**Sagar Nidhi Cruise, SN 120**

**31 May - 27 June, 2017**

Sagar Nidhi started sailing from Chennai port from 1st June 2017 for a 29 day cruise in Bay of Bengal. Total science crew in this cruise (SN 120) is 20 members which include scientists and students from several Indian research labs and academic institutes.


## 1. Objectives and Cruise Outline

SN 120 is conducted as part of INCOIS Ocean Observation Network (OON) program. Main objectives of the 29 day cruise are

a) Vertical Microstcture Profiler (VMP) one day timeseries measurements in south and north Bay of Bengal
b) 12 hour interval measurements along south-north transect which include water sample collection, VMP measurements, and radiosonde launch.
c) Deployment of 9 argo floats, two gliders and testing of the Autonomous Vertical Profiler (AVP)

d) High frequency sampling around BD09 mooring in a butterfly pattern using underway CTD (uCTD), VMP, ship CTD, ASIMET meteorological measurements, ADCP current measurements, radiosonde launch, radiometer measurements etc.

Science crew signed on 31 May and started installing and integrating various scientific instruments in the ship. Pre-cruise activities include fabrication of a pole mount ADCP, setting-up of the ASIMET meteorological sensors in the bow of the ship, installation of the uCTD system, setting up of the radiosonde radar and associated sub-systems. Sagar Nidhi started sailing from Chennai port on 1 June 2017 and the first way point was given at the southern location (11°56' N,83°33' E). We reached at this location by 10:30 UTC on 2 June and did a one day timeseries of VMP at every 3 hour intervals. In addition, we launched radiosonde at every 6 hour intervals and collected water samples. During day time hours between 10 AM and 2 PM, radiometer was also operated.

Once this one day timeseries were done, we started sailing towards north Bay with stoppages at every 12 hours at 05:30 AM and 05:30 PM IST. At these locations we operated VMP, collected water samples and launched radiosonde. Timing of these stoppages were selected such that the diurnal minimum mixed layer prevails in the morning locations while due to the convective mixing during the day time, diurnal maximum mixed layer depths were observed at the evening stoppage locations.

We reached the northern most transect point (20°34'N, 89°03'E) on 8 June 00:14 hours UTC and did a one day timeseries observations at every 3 hour intervals. One CTD cast was done with NIO AVP and INCOIS CTD attached to the CTD rosette to validate the NIO AVP sensors. We finished our south-north transect operations on 9 June. We then sailed south and reached near the BD09 mooring location at 17.6°N, 89.16°E on 10 June 10:30 UTC. We planned a butterfly like pattern with transects from north to south, then to east and from there to west. The north-south and east-west transects lengths were planned as 25 km. The pattern is planned in such a way that the BD09 mooring was located in the south-west corner of the butterfly pattern, roughly 2.5 nm away from the center location. The pole mount ADCP was lowered to take current measurements and continuous uCTD operations were started at 11:00 hours UTC. uCTD profiling timing were fixed such that one profile upto ~120m was done at every 5 minute intervals.

At the butterfly pattern location, we launched radiosonde at every 6 hour intervals irrespective of the location of the ship at that time, and also planned to deploy agro floats at the four corners of the pattern. Everytime the ship reaches the central location, VMP was operated. By 10 June 18:28 hours UTC three argo floats were deployed at the north, south and east corner points of the transects. But then we had to stop all our operations by 18:38 UTC since weather started to pick-up around the BD09 location due to the formation of a depression. Ship was drifting around, heading the weather until 13 June, and then decided to shift the butterfly pattern survey further south, around BD10 mooring. On 14 June 17:40 UTC Sagar Nidhi reached the BD10 location, and started surveying around the mooring in the butterfly pattern. Continuous uCTD profile

measurements at every 5 minute intervals upto ~120 m, radiosonde launch at every 6 hours, and continuous current measurements were done.

On 16 June, four argo floats were deployed at the four corners of the butterfly pattern. On 17 June 2017, 4:30 UTC, survey operations were temporarily halted for the deployment of Seaglider (SG-615), which was launched at 16°33'N, 88°11'E. One CTD cast was done at the location at 05:30 UTC for validating the glider CTD data. On 19 June 2017, a second glider (SG-627) was deployed at 16°41'N, 88°02'E, followed by a CTD cast. After the launch of the second glider, reports came from glider base station at INCOIS that the first glider deployed two days back got some technical glitches and not working. A decision was then taken to stop the activities around BD10, and to proceed to the glider location to recover it. SG-615 was sighted on 21 June 2017 at 04:00 UTC, and recovered by 5:58 UTC.

We sailed back to the BD10 survey location, and resumed our uCTD, ADCP survey by 21 June, 18:00 UTC, which was continued until 23 June 11:00 UTC. One argo float, and a EM-APEX float were deployed at the center of the butterfly location, and then the ship started sailing back to Chennai. For the ADCP data processing purpose, bottom tracking operation was planned to do at shallow depths of 30-40 m. On 26 June at 12:30 UTC, ship reached off Chennai at shallow depths. Pole mount ADCP was again lowered and bottom tracking was completed in 2 hours. Thus all the planned operations onboard were completed and ship started sailing towards Chennai port for a port call.

We reached Chennai port on morning hours of 27 June, and all the science crew signed off in the afternoon. Scientific materials were unloaded in the late evening for transporting to NIOT campus.

