HOKKAIDO UNIVERSITY

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8

# THE “OSHORO MARU” CRUISE 195
# TO WATERS EAST OF HONSHU AND TO THE OGASAWARA ISLANDS

IN NOVEMBER 2008

## 1. Cruise Itinerary

Cruise 195

| | | | |
|---|---|---|---|
| Departure from Hakodate | Nov. | 13 | ,2008 |
| Start hydrographic research (OS08211) | | 14 | |
| Arrival at Futami | | 20 | |
| Departure from Futami | | 23 | |
| Finish hydrographic research (OS08222) | | 23 | |
| Return to Hakodate | | 28 | |

Total coverage 2324.6miles

## 2. Vessel Personnel

| | | | |
|---|---|---|---|
| Captain: | | Professor | Toshimi Meguro |
| Crew : | First Officer | Associated Professor | Shogo Takagi |
| | Second Officer | Instructor | Yoshihiko Kamei |
| | Jr. Second Officer | Instructor | Keiichiro Sakaoka |
| | Chief Engineer | Instructor | Junichi Kimura |
| | And 24 men | | |

Cruise 195

| | | |
|---|---|---|
| Research Staff: | Professor | (Laboratory of Marine Bio-resources Ecology) Kenshi Kuma |
| | Associate Professor | (Laboratory of Marine Environmental Science) Yutaka Isoda |
| Guest Scientist: | Affiliated Professor | (Pacific Aquaculture and Coastal Resources Center University of Hawaii) Keiko Sekiguchi |
| | Scientist | (National Institute for Environmental Studies) Takafumi Aramaki |
| | Scientist | (Ogasawara Whale Watching Association) Kyouichi Mori |
| | Post Doctor | (Department of Earth and Planetary Science, University of Tokyo) Maki Nagasawa |

| | |
|---|---|
| Graduate Students: | 6 Persons |
| Under Graduate Students: | 10 Persons |
| | Total 51 persons |

