RVTEC Oct 2019 – UHDAS/ADCP

Time,
ADCP
Position
Attitude

os75nb: last time 2012/03/10 16:04:27
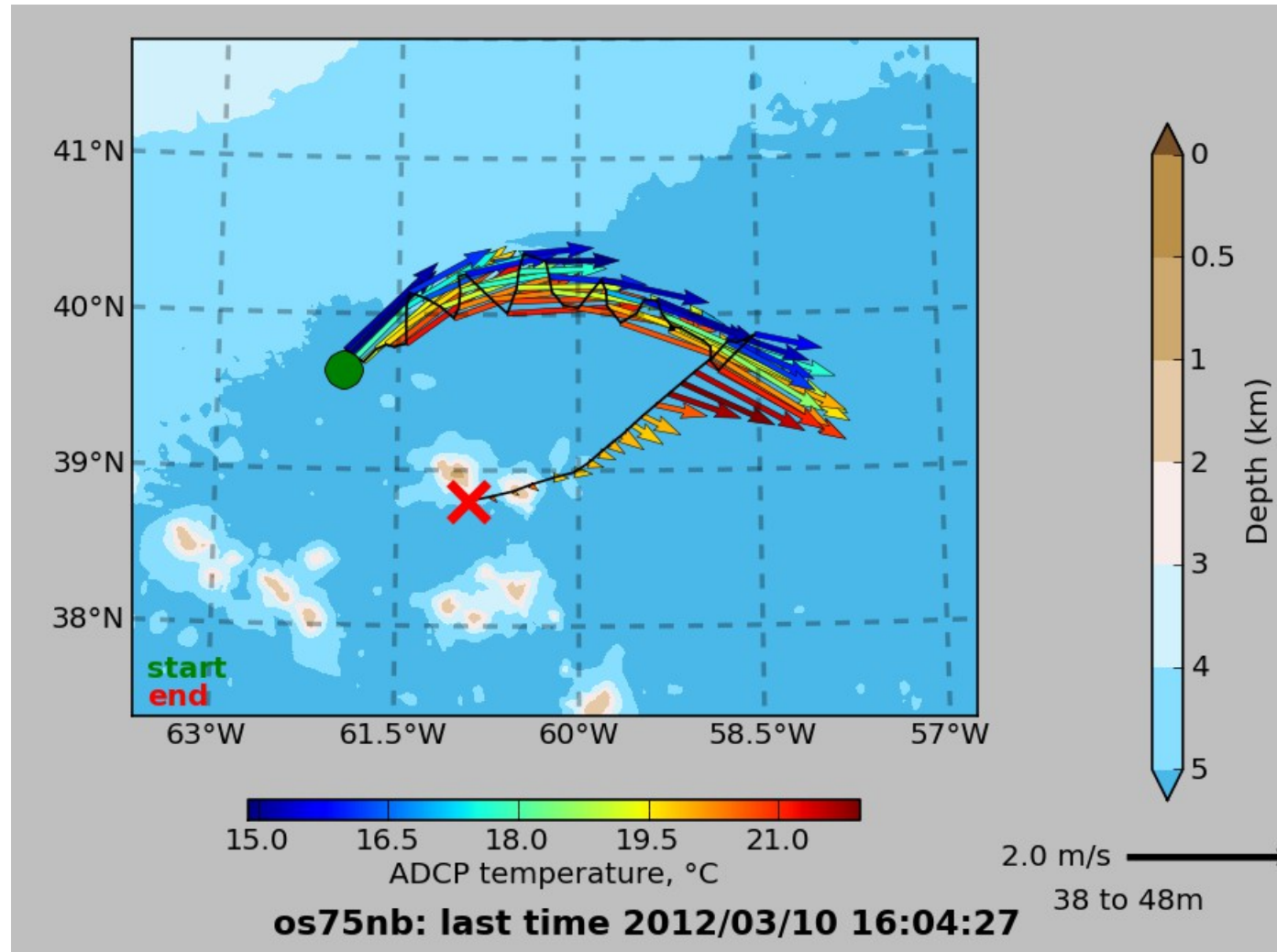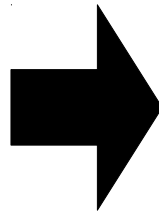
primitive data

ocean velocities

UHDAS/ADCP

Review UHDAS Concept:

- **Acquisition**: Start by collecting the data well

  - reliable, robust, duplicate feeds

- **Monitoring:** Keep it working well

  - daily scrutiny by UHDAS Team and people on shore (email)
  - at-sea web site has diagnostic plots

- **Processing:** provide access to data and plots at sea

  - Balance real-time output and post-cruise recovery
  - data access and figures in at-sea web site
  - Portable code and documentation

- **Stewardship:**

  - improve QA, accessibility, visibility, understanding
  - rely on R2R and NCEI for conduit and archiving

UHDAS Systems (2019)

- **17 UNOLS ships**: Atlantic Explorer, Neil Armstrong, Atlantis, Blue Heron, Endeavor, Hugh Sharp, Kilo Moana, Langseth, Oceanus, Pelican, R.Revelle, Sally Ride, Savannah, Sikuliaq, R.G.Sproul, T.G.Thompson, F.G.Walton Smith

- **3 polar ships**: Healy, L.M.Gould, N.B.Palmer

- **11** (+/-) **NOAA ships**: Okeanos Explorer, Hassler, G.Gunter, H.Bigelow, Hi`ialakai, N.Foster, Pisces, R.Brown, R.Lasker, Sette, B.Shimada, Dyson