## 2. Cruise track

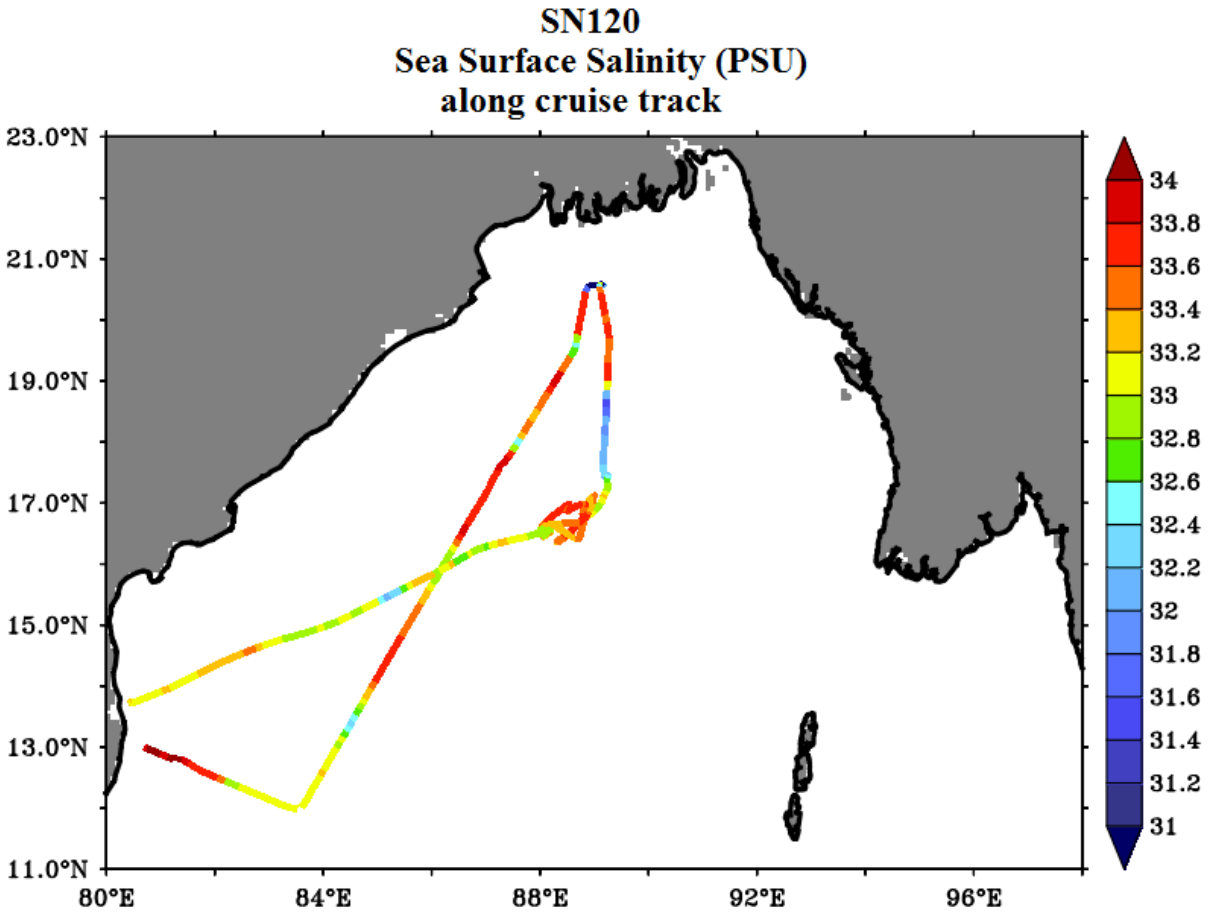


Figure 1: Cruise track of Sagar Nidhi (SN120) voyage during 31 May - 27 June 2017. Color indicates Sea Surface Salinity from TSG

## 3. Operations Timeline

| Sl No | Date (dd/mm/yy) | Time (UTC) | Lat (N) | Lon (E) | Way Point | Activity |
|---|---|---|---|---|---|---|
| 1 | 1-Jun-17 | 5:10:00 | 13° 04.202' | 80° 15.742' | | Ship Started from Chennai Port |
| 2 | 1-Jun-17 | 11:45:00 | 12°48.763' | 81° 13.345' | | Radiosonde Operation started |
| 3 | 1-Jun-17 | 12:10:00 | 12°48.763' | 81° 13.345' | | Radiosonde Baloon released |
| 4 | 1-Jun-17 | 12:00:00 | 12°48.763' | 81° 13.345' | | CTD test started with Dummy Weight |
| 5 | 1-Jun-17 | 13:10:00 | 12°48.764' | 81° 13.346' | | Setting up of Radiometer(ES Sensor) |
| 6 | 1-Jun-17 | 13:30:00 | 12°48.76' | 81° 13.34' | | VMP Operation Started |
| 7 | 2-Jun-17 | 10:30:00 | 11°56.898' | 83° 33.101' | WP1 | Ship Stopped at First Way Point |
| 8 | 2-Jun-17 | 10:50:00 | 11°56.869' | 83° 33.101' | WP1 | Ship CTD deployed |

