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Bureau of Meteorology

ISAR in Australia

ISFRN Workshop

17th – 18th September 2020

Nicole Morgan, Helen Beggs and Janice Sisson |
18/09/2020

ISAR operations in Australia

CSIRO

- Nicole Morgan

Australian Bureau of Meteorology

- Helen Beggs
- Janice Sisson
- Joel Cabrie

ISAR operations in Australia

CSIRO - ISAR5D_010

- Installed on RV Investigator since 2014
- Completed 44 voyages to date
- 829 days of data

CSIRO - new ISAR

- On order

Australian Antarctic Division

- To be installed on RSV Nuyina (expected delivery mid 2021)

ISAR data storage

CSIRO

https://marlin.csiro.au/geonetwork/srv/eng/catalog.search#/metadata/bdf91f86-2968-4711-873e-2761383bb207

IMOS QC

http://thredds.aodn.org.au/thredds/catalog/IMOS/SOOP/SOOP-ASF/VLMJ_Investigator/meteorological_sst_observations/20XX/ISAR-QC/catalog.html *XX = Year (2015, 2016, 2017, 2018, 2019)

IMOS Real time

http://thredds.aodn.org.au/thredds/catalog/IMOS/SOOP/SOOP-ASF/VLMJ_Investigator/meteorological_sst_observations/catalog.html

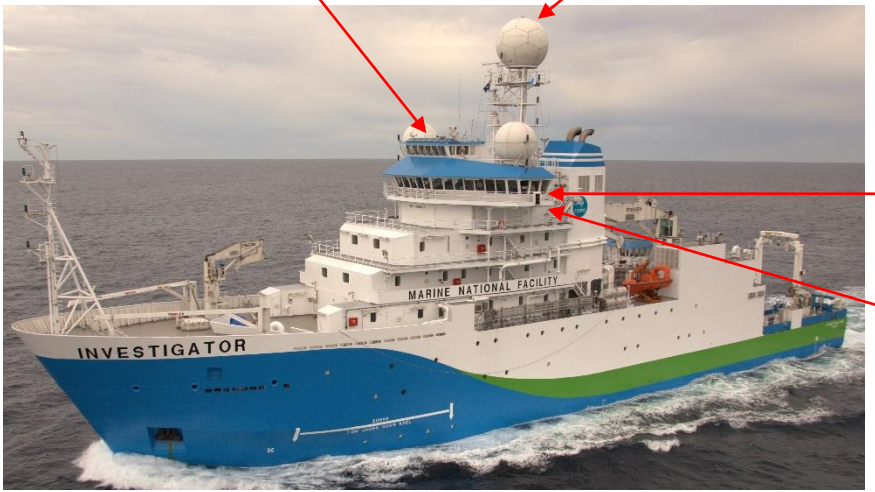
Ifremer

eftp.ifremer.fr

Meteorological Suite on RV Investigator

PORT & STARBOARD
Precision Infrared Radiometer (PIR)
Precision Spectral Pyranometer (PSP)
Photosynthetically Active Radiation (PAR)

Weather Radar



ISAR

Barometer

Meteorological Suite on RV Investigator 2

- Port & Starboard Temperature & Relative Humidity Sensors
- Port & Starboard Wind Sensors
- Disdrometer
- Ultrasonic Wind Sensor
- Port & Starboard Siphoning Rain Gauges
- Barometer

