

data summary

Southern Surveyor Voyage ss2013_v04
Underway Processing



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ss2013_v04

Title

“Observations of remarkable eastward flows and eddies in the subtropical southeast Indian Ocean”

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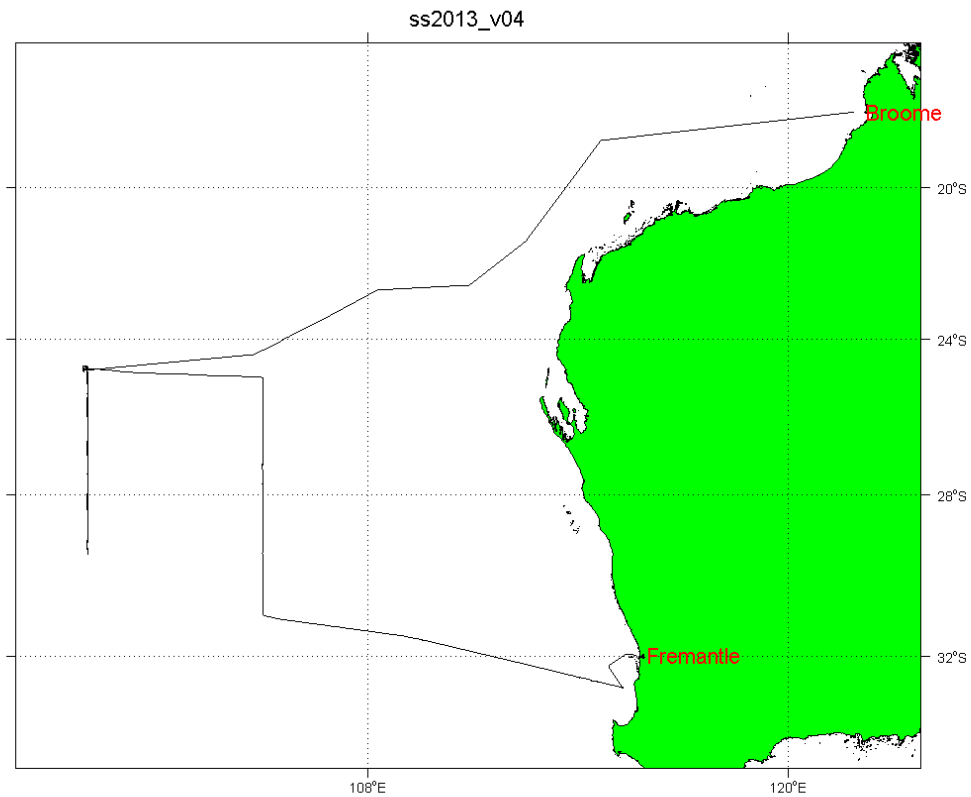
Ports

Depart: Fremantle 1800hrs on Monday 1st July 2013
Arrive: Broome 0800hrs on Friday 26th July 2013

Date

04-Jul-2013 04:30:05 to 25-Jul-2013 19:59:25 (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.

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.

Navigation, meteorological, thermosalinograph, IMOS and depth data are preliminary 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 August 2013 and final by running a Java application, written by Lindsay Pender of CMAR, UwyMerger version 1.8.0 with data time range of 04-Jul-2013 04:30:05 to 25-Jul-2013 19:59:25 (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 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 1 degrees, otherwise both sensors gave very close reading with the mean absolute difference of about 0.07 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 the ships metal structure and air due to the ship becoming stationary or cooling of the air temperature due to the ship speeding off from stationary or due to the evaporation of rain water around the sensor housing. It is unclear as to why there should be a temperature differential between the port and starboard temperature sensors.

A similar discrepancy (max differences of about 5.6%) between the port and starboard humidity sensors was observed. It should also be noted that the port humidity sensor appears to give a lower with the mean absolute difference of about 0.84%. The recorded values are within instrument tolerance.

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.

The optical rain sensor (which provides IMOSRain and IMOSRainRate) was not functional during this voyage. Therefore IMOSRain and IMOSRainRate have been set to NaNs and their QG flags set to {'bad','none','operatorFlagged'}.

The main mast rain gauge data (syphon rain gauge) has been accepted as good.

The main mast wind speed sensor had recorded intermittent erroneous values. These along with the maxWindGust values were NaNed and their QG flags set to {'bad','none','operatorFlagged'}.

