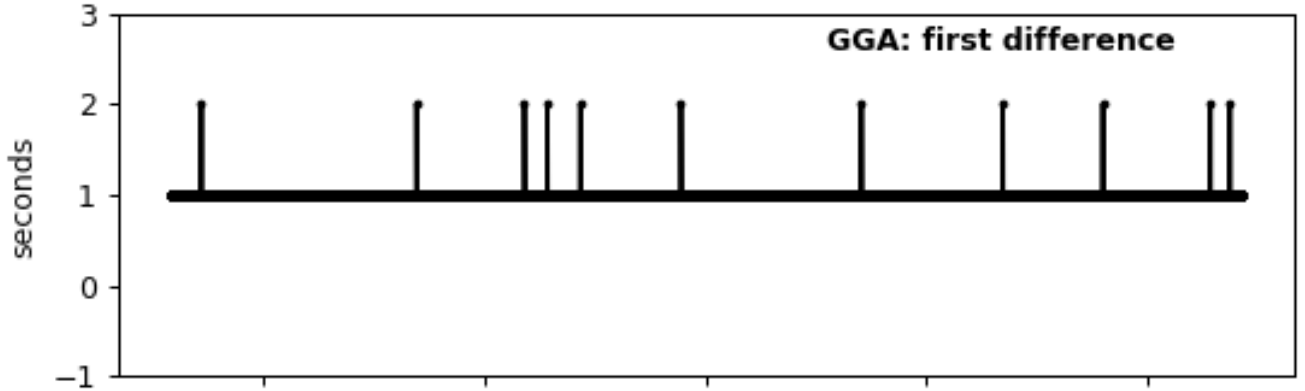
GPS="A-GPS" (Trimble)