- **6 "other" research ships:** Falkor, Pt Sur, Investigator, Kristine Bonnevie, Discovery, James Cook

- **4** (-) **Volunteer Observing Ship**: Oleander, Norrona, RCCL Adventure of the Seas, RCCL Celebrity Flora

UHDAS: recap of 2019

- new ships:

    VOS: RCCL Celebrity Flora, Oleander

    UK: James Cook, Discovery

- operating system (trusty 14.04), (xenial 16.04), (bionic 18.04)

  - Revelle, Sproul

  - Atlantis, Armstrong, Blue Heron, Healy, Langseth, Pelican, Sikuliaq, Sally Ride, Thompson, Walton Smith

  - Atlantic Explorer, Endeavor, Hugh Sharp, Kilo Moana, Oceanus, L.M.Gould, N.B.Palmer, Savannah

Accurate Heading (known/vetted devices)

- **POSMV**: 23 ships (QA-email)

- **Seapath**: 15 ships

- **Phins:** 4

- **Ashtech**: (QA-email)

  - **ADU2: 1**   ancient

  - **ADU5**: 4   very old

  - **ADU800**: 3   out of service

  - **ABX-TWO**: 7   seems to work well (*)

goal = 0.1deg accuracy

Devices to Evaluate

| device to evaluate	ship	conclusions
Vector VS330	Savannah	recommend ABXTWO
SpatialDual	Endeavor	continued testing
Hemisphere	Sally Ride	terrible
Trimble (BX982)	Sally Ride Pt Sur	seemed OK problematic
Japan Radio Corp	Atlantic Explorer	not good enough

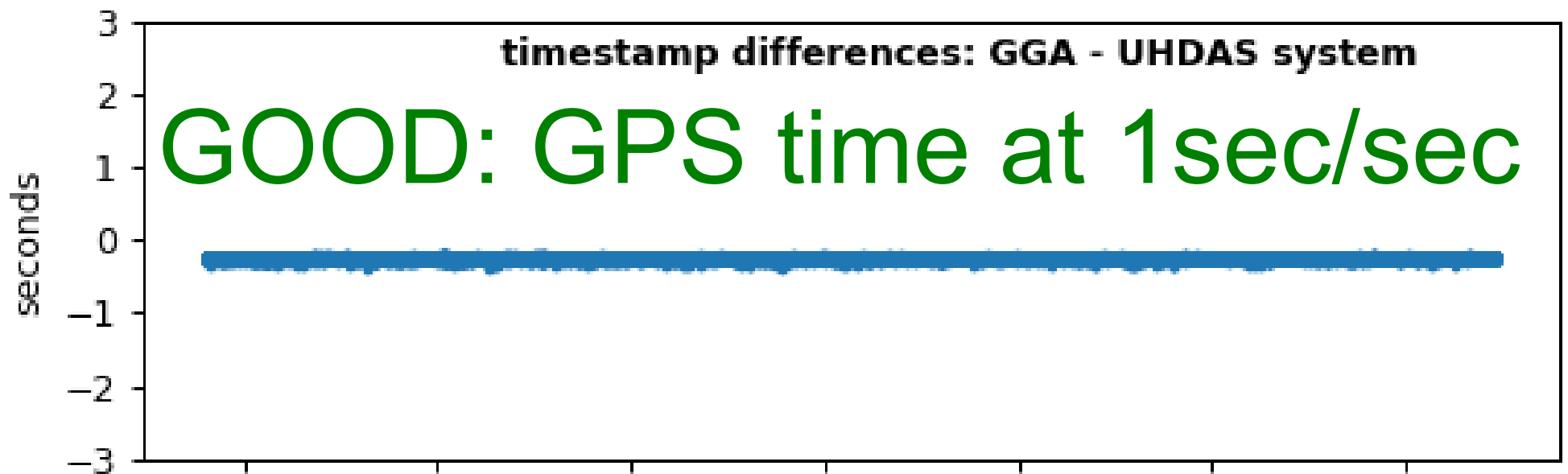# UHDAS: recap of 2019

New developments:

- switched to Python3 for all activities
- updated Virtual Computer for CODAS workshops
  - gave (2) 3-day ADCP processing workshops
- improvements to ticketing system
  - more flags automatically raised based on email bundle
  - can include outsiders in the emails, attachments
  - added GPS time quality tracking (uh-oh)

GPS time problems
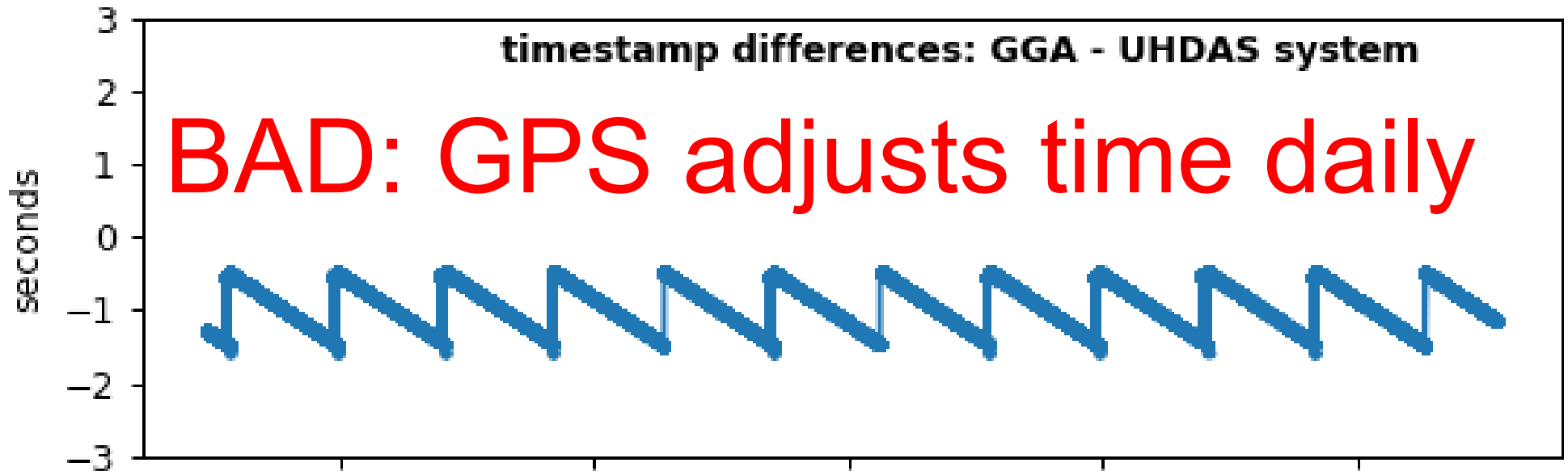
Problems: ADCP instruments

