data summary

Southern Surveyor Voyage ss2011_t04

CSIRO

MARINE NATIONAL FACILITY

Table of Contents

Table of Contents 2
ss2011_t04 3
Title 3
Principal Investigators 3
Ports 3
Date 3
Voyage Track 4
Underway Data 4
Completeness and Data Quality 5
Processing Comments 5
Final Underway Data 7
References 7

ss2011_t04

Title

“ 2,000 years of oceanic history offshore southern Australia *in combination with* **National upper slope seabed multi-beam mapping and ecological interpretation**

Principal Investigators

Prof. Patrick De Deckker (Chief Scientist) –

Australian National University, Research School of Earth Sciences, ANU,

Canberra ACT 0200

Ports

Original schedule (local time):

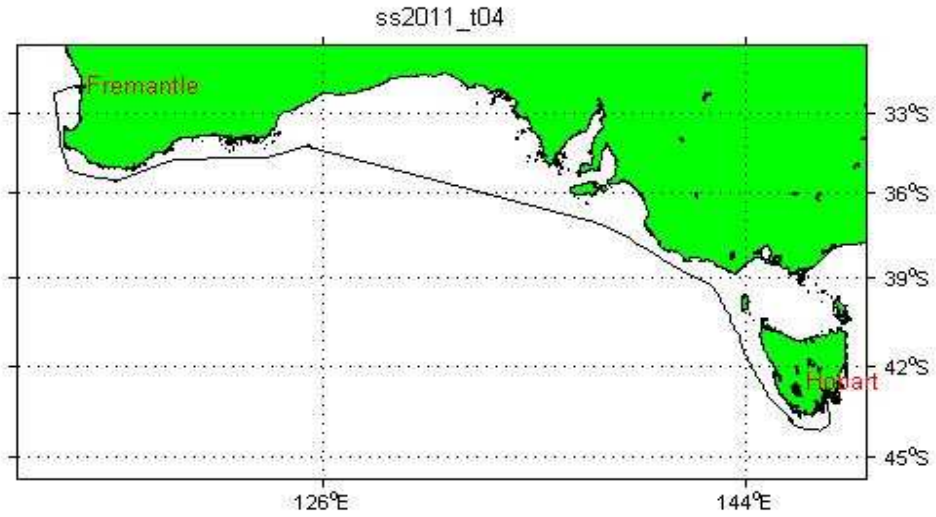
Depart Fremantle 1600hrs, Thursday 10 November 2011Arrive Hobart 1400hrs,

Sunday 20 November 2011 and demobilize

Date

10-Nov-2011 08:07:30 to 20-Nov-2011 02:15:35 (UTC)

Voyage Track



Underway Data

Navigation data is acquired using the Seapath 200 position and reference unit, which is also differentially corrected by data from the FUGRO DGPS receiver.

The Meteorological data consists of 2 relative humidity and temperature sensors; a barometer, wind sensor, and licor light sensor.

Thermosalinograph data is acquired with a Seabird TSG and remote temperature by SBE 3T. Data from a flow meter is also recorded.

Digital depth data is recorded from a Simrad EK60 sounder. Echograms are also recorded using SonarData's Echolog software. Digital depth data can be re-picked using SonarData's Echoview software.

Data from "IMOS" (Integrated Marine Observing System) sensors are also included. The sensors are port and starboard radiometers and pyranometers, wind speed and direction; rain and rainrate.

See Electronics report for this voyage for instruments used and their serial numbers.

Navigation, meteorological, thermosalinograph, IMOS and depth data are quality controlled by combining all data from hourly recorded files to 5 second values in a netCDF formatted file. The combined data is referred to as "underway data".

A combined file was made on 16-Feb-2012 by running a Java application, written by Lindsay Pender of CMAR, UwyMerger version 1.3 with data time range of 10-Nov-2011 08:07:30 to 20-Nov-2011 02:15:35 (UTC).

