

DISCOVER THE OCEAN. UNDERSTAND THE PLANET.

OCEAN
NETWORKS
CANADA

DATA QUALITY ASSURANCE/ QUALITY CONTROL APPROACHES FOR COASTAL OCEAN MULTI- PARAMETER DATA FROM A CABLED OBSERVATORY IN THE NORTHEAST SUBARCTIC PACIFIC

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AN INITIATIVE OF  University
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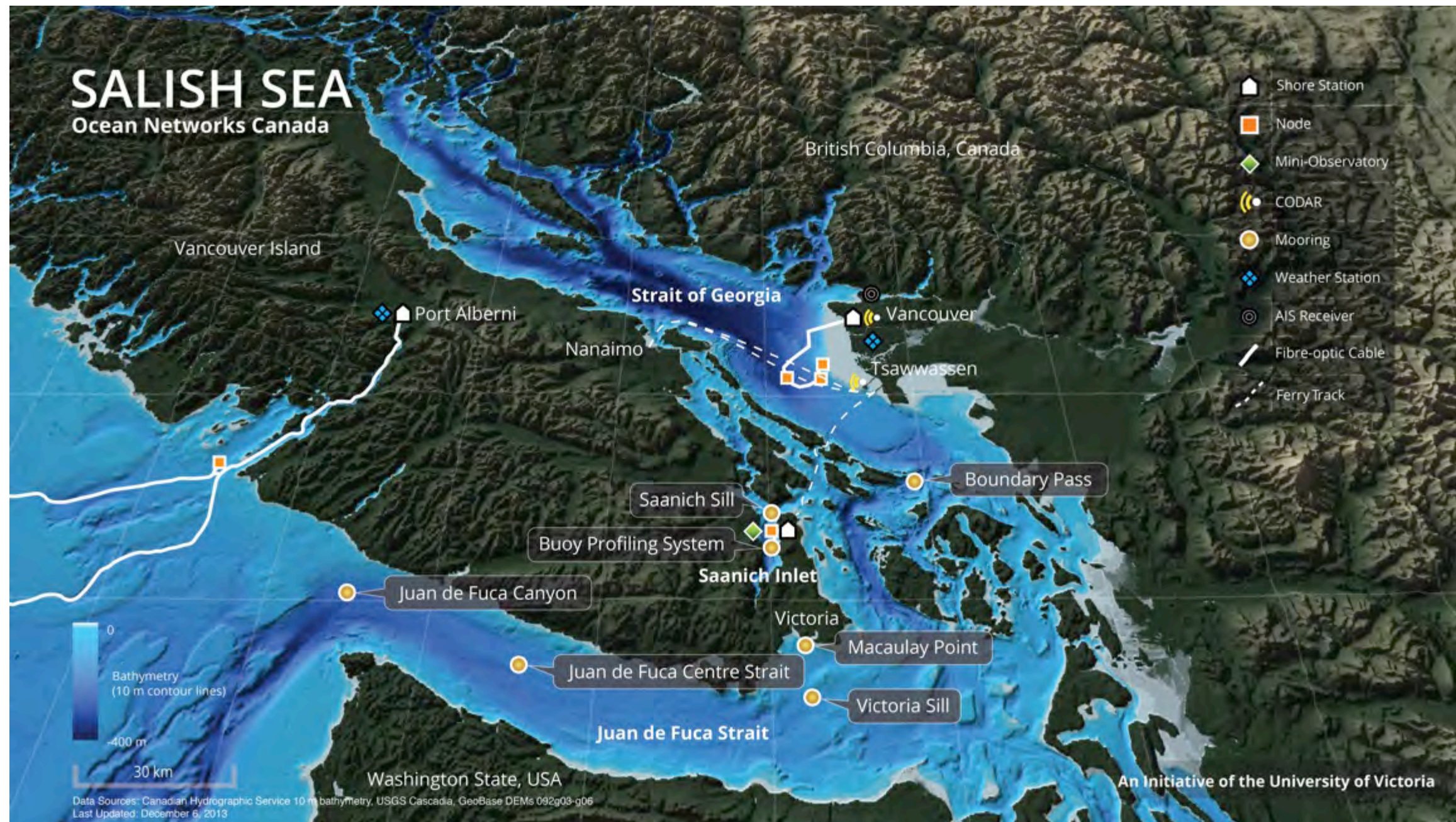
TALK OUTLINE