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|---|---|---|---|---|---|---|
| 9 | 2-Jun-17 | 11:20:00 | 11°56.869' | 83° 33.101' | WP1 | Ship CTD taken back |
| 10 | 2-Jun-17 | 12:00:00 | 11°56.899' | 83° 33.258' | WP1 | Radiosonde Baloon released |
| 11 | 2-Jun-17 | 12:00:00 | 11°56.899' | 83° 33.258' | WP1 | VMP deployed |
| 12 | 2-Jun-17 | 12:10:00 | 11°56.899' | 83° 33.258' | | CTD Cast away tested |
| 13 | 2-Jun-17 | 12:55:00 | 11°56.898' | 83° 33.258' | | CTD cast away First reading |
| 14 | 2-Jun-17 | 14:30:00 | 11°56.894' | 83° 33.073' | | Ship CTD deployed |
| 15 | 2-Jun-17 | 15:20:00 | 11°56.93' | 83° 33.136' | | VMP deployed |
| 16 | 2-Jun-17 | 17:25:00 | 11°56.864' | 83° 33.071' | | Ship CTD deployed |
| 17 | 2-Jun-17 | 18:00:00 | 11° 56.897' | 83° 33.071' | | VMP deployed |
| 18 | 2-Jun-17 | 20:27:00 | 11°56.897' | 83° 33.071' | | Ship CTD deployed |
| 19 | 2-Jun-17 | 21:00:00 | 11°56.965' | 83° 33.187' | | VMP deployed |
| 20 | 2-Jun-17 | 23:26:00 | 11°56.903' | 83° 33.074' | | Ship CTD deployed |
| 21 | 3-Jun-17 | 0:00:00 | 11°56.903' | 83° 33.627' | | Radiosonde Baloon released |
| 22 | 3-Jun-17 | 0:05:00 | 11°56.903' | 83° 33.627' | | VMP deployed |
| 23 | 3-Jun-17 | 2:30:00 | 11°56.896' | 83° 33.068' | | Ship CTD deployed |
| 24 | 3-Jun-17 | 3:15:00 | 11°56.971' | 83° 33.278' | | VMP deployed |
| 25 | 3-Jun-17 | 4:45:00 | 11°57.409' | 83° 34.326' | | IR Thermometer |
| 26 | 3-Jun-17 | 5:19:00 | 11° 56.896' | 83° 33.072' | | Ship CTD deployed |
| 27 | 3-Jun-17 | 6:18:00 | 11°56.896' | 83° 33.068' | | Ship CTD deployed (Rossette deployed) |
| 28 | 3-Jun-17 | 6:46:00 | 11°56.905' | 83° 33.116' | | VMP deployed |
| 29 | 3-Jun-17 | 7:48:00 | 11° 57.471' | 83° 34.121' | | Radiometer deployed |
| 30 | 3-Jun-17 | 8:16:00 | 11° 56.896' | 83° 33.306' | | Ship CTD deployed |
| 31 | 3-Jun-17 | 9:18:00 | 11° 56.977' | 83°33.220' | | VMP deployed |
| 32 | 3-Jun-17 | 11:26:00 | 11° 56.903' | 83°33.071' | | Ship CTD deployed |
| 33 | 3-Jun-17 | 12:00:00 | 11°57.130' | 83°33.177' | | Radiosonde Baloon released |
| 34 | 3-Jun-17 | 12:37:00 | 11°58.529' | 83° 34.288' | | Zooplankton collected |
| 35 | 4-Jun-17 | 0:00:00 | 12°54.506' | 84°10.327' | WP2 | Radiosonde Baloon released |
| 36 | 4-Jun-17 | 0:30:00 | 12°54.522' | 84°10.309' | | Cast away CTD |
| 37 | 4-Jun-17 | 0:30:00 | 12°54.522' | 84°10.309' | | Ship CTD deployed |
| 38 | 4-Jun-17 | 0:45:00 | 12°54.515' | 84°10.310' | | IR Thermometer |
| 39 | 4-Jun-17 | 12:00:00 | 13°51.483' | 84° 47.422' | WP3 | Radiosonde Balloon released |
| 40 | 4-Jun-17 | 12:32:00 | 13°51.981' | 84° 47.867' | | Ship CTD |
| 41 | 4-Jun-17 | 12:45:00 | 13°51.976’ | 84° 47.867’ | | IR Thermometer |
| 42 | 4-Jun-17 | 13:51:00 | 13°51.99' | 84° 47.885' | | Cast away CTD |
| 43 | 4-Jun-17 | 14:02:00 | 13°52.072' | 84° 47.885' | | VMP deployed |
| 44 | 4-Jun-17 | 14:10:00 | 13°52.072' | 84° 47.885' | | Water Sample collected |
| 45 | 5-Jun-17 | 0:00:00 | 14° 48.025' | 85° 24.466' | WP4 | Radiosonde Baloon released |
| 46 | 5-Jun-17 | 0:25:00 | 14°48.678' | 85° 24.678' | | Ship CTD with water sample |
| 47 | 5-Jun-17 | 0:45:00 | 14°48.678' | 85° 24.678' | | IR Thermometer |
| 48 | 5-Jun-17 | 1:30:00 | 14° 48.673' | 85°24.902' | | Cast away CTD |
| 49 | 5-Jun-17 | 1:55:00 | 14°48.92' | 85° 25.194' | | VMP deployed |
| 50 | 5-Jun-17 | 8:30:00 | 15° 20.488' | 85° 46.255' | | Air Moisture trap |
| 51 | 5-Jun-17 | 11:50:00 | 15° 45.64' | 86° 03.357' | WP5 | VMP |
| 52 | 5-Jun-17 | 12:00:00 | 15° 45.64' | 86° 03.357' | | Radiosonde Balloon released |
| 53 | 5-Jun-17 | 12:45:00 | 15° 46.017' | 86° 4.996' | | Cast away CTD |
| 54 | 5-Jun-17 | 12:58:00 | 15° 46.16' | 86° 05.208' | | Ship CTD |
| 55 | 5-Jun-17 | 13:07:00 | 15° 46.065' | 86° 41.577' | | IR Thermometer |
| 56 | 5-Jun-17 | 13:35:00 | 15° 46.16' | 86° 05.406' | | Cast away CTD |
| 57 | 5-Jun-17 | 13:45:00 | 15.7704461° | 86.0941568° | | Zooplankton collection |
| 58 | 6-Jun-17 | 0:00:00 | 16° 42.436' | 86° 40.272' | WP6 | Radiosonde Balloon released |