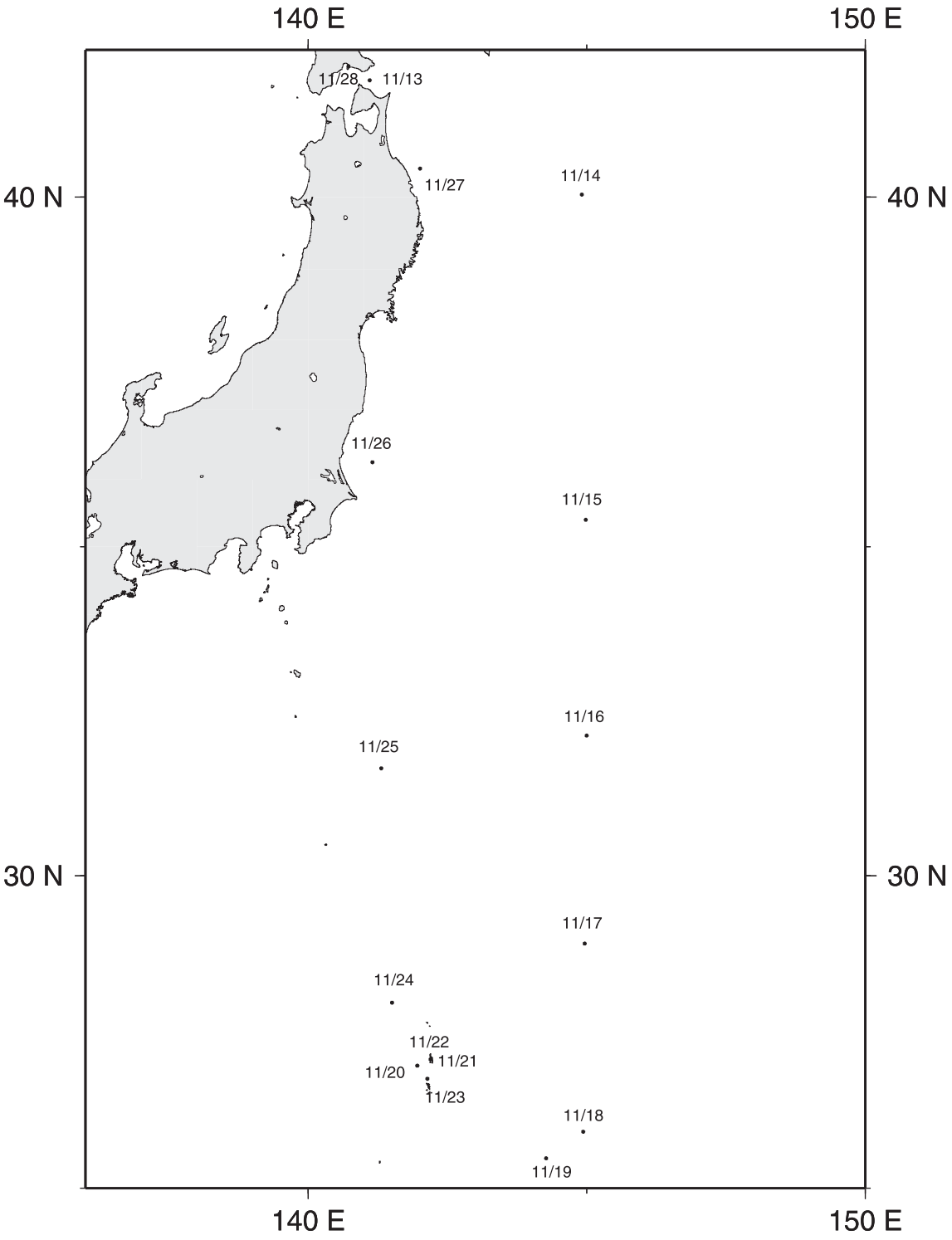


Figure 1: Noon position

## 3. Items of Research

Hydrographic observations: Fig. 2 Table 1, 2

Behavior of trace metals in the North Pacific Ocean

Investigation for behavior of aluminum in the North Pacific Ocean

Behavior of dissolved organic radiocarbon in the North Pacific Ocean

Flow and mixing in the intermediate and abyssal layers in the North Pacific Ocean

Dynamics of primary production process in the North Pacific Ocean

The relation between micro-scale and fine scale current shear in deep Ocean, measurements using VMP5500 and XCP

## 4. Data on Temperature, Salinity, and Computed Dynamic Depth Anomaly

Hydrographic work on deck and the data processing were made by the deck officers, crews, research staff and cadets of the "Oshoro Maru".

Temperature and salinity were measured by CTD (Seabird SBE9Plus and SBE-19).

Dynamic computations were made using a desk-top computer aboard the "Oshoro Maru".

Table 1: List of Oceanographic Stations

| Station | Lat.(*) | Long.(*) | Date | S.M.T | T.Z. | Depth | COL. | TR. | S.S.T. | WR. | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OS08211 | 40-00.0N | 145-00.0E | 11/14 | 0821 | 9 | 5611 | 7 | 5.1 | - | b | SBE-9plus |
| OS08212 | 35-00.0N | 145-00.0E | 11/15 | 1646 | 9 | 5747 | - | - | - | c | SBE-9plus |
| OS08213 | 30-00.0N | 145-00.0E | 11/17 | 0103 | 9 | 5910 | - | - | 24.6 | bc | SBE-9plus |
| OS08214 | 25-55.3N | 144-56.1E | 11/18 | 0312 | 9 | 4931 | - | - | - | r | XCTD2 |
| OS08215 | 25-50.0N | 145-00.0E | 11/18 | 2200 | 9 | 5016 | - | - | - | o | SBE-9plus |
| OS08216 | 25-13.1N | 144-37.4E | 11/19 | 0612 | 9 | | - | - | - | c | XCTD1 |
| OS08217 | 25-29.3N | 144-16.7E | 11/19 | 1220 | 9 | | - | - | - | c | XCTD1 |
| OS08218 | 26-58.5N | 141-57.4E | 11/20 | 1155 | 9 | | - | - | - | b | XCTD1 |
| OS08219 | 26-59.9N | 141-57.8E | 11/20 | 1251 | 9 | | - | - | - | b | XCTD1 |
| OS08220 | 26-45.0N | 142-00.0E | 11/23 | 1105 | 9 | 903 | - | - | - | b | XCTD1 |
| OS08221 | 26-51.3N | 142-20.3E | 11/23 | 1420 | 9 | 1460 | - | - | - | b | XCTD1 |
| OS08222 | 27-10.5N | 142-24.6E | 11/23 | 2034 | 9 | 960 | - | - | - | b | XCTD1 |