1. Introduction to Ocean Networks Canada (ONC)
2. Current practises for data QAQC
3. Current Instrument testing and calibration protocols
4. Current approaches to identify and account for data quality issues
5. Future direction of ONC QAQC best practises

INTRODUCTION TO ONC

- Located in North East Pacific
 - Neptune and VENUS Observatories
 - Community Observatories
 - Land-based Observatories (HF Radar, Met stations, AIS, cameras)
- Currently deployed
 - Over 180 instruments operating 24/7/365 in real-time
 - 25+ underwater stationary instrument sites
 - 16 coastal sites, plus 7 land-based sites
 - 5+ Mobile sites – BC Ferries, Vertical profiler, Citizen Science
- Approximately 300 GB daily, available on internet in near real-time (<http://dmas.uvic.ca>)

SALISH SEA



COMMUNITY OBSERVATORIES



ONC BEST PRACTISES

WHY?

- To produce accurate and reproducible data sets
- To deliver the best quality data to support research and decision making
- To provide future studies with accurate, baseline data

HOW?

- Process oriented workflow throughout device life cycle
- Accurate metadata for device, deployment, data
- Detailed documentation on device, deployment, data product
- Proper delivery of data and metadata to end user

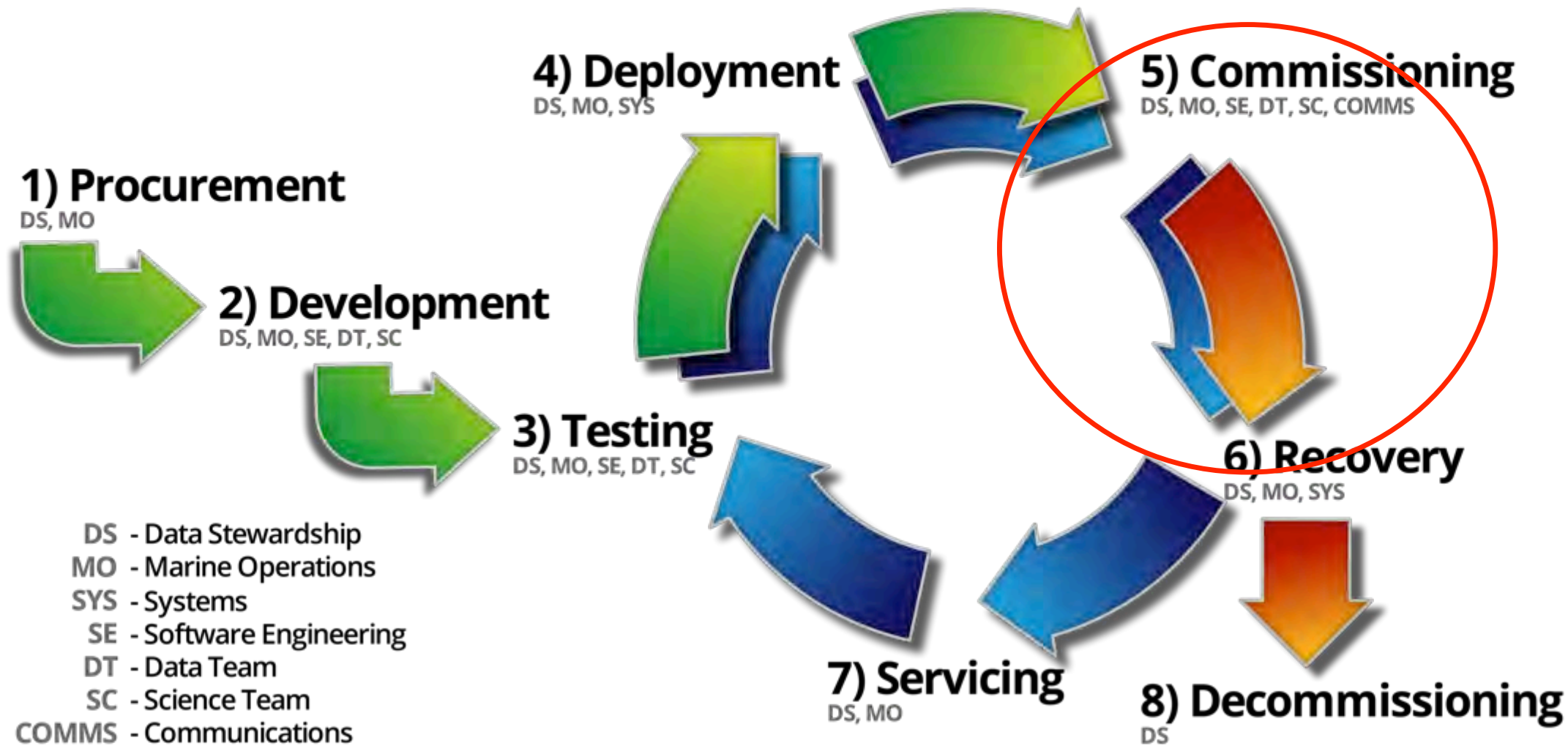
ONC BEST PRACTISES OVERVIEW

Considers instrument preparations, data archival, data quality, and data distribution

- Documented and consistent instrument settings
- Consistent naming of archived files
- Documented and consistent data quality control practises
- Documented and consistent data products and data delivery mechanisms
- Consistent with international standards where applicable

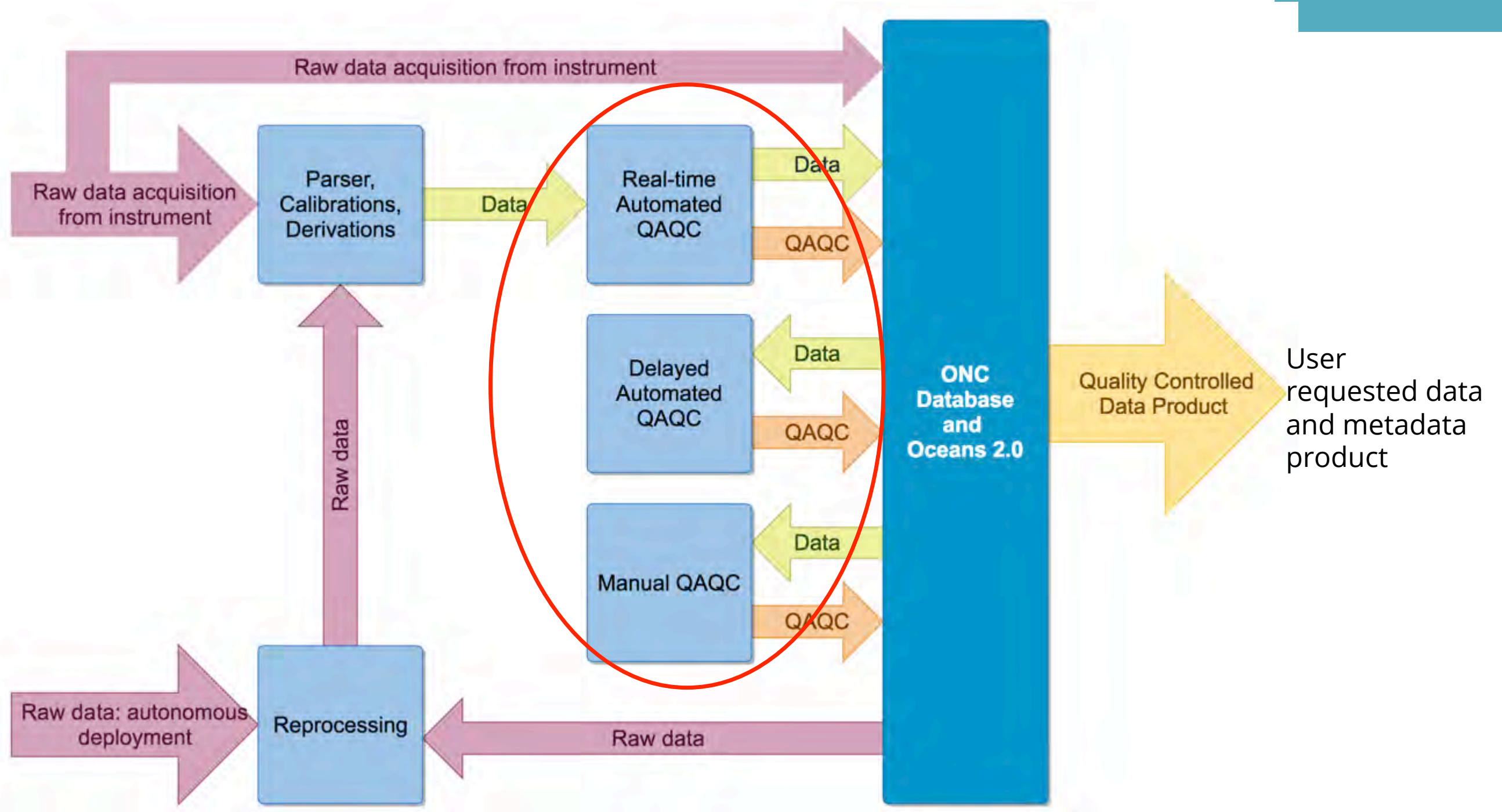
KEYWORDS: **Documentation** and **Consistency**