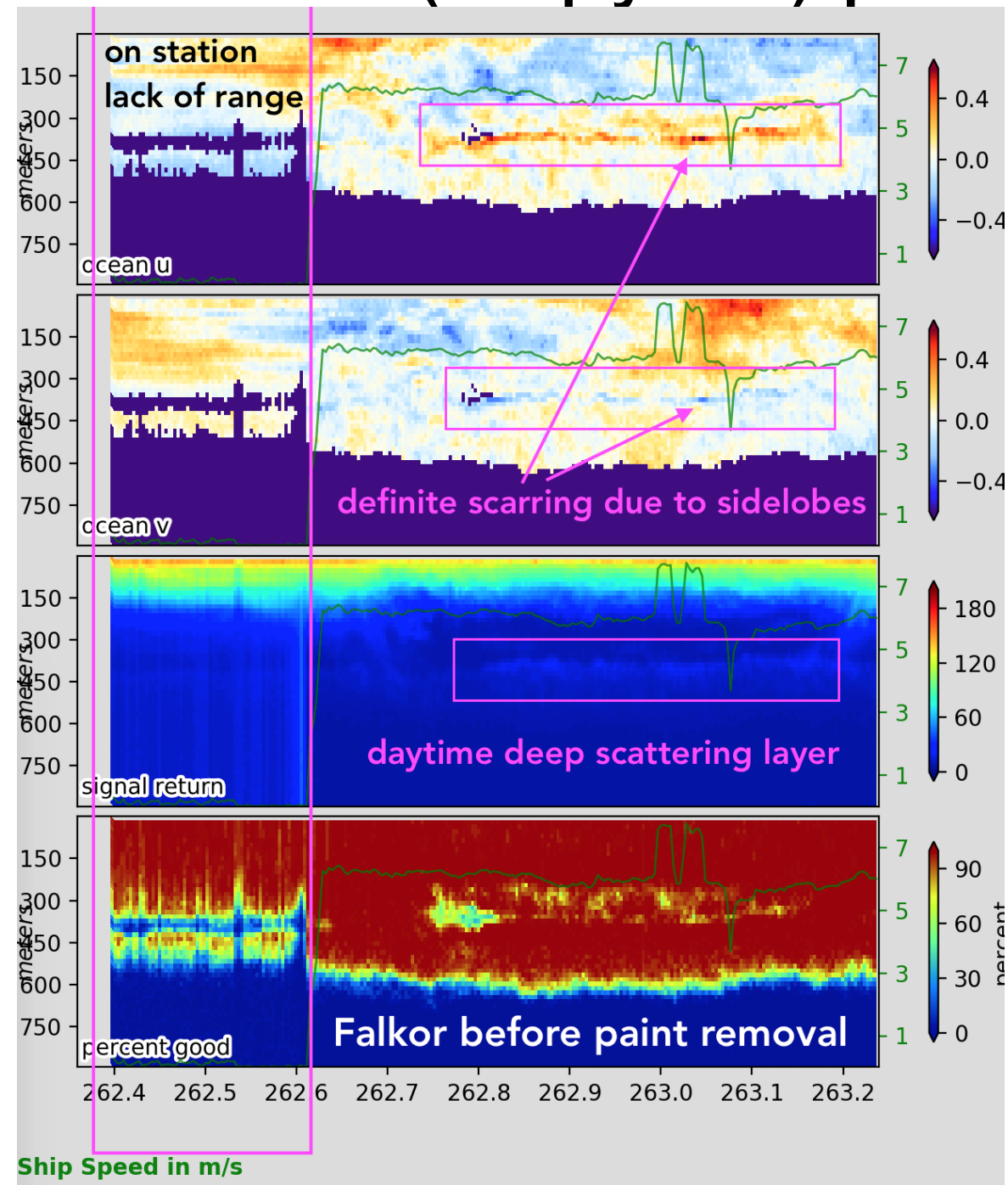| ship	instrument	problem	New Instrument
• Oleander	: **OS150**	2 beams: no transmit	
• Oleander	: **OS38**	electrical noise or bubbles	
• Flora	: **OS150**	2 beams no transmit	
• Sikulaiq	: **WH300**	2 beams biased	
• Sproul	: WH300	top 40m (out of 80) biased	
• Gunter	: OS75	intermittent loss	
• James Cook	: OS75	dead out of shipyard	
• Norrona	: OS75	dead	
• Kilo Moana	: OS38	deck unit	
• Thompson	: OS75	barnacle growth	
• Falkor	: WH300+OS75	shipyard painted transducers	
• Pelican	: OS75	bias towards 0 (beam vels)	