(*):Fixed position by Global Positioning system

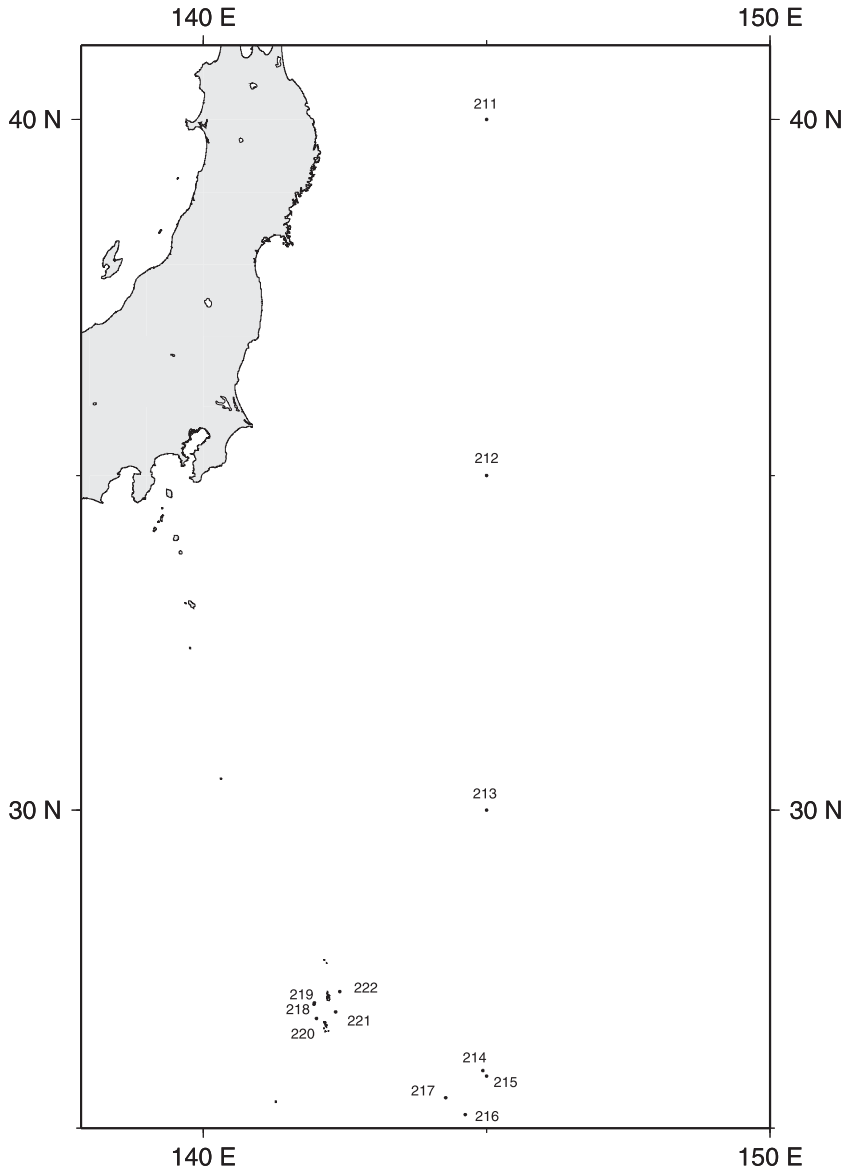


Figure 2: Oceanographic stations

Table 2: Oceanographic data

| Station | | OS08211 | |
|---|---|---|---|
| Longitude | | 40-00.0N | |
| Latitude | | 145-00.0E | |
| Depth(m) | | 5611 | |
| Press. | Temp. | Sal. | SIG-T |
| 5 | 9.745 | 33.103 | 25.514 |
| 10 | 9.713 | 33.106 | 25.521 |
| 20 | 9.613 | 33.120 | 25.549 |
| 30 | 9.566 | 33.120 | 25.556 |
| 40 | 8.495 | 33.084 | 25.696 |
| 50 | 7.768 | 33.072 | 25.794 |
| 75 | 3.923 | 33.213 | 26.372 |
| 100 | 3.405 | 33.312 | 26.501 |
| 125 | 2.736 | 33.321 | 26.567 |
| 150 | 2.318 | 33.343 | 26.620 |
| 200 | 2.350 | 33.427 | 26.684 |
| 250 | 2.377 | 33.526 | 26.761 |
| 300 | 2.405 | 33.602 | 26.820 |
| 400 | 2.953 | 33.799 | 26.931 |
| 500 | 3.102 | 33.937 | 27.028 |
| 600 | 3.111 | 34.060 | 27.125 |
| 700 | 3.160 | 34.174 | 27.211 |
| 800 | 3.022 | 34.249 | 27.284 |
| 900 | 3.108 | 34.344 | 27.352 |
| 1000 | 3.037 | 34.395 | 27.399 |
| 1200 | 2.632 | 34.437 | 27.468 |
| 1500 | 2.355 | 34.509 | 27.550 |
| 2000 | 1.981 | 34.590 | 27.645 |
| 2500 | 1.723 | 34.635 | 27.700 |
| 3000 | 1.578 | 34.660 | 27.732 |