DEVICE LIFECYCLE



- DS - Data Stewardship
- MO - Marine Operations
- SYS - Systems
- SE - Software Engineering
- DT - Data Team
- SC - Science Team
- COMMS - Communications

QAQC DATA MODEL



ONC QAQC ADOPTED STANDARDS

- QARTOD – Quality Assurance of Real-Time Oceanographic Data
 - Part of US IOOS DMAS core services
 - Establishes best practises for real-time QAQC for a variety of instrumentation
 - Use known climatological values or analysis based values for automated QAQC
- ARGO data quality flags
 - 0 – No Quality Control
 - 1 – Data deemed good
 - 2 – Data deemed probably good
 - 3 – Data deemed probably bad
 - 4 – Data deemed bad
 - 7 – Averaged, clean data (ONC Defined)
 - 8 – Interpolated
 - 9 – Missing value

BEST PRACTISES: MOVING AHEAD

- Systematically evaluate historical data for:
 - Properly assigned QAQC values
 - Adequate metadata for reproducibility
 - Identify data that needs corrections
 - Update automated QAQC test values
- Publish data sets of interest for researchers
 - Follow standards for DOI
 - Dataverse repositories
- Update from FGDC to ISO 19115 metadata standard
 - In progress

BEST PRACTISES: INSTRUMENTATION

- Source instruments that are widely respected in the scientific community
- Adhere to manufacturer's recommended calibration schedule
 - Regular contact with manufacturers is key
- Consider the deployment site in choice of instrument – Science/Resaercher
 - Scale of phenomena
 - turbidity, currents etc
- Consider all aspects of deployment
 - Frame material, connectivity, available power,
 - Instrument interference or contamination issues