Completeness and Data Quality

Navigation data (latitude and longitude, speed over ground, ship heading and course over ground); meteorological data (port and starboard air temperature, port and starboard humidity, wind direction and speed, maximum wind gust, light, atmospheric pressure, uncorrected wind direction, rain and speed) and IMOS data (port and starboard radiometers, port and starboard pyranometers, derived wind direction and speed, uncorrected wind direction and speed, rain and rain rate), thermosalinograph (salinity and water temperature) data and depth data were evaluated and quality controlled.

Processing Comments

A number of minor discrepancies between the port and starboard air temperature sensors were noted (max differences of about 0.9 degrees, otherwise both sensors gave very close reading with the mean absolute difference of about 0.03 degrees). These occurred usually during periods of rapid temperature increase or decrease. Investigation of these indicated that they have usually occurred when the ship was stationary with little wind or during/following periods of rainfall. This phenomenon has probably come about due to the rapid warming of air due to the ship becoming stationary or cooling of the air temperature due to the evaporation of the rain water around the sensor housing. It is unclear as to why there should be a notable temperature differential between the port and starboard temperature sensors.

A similar discrepancy (max differences of about 7.6%) between the port and starboard humidity sensors was observed. It should also be noted that the starboard humidity sensor appears to consistently give a higher humidity reading with the mean absolute difference of about 0.81%. The recorded values appear to be within instrument tolerance.

A number of rapid temperature changes were noted (e.g. rise or drops of around 3 degrees during a short period of time) for both port and starboard temperature sensors.
These rapid temperature changes were most likely due to the warming up effect of the ship's metal structures and/or the engine exhaust blowing over the sensors, when the wind is blowing on the stern of the ship or the ship is stationary with little wind or being hit by a cold/warm front. The sensor values for the ship speed, uncorrected wind direction, wind speed and port/starboard temperature were closely examined for correlation and the following two conditions were indentified as usually prevalent during the periods of rapid temperature changes (in particular temperature rise):

1) The ship stationary with no or low wind speed in the region of 5 knots blowing on the stern (i.e. uncorrected wind direction around 135 to 225 degrees).
2) The ship cruising at about 8-10 knots with wind speed in the region of 10-40 knots blowing on the stern (i.e. uncorrected wind direction around 135 to 225 degrees).

Periods of rapid changes are suspect for reasons highlighted above, otherwise the data is good.

The courseOG values when the ship is stationary are not true values as the ship is not travelling a course however this is a feature of the current acquisition system. The QC flags

have been set as good however this feature should be noted if the values during the stationary periods are to be used.

It was noted that IMOS starboard Radiometer recordings were mostly about 1.83 (W/m^2) greater than the port Radiometer recordings throughout the voyage.

The IMOS rain and rainRate were bad due to bad instrument connection. Therefore the whole data have been set to NaNs with their QG flags set to {'bad','none','operatorFlagged'}. The following text was extracted from the voyage electronics report in relation to this issue. ["It was noticed on November 18 when quite deal of rain fell that there was no rainfall displayed on the system. Further investigation showed that the Syphon Rain Gauge was working ok but was not being displayed. The Optical Rain Gauge however was not sending out a data stream. Efforts were made to restart the controller software for this sensor with no result. A power cycle also failed to re-start the instrument. It seems that the problem is most likely in the electronics package up the foremast. A task for the Hobart Port period."]

The depth data was re-picked using Myriax Echoview software. According to the voyage DAP report " A problem was detected in the 12kHz sounder logging where for the period covering all of 12, 13 and up to 11:45 of 14/11, the EK60 acquisition display indicated that recording was on but in fact no data was being recorded. This problem could not be replicated." Therefore there are periods without depth data and where it could not be QCed, it has been set to NaNs. The notable approximate periods without QCed depth data are listed below:
10-Nov-2011 15:16:30 to 10-Nov-2011 16:22:30
10-Nov-2011 17:43:45 to 10-Nov-2011 19:25:20
11-Nov-2011 12:51:20 to 13-Nov-2011 07:15:20
13-Nov-2011 23:20:10 to 14-Nov-2011 11:46:35
17-Nov-2011 00:27:25 to 17-Nov-2011 01:33:25
17-Nov-2011 20:15:40 to 19-Nov-2011 01:47:50
19-Nov-2011 15:30:25 to 19-Nov-2011 16:56:45