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| 59 | 6-Jun-17 | 0:05:00 | 16° 42.509 | 86° 40.373' | | VMP |
| 60 | 6-Jun-17 | 1:00:00 | 16°43.944' | 86° 41.439' | | Cast away CTD |
| 61 | 6-Jun-17 | 1:05:00 | 16° 44.148' | 86° 41.580' | | Ship CTD |
| 62 | 6-Jun-17 | 1:21:00 | 16° 44.148' | 86° 41.580' | | IR Thermometer (IR Gun) |
| 63 | 6-Jun-17 | 2:30:00 | 16.7425901° | 86.6961882° | | Zooplankton collection |
| 64 | 6-Jun-17 | 8:25:00 | 17° 28.41' | 87° 09.50' | | Radiosonde Balloon released |
| 65 | 6-Jun-17 | 8:30:00 | 17.476964° | 87.1629522° | | Air Moisture trapping started |
| 66 | 6-Jun-17 | 9:43:00 | 17° 32.815’ | 87° 13.305’ | | VMP Operation Started |
| 67 | 6-Jun-17 | 11:05:00 | 17° 33.820’ | 87° 13.115’ | | Cast away CTD |
| 68 | 6-Jun-17 | 12:00:00 | 17° 34.984’ | 87° 12.331’ | | Radiosonde Balloon released |
| 69 | 6-Jun-17 | 15:30:00 | 17.7867553° | 87.4214385° | | EM_Apex Agro float tested and Sea glider tested |
| 70 | 6-Jun-17 | 23:57:00 | 18° 35.782’ | 87° 58.739’ | WP7 | VMP Operation Started |
| 71 | 7-Jun-17 | 0:00:00 | 18° 35.790’ | 87° 58.784' | | Radiosonde Balloon released |
| 72 | 7-Jun-17 | 0:49:00 | 18° 36.04’ | 87° 59.20' | | Cast away CTD |
| 73 | 7-Jun-17 | 0:59:00 | 18° 36.158’ | 87° 59.369’ | | Ship CTD |
| 74 | 7-Jun-17 | 1:15:00 | 18° 36.169’ | 87° 59.377’ | | IR Thermometer |
| 75 | 7-Jun-17 | 1:40:00 | 18° 36.164’ | 87° 59.377’ | | Zooplankton collection |
| 76 | 7-Jun-17 | 8:30:00 | 19° 28.061' | 88° 33.785' | | Air Moisture trapping started |
| 77 | 7-Jun-17 | 10:10:00 | 19° 31.598’ | 88° 37.549' | | Sighted school of Dolphin |
| 78 | 7-Jun-17 | 10:38:00 | 19.5341153° | 88.6317477° | | Zooplankton collection |
| 79 | 7-Jun-17 | 10:55:00 | 19° 32.368’ | 88° 38.257’ | WP8 | Cast away CTD |
| 80 | 7-Jun-17 | 11:00:00 | 19° 32.368’ | 88° 38.257’ | | VMP winch dead weight test |
| 81 | 7-Jun-17 | 11:25:00 | 19° 32.542’ | 88° 38.343’ | | VMP Operation Started |
| 82 | 7-Jun-17 | 11:40:00 | 19.544461° | 88.639078° | | Water Sample collected |
| 83 | 7-Jun-17 | 12:00:00 | 19° 32.885’ | 88° 38.549' | | Radiosonde Balloon released |
| 84 | 7-Jun-17 | 12:40:00 | 19° 33.039’ | 88° 38.481’ | | IR thermometer |
| 85 | 7-Jun-17 | 13:55:00 | 19° 33.145’ | 88° 38.449' | | VMP winch dead weight test |
| 86 | 7-Jun-17 | 14:10:00 | | | | Sea glider SG615 self test started |
| 87 | 7-Jun-17 | 16:30:00 | 19.8027282° | 88.6834389° | | EM_Apex Agro float test started |
| 88 | 7-Jun-17 | 22:10:00 | 20.5874346° | 88.8535828° | | Mutibeam survery started |
| 89 | 8-Jun-17 | 0:14:00 | 20° 34.951' | 89° 03.445' | WP9 | Radiosonde Balloon released |
| 90 | 8-Jun-17 | 3:40:00 | 20.5947559° | 89.1221626° | | Zooplankton collection |
| 91 | 8-Jun-17 | 3:58:00 | 20.5959058° | 89.1201439° | | Cast away CTD |
| 92 | 8-Jun-17 | 4:09:00 | 20° 35.748' | 89° 07.118' | | Ship CTD |
| 93 | 8-Jun-17 | 4:15:00 | 20° 35.748' | 89° 07.118' | | IR Thermometer |
| 94 | 8-Jun-17 | 6:05:00 | 20° 35.556' | 89° 06.810' | | VMP Operation Started |
| 95 | 8-Jun-17 | 6:08:00 | 20° 35.483’ | 89° 06.743' | | Radiosonde Balloon released |
| 96 | 8-Jun-17 | 6:42:00 | 20° 35.008' | 89° 06.101' | | Radiosonde Balloon released |
| 97 | 8-Jun-17 | 7:08:00 | 20° 34.623' | 89° 05.427' | | Cast away CTD |
| 98 | 8-Jun-17 | 8:30:00 | | | | Air Moisture trapping started |
| 99 | 8-Jun-17 | 9:00:00 | 20° 35.799' | 89° 07.228' | | VMP deployed |
| 100 | 8-Jun-17 | 10:00:00 | 20° 35.728' | 89° 05.929' | | Cast away CTD |
| 101 | 8-Jun-17 | 10:10:00 | 20° 35.762' | 89° 05.807' | | Ship CTD |
| 102 | 8-Jun-17 | 10:40:00 | 20° 35.755' | 89° 05.804' | | Ship CTD hydrographic winch testing with dummy weight for 200m water depth |
| 103 | 8-Jun-17 | 11:05:00 | 20° 35.759' | 89° 05.803' | | Ship CTD frame for hydrographic winch testing |
| 104 | 8-Jun-17 | 12:02:00 | 20° 35.803' | 89° 07.286' | | Radiosonde Balloon released |
| 105 | 8-Jun-17 | 12:12:00 | 20° 34.623' | 89° 07.286' | | VMP deployed |