-5 times per day
- latencies of 2 sec



-5 times per day
- latencies of 2 sec
- shorter arrival times



- very few missing GGA messages
- no repeated timestamps

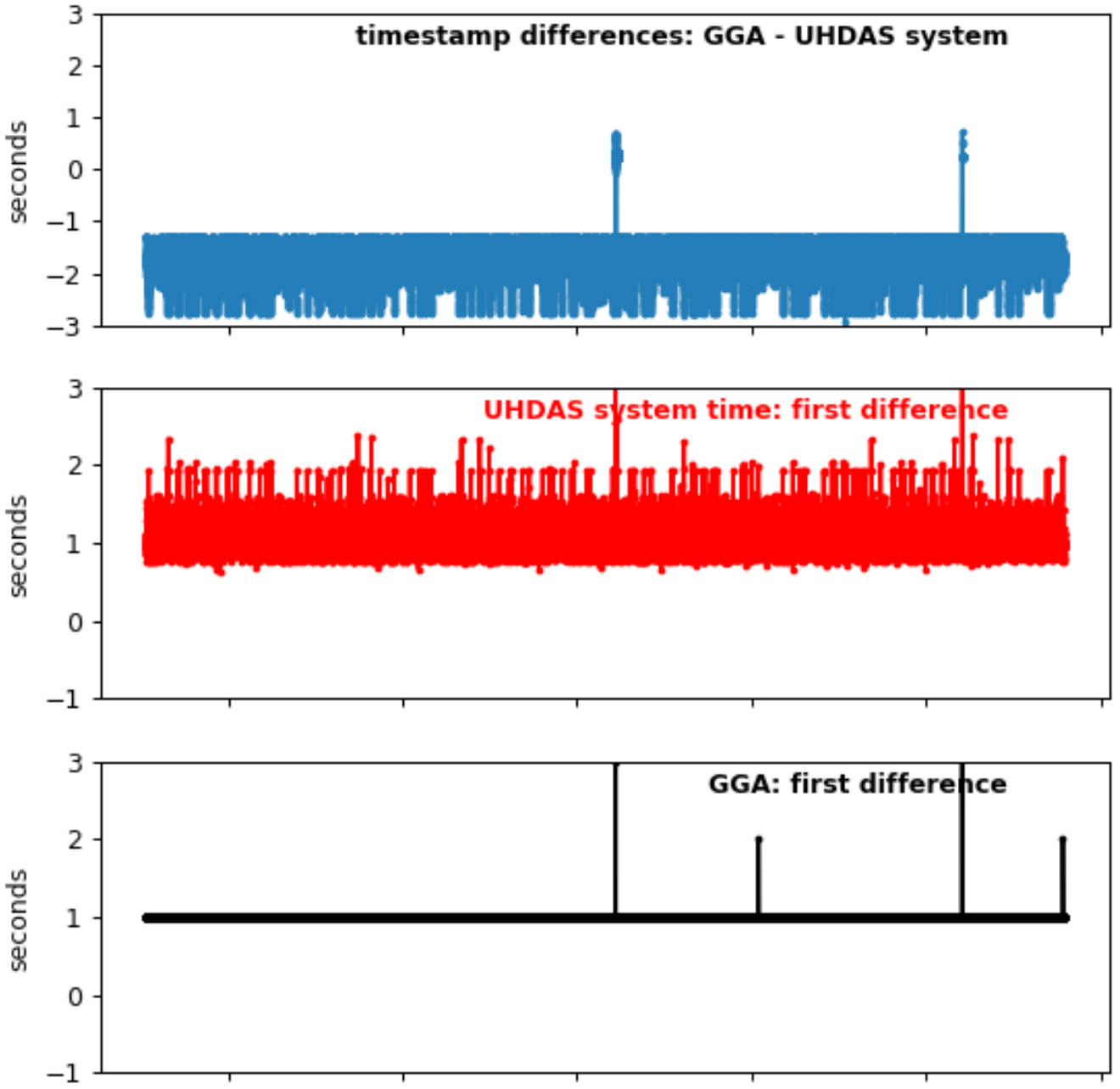