During the processing of recent voyages TSG/CTD calibration runs, the examination of the overlapped salinity plots have shown a notable discrepancy in the TSG salinity relative to the CTD salinity. The investigation of this anomaly has not been conclusive so far. However examination of TSG data has revealed that if the TSG conductivity is advanced by about 30-50 seconds relative to the TSG sensor temperature, when calculating the derived salinity, a significant improvement in TSG salinity relative to the CTD salinity is obtained. Whilst this issue is being investigated further, a conductivity lag correction factor is introduced as part of TSG calibration and utilised for the calculation and processing of TSG salinity. This lag factor is henceforth documented in this processing report.

The CTD calibration data for the primary sensor was obtained from file ss2011_t04006Ctd (i.e. CTD offset and scale factor 0.000288698966477064, 0.999556544031167). This data was then used to derive the TSG salinity calibration against the calibrated CTD data. Using CTD/TSG calibration run in CTD ss2011_t04001Ctd.nc and ss2011_t04010Ctd.nc with a TSG conductivity lag of 30 and 50 seconds respectively, an averaged salinity scaling factor of 0.999739154978439 was calculated for the CTD primary conductivity cell. This scaling

factor along with the average conductivity lag of 40 seconds was applied to the TSG salinity data and the thermosalingraph salinity QC was set to {‘good’ ,‘manually adjusted’,‘no error’}.

Note: All 2011 underway voyage data is acquired and preliminary processed by the TECHSAS and uwyMerger acquisition system respectively. It should further be noted that the following data and their QC flags are not supported in the TECHSAS/uwyMerger acquisition system: maxWindGustDir, maxWindGustDirQC, IMOSMaxWindGust, IMOSMaxWindGustQC, IMOSMaxWindGustDir, MOSMaxWindGustDirQC.

Final Underway Data

The navigation, meteorological, thermosalinograph, IMOS and depth data will be entered into the CMAR divisional data warehouse. All data timestamps are in UTC.

Filename	Parameters	Resolution
ss2011_t04uwy10.csv	latitude, latitudeQC, longitude, longitudeQC, speedOG, speedOGQC, courseOG, courseOGQC, shipHeading, shipHeadingQC, uncorrWindDir, uncorrWindDirQC, uncorrWindSpeed, uncorrWindSpeedQC, waterDepth, waterDepthQC, portAirTemp, portAirTempQC, stbdAirTemp, stbdAirTempQC, portHumidity, portHumidityQC, stbdHumidity, stbdHumidityQC, windSpeed, windSpeedQC, maxWindGust, maxWindGustQC, windDir, windDirQC, PAR, PARQC, atmPressure, atmPressureQC, waterTemp, waterTempQC, salinity, salinityQC, IMOSStbdRadiometer, IMOSStbdRadiometerQC, IMOStbdPyranometer, IMOSStbdPyranometerQC, IMOSRainRate, IMOSRainRateQC, IMOSRain, IMOSRainQC, IMOSWindSpeed, IMOSWindSpeedQC, IMOSWindDir,IMOSWindDirQC, IMOSPortRadiometer, MOSPortRadiometerQC, IMOSPortPyranometer, IMOSPortPyranometerQC, IMOSUncorrWindSpeed,MOSUncorrWindSpeedQC, IMOSUncorrWindDir,IMOSUncorrWindDirQC rain, rainQC	10 seconds
ss2011_t04uwy5min.csv	Ditto 10 second data	5 minutes
ss2011_t04pdr10.csv	latitude, latitudeQC, longitude, longitudeQC, waterDepth, waterDepthQC	10 seconds

References

Subversion repository version of DPG Matlab generic tools 3427
Pender, L., 2000. Data Quality Control flags.
http://www.marine.csiro.au/datacentre/ext_docs/DataQualityControlFlags. Pdf

Processed by: A Sarraf , CSIRO Marine and Atmospheric Research, Hobart, Tasmania, Australia