UHDAS:
Raising the Profile of Ocean Currents

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Ron Brown Users Meeting FY16

Terminology:
ADCP:
Acoustic Doppler Current Profiler

UHDAS:
University of Hawaii Data Acquisition System
Ocean Currents from ADCP

Time, ADCP, Position, Attitude

primitive (raw) data

UHDAS
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 = 0.1 m/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 only if asynchronous (not triggered)
- 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