Sproul

- GP10 consistently buffering
- **merely OK**

ntpd=True

SP1915

GPS=GP170



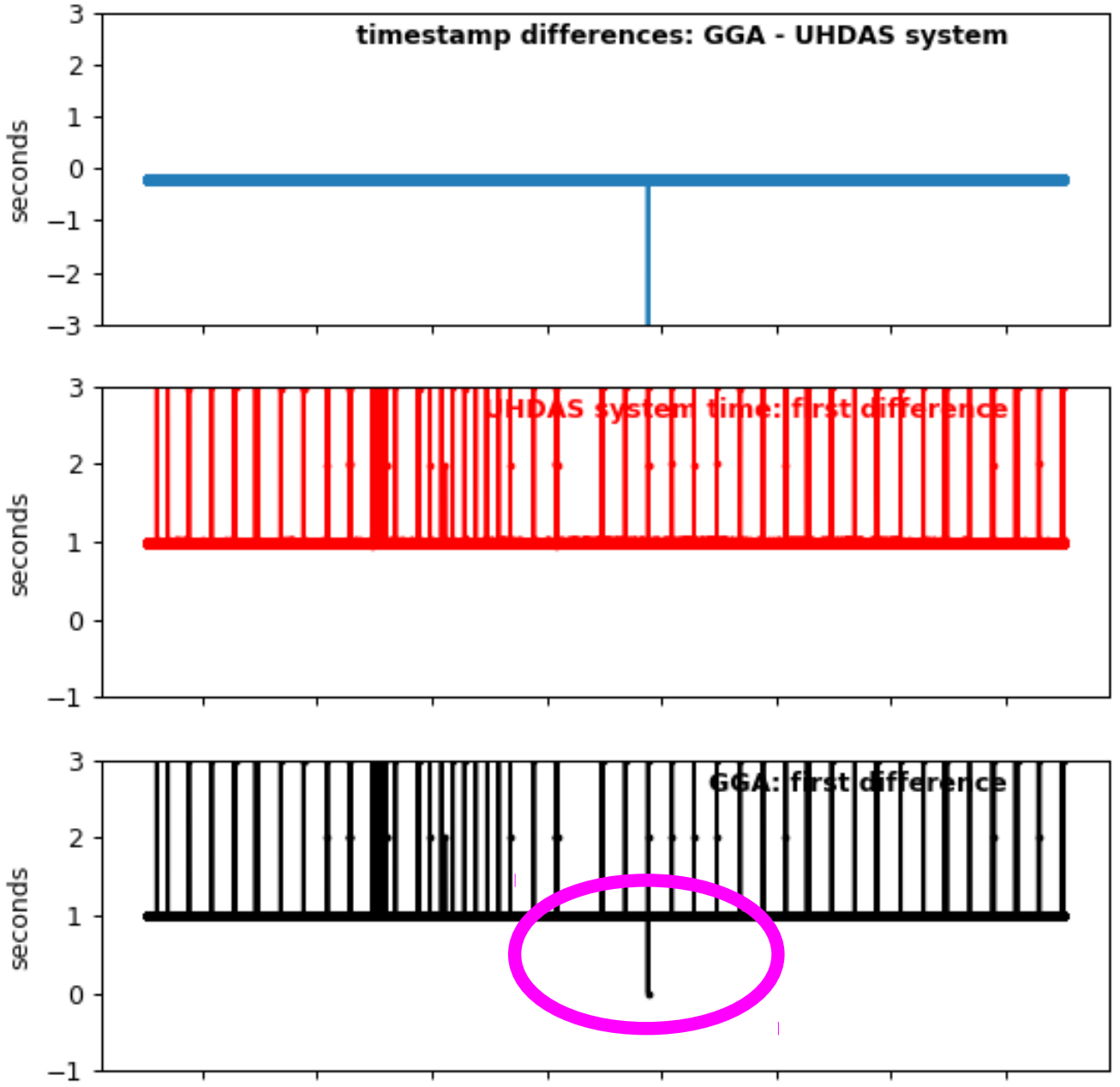
Thompson

- CNAV messages regularly lost (**bad**)
- repeated timestamp (**ugly**)