It was noted that values recorded by the IMOS port and starboard Radiometer and Pyranometer had a mean absolute difference of 2.06 and 13.42 W/m² respectively and in particular the port Radiometer values were mostly smaller than the starboard sensor.

Due to hardware incompatibility between the remote temperature sensor probe and the newly refurbished TSG, a new acquisition mechanism was improvised during the voyage. The sea

surface temperature (i.e. waterTemp in UWY data set) was recorded via the CAP (CTD acquisition software) system. This data was then spliced into the underway data set (i.e. waterTemp). Any gap in the data is set to NaNs and its QC flag set to {'bad','none','hardwareError'}. Any erroneous waterTemp values (e.g. spikes) has been NaNed and its QC flag set to {'bad','none','operatorFlagged'}.

The major gaps in the waterTemp data are approximately from start of the voyage to 10-Jul-2013 21:25:25
11-Jul-2013 05:54:50 to 11-Jul-2013 06:39:45
12-Jul-2013 08:14:30 to 12-Jul-2013 09:01:10
12-Jul-2013 13:55:00 to 14-Jul-2013 06:54:20
14-Jul-2013 23:31:10 to 14-Jul-2013 23:54:50
15-Jul-2013 06:09:30 to 15-Jul-2013 06:54:05
16-Jul-2013 06:43:00 to 16-Jul-2013 07:31:45
16-Jul-2013 07:38:40 to 16-Jul-2013 08:27:25
16-Jul-2013 14:12:50 to 16-Jul-2013 14:57:25
17-Jul-2013 06:58:25 to 17-Jul-2013 07:10:55
18-Jul-2013 01:48:05 to 18-Jul-2013 06:47:50
19-Jul-2013 17:41:15 to 19-Jul-2013 18:35:05
20-Jul-2013 12:28:45 to 20-Jul-2013 13:06:25
20-Jul-2013 17:21:20 to 20-Jul-2013 17:48:20
21-Jul-2013 11:36:30 to 21-Jul-2013 13:04:30
21-Jul-2013 21:04:50 to 21-Jul-2013 22:07:05
24-Jul-2013 09:48:05 to 24-Jul-2013 12:21:55

Similarly, the major gaps in the TSG salinity data are approximately from start of the voyage to 06-Jul-2013 20:26:55
14-Jul-2013 17:58:10 to 14-Jul-2013 23:56:30

The CTD calibration data for the primary sensor was obtained from the processed CTD file ss2013_v04016Ctd (i.e. CTD offset and scale -0.000685961724944006, 1.00002995761139). This data was then used to derive the TSG salinity calibration against the calibrated CTD data.

Using CTD/TSG calibration run ss2013_v04003Ctd.nc, ss2013_v04015Ctd.nc, ss2013_v04017Ctd.nc and ss2013_v04022Ctd.nc the average salinity scaling factor and conductivity lag of 1.070475507643193 and 12.8834 respectively was calculated against the primary CTD conductivity cell. This was then applied to the thermosalinograph salinity data and the salinity QC was set to {'good', 'manually adjusted', 'no error'}. All erroneous salinity spikes were NaNed and their QG flags set to {'bad','none','operatorFlagged'}

Note: Depth data is no longer processed. The non QCed data is available in the underway data. QCed depth data could be obtained from processed Swath dataset for this voyage. Moreover please note that the EM300 centre beam depth is measured from the transducer rather than below the waterline. The transducer is 6.5m below the waterline.

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 |
|-----------------------|--|------------|
| ss2013_v04uwy10.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, IMOSStbdPyranometer, IMOSStbdPyranometerQC, IMOSRainRate, IMOSRainRateQC, IMOSRain, IMOSRainQC, IMOSWindSpeed, IMOSWindSpeedQC, IMOSWindDir,IMOSWindDirQC, IMOSPortRadiometer, MOSPortRadiometerQC, IMOSPortPyranometer, IMOSPortPyranometerQC, IMOSUncorrWindSpeed,MOSUncorrWindSpeedQC, IMOSUncorrWindDir,IMOSUncorrWindDirQC rain, rainQC | 10 seconds |
| ss2013_v04uwy5min.csv | Ditto 10 second data | 5 minutes |

References

Subversion repository version of DPG Matlab generic tools 3974

Pender, L., 2000. Data Quality Control flags.

http://www.marine.csiro.au/datacentre/ext_docs/DataQualityControlFlags. Pdf

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