

UHDAS Troubleshooting

Part 1

- What UHDAS does
- Tour of the UHDAS GUI
- Basic Troubleshooting: Follow the data

Part 2

- Guidelines
- Instrument settings
- Computer overview
- Frequently Used Answers

UHDAS Troubleshooting

Part 1

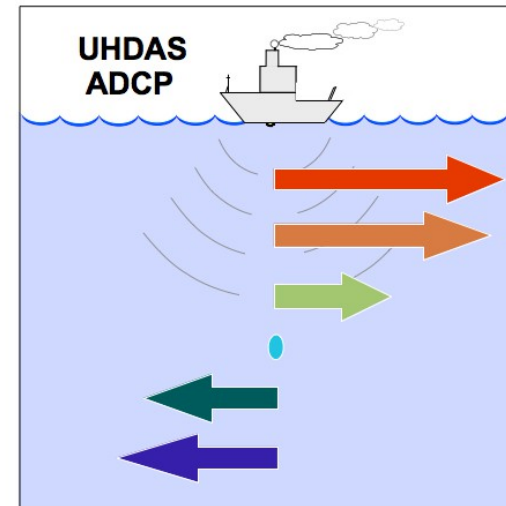
- What UHDAS does
 - Acquisition
 - Processing
 - Monitoring Tools
- Tour of the UHDAS GUI
 - Communications with ADCP
- Guidelines for Acquisition
- Basic Troubleshooting: Follow the data

UHDAS icon

old



new



Look for it when you start the UHDAS GUI

UHDAS Acquisition

Example:

- ADCP raw data
 - wh300
 - os75
- ancillary feeds
 - gps1 (from some GPS)
 - gps2 (from another GPS)
 - gyro(reliable)
 - posmv,seapath,ashtech (accurate)
- timestamping: NTP

UHDAS Acquisition (feeds)

Guidelines:

- NMEA strings should include checksum
- Feeds should come from real instruments not
 - combinors (switched feed) of any kind
 - a computer program
- Do not split a serial feed without using a powered repeater (don't just twist wires)
- **TELL US** if something changes, for example:
 - replacing or moving a GPS
 - removing and re-installing an ADCP

UHDAS Processing

- transformation to earth coordinates:
 - requires selection of
 - primary heading device (reliable=gyro)
 - accurate heading (for correction)
 - position (for ship speed)
 - requires calibration:
 - transducer angle for each ADCP
 - offset between each ADCP and gps
- assembly, single-ping editing
- produces plots

UHDAS Monitoring

- email sent to UHDAS Team at Univ. Hawaii and ship techs
 - status at 1430UTC
 - is a cruise active?
 - is data being logged?
 - is the data processing up to date?
 - is the accurate heading device working well?
 - figures generated on land: anything to cause alarm?
 - eg. “is logging” but data processing is old
 - eg. artifacts in the plots
- web site AT SEA
- figures on land (monitoring status table)

UHDAS at-sea web site

- monitoring
 - accurate heading device health
- operations
 - bridge plot (kts and direction near the surface)
 - vector profile plot (kts and direction various depths)
 - beam velocities
 - speedlog

Take a tour  link: [at-sea web site example](#)

UHDAS at-sea web site

Take a tour  link: [at-sea web site example](#)

Hint: do we have a live UHDAS GUI to practice with?

UHDAS GUI Tour

start GUI

start cruise (eg. KM1701)

start recording

look at green bars and figures

look at web page

stop recording

(change settings)

start recording

[etc, through the cruise]

stop recording

end cruise

start cruise (eg. KM1702)

start recording

stop recording

end cruise

kill GUI

UHDAS GUI Tour

start recording

stop recording

change settings

- toggle bottom track on/off
- Ocean Surveyor – choose
Broadband or Narrowband
- troubleshoot ADCP (instead of using BBTALK)

start recording

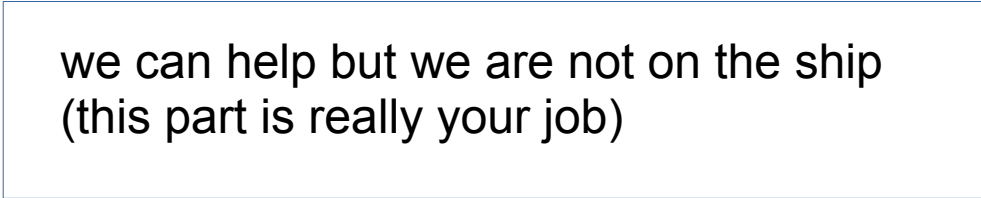
stop recording

Troubleshooting: follow the data

communication:

- before UHDAS:

- ADCP transducer cable
- ADCP deck unit
- ADCP serial cable



we can help but we are not on the ship
(this part is really your job)

- inside UHDAS (details coming up)

- is the USB-serial device plugged in? Is it powered?
- are the USB communication devices found?
- baud rate
- port (device numbers are ttyUSB0, ttyUSB1, ... ttyUSB7)
- are the messages specified correctly (config/sensor_cfg.py)
- are we using ZMQ publishers? is zmq_publisher.py running?

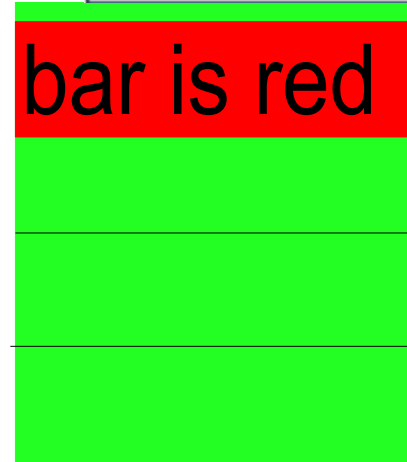
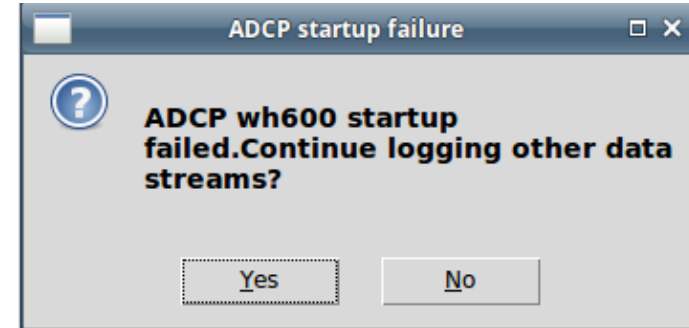
Troubleshooting: “no communication with ADCP”

Symptom:

- eg. ADCP: no 'wakeup' message
- eg. Ancillary feed: UHDAS GUI bar is red

Solution:

- talking to the ADCP
 - using “**tk_terminal.py**” (replacement for BBTALK)
 - using UHDAS GUI (if configured) use Terminal Tab



Conclusion: Once you have communication with the ADCP, the UHDAS GUI bar should turn green during data acquisition

Troubleshooting: communication

- inside UHDAS
 - Are the USB-serial devices found?
 - are the messages specified correctly (config/sensor_cfg.py)
 - are we using ZMQ publishers? is zmq_publisher.py running?

Troubleshooting: communication

- inside UHDAS
 - Are the devices found?
 - if 'yes' this is what we expect to find:

```
ls -l /dev/ttyUSB*
```

```
crw-rw---- 1 root dialout 188, 0 Oct 16 13:45 /dev/ttyUSB0
crw-rw---- 1 root dialout 188, 1 Oct 16 13:26 /dev/ttyUSB1
crw-rw---- 1 root dialout 188, 2 Oct 16 13:45 /dev/ttyUSB2
crw-rw---- 1 root dialout 188, 3 Oct 16 13:26 /dev/ttyUSB3
crw-rw---- 1 root dialout 188, 4 Oct 16 13:26 /dev/ttyUSB4
crw-rw---- 1 root dialout 188, 5 Oct 16 13:26 /dev/ttyUSB5
crw-rw---- 1 root dialout 188, 6 Oct 16 13:26 /dev/ttyUSB6
crw-rw---- 1 root dialout 188, 7 Oct 16 13:26 /dev/ttyUSB7
```


Troubleshooting: communication

- inside UHDAS
 - are the messages specified correctly?
 - is the baud rate correct?

config/sensor_cfg.py



annotated
layout in
linked figure

```
{ 'instrument' : 'Furuno', # model=SC-50
  'device' : 'ttyUSB5', # USB-serial device number
  'baud' : 9600, # baud rate
  'format' : 'ascii', # C-program to log with
  'subdir' : 'furuno', # subdirectory to write in
  'ext' : 'hdg', # ascii file suffix
  'strings' : ('$HEHDT', '$GPGGA'), # record these
  'messages' : ('hdg', 'gps'), # translation codes
  'opt' : '-c -Y2', # $PYRTM time stamp
},
```

Troubleshooting: communication

- inside UHDAS
 - are we using **ZMQ publishers**?
 - is `zmq_publisher.py` running?