ntpd=True

TN366_incomplete

GPS=CNAV



gaps in GGA times

one repeated timestamp

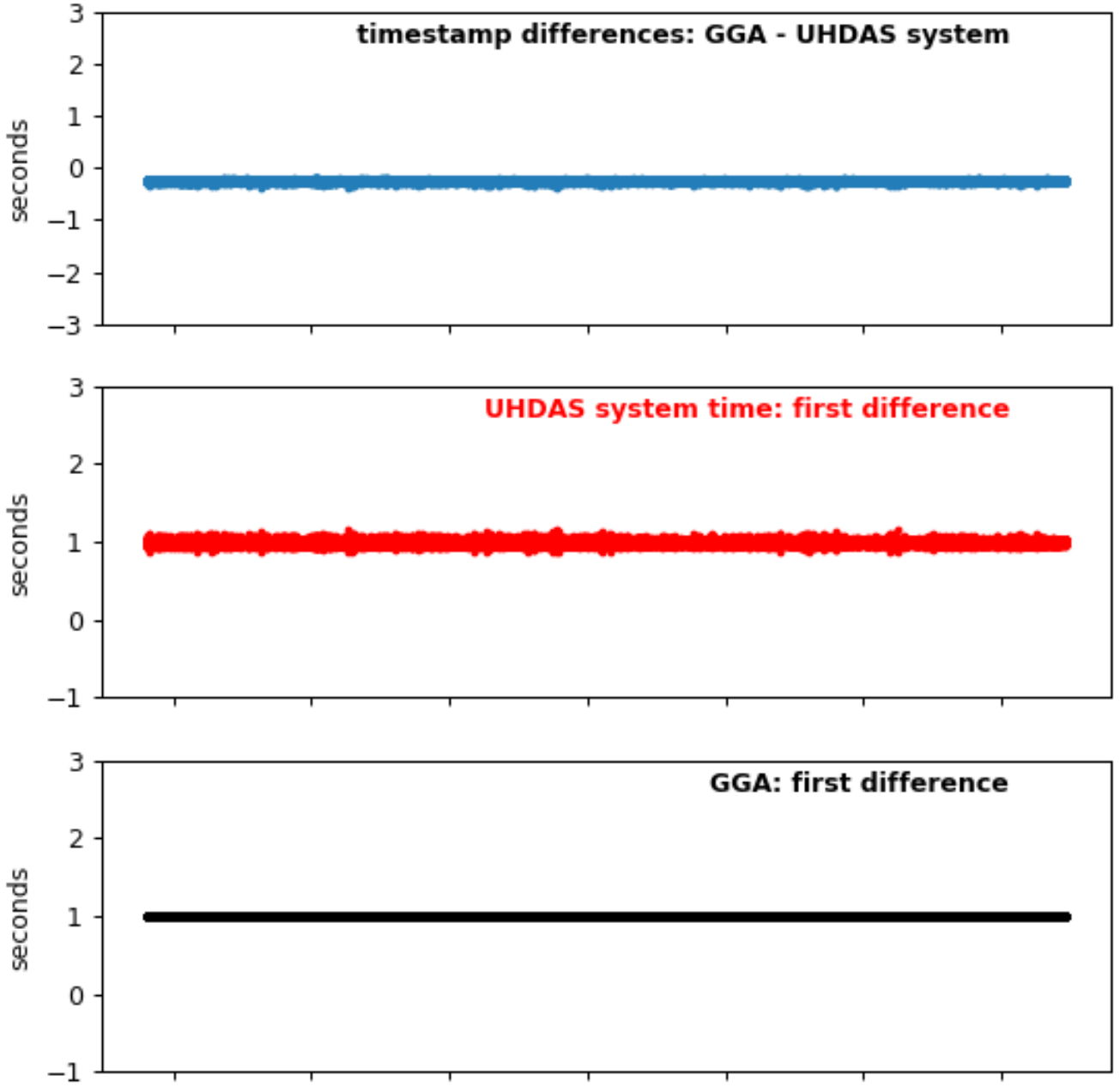
Endeavor

- ntpd is running (computer clock not drifting)
- ADU5: times are (usually) OK (**good**)
- ADU2: lost messages, irregular buffering (**bad**)
- Norstar: **ugly**
  - a few lost messages,
  - one backwards time step
  - resets once per day

