

Southern Surveyor Voyage ss2012_v05





Table of Contents

	Table of Contents	.2
ss2	2012_v05	.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	.6
	References	.7

ss2012_v05

Title

"IMOS: Sustained observations of the Timor Passage and Ombai Strait components of the Indonesian Throughflow."

Principal Investigators

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Ports

Original schedule (local time): Depart: Darwin1000hrs, Wednesday 26 September 2012 Arrive: Darwin 0800hrs, Wednesday 10 October 2012

Date

26-Sep-2012 00:39:50 to 09-Oct-2012 03:14:10 (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 7 November by running a Java application, written by Lindsay Pender of CMAR, UwyMerger version 1.8.0 with data time range of 26-Sep-2012 00:39:50 to 09-Oct-2012 03:14:10 (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 1.49 degrees, otherwise both sensors gave very close reading with the mean absolute difference of about 0.033 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 8.6%) between the port and starboard humidity sensors was observed. It should also be noted that the port humidity sensor appears to consistently give a higher humidity reading with the mean absolute difference of about 2.98%. The difference between the port and starboard humidity sensor values is notably larger than the usual and in fact the mean difference exceeds the instrument tolerance which is 1%. Presently it is not possible to ascertain if one or both sensors are faulty (e.g. if one sensor is drifting higher or another is drifting lower). The data from both sensors was therefore suspect due to instrumentation drift. This data has been left in the data set unchanged with its QC flags set to {'suspect', 'none ', 'hardwareError'}.

The instrument measuring IMOSrain and IMOSrainRate was not working during this voyage. Therefore they 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.

A number of rapid temperature changes were noted (e.g. rise or drops of around 3-5 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.

The depth data was re-picked using Myriax Echoview software. Notable periods without QCed depth data are listed below:

From 27-Sep-2012 10:02:20 to 27-Sep-2012 10:31:15 From 27-Sep-2012 11:41:30 to 27-Sep-2012 12:55:35 From 27-Sep-2012 19:39:45 to 28-Sep-2012 02:17:35 From 28-Sep-2012 08:05:15 to 28-Sep-2012 00:045 From 30-Sep-2012 08:45:45 to 30-Sep-2012 09:27:00 From 02-Oct-2012 04:34:15 to 02-Oct-2012 05:38:40 From 03-Oct-2012 19:54:45 to 03-Oct-2012 23:20:55 From 04-Oct-2012 08:22:05 to 04-Oct-2012 12:06:15 From 05-Oct-2012 01:07:15 to 05-Oct-2012 08:57:45 From 06-Oct-2012 06:36:35 to 06-Oct-2012 08:12:05

The CTD calibration data for the secondary sensor was obtained from the voyage CTD processing report (i.e. CTD offset and scale factor of 0.00073142188, 0.99971022). This data was then used to derive the TSG salinity calibration against the calibrated CTD data. Using CTD/TSG calibration run in CTD deployment ss2012_v05001Ctd.nc with a TSG conductivity lag of 50 seconds, an averaged salinity scaling factor of 1.000884991646165 was calculated for the CTD secondary conductivity cell. This scaling factor along with the lag of 50 seconds was applied to the TSG salinity data and the thermosalingraph salinity QC was set to {'good', 'manually adjusted', 'no error'}.

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
ss2012_v05uwy10.csv	latitude, latitudeQC, longitude, longitudeQC, speedOG, speedOGQC, courseOG, courseOGQC, shipHeading, shipHeadingQC, uncorrWindDir, uncorrWindDirQC, uncorrWindSpeed, uncorrWindSpeedOC, waterDepth, waterDepthOC,	10 seconds

	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,	
	IMOSPortPyranometer, IMOSPortPyranometerQC, IMOSUncorrWindSpeed,MOSUncorrWindSpeedQC, IMOSUncorrWindDir,IMOSUncorrWindDirQC rain, rainQC	
ss2012_v05uwy5min.csv	Ditto 10 second data	5 minutes
ss2012_v05pdr10.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

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