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| 106 | 8-Jun-17 | 13:02:00 | 20° 36.575' | 89° 06.099' | Cast away CTD |
| 107 | 8-Jun-17 | 13:21:00 | 20° 36.634' | 89° 05.995' | NIO AVP and INCOIS CTD (offline) testing for calibration |
| 108 | 8-Jun-17 | 13:38:00 | 20° 36.636’ | 89° 05.995' | Ship CTD |
| 109 | 8-Jun-17 | 15:05:00 | 20° 35.958' | 89° 06.57' | VMP deployed |
| 110 | 8-Jun-17 | 15:58:00 | 20° 36.647' | 89° 06.332' | Cast away CTD |
| 111 | 8-Jun-17 | 15:59:00 | 20° 36.695’ | 89° 06.276' | Ship CTD |
| 112 | 8-Jun-17 | 17:55:00 | 20° 35.958' | 89° 06.95' | VMP deployed |
| 113 | 8-Jun-17 | 18:00:00 | 20.61602° | 89.09177° | Radiosonde Balloon released |
| 114 | 8-Jun-17 | 19:00:00 | 20° 36.367' | 89° 05.816' | Cast away CTD |
| 115 | 8-Jun-17 | 19:07:00 | 20° 36.390' | 89° 05.747' | Ship CTD |
| 116 | 8-Jun-17 | 21:00:00 | 20° 35.751’ | 89° 07.225’ | VMP deployed |
| 117 | 8-Jun-17 | 22:00:00 | 20° 36.709' | 89° 06.193' | Cast away CTD |
| 118 | 8-Jun-17 | 22:05:00 | 20° 36.709’ | 89° 06.193' | Ship CTD |
| 119 | 9-Jun-17 | 0:04:00 | 20° 35.819' | 89° 07.232' | Radiosonde Balloon released |
| 120 | 9-Jun-17 | 0:04:00 | 20° 35.819' | 89° 07.232' | VMP deployed |
| 121 | 9-Jun-17 | 0:50:00 | 20.6118° | 89.1077° | Cast away CTD |
| 122 | 9-Jun-17 | 1:00:00 | 20° 36.863' | 89° 06.390' | Ship CTD |
| 123 | 9-Jun-17 | 3:00:00 | 20° 35.928' | 89° 07.193' | VMP deployed |
| 124 | 9-Jun-17 | 3:55:00 | 20° 36.590' | 89° 06.646’ | Cast away CTD |
| 125 | 9-Jun-17 | 4:17:00 | 20° 36.711' | 89° 06.423' | Radiometer deployed |
| 126 | 9-Jun-17 | 4:40:00 | 20° 36.763' | 89° 06.269’ | IR Thermometer |
| 127 | 9-Jun-17 | 6:39:00 | 20° 35.807 | 89° 07.112’ | VMP deployed |
| 128 | 9-Jun-17 | 7:24:00 | 20° 35.686' | 89° 06.097' | Cast away CTD |
| 129 | 9-Jun-17 | 7:44:00 | 20° 35.627' | 89° 05.755’ | Radiometer deployed |
| 130 | 9-Jun-17 | 8:05:00 | 20.5927481° | 89.0892114° | Preparation for AVP deployment |
| 131 | 9-Jun-17 | 8:30:00 | 20.59139841° | 89.0813539° | Air Moisture trapping started |
| 132 | 9-Jun-17 | 8:48:00 | 20° 35.440' | 89° 0437785' | Ship CTD |
| 133 | 9-Jun-17 | 11:00:00 | 20.3707704° | 89.1261205° | Predeployment mock test for SG615 carried out |
| 134 | 9-Jun-17 | 12:00:00 | 20° 14.896' | 89° 09.103’ | Radiosonde Balloon released |
| 135 | 10-Jun-17 | 0:00:00 | 18° 37.302’ | 89° 12.497’ | Radiosonde Balloon released |
| 136 | 10-Jun-17 | 4:50:00 | 17.9565626° | 89.1658135° | UCTD training |
| 137 | 10-Jun-17 | 7:05:00 | 17° 36.868’ | 89° 09.268' | AVP deployed |
| 138 | 10-Jun-17 | 8:32:00 | 17.6107° | 89.1558° | Cast away CTD |
| 139 | 10-Jun-17 | 9:30:00 | 17.6091741° | 89.1590914° | Pole mounted ADCP attached to ship deck (starboard side) |
| 140 | 10-Jun-17 | 10:53:00 | 17.6040159° | 89.1539496° | Argo float deployed |
| 141 | 10-Jun-17 | 11:00:00 | 17.5982048° | 89.1528008° | UCTD operation started |
| 142 | 10-Jun-17 | 12:00:00 | 17° 32.584' | 89° 09.268' | Radiosonde Balloon released |
| 143 | 10-Jun-17 | 12:22:00 | 17.525488° | 89.1536708° | SG615 Self-test started |
| 144 | 10-Jun-17 | 13:00:00 | 17° 30 .703' | 89° 09.718' | VMP deployed |
| 145 | 10-Jun-17 | 16:22:00 | 17° 23.88' | 89° 10.38' | Agro deployed |
| 146 | 10-Jun-17 | 18:05:00 | 17.5109894° | 89.2765404° | UCTD operation suspended |
| 147 | 10-Jun-17 | 18:20:00 | 17° 30.647’ | 89° 16.639’ | Radiosonde Balloon released without sensor |
| 148 | 10-Jun-17 | 18:28:00 | 17° 30.40’ | 89° 16.47' | Agro deployed |
| 149 | 11-Jun-17 | 18:35:00 | 17.5058052° | 89.2733335° | All activity suspended due to depression developed around BD09 |
| 150 | 12-Jun-17 | 14:30:00 | | | Meeting conducted to discuss about next plan |