ntpd=True

EN642

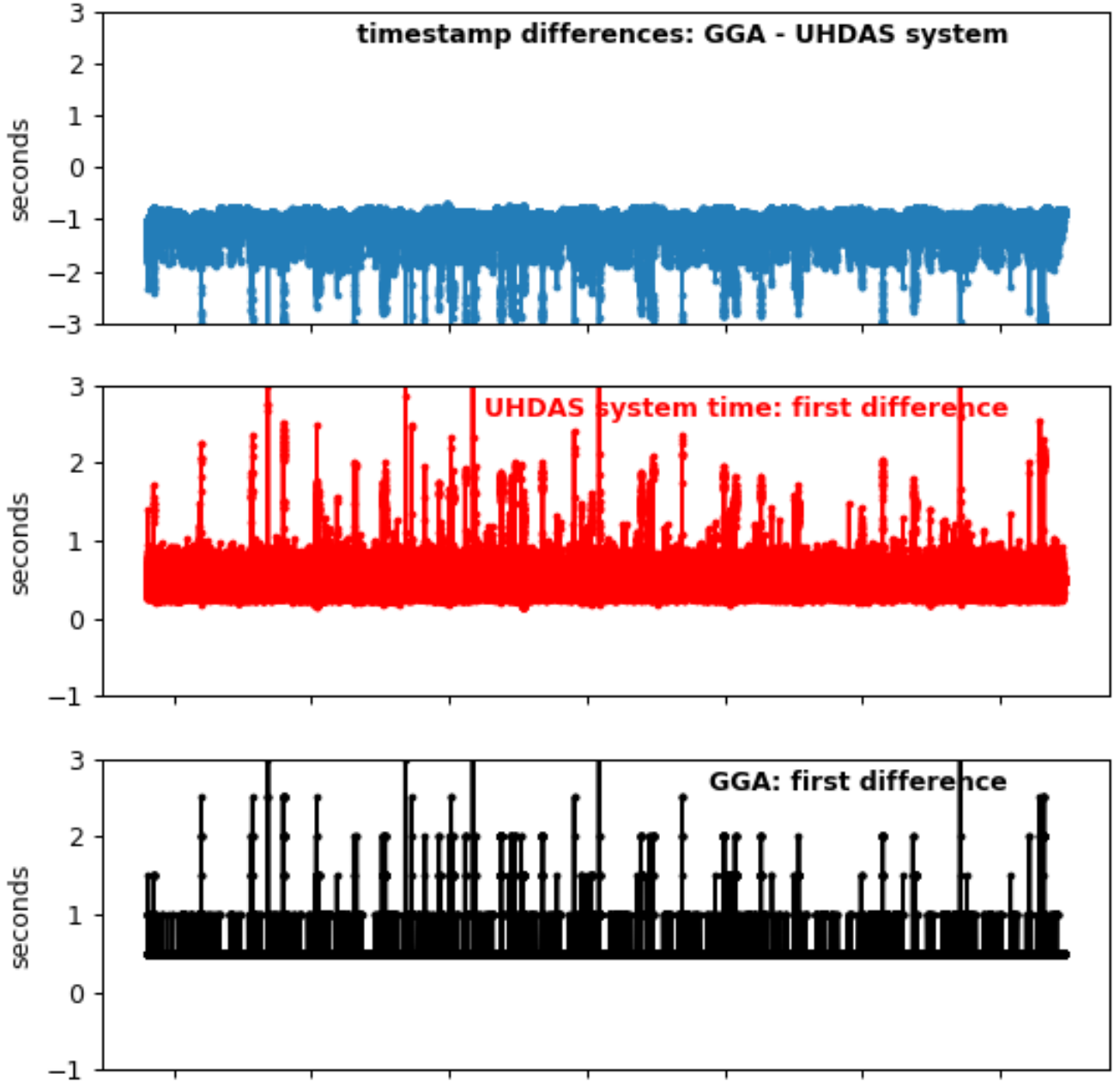
GPS=ADU5



ntpd=True

EN642

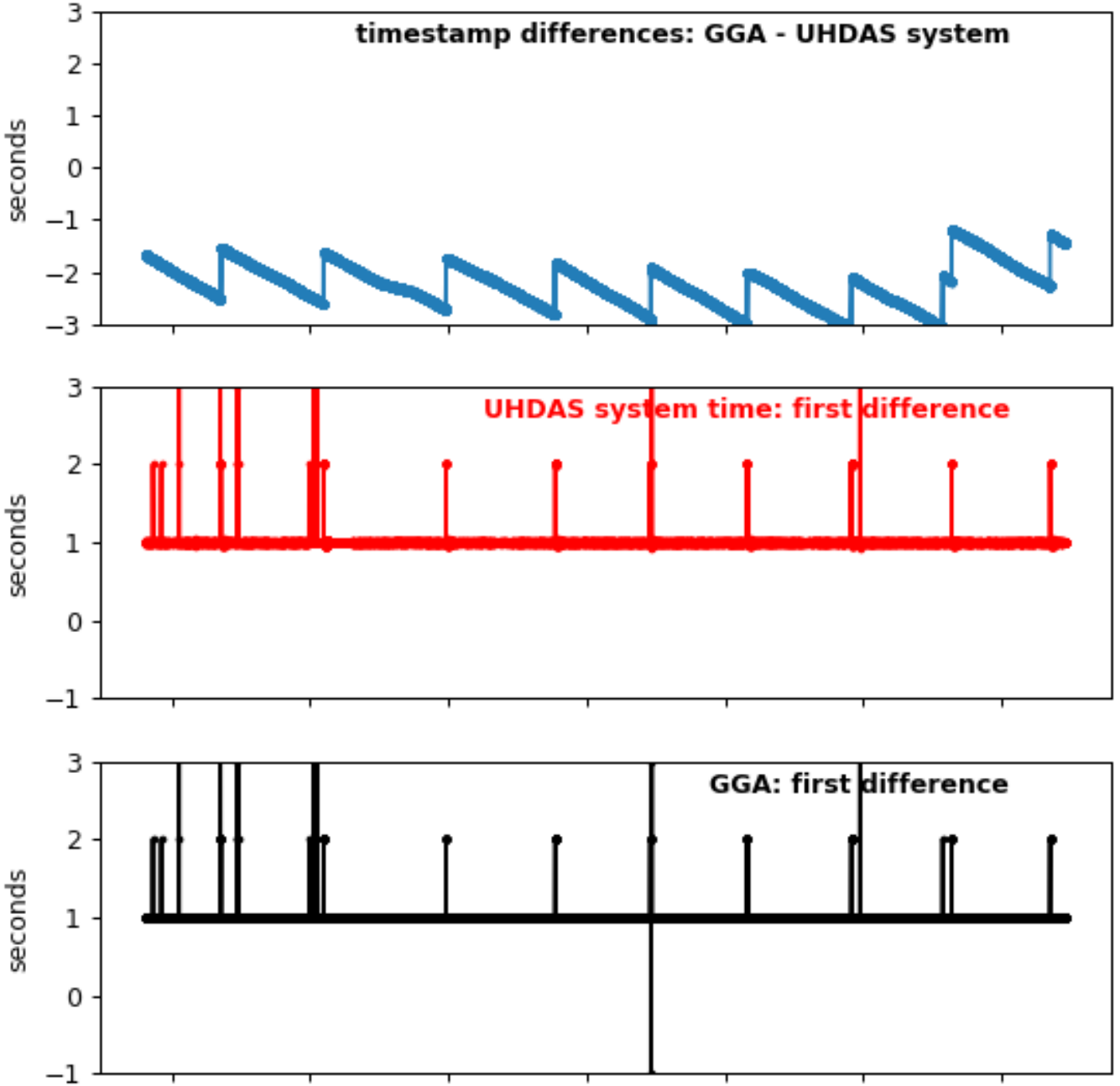