Thompson barnacle growth

ocean u

ocean v

terrible range

signal return

loud background return
(high noise floor)

percent good

Thompson:
before barnacles were removed

Ship Speed in m/s

ocean u

ocean v

signal return

- low noise floor

- deep quiet = excellent range

percent good

Thompson
after barnacles were removed
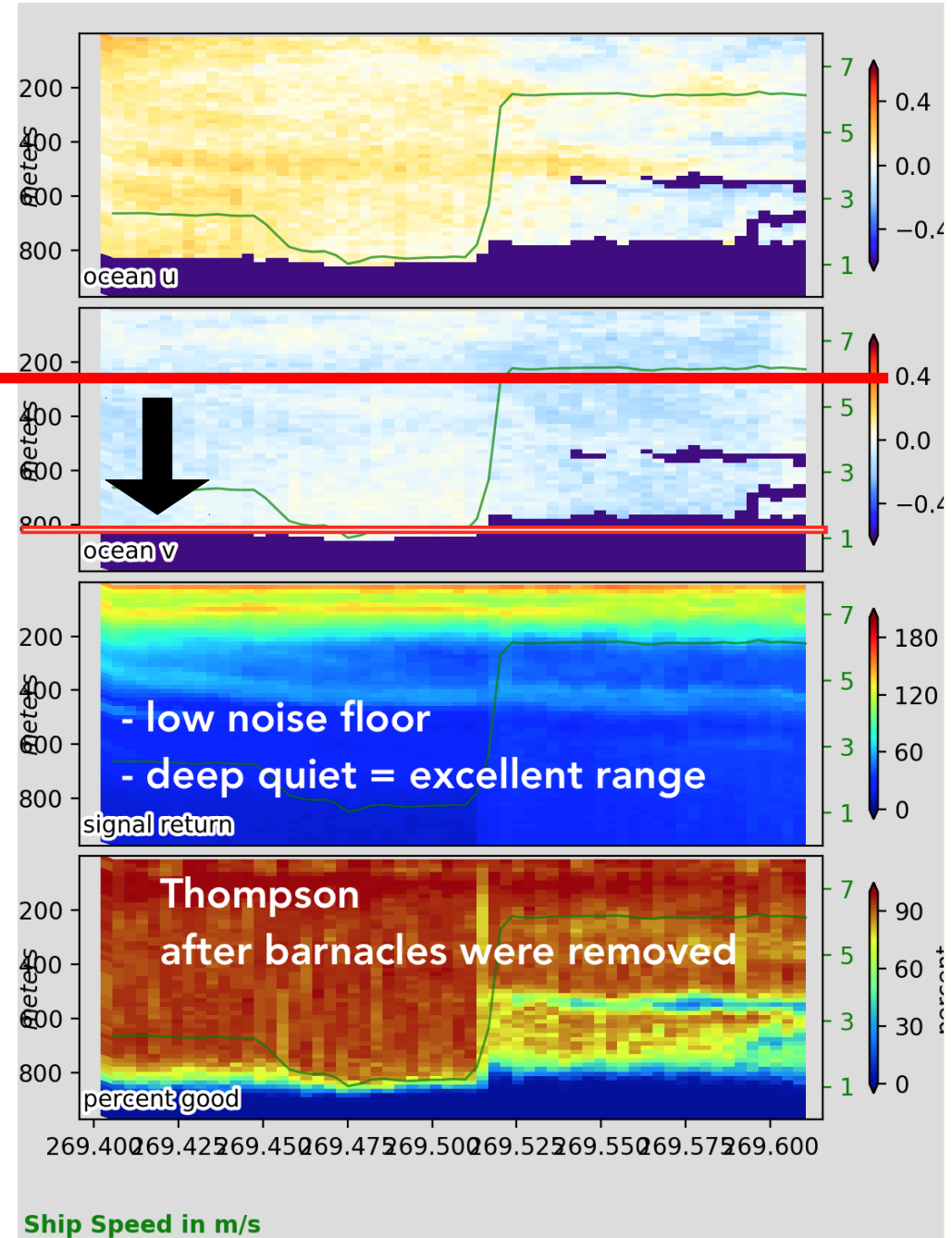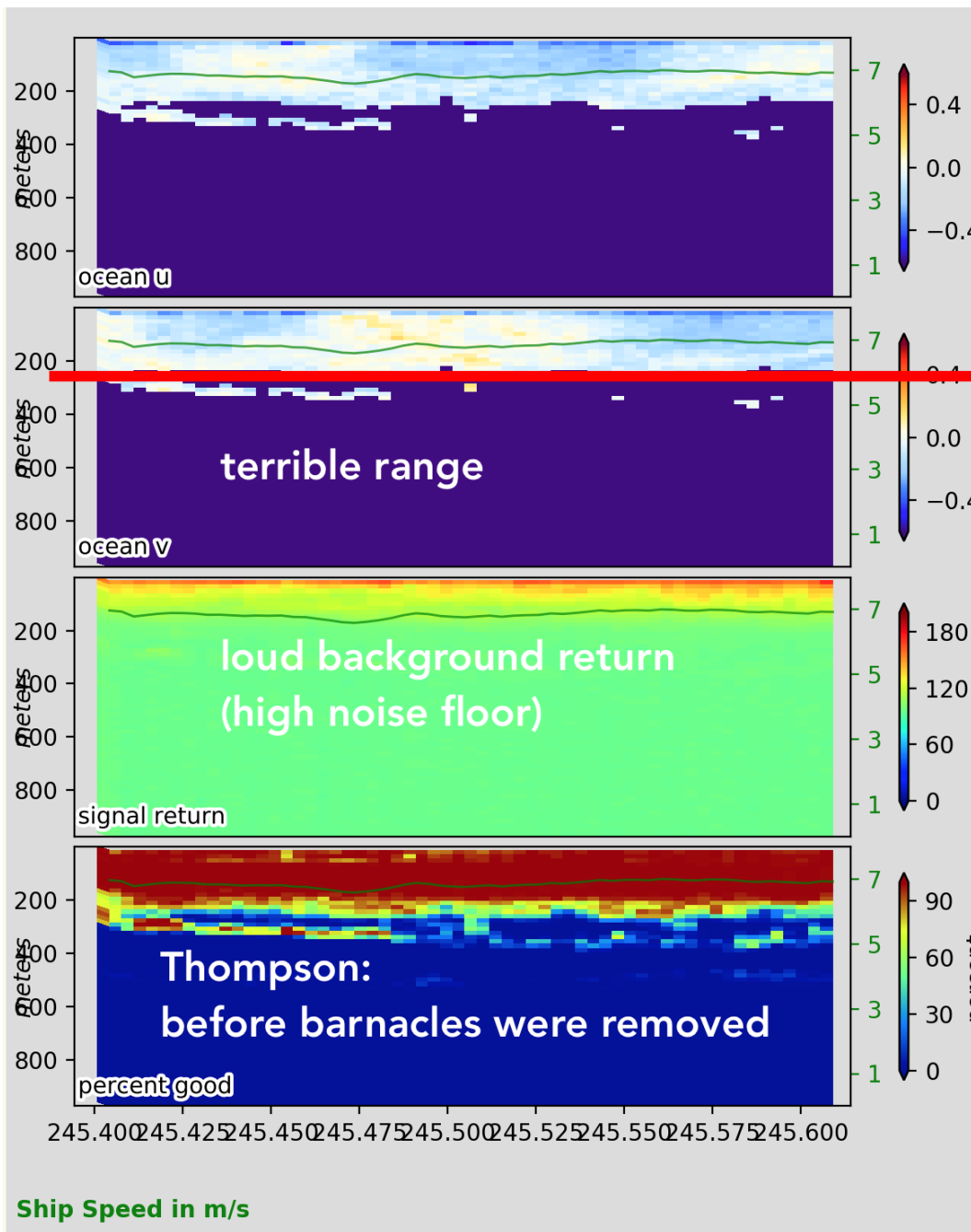
Ship Speed in m/s