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| 151 | 13-Jun-17 | | | | | Due to high waves in BD09 the replaned to activitities to BD10 |
| 152 | 14-Jun-17 | 5:30:00 | 16.6089235° | 88.2491101° | | Vessel altered her course to new location at northern way point closer to BD10 |
| 153 | 14-Jun-17 | 17:30:00 | 16.5652565° | 88.0359681° | | UCTD operations started at new location |
| 154 | 14-Jun-17 | 18:00:00 | 16° 33.104' | 88° 02.192' | | Radiosonde balloon released |
| 155 | 14-Jun-17 | 19:00:00 | 16.5377708° | 88.045074° | | UCTD halted for VMP operation |
| 156 | 14-Jun-17 | 19:05:00 | 16° 32.329' | 88° 02.865' | WP-15 | VMP Operation Started |
| 157 | 15-Jun-17 | 0:00:00 | 16.4346018° | 88.0585386° | | Radiosonde balloon released |
| 158 | 15-Jun-17 | 4:00:00 | 16° 32.70' | 88°03.77' | | VMP Operation Started |
| 159 | 15-Jun-17 | 4:58:00 | 16.5554° | 88.0789° | | Cast away CTD |
| 160 | 15-Jun-17 | 6:00:00 | 16°32.400' | 88° 02.831' | | Radiosonde Balloon released |
| 161 | 15-Jun-17 | 6:20:00 | 16°32.028' | 88° 02.600' | | Radiosonde Balloon released |
| 162 | 15-Jun-17 | 12:03:00 | 16°26.517' | 88° 02.279' | | Radiosonde Balloon released |
| 163 | 15-Jun-17 | 14:10:00 | 16° 32.049' | 88° 02.631' | | VMP Operation Started |
| 164 | 15-Jun-17 | 15:12:00 | 16.5462° | 88.0739° | | Cast away CTD |
| 165 | 15-Jun-17 | 18:02:00 | 16°27.11' | 88° 04.49' | | Radiosonde balloon released |
| 166 | 16-Jun-17 | 0:00:00 | 16° 37.5' | 88° 01.4' | | Radiosonde Balloon released |
| 167 | 16-Jun-17 | 2:15:00 | 16° 32.500' | 88° 02.865' | | VMP operation started |
| 168 | 16-Jun-17 | 3:16:00 | 16.5647° | 88.0764° | | Cast away CTD |
| 169 | 16-Jun-17 | 6:00:00 | 16° 26.3' | 88° 03.60' | | Radiosonde Balloon released |
| 170 | 16-Jun-17 | 9:02:00 | 16° 32.130' | 88° 03.075 | | VMP Operation Started |
| 171 | 16-Jun-17 | 10:01:00 | 16.5561° | 88.095° | | Cast away CTD |
| 172 | 16-Jun-17 | 12:05:00 | 16° 26.50' | 88° 02.290' | | Radiosonde Balloon released |
| 173 | 16-Jun-17 | 14:56:00 | 16° 31.60' | 88° 08.80' | | Agro No.4 deployed |
| 174 | 16-Jun-17 | 17:45:00 | 16° 32.30' | 87° 55.30' | | Agro No.5 deployed |
| 175 | 16-Jun-17 | 18:02:00 | 16° 32.2' | 87° 56.3' | | Radiosonde Balloon Released |
| 176 | 16-Jun-17 | 20:06:00 | 16° 38.12' | 88° 02.260' | | Agro float no 6 deployed |
| 177 | 16-Jun-17 | 23:15:00 | 16° 25.420 | 88° 02.73' | | Agro float no 7 deployed |
| 178 | 17-Jun-17 | 0:20:00 | 16° 28.48' | 88° 06.09' | | Radiosonde Balloon Released |
| 179 | 17-Jun-17 | 0:45:00 | 16.5002326° | 88.1271111° | | UCTD operation halted for Sea glider deployment |
| 180 | 17-Jun-17 | 4:30:00 | 16° 33.749' | 88° 11.770' | | Sea glider SG615 deployed |
| 181 | 17-Jun-17 | 6:00:00 | 16° 31.9' | 88° 09.53' | | Radiosonde Balloon released |
| 182 | 17-Jun-17 | 6:15:00 | 16° 31.83' | 88° 09.48' | | Ship CTD |
| 183 | 17-Jun-17 | 12:10:00 | 16° 33.79' | 87°56.87' | | Radiosonde Balloon released |
| 184 | 17-Jun-17 | 18:00:00 | 16° 29.4' | 88° 06.90' | | Radiosonde Balloon released |
| 185 | 18-Jun-17 | 0:00:00 | 16° 35.05' | 88° 02.23' | | Radiosonde Balloon released |
| 186 | 18-Jun-17 | 0:51:00 | 16° 32.105' | 88° 02.110' | | VMP Operation Started |
| 187 | 18-Jun-17 | 1:52:00 | 16.5566° | 88.0569° | | Cast away CTD |
| 188 | 18-Jun-17 | 6:00:00 | 16° 31.6' | 88° 08.5' | | Radiosonde Balloon released |
| 189 | 18-Jun-17 | 8:23:00 | 16.5502615° | 88.0809249° | | Radiometer in water |
| 190 | 18-Jun-17 | 8:30:00 | 16° 33.086' | 88° 05.002' | | VMP Operation Started |
| 191 | 18-Jun-17 | 9:29:00 | 16.5713° | 88.1127° | | Cast away CTD |
| 192 | 18-Jun-17 | 11:10:00 | 16.5305539° | 88.0165838° | | UCTD operation resumed |
| 193 | 18-Jun-17 | 12:00:00 | 16° 31.36' | 87° 56.96' | | Radiosonde balloon released |
| 194 | 18-Jun-17 | 12:10:00 | 16° 31.96' | 87° 57.09' | | Radiosonde balloon released |
| 195 | 18-Jun-17 | 18:00:00 | 16° 27.5' | 88° 09.01' | | Radiosonde balloon released |
| 196 | 19-Jun-17 | 0:15:00 | 16° 38.09' | 88° 01.75' | | Radiosonde balloon released |