(see next 2 slides) then

check the Troubleshooting section of the documentation

monitoring position (use_publishers = False)

Monitoring GPS (without zmq)

Without zmq Publisher—only accessible when DAS.py is logging

Logging controlled by DAS.py

`/dev/ttyUSB0`

`$GPGGA`

`ser_asc`

Written to disk:
`/home/data/CRUISEID/raw/gpsnav`

monitoring position (use_publishers = True)

Monitoring GPS with zmq

Using zmq Publisher— **start on boot, always available**

`/dev/ttyUSB0`

`$GPGGA`

zmq_ser_asc

Published to a tcp port
`tcp://127.0.0.1:38000`

Logging controlled
by DAS.py

ser_asc

Written to disk:
`/home/data/CRUISEID/raw/gpsnav`

Troubleshooting: computer

- is the monitor on?
- is the KVM working? are the parts plugged in?
- is the right computer on?
- can you ping the computer?
- can you ssh into the computer?
- Try running this command to bring back the display:

```
sudo xrandr -d :0 --auto
```

UHDAS Troubleshooting

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- Frequently Used Answers

Guidelines: ADCP settings

- In general
 - use our defaults (they were chosen for your ship)
 - usually bottom track is OFF
 - triggering is (often) bad for ADCP data
 - usually degrades ADCP data
 - fewer number of pings
 - detrimental interference (can happen)
- Exceptions
 - science request/requirement (“It's your data”)
 - bottom track ON for specific ships if no accurate heading device
 - recommend: only use in shallow water with high-frequency instrument

Guidelines ADCP settings

If you change the bin size:

Aim at keeping the potential range consistent with the instrument's expected range

Expected instrument range

	broadband mode	narrowband mode
wh1200:	10–15m	–
wh600:	50m	–
wh300:	50m–80m	–
os150:	150m–250m	200m–300m
os75:	400m–600m	500m–800m
os38:	500m–1000m	800m–1600m

Guidelines: UHDAS

- Please let us know if something change:
 - ADCP goes out for refurb (reinstall → calibration)
 - any change in heading devices
- Click **End Cruise** as soon as practical after arriving in port:
 - Important cleanup occurs after data logging is done
- Do not reset computer clock during data acquisition (do it between cruises)

Cruise name and backups

- names should sort alphabetically and in time
- examples: good
 - **EN203, EN204, EN205,...** (sequential cruise numbers)
 - **KM1701, KM1702, ...**(year and cruise number in year)
- variations: good
 - **PS17_10_Asper_ADCP,**
 - **oc1411_a, oc1411_b, oc1411_c**

Cruise name and backups

- names should sort alphabetically and in time, and be meaningful
- examples: bad
 - **transit**
 - **transit_Oct16**
 - **transit_1112**
- If desperate, use the previous or next cruise name and add some words, eg:
 - **km1701_transit_to_drydock**
 - **km1701_NSF**

New: you can (now/soon) use '-' in the cruise name, eg **PC-17-01**

Cruise name and backups

- ADCP processing does best in large chunks, eg “a cruise”
- “**start cruise**” (eg **EN205**) – data goes into `/home/data/EN205`
- Occasionally a UHDAS “cruise” will have to be split.
- Reasons include:
 - calibration (new ADCP)
 - processing failure (logging OK, plots stalled)
 - bookkeeping
- Cruise naming convention can help minimize trauma
- Examples (good)
 - **SKQ201615S, SKQ201615S_01**
 - **SKQ201702T, SKQ201702TCAL**
 - **EN509, EN509b**
 - **oc1401a, oc1401a_01, oc1401a_02**
 - **oc1401b, oc1401b_01**