Falkor (shipyard) paint on transducers
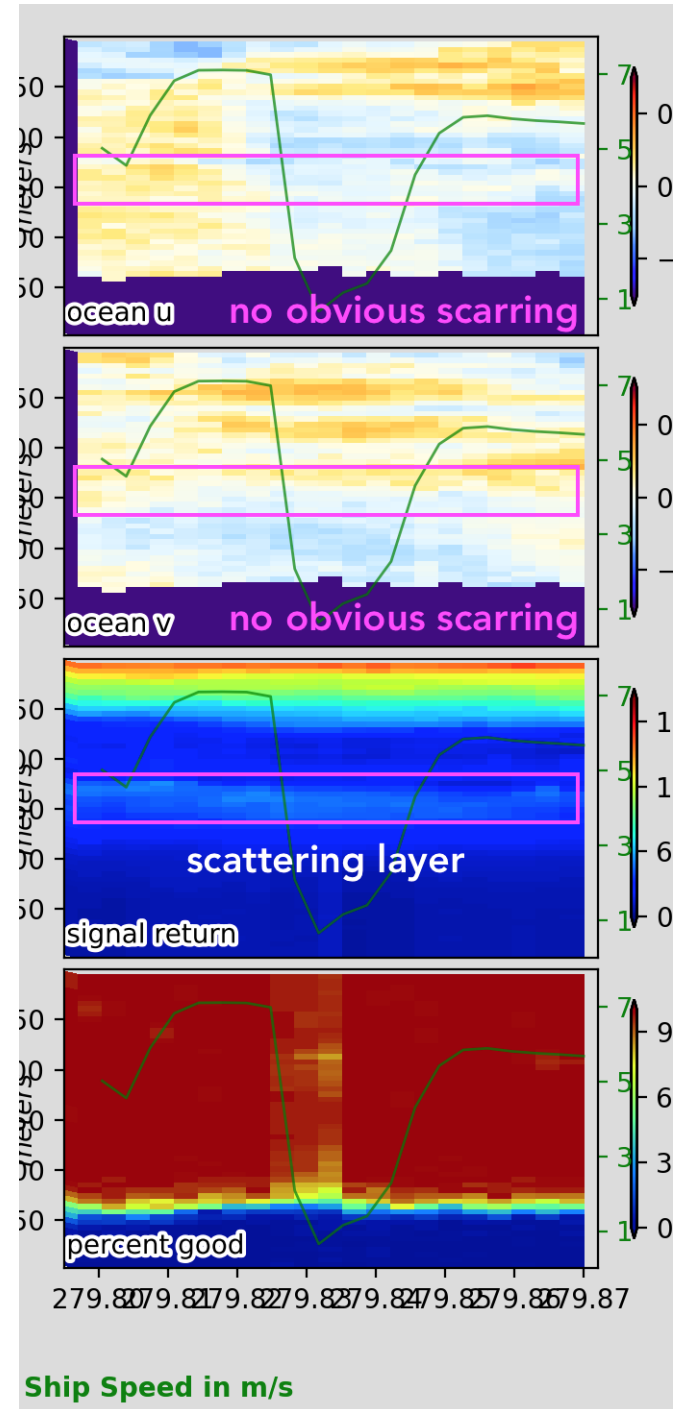
Pelican "banded" velocities

