UHDAS:
Raising the Profile of Ocean Currents

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Ron Brown Users Meeting FY16

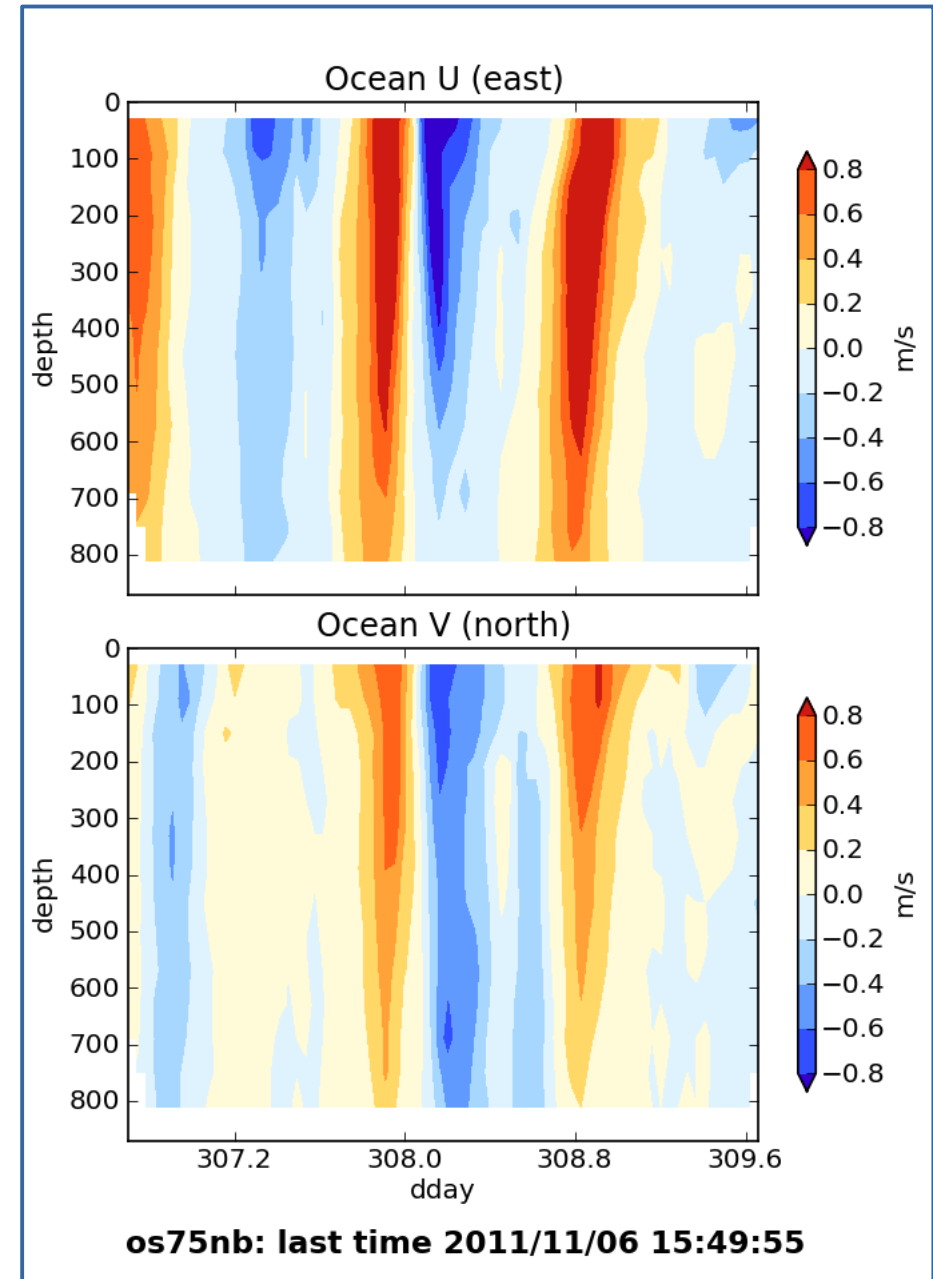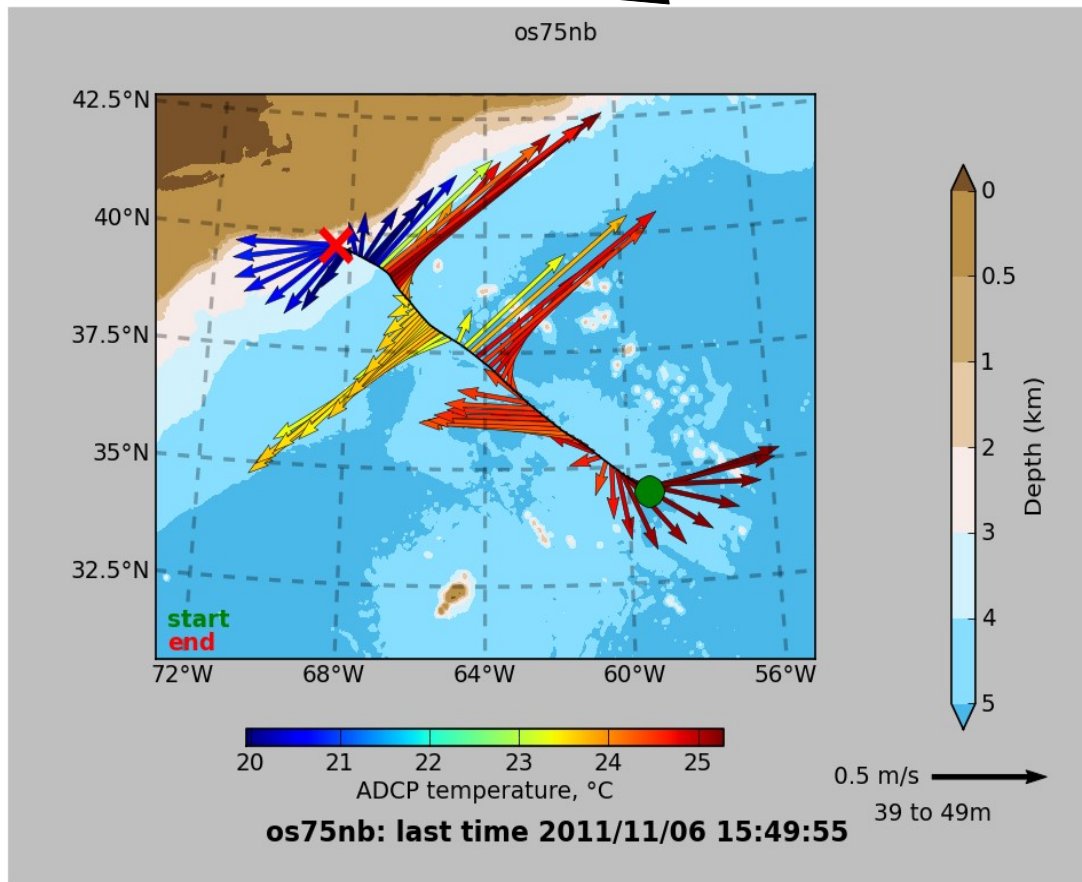