UHDAS Cruise name R2R submission:

start cruise (eg. **KM1701**)

start recording

stop recording

end cruise

start cruise (eg. **KM1701_part2**)

start recording

stop recording

end cruise

start cruise (eg. **KM1702**)

start recording

stop recording

end cruise

start cruise (eg. **KM1703**)

start recording

stop recording

end cruise

R2R cruise distro "adcp"

Keep separate

ctd/
xbt/
adcp/

KM1701

KM1701_part2

ctd/
xbt/
adcp/

KM1702

ctd/
xbt/
adcp/

KM1703

computer layout

directory structure

cruise: /home/data/km1707 → /home/adcp/km1707

configuration:

- /home/adcp/config
 - sensor_cfg.py # logging
 - proc_cfg.py # processing
 - uhdas_cfg.py # other (eg. email)

logfiles:

- /home/adcp/log

[link to directory layout in documentation](#)

email:

- /home/adcp/daily_report

Troubleshooting serial communication

open `tk_terminal.py`



- Do NOT use any port that UHDAS GUI is using
- Kill the UHDAS GUI first (or use other ports)

serial communication with UHDAS

(`tk_terminal.py`)

- choose port (0-7 NOT 1-8)

`/dev/ttyUSB0 [ttyUSB1, ... ttyUSB7]`

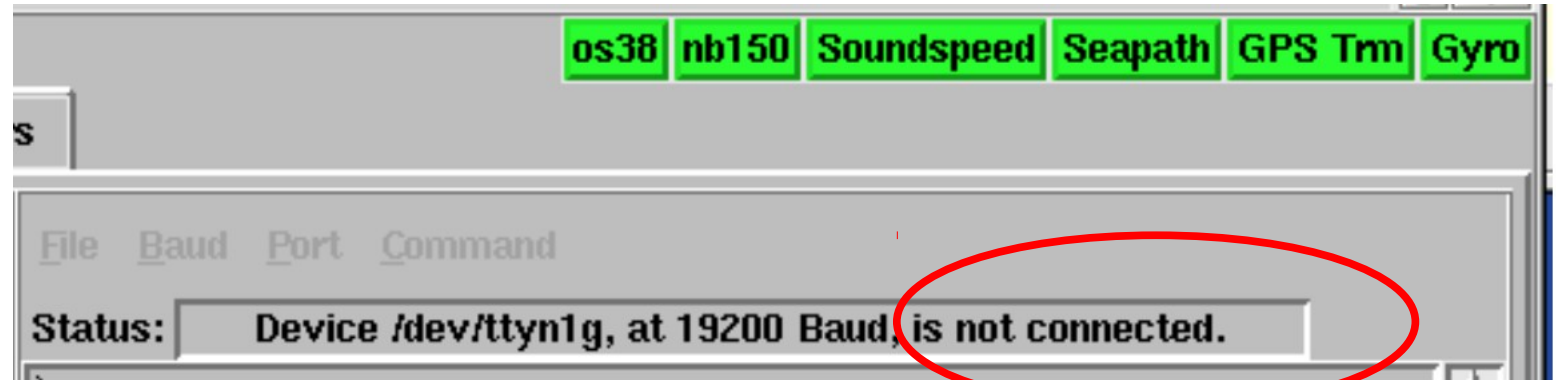
`/dev/ttyS0`



USB-serial device
on-board computer



- choose baud rate (eg. 9600)
- connect to port
 - for NMEA messages, automatically spew forth)
 - for ADCP: Commands ----> send Wakeup
- **Disconnect** before changing port or baud rate
- kill with 'x'



Terminal Tab:
UHDAS GUI always says

“is not disconnected”

when logging because C programs are
doing the logging not the UHDAS GUI.