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| 197 | 19-Jun-17 | 4:15:00 | 16° 41.85' | 88° 02.31' | Seaglider SG627 launched |
| 198 | 19-Jun-17 | 5:15:00 | 16° 38.772' | 88° 2.318' | Ship CTD |
| 199 | 19-Jun-17 | 5:25:00 | 16° 38.772' | 88° 2.318' | Ship CTD |
| 200 | 19-Jun-17 | 6:08:00 | 16° 38.70' | 88° 02.30' | Radiosonde balloon released |
| 201 | 19-Jun-17 | 6:42:00 | 16° 39.047' | 88° 02.778' | AVP deployed |
| 202 | 19-Jun-17 | 7:00:00 | 16.6566031° | 88.0554093° | UCTD operations halted for sea glider search |
| 203 | 19-Jun-17 | 12:00:00 | 16° 47.86' | 88° 13.31' | Radiosonde balloon released |
| 204 | 19-Jun-17 | 12:30:00 | 16° 48.689' | 88° 14.260' | Water Sample collected |
| 205 | 19-Jun-17 | 14:30:00 | 16.849622° | 88.2815982° | Air Moisture trapping started |
| 206 | 20-Jun-17 | 6:00:00 | 16° 50.1' | 88° 29.30' | Radiosonde balloon released |
| 207 | 20-Jun-17 | 6:25:00 | 16° 53.511 | 88° 30.044' | VMP deployed |
| 208 | 20-Jun-17 | 7:33:00 | 16° 54.687' | 88° 32.150' | Cast away CTD |
| 209 | 20-Jun-17 | 11:02:00 | 16° 57.718' | 88° 39.400' | VMP deployed |
| 210 | 20-Jun-17 | 12:05:00 | 16° 58.443' | 88° 41.976' | Radiosonde balloon released |
| 211 | 20-Jun-17 | 12:07:00 | 16.9745° | 88.6991° | Cast away CTD |
| 212 | 20-Jun-17 | 14:53:00 | 16°59.642' | 88° 46.958' | VMP deployed |
| 213 | 20-Jun-17 | 15:51:00 | 16.9956° | 88.8186° | Cast away CTD |
| 214 | 20-Jun-17 | 17:55:00 | 16° 58.8' | 88° 52.1' | Radiosonde balloon released |
| 215 | 21-Jun-17 | 0:00:00 | 16° 43.11' | 88° 49.6' | Radiosonde balloon released |
| 216 | 21-Jun-17 | 4:00:00 | 16° 41.917' | 88° 46.148' | Sea glider SG627sighted |
| 217 | 21-Jun-17 | 4:30:00 | 16° 41.8847' | 88° 46.03655' | Operations started for recoverying sea glider |
| 218 | 21-Jun-17 | 5:58:00 | 16° 41.717' | 88° 46.234' | Sea glider SG627 recovered |
| 219 | 21-Jun-17 | 6:20:00 | 16° 41.668' | 88° 46.169' | Operations started for lifting pole mounted ADCP |
| 220 | 21-Jun-17 | 6:43:00 | 16° 41.667' | 88° 46.169' | Pole mounted ADCP lifted |
| 221 | 21-Jun-17 | 14:30:00 | 16° 44.5513' | 88° 46.799' | Air Moisture trapping started |
| 222 | 21-Jun-17 | 14:30:00 | 16° 44.5513' | 88° 46.799' | UCTD operation restarted from the northern way point |
| 223 | 21-Jun-17 | 15:30:00 | 16° 31.927' | 88° 02.266' | UCTD operation halted for VMP operation |
| 224 | 21-Jun-17 | 15:52:00 | 16° 32.098' | 88° 03.127' | VMP Operation Started |
| 225 | 21-Jun-17 | 16:50:00 | 16.5254° | 88.096° | Cast away CTD |
| 226 | 21-Jun-17 | 18:08:00 | 16° 31.928' | 88° 02.432' | UCTD operations resumed |
| 227 | 22-Jun-17 | 0:15:00 | 16° 33.84' | 87° 57.09' | Radiosonde balloon released |
| 228 | 22-Jun-17 | 3:30:00 | 16.5224136° | 88.0387283° | UCTD operation halted for VMP operation |
| 229 | 22-Jun-17 | 3:55:00 | 16.5229303° | 88.0605476° | VMP Operation Started |
| 230 | 22-Jun-17 | 4:57:00 | 16.5254° | 88.0833° | Cast away CTD |
| 231 | 22-Jun-17 | 6:00:00 | 16° 31.5' | 88° 04.00' | Radiosonde balloon released |
| 232 | 22-Jun-17 | 11:15:00 | 16.5284645° | 88.045474° | VMP Operation Started |
| 233 | 22-Jun-17 | 12:00:00 | 16° 32.02' | 88° 04.7' | Radiosonde Balloon released |
| 234 | 22-Jun-17 | 12:10:00 | 16.5351° | 88.0833° | Cast away CTD |
| 235 | 22-Jun-17 | 13:30:00 | 16° 33.258' | 87° 56.066' | Rain water collected |
| 236 | 22-Jun-17 | 14:30:00 | 16° 32.556' | 87° 55.349' | Air Moisture trapping started |
| 237 | 22-Jun-17 | 15:00:00 | 16° 33.870' | 87° 56.066' | Water Sample collected |
| 238 | 22-Jun-17 | 18:10:00 | 16° 32.0' | 88° 02.2' | Radiosonde Balloon released |
| 239 | 23-Jun-17 | 0:05:00 | 16° 31.82' | 87° 56.81' | Radiosonde Balloon released |
| 240 | 23-Jun-17 | 4:05:00 | 16.5363032° | 88.044538° | VMP Operation Started |
| 241 | 23-Jun-17 | 5:10:00 | 16.568157° | 88.0866194° | Cast away CTD |
| 242 | 23-Jun-17 | 5:20:00 | 16.5729719° | 88.0932424° | AVP GPS not responding |