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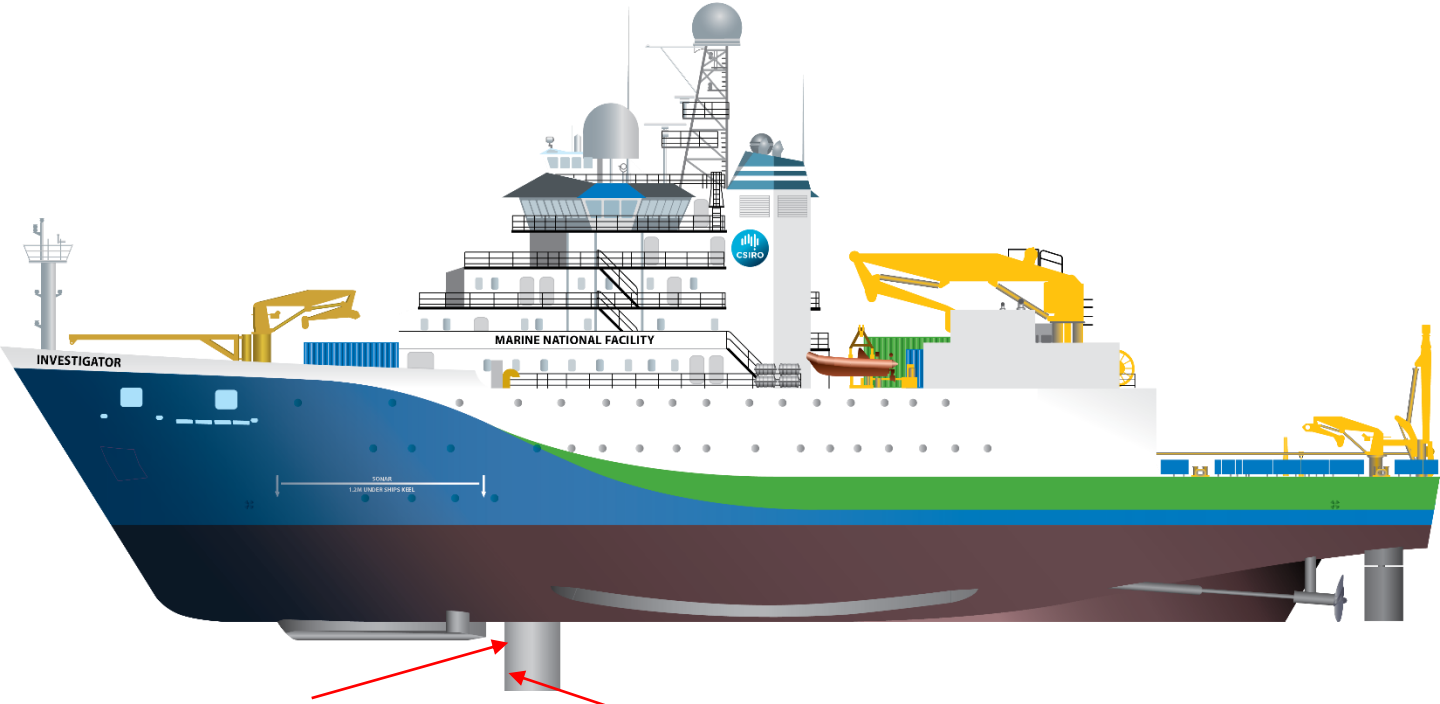
Meteorological Suite on RV Investigator 3



Meteorological Suite on RV Investigator 4

The depth below the water of the SBE38 temperature probe will vary throughout a voyage

Drop Keel Location	Depth (SLL)
Flush with hull	6.20m
Flush with gondola	7.39m
2m extended	8.20m
4m extended	10.20m