| Station | | OS08212 | |
|---|---|---|---|
| Longitude | | 35-00.0N | |
| Latitude | | 145-00.0E | |
| Depth(m) | | 5747 | |
| Press. | Temp. | Sal. | SIG-T |
| 5 | 23.399 | 34.328 | 23.311 |
| 10 | 23.405 | 34.329 | 23.309 |
| 20 | 23.407 | 34.328 | 23.308 |
| 30 | 23.409 | 34.328 | 23.307 |
| 40 | 23.413 | 34.328 | 23.306 |
| 50 | 23.414 | 34.335 | 23.312 |
| 75 | 23.417 | 34.397 | 23.357 |
| 100 | 21.863 | 34.697 | 24.027 |
| 125 | 21.093 | 34.781 | 24.303 |
| 150 | 20.116 | 34.800 | 24.580 |
| 200 | 18.854 | 34.818 | 24.920 |
| 250 | 18.320 | 34.795 | 25.037 |
| 300 | 17.783 | 34.782 | 25.159 |
| 400 | 16.252 | 34.685 | 25.448 |
| 500 | 13.397 | 34.490 | 25.919 |
| 600 | 9.679 | 34.332 | 26.485 |
| 700 | 7.308 | 34.228 | 26.768 |
| 800 | 5.779 | 34.239 | 26.979 |
| 900 | 4.588 | 34.204 | 27.091 |
| 1000 | 3.899 | 34.263 | 27.210 |
| 1200 | 3.350 | 34.371 | 27.350 |
| 1500 | 2.610 | 34.476 | 27.502 |
| 2000 | 2.086 | 34.575 | 27.624 |
| 2500 | 1.781 | 34.629 | 27.691 |
| 3000 | 1.613 | 34.657 | 27.727 |

| Station | | OS08213 | |
|---|---|---|---|
| Longitude | | 30-00.0N | |
| Latitude | | 145-00.0E | |
| Depth(m) | | 5910 | |
| Press. | Temp. | Sal. | SIG-T |
| 5 | 24.843 | 34.389 | 22.929 |
| 10 | 24.851 | 34.389 | 22.926 |
| 20 | 24.852 | 34.389 | 22.926 |
| 30 | 24.852 | 34.389 | 22.927 |
| 40 | 24.245 | 34.487 | 23.182 |
| 50 | 22.214 | 34.725 | 23.950 |
| 75 | 19.328 | 34.786 | 24.775 |
| 100 | 18.323 | 34.787 | 25.030 |
| 125 | 17.850 | 34.777 | 25.139 |
| 150 | 17.504 | 34.766 | 25.215 |
| 200 | 16.981 | 34.742 | 25.322 |
| 250 | 16.361 | 34.701 | 25.435 |
| 300 | 15.228 | 34.614 | 25.625 |
| 400 | 12.841 | 34.448 | 25.998 |
| 500 | 9.628 | 34.215 | 26.401 |
| 600 | 6.882 | 34.008 | 26.654 |
| 700 | 5.669 | 34.070 | 26.859 |
| 800 | 4.590 | 34.168 | 27.061 |
| 900 | 4.072 | 34.250 | 27.182 |
| 1000 | 3.665 | 34.321 | 27.280 |
| 1200 | 3.084 | 34.425 | 27.418 |
| 1500 | 2.482 | 34.517 | 27.545 |
| 2000 | 1.936 | 34.601 | 27.657 |
| 2500 | 1.703 | 34.639 | 27.705 |
| 3000 | 1.568 | 34.660 | 27.733 |