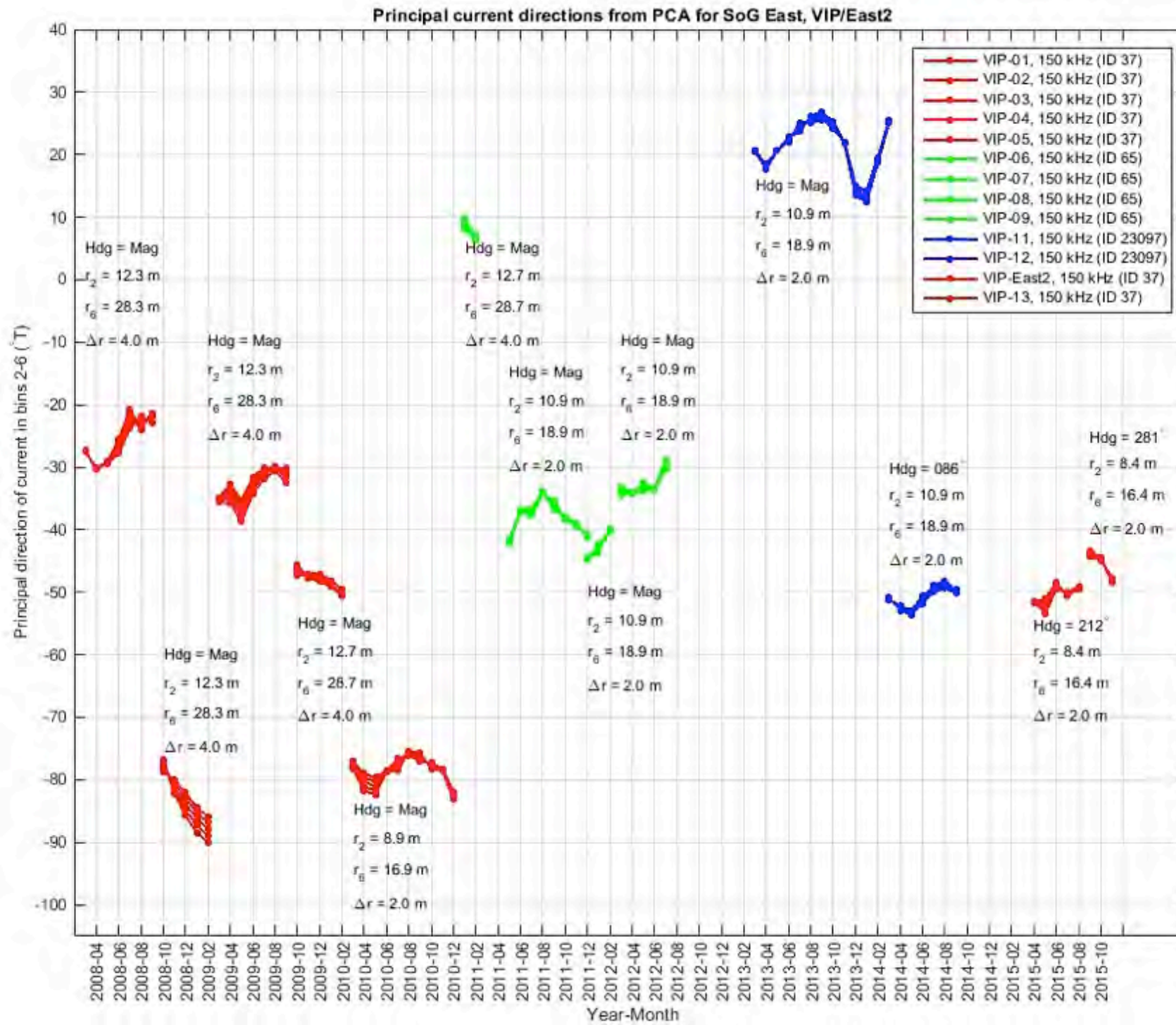
BEST PRACTISES: INSTRUMENTATION

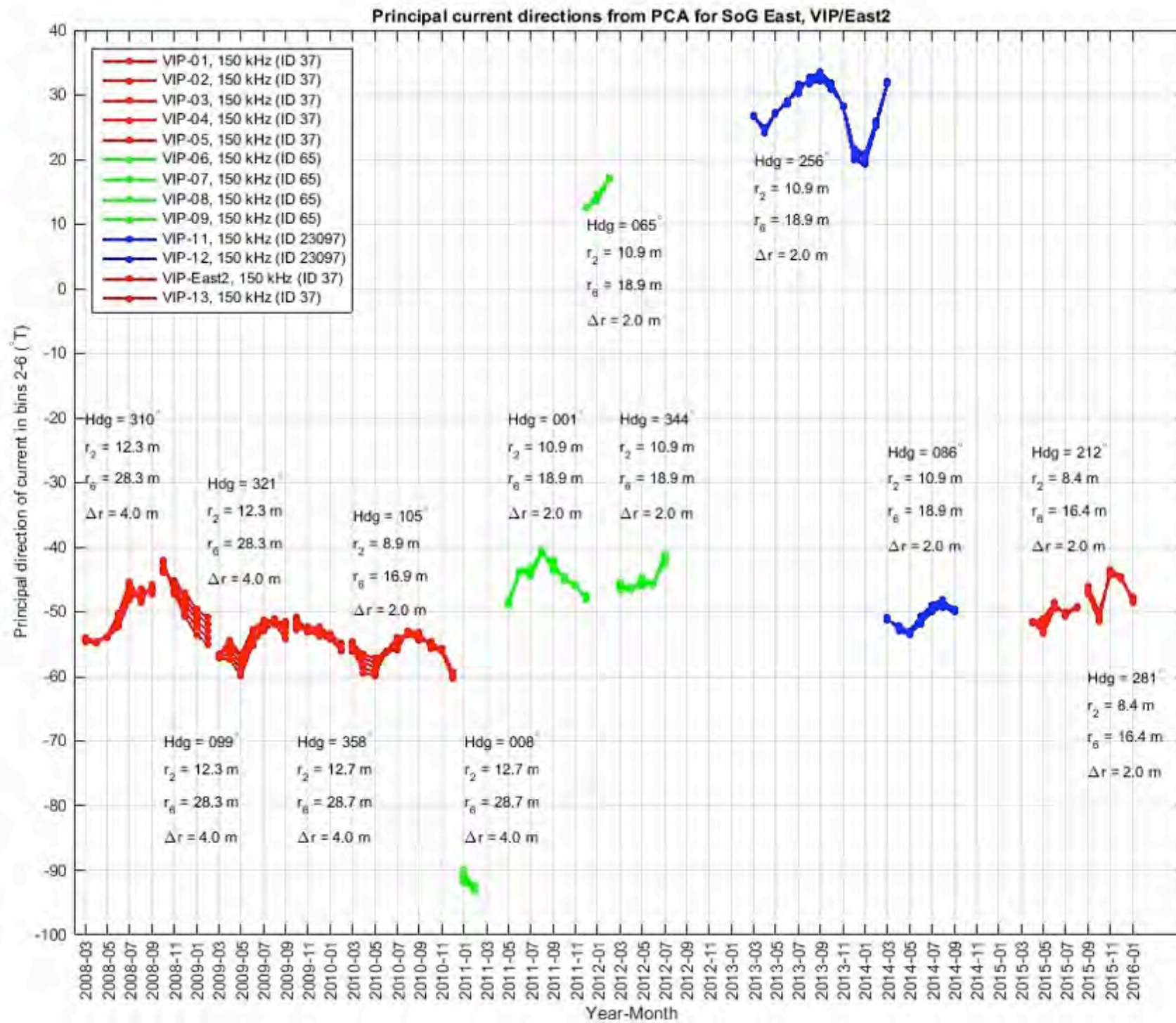
CURRENT

- Identify instrumentation that benefit from 2-point calibrations
 - Optodes, Fluorometers
- Introducing monuments for bottom instruments

NEAR FUTURE

- Create testing process for every type of device
 - Camera installations
 - Hydrophone arrays
- Install reference instrumentation in test tanks
 - Current practise is comparison methods





BEST PRACTISES: REVIEW

- Delivering high quality data is the responsibility of the entire organization
- **Documentation** and **consistency** is key throughout entire device life-cycle, QAQC workflow and organizational processes
- Adhere to international standards for **interoperability** when possible for both data and metadata

BEST PRACTISES: REVIEW

- Document instrument/platform failures
- Learn from past mistakes
- Listen to users!

THANK YOU FOR YOUR ATTENTION.

ANY QUESTIONS?

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