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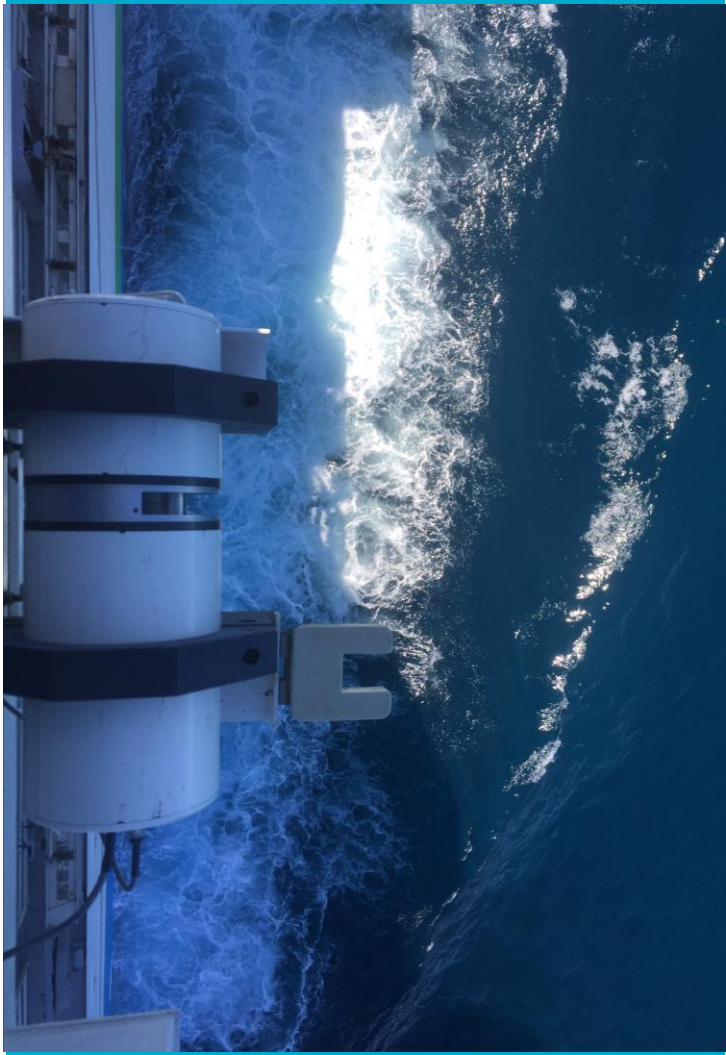
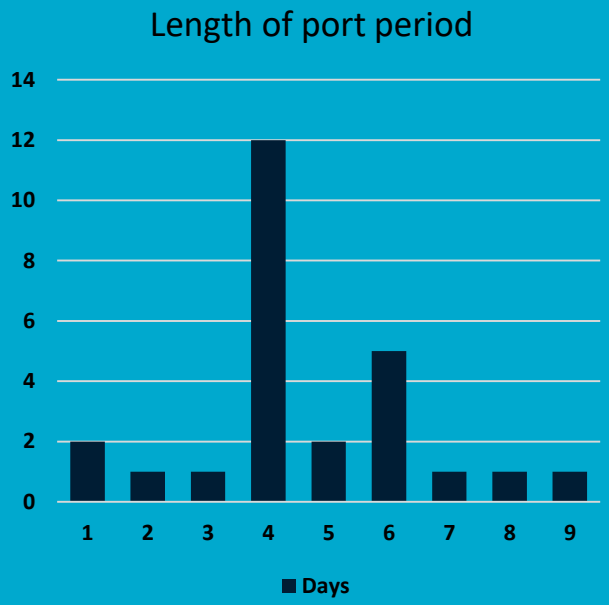
Issues experienced