GPS from ADU2



ntpd=True

EN642

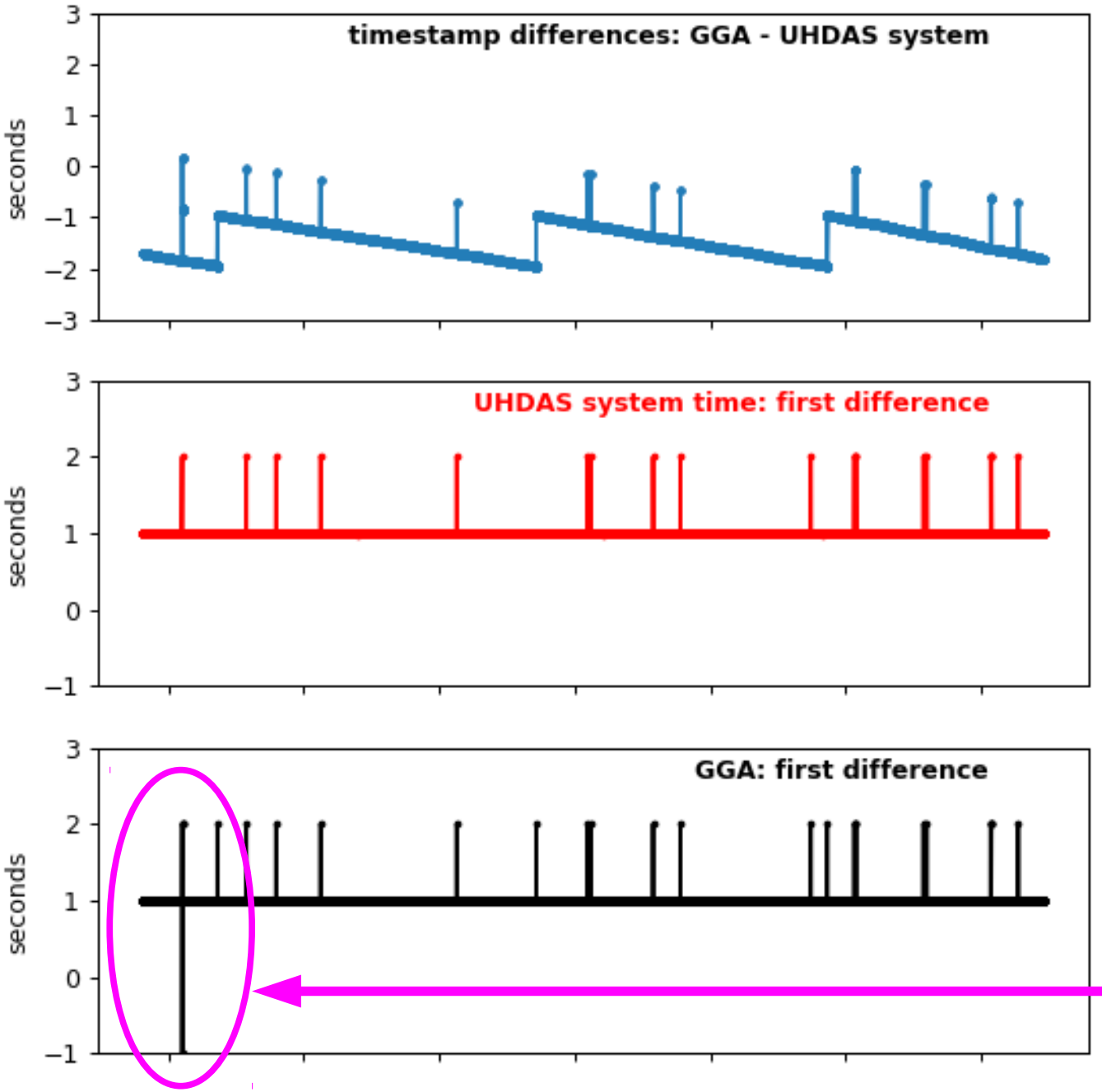
GPS from Norstar GPS



ntpd=True

EN642

GPS=Norstar