Station OS08214
Longitude 25-55.3N
Latitude 144-56.1E
Depth(m) 4931

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 26.563 | 34.287 | 22.321 |
| 10 | 26.563 | 34.304 | 22.334 |
| 20 | 26.573 | 34.318 | 22.341 |
| 30 | 26.553 | 34.331 | 22.358 |
| 40 | 26.572 | 34.374 | 22.384 |
| 50 | 23.600 | 34.627 | 23.478 |
| 75 | 20.821 | 34.752 | 24.355 |
| 100 | 19.594 | 34.752 | 24.680 |
| 125 | 18.931 | 34.753 | 24.851 |
| 150 | 18.497 | 34.749 | 24.958 |
| 200 | 17.887 | 34.740 | 25.102 |
| 250 | 17.432 | 34.719 | 25.196 |
| 300 | 16.617 | 34.668 | 25.351 |
| 400 | 13.527 | 34.440 | 25.853 |
| 500 | 11.157 | 34.267 | 26.177 |
| 600 | 8.224 | 34.092 | 26.528 |
| 700 | 5.703 | 34.045 | 26.835 |
| 800 | 4.859 | 34.110 | 26.986 |
| 900 | 4.065 | 34.234 | 27.170 |
| 1000 | 3.686 | 34.314 | 27.272 |
| 1200 | 3.084 | 34.412 | 27.408 |
| 1500 | 2.414 | 34.512 | 27.547 |

Station OS08215
Longitude 25-50.0N
Latitude 145-00.0E
Depth(m) 5016

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 26.590 | 34.423 | 22.415 |
| 10 | 26.596 | 34.428 | 22.417 |
| 20 | 26.562 | 34.477 | 22.465 |
| 30 | 26.329 | 34.538 | 22.584 |
| 40 | 25.546 | 34.643 | 22.906 |
| 50 | 24.034 | 34.716 | 23.418 |
| 75 | 20.726 | 34.799 | 24.416 |
| 100 | 19.147 | 34.800 | 24.832 |
| 125 | 18.843 | 34.803 | 24.912 |
| 150 | 18.255 | 34.804 | 25.060 |
| 200 | 17.621 | 34.778 | 25.196 |
| 250 | 17.019 | 34.746 | 25.315 |
| 300 | 16.044 | 34.675 | 25.488 |
| 400 | 13.291 | 34.475 | 25.928 |
| 500 | 10.941 | 34.303 | 26.244 |
| 600 | 7.960 | 34.120 | 26.589 |
| 700 | 5.708 | 34.076 | 26.859 |
| 800 | 4.797 | 34.155 | 27.029 |
| 900 | 4.270 | 34.234 | 27.149 |
| 1000 | 3.753 | 34.326 | 27.275 |
| 1200 | 3.128 | 34.428 | 27.417 |
| 1500 | 2.451 | 34.527 | 27.556 |
| 2000 | 1.890 | 34.611 | 27.669 |
| 2500 | 1.654 | 34.649 | 27.717 |
| 3000 | 1.554 | 34.667 | 27.739 |

Station OS08216
Longitude 25-13.1N
Latitude 144-37.4E
Depth(m) -

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 27.361 | 34.562 | 22.274 |
| 10 | 27.361 | 34.576 | 22.285 |
| 20 | 27.351 | 34.580 | 22.291 |
| 30 | 26.863 | 34.480 | 22.372 |
| 40 | 26.512 | 34.657 | 22.616 |
| 50 | 26.051 | 34.678 | 22.776 |
| 75 | 22.891 | 34.761 | 23.785 |
| 100 | 20.511 | 34.797 | 24.473 |
| 125 | 18.916 | 34.799 | 24.890 |
| 150 | 18.245 | 34.790 | 25.052 |
| 200 | 17.637 | 34.765 | 25.182 |
| 250 | 17.022 | 34.732 | 25.304 |
| 300 | 16.141 | 34.670 | 25.462 |
| 400 | 13.569 | 34.469 | 25.867 |
| 500 | 10.343 | 34.257 | 26.313 |
| 600 | 7.608 | 34.127 | 26.646 |
| 700 | 5.631 | 34.129 | 26.910 |
| 800 | 4.635 | 34.215 | 27.094 |
| 900 | 4.019 | 34.326 | 27.248 |
| 1000 | 3.589 | 34.394 | 27.346 |