- Mounting location



Issues experienced

- Mounting location
- Short turn around times between voyages

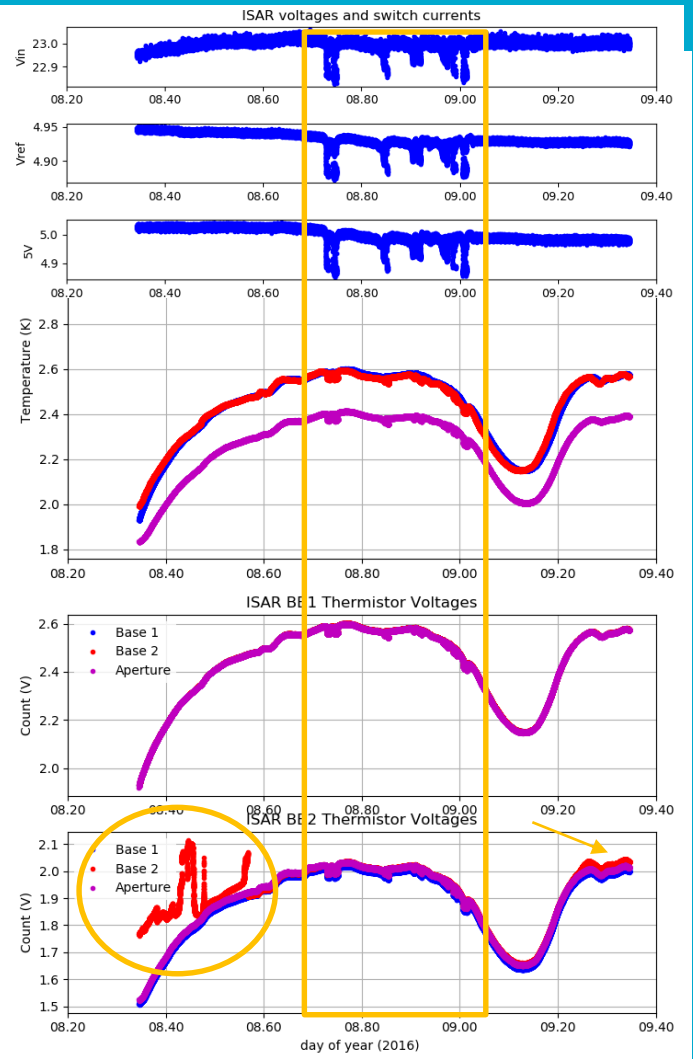


Issues experienced

- Mounting location
- Short turn around times between voyages
- Inability to calibrate for cold climates

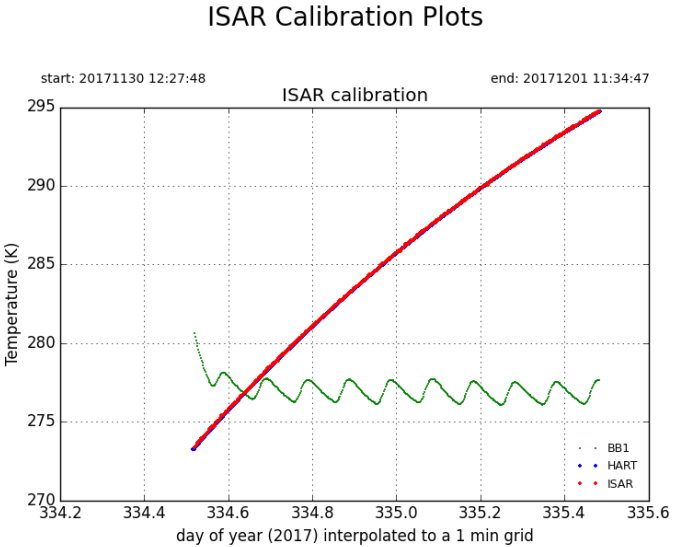
Issues experienced

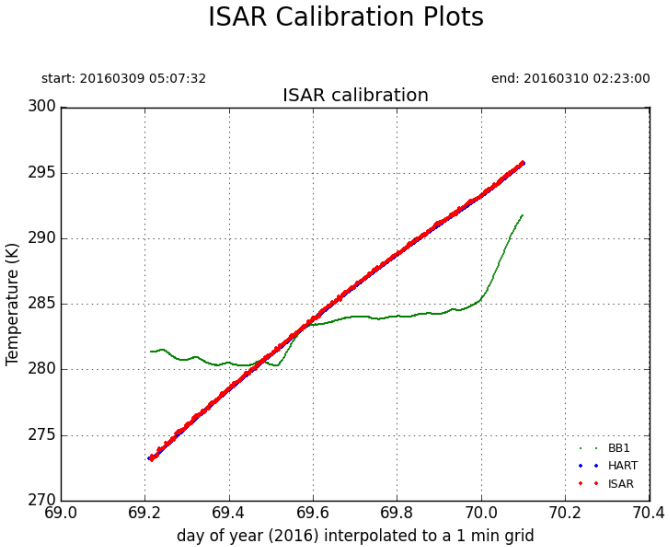
- Mounting location
- Short turn around times between voyages
- Inability to calibrate for cold climates
- Noise on thermistor measurement circuit