Signatures of bad data

- previous ping interference
- bubbles
- too shallow
- ringing

Signatures of bad data

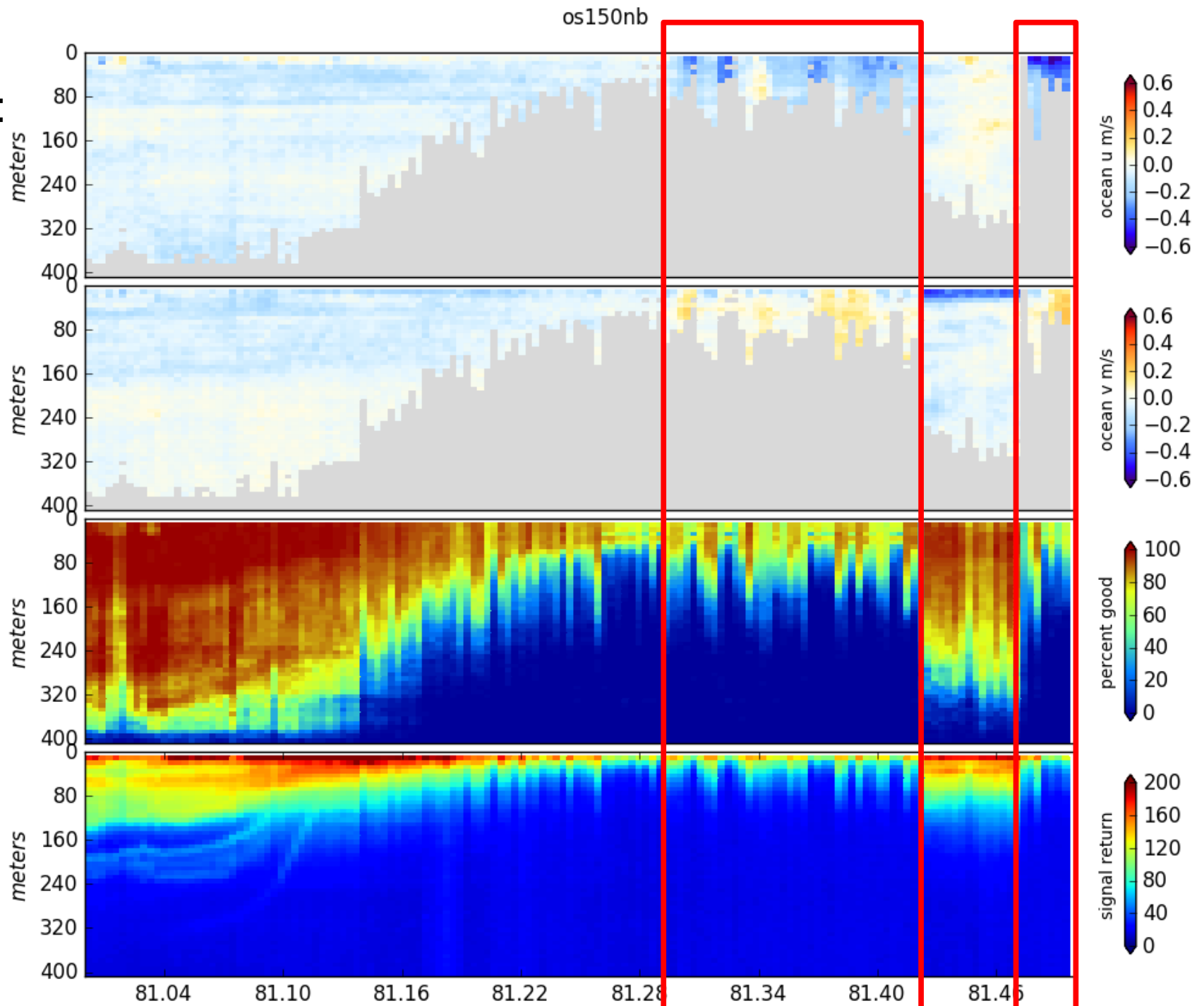
- previous ping interference

solutions:

- allow time between pings for sound to die out
- change time between pings (based on depth)
 - (guidance to forthcoming)