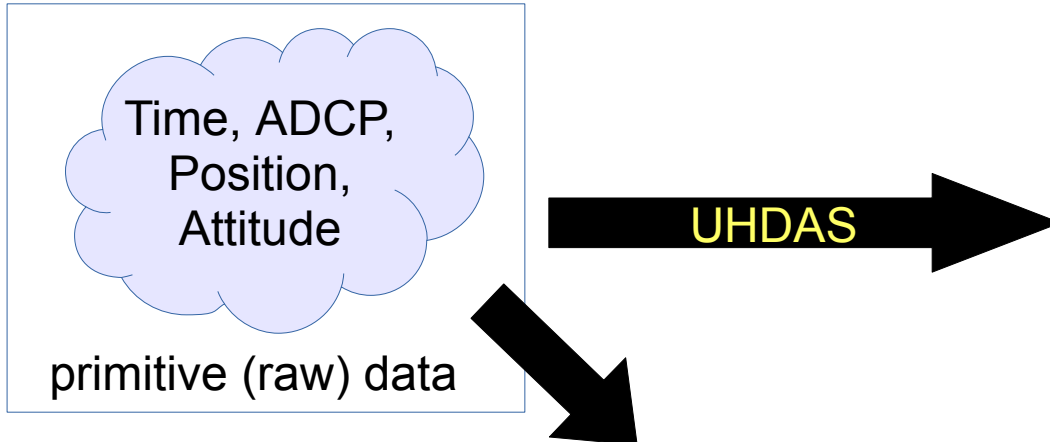## Terminology:

ADCP:

Acoustic **D**oppler **C**urrent **P**rofiler

UHDAS:

University of **H**awaii **D**ata **A**cquisition **S**ystem

Ocean Currents from ADCP

What does UHDAS do?