Ocean velocity N/S

os75nb.adu800.orig: ocean v

**at-sea data from UHDAS
unknown cause
bias when underway**

os75nb.adu800.uvship: ocean v

**after manual calibration
(post-cruise) looks good**

v diff.: os75nb.adu800.uvship - os75

**difference between
at-sea data and after
manual calibration**
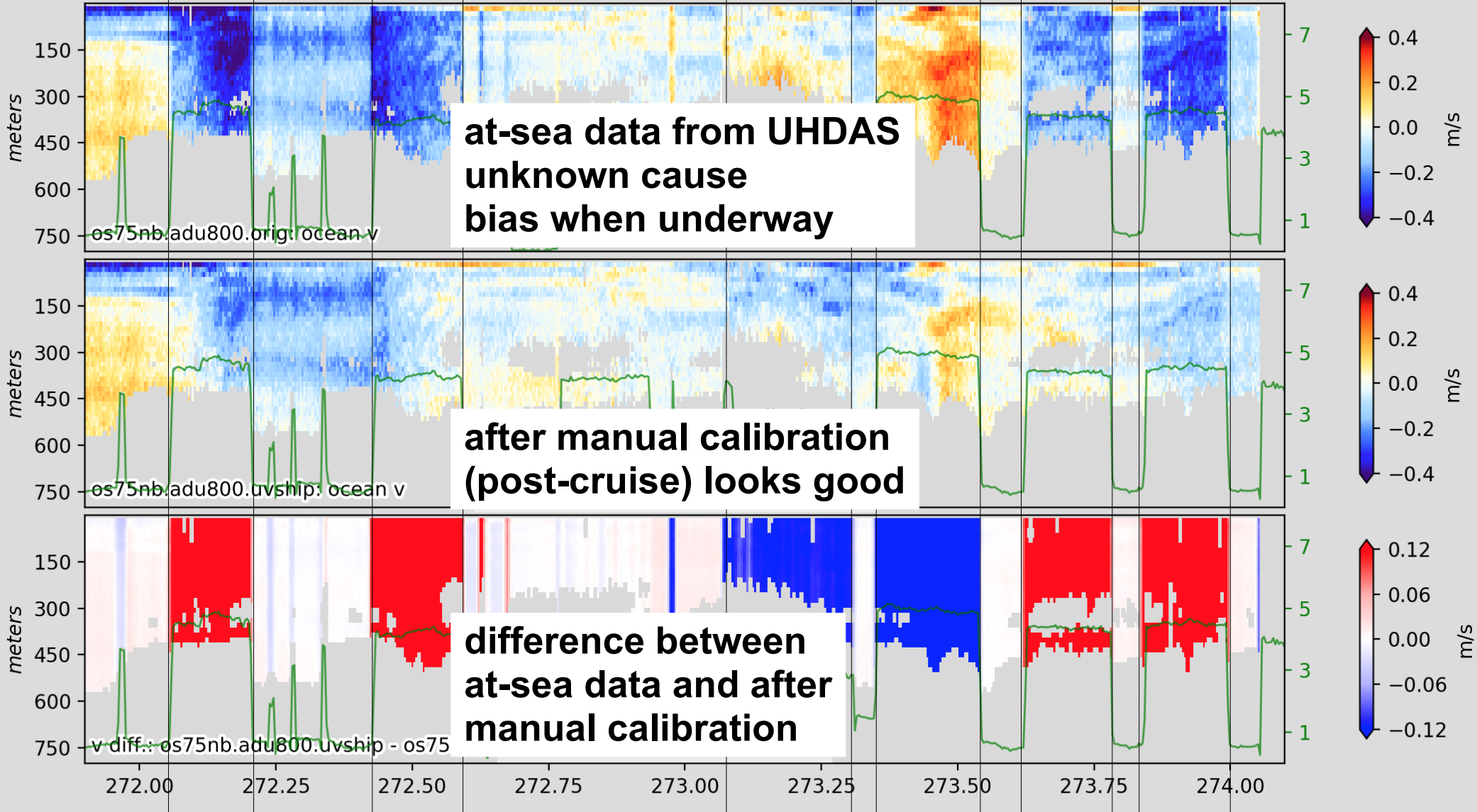
Ship Speed in m/s
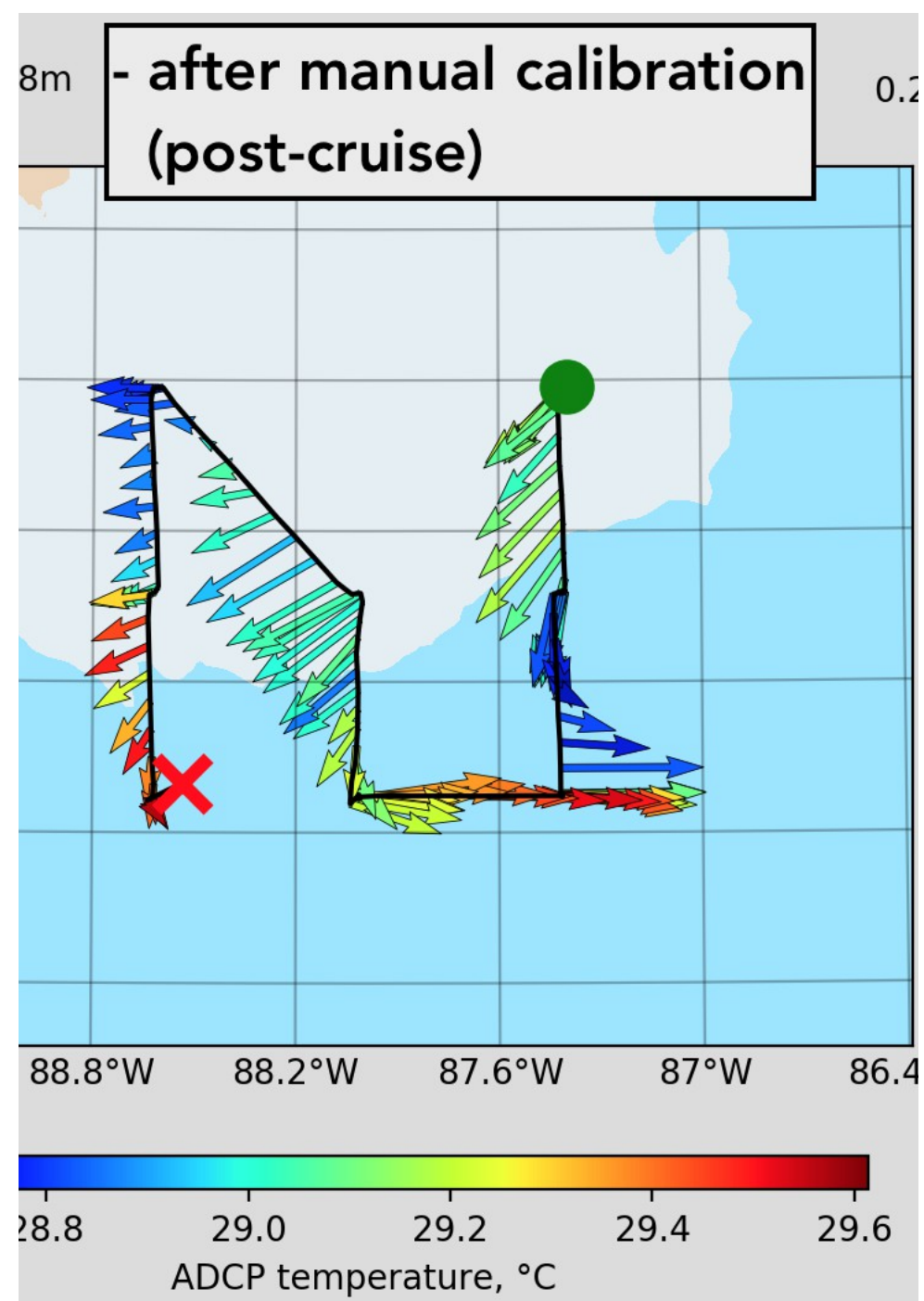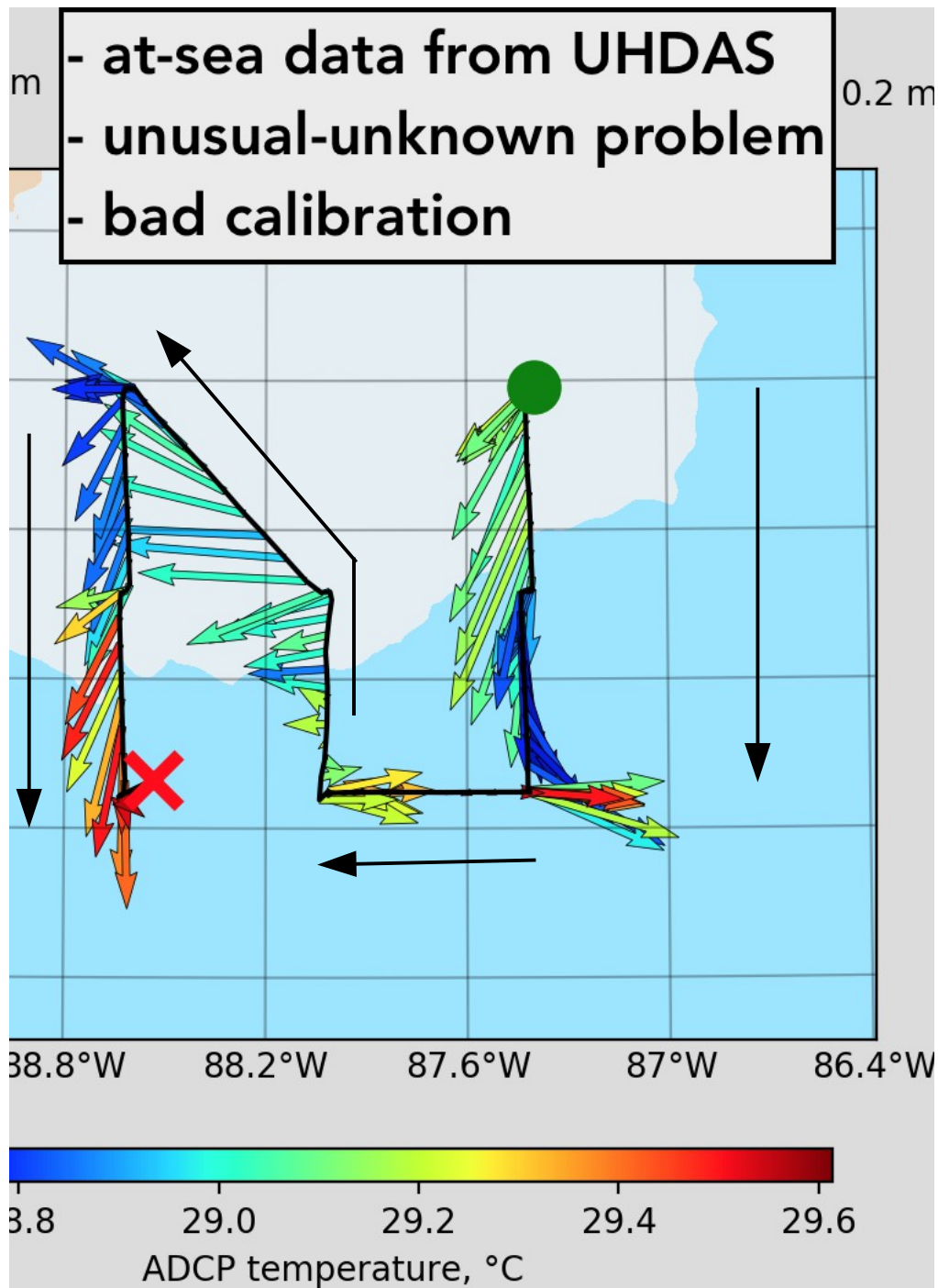
Error in velocities is about 50% of the ocean signal when underway