Backwards
GGA time step
Very Bad

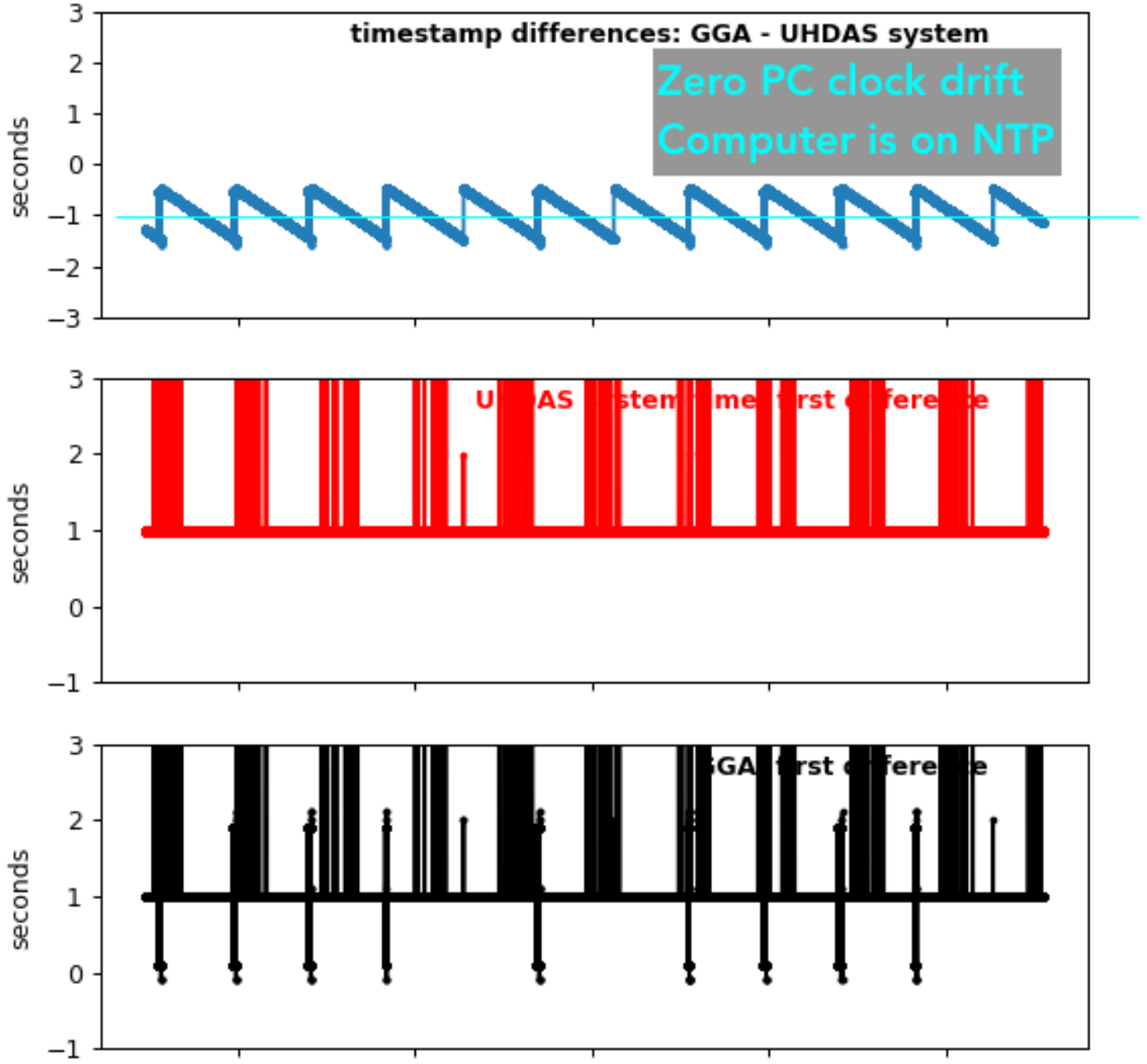
Atlantic Explorer

- Simrad MK12 resets every day (**ugly**)