Future plans

- Environmental test chamber for calibrations





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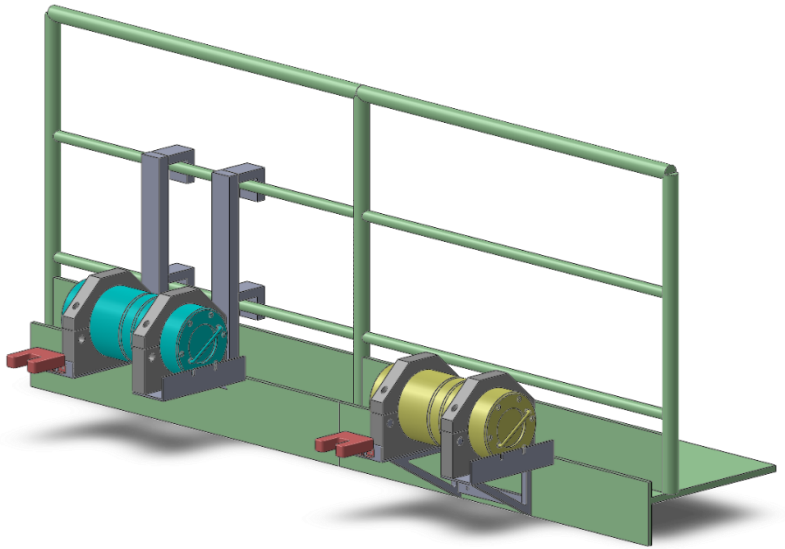
Future plans

- Environmental test chamber for calibrations

- ISAR side by side comparison



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Future plans

- Environmental test chamber for calibrations
- ISAR side by side comparison
- Domestic Collaborations

Australian Government
Department of Industry, Science, Energy and Resources
National Measurement Institute

Australian Government
Department of the Environment and Energy
Australian Antarctic Division

Future plans

- Environmental test chamber for calibrations
- ISAR side by side comparison
- Collaboration with National Measurement Institute
- Ongoing ISAR data from Investigator

https://www.cmar.csiro.au/data/underway/

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Thank you

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National Facilities and Collections

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IMOS Ship SST Automated QC

- BoM employs an automated QC method based on SAMOS (http://samos.coaps.fsu.edu) QC for all IMOS ship meteorological and SST measurements
- Tests in order of application for VLMJ:
  1. Verify existence of time, lat, lon for every record
  2. Flag data not within physically possible bounds
  3. Flag non-sequential and/or duplicate times
  4. Flag positions where vessel over land
  5. Flag unrealistic vessel speeds
  6. SST only: Flag data measured when port drop keel not extended
  7. SST only: Climatology test (SST more than 3K above/below Bureau's most recent SST analysis in vessel location – either RAMSSA or GAMSSA)
  8. Flag data failing statistical test: flag step, discontinuity or spike (at daily QC)
- Once any datum's flag is changed, it will not be altered further by any subsequent test.

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Merge of re-processed ISAR with co-located meteorological data

- ISAR observation time matched to closest meteorological time.
- Upper time-limit of 1 minute for time-match otherwise ship has moved on.
- Manual QC of merged files - flag failed sensors, remove un-navigated observations, de-spike selected meteorological variables.
- QC of re-processed radiometric sea temperature is via total uncertainty.
- Real-time bulk sea temperatures passing all except climatology, statistical tests sent to GTS (FM13 SHIP, FM62 TRACKOB, BUFR proposed). ISAR not sent to GTS.
- Real-time ISAR, bulk SST, meteorological data uploaded to AODN daily.
- Post-cruise, merged re-processed ISAR and meteorological files supplied to AODN.