Performs these tasks:

- Data acquisition (ADCP, position, heading)
- Data processing (create ocean currents)
- Generates data products for science and OPS
- Creates tools and components for monitoring

(at sea and on shore)

UHDAS: installations

- Presently installed on about 27 ships
- Recently funded to include NOAA ships
    - retired: Ka`imimoana
    - current: Ron Brown, Hi`ialakai, Nancy Foster, Bell Shimada, Sette
    - FY16:   Okeanos Explorer, Hassler, Bigelow, Gunter, Pisces

- Installed on Ron Brown in 2007

- Ron Brown ADCP user interest:
    - PIRATA, various from AOML
    - CLIVAR cruises, TAO cruises

What are our practical goals?

- Provide viable ocean current data at sea

- Collect as much ADCP data as possible (within science mission)

- Enhance the utility and visibility of ADCP data

- Happy Scientists

- Happy Techs (Survey, Electronics, Science)

- Happy Managers (data, ops, ship)

What are our data goals?

- Data should be useful for science and operations at sea

- Data should be as close to "final" as possible (for an automated system)

- Require minimal post-processing for science

- Reprocessing on multiple operating systems (Linux, Mac, Windows)

Benefits of UHDAS

- Real-time data accessible for :

- Science at sea

  - dynamic sampling

  - context in habitat mapping

  - drifters, floating sediment traps

- Operations

  - ROV deployment

  - CTD wire angle

  - mooring deployment

Benefits of UHDAS

- Reliable, simple interface for Techs

- Remote monitoring by ADCP guru (or anyone else)

- Long-term usefulness:
  - Open source software
  - Existing path to NODC

- Open communication with scientists and techs

- Documentation for post-processing datasets

UHDAS support: post-processing scope

(1) initial evaluation of ADCP system

- requires processing of a recent dataset
- assess best settings (eg. can BB mode be used?)
- determine transducer angle in hull (for processing)
- alert OPS to any warnings or problems

(2) after installation, monitor daily: note problems

(3) if indicated: examine additional datasets

Normally, we do not regularly see the raw data or even the processed data from sea; only the emailed (averaged) data snippet, plots, and diagnostics

Rob Brown: post-processing exceptions

- funded by NSF to do the final processing of GO-SHIP (was "CLIVAR") ADCP data

- personal scientific interest in Equatorial Pacific currents: pro-bono/QC processing of TAO

- colleagues are using the Ron Brown

Summary: If it's not a GO-SHIP cruise, or a TAO cruise, we will probably not be doing the final post-processing of the data. However, we have documentation, software, an email address, occasional processing workshops, and a sincere desire to help.

email: uhdas@hawaii.edu

Examples

At-sea web page:

http://currents.soest.hawaii.edu/uhdas_fromships/kilomoana_atseaweb/index.html

Table of live ships reporting:

http://currents.soest.hawaii.edu/uhdas_fromships.html

Documentation:

http://currents.soest.hawaii.edu/docs/adcp_doc/index.html

Concerns: Accurate Heading Required

- ADCP requires accurate heading (or ocean currents have cross-track errors when underway)
- 1 degree heading error = 0.1m/s velocity error
  - Cross-track direction
  - About ½ of open ocean speeds
- Mahrs (mostly) failed late RB1503
- POSMV has never worked well
- Reports: 2013, 2015

Concerns:
Interaction with other sonars

- ADCP data requires lots of pings (averaged)

- UHDAS edits out acoustic interference but

    <u>only if asynchronous (not triggered)</u>

- Synchronized pinging "can work" but is

    not be a perfect solution

The Ron Brown has a history of free-running the ADCP during most cruises; excellent approach

Summary

- UHDAS is joining the NOAA fleet

- University of Hawaii ADCP group has a long and productive history with the Ron Brown

- Goals

  - Enhance the utility of ADCP data within

    the framework of existing needs

  - Play well together

  - Successful cruises, good data, happy participants