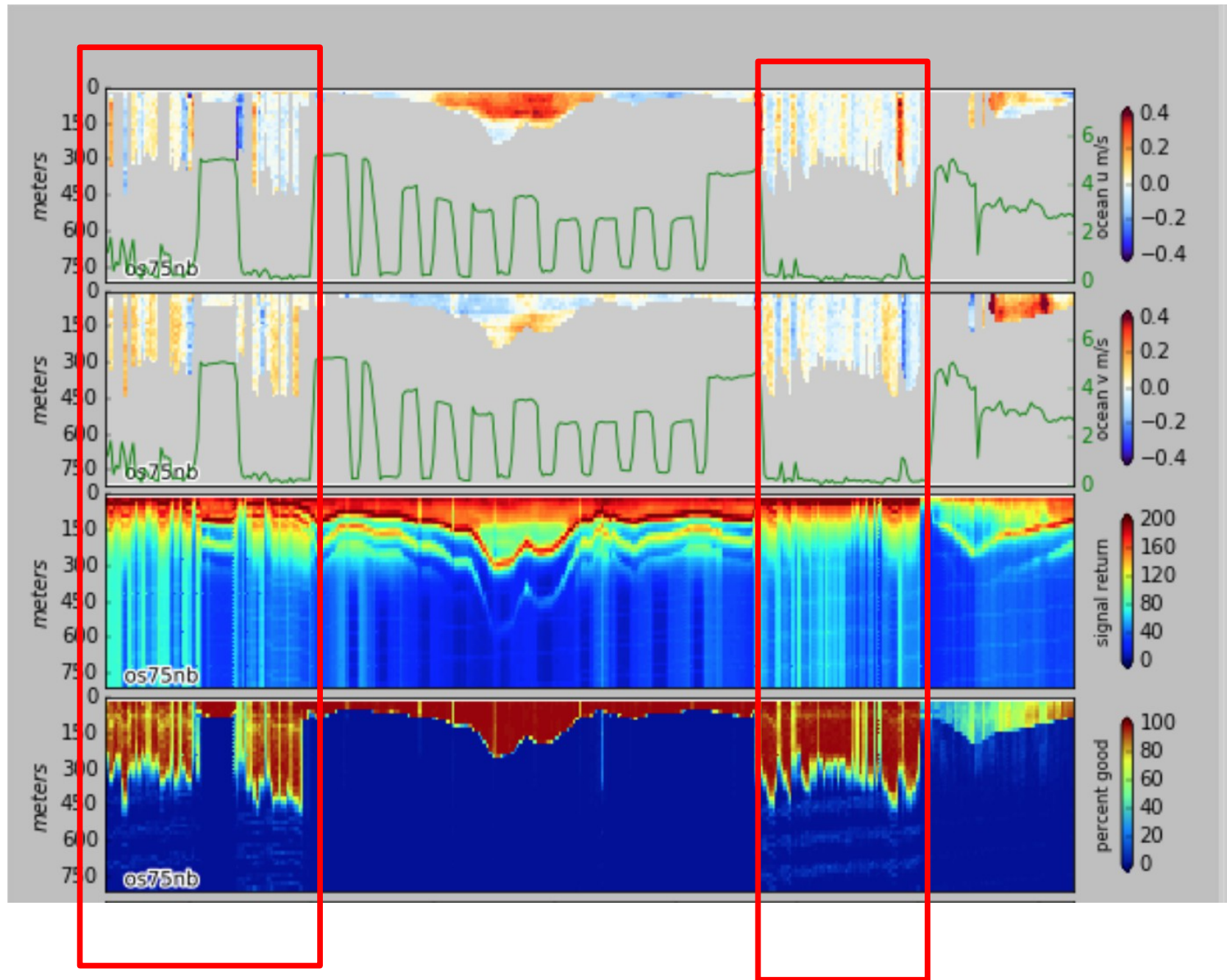
bubbles:
at-sea data:

single-ping
(link)



Signatures of bad data

too shallow



Signatures of bad data

- ringing
- sound reverberates inside the well

solutions:

- add damping material inside the well
- verify the window specs are correct

Frequently Used Answers

(scenarios that provoke email from us)

- ADCP “simply stopped” collecting data
- Bottom track is ON in deep water
- new plots (where is it on the at-sea web site?)
 - high-resolution panel plot
 - vector-profile plot (“maypole” plot)
- Ship still logging data in port (not yet End Cruise)
- instructions to ping in port (monitor ancillary data)

Frequently Used Answers

(scenarios that provoke email from us)

- POSMV glitches (more than usual)
- reset your ashtech
- forcing an email to go out (so we can see effects)
- configuration change – how far “backward” to go?
 - requires only stop/start recording?
 - also start a new cruise?
 - also kill the UHDAS GUI in between cruises?
 - also reboot the computer between cruises?