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| 243 | 23-Jun-17 | 6:00:00 | 16.5908215° | 88.1190773° | Radiosonde Balloon released |
| 244 | 23-Jun-17 | 6:30:00 | 16.5865072° | 88.1140012° | UCTD operations stopped |
| 245 | 23-Jun-17 | 8:40:00 | 16° 32.650' | 88° 05.954' | Argo float deployed |
| 246 | 23-Jun-17 | 10:38:00 | 16° 34.28' | 88° 12.24' | Argo float deployed |
| 247 | 23-Jun-17 | 11:10:00 | 16.573554° | 88.2237267° | Vessel heading to Sriharikotta |
| 248 | 23-Jun-17 | 14:30:00 | 16° 30.208' | 87° 55.151' | Air Moisture trapping started |
| 249 | 24-Jun-17 | 14:30:00 | 15° 46.371' | 85° 50.835' | Air Moisture trapping started |
| 250 | 24-Jun-17 | 15:00:00 | 15° 46.371' | 85° 50.835' | Rain water collected |
| 251 | 26-Jun-17 | 12:30:00 | 13° 44.836' | 80° 25.402' | Pole mounted ADCP attached to ship deck (starboard side) |
| 252 | 27-Jun-17 | 9:00 | | | Reached Chennai Port |

28/06/2017

**Dr. B. Praveen Kumar**
**Chief Scientist - SN120 &**
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