2020 improvements/projects

- new ships: ??

- renewals (existing ADCPs+computers, new OS)

  - Xubuntu 18.04 (Bionic Beaver)

  - get ready for 20.04 (testing midsummer, install in fall)

- directions for improvement:

  - work with R2R to improve

    – visibility (see prototype web site with R2R data)

    – QA tools

  - better tracking of GPS glitches

- further refinements to the documentation (web, and code)

Continuing Request:
Keep us in the loop regarding
(**give us lots of warning**)

- New ADCP (requires configuration, calibration)

- Replaced/Reinstalled ADCP

- Changes in serial feeds

- Moving a GPS antenna we use, especially for processing

- New attitude devices (we like to evaluate them)

- Changes in networking

  - route to ship

  - infrastructure on ship

- Science Special Needs (triggering, temporary instrument)

give us lots of warning

Protocol

(1) Always run "End Cruise" before archiving

- UHDAS adds final metadata to directory
- UHDAS builds a "reports" directory to help with QA

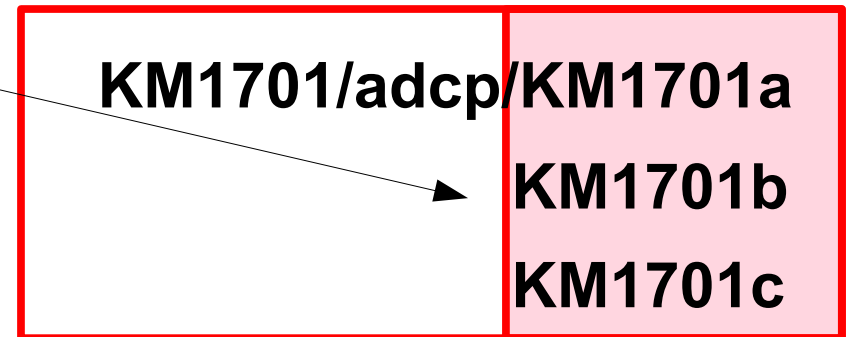(2) Cruise names: same sorting order by date or ascii

- use year first: **2019-04-01** not 4-1-2019

(3) Cruise distribution and backup:

- **ALWAYS** use complete cruise names,
- eg. cruise distro:
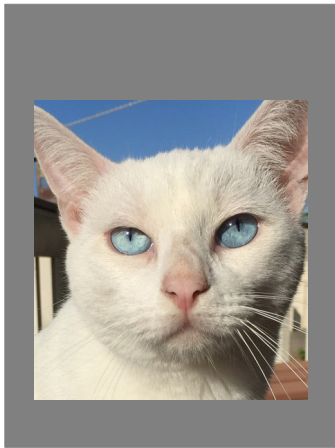
keep data in original names

web site: http://uhdas.org
email uhdas@hawaii.edu
email askuhdas@hawaii.edu

KM1701/adcp/KM1701a

KM1701b

KM1701c

Final request

… as always:

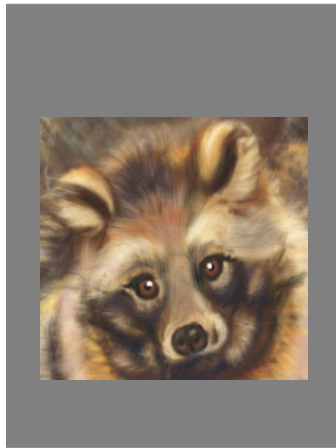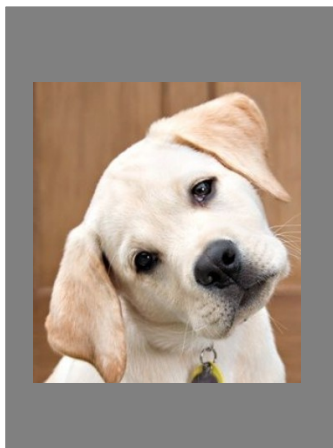## Send your needy scientists to ~~Jules~~

Jules   Toby   Uggo   Thomas

The UHDAS Team!