ntpd=True

AE1917

GPS=Simrad MK12



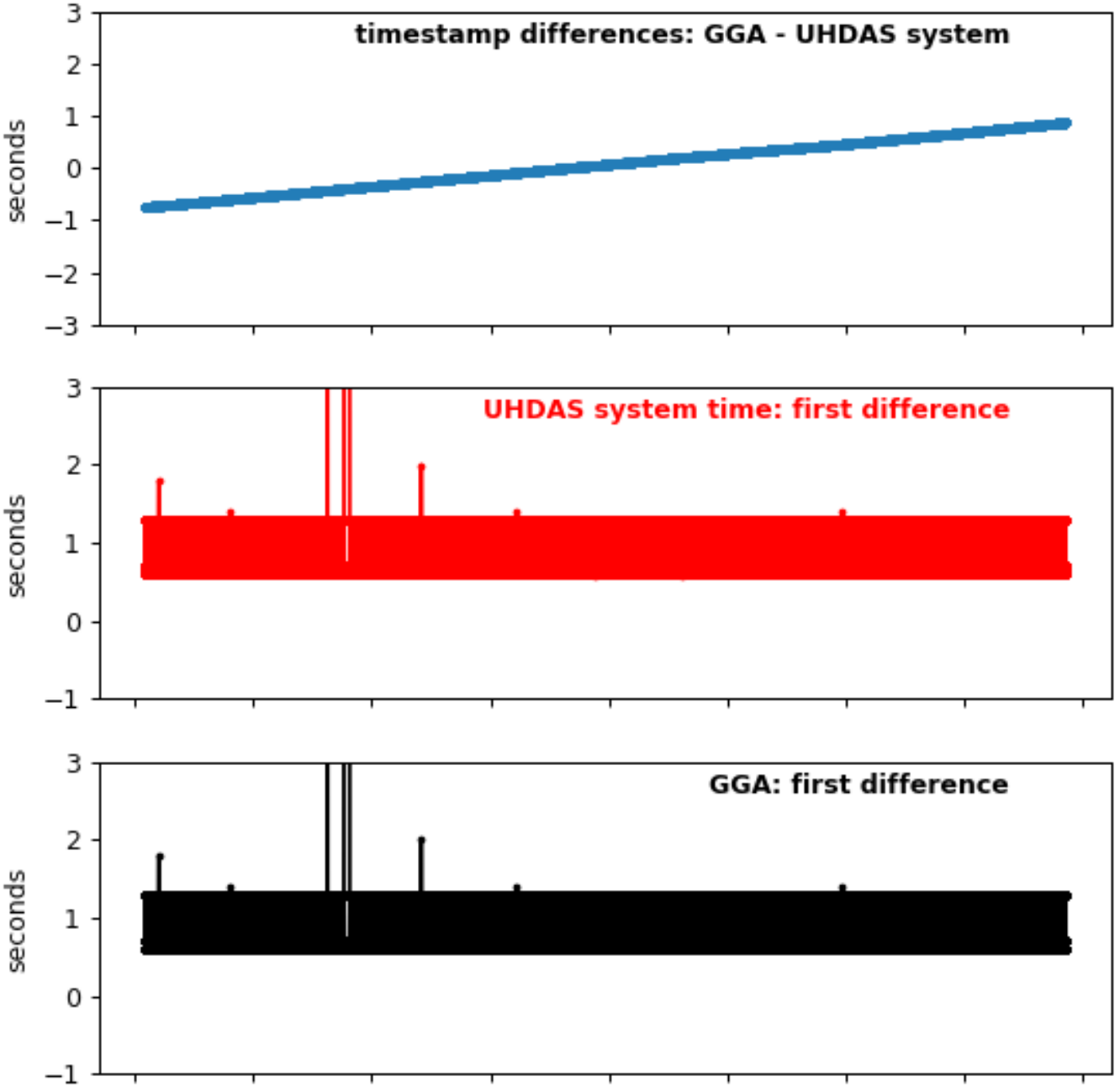
Pelican

- UHDAS clock not using ntp (drift 1sec/day)
- Furuno time resets every day (**ugly**)
- Furuno time resets by
  - missing message
  - repeating timestamps

ntpd=True

PE19_13_Sidorovskaia

GPS=ADU800



ntpd=False

- GGA times are reset every day at 00UTC. During the "reset
  - messages are lost
  - timestamps are duplicated

GGA from furuno

GPS=Furuno