Station OS08217
Longitude 25-29.3N
Latitude 144-16.7E
Depth(m) -

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 28.196 | 34.592 | 22.026 |
| 10 | 28.103 | 34.636 | 22.089 |
| 20 | 28.052 | 34.654 | 22.120 |
| 30 | 27.744 | 34.591 | 22.173 |
| 40 | 27.268 | 34.500 | 22.258 |
| 50 | 26.595 | 34.331 | 22.344 |
| 75 | 25.314 | 34.345 | 22.753 |
| 100 | 21.682 | 34.700 | 24.080 |
| 125 | 19.748 | 34.781 | 24.662 |
| 150 | 18.843 | 34.784 | 24.897 |
| 200 | 17.912 | 34.757 | 25.109 |
| 250 | 17.259 | 34.733 | 25.249 |
| 300 | 16.556 | 34.683 | 25.376 |
| 400 | 14.274 | 34.517 | 25.757 |
| 500 | 11.689 | 34.329 | 26.127 |
| 600 | 8.576 | 34.136 | 26.508 |
| 700 | 6.645 | 34.074 | 26.738 |
| 800 | 5.346 | 34.104 | 26.925 |
| 900 | 4.389 | 34.210 | 27.117 |
| 1000 | 3.762 | 34.318 | 27.268 |

Station OS08218
Longitude 26-58.5N
Latitude 141-57.4E
Depth(m) -

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 25.603 | 34.434 | 22.731 |
| 10 | 25.583 | 34.453 | 22.752 |
| 20 | 25.563 | 34.464 | 22.766 |
| 30 | 25.283 | 34.441 | 22.835 |
| 40 | 24.830 | 34.442 | 22.973 |
| 50 | 24.587 | 34.476 | 23.072 |
| 75 | 23.612 | 34.572 | 23.433 |
| 100 | 22.708 | 34.636 | 23.743 |
| 125 | 21.484 | 34.677 | 24.117 |
| 150 | 20.084 | 34.721 | 24.528 |
| 200 | 18.442 | 34.771 | 24.988 |
| 250 | 17.858 | 34.755 | 25.120 |
| 300 | 16.894 | 34.730 | 25.333 |
| 400 | 15.202 | 34.604 | 25.623 |
| 500 | 11.395 | 34.358 | 26.204 |
| 600 | 7.900 | 34.169 | 26.636 |
| 700 | 5.692 | 34.168 | 26.934 |
| 800 | 4.854 | 34.212 | 27.067 |
| 900 | 4.090 | 34.286 | 27.209 |
| 1000 | 3.680 | 34.345 | 27.298 |

Station OS08219
Longitude 26-59.9N
Latitude 141-57.8E
Depth(m) -

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 25.684 | 34.495 | 22.752 |
| 10 | 25.655 | 34.504 | 22.768 |
| 20 | 25.197 | 34.482 | 22.892 |
| 30 | 24.908 | 34.468 | 22.969 |
| 40 | 24.841 | 34.482 | 23.000 |
| 50 | 24.684 | 34.496 | 23.058 |
| 75 | 23.245 | 34.604 | 23.564 |
| 100 | 21.785 | 34.688 | 24.042 |
| 125 | 20.990 | 34.716 | 24.282 |
| 150 | 19.752 | 34.764 | 24.648 |
| 200 | 18.504 | 34.791 | 24.988 |
| 250 | 17.582 | 34.781 | 25.207 |
| 300 | 16.929 | 34.744 | 25.336 |
| 400 | 14.511 | 34.571 | 25.748 |
| 500 | 11.199 | 34.360 | 26.242 |
| 600 | 7.568 | 34.171 | 26.686 |
| 700 | 5.844 | 34.164 | 26.912 |
| 800 | 4.694 | 34.232 | 27.101 |
| 900 | 3.999 | 34.306 | 27.234 |
| 1000 | 3.639 | 34.355 | 27.310 |

| Station | OS08220 |
|---|---|
| Longitude | 26-45.0N |
| Latitude | 142-00.0E |
| Depth(m) | 903 |

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 25.002 | 34.480 | 22.950 |
| 10 | 24.642 | 34.492 | 23.067 |
| 20 | 24.506 | 34.502 | 23.116 |
| 30 | 24.328 | 34.513 | 23.177 |
| 40 | 24.172 | 34.532 | 23.238 |
| 50 | 24.019 | 34.550 | 23.297 |
| 75 | 22.521 | 34.674 | 23.825 |
| 100 | 20.257 | 34.763 | 24.514 |
| 125 | 19.224 | 34.774 | 24.792 |
| 150 | 18.653 | 34.779 | 24.941 |
| 200 | 17.934 | 34.772 | 25.115 |
| 250 | 17.431 | 34.760 | 25.228 |
| 300 | 16.837 | 34.719 | 25.338 |
| 400 | 14.539 | 34.565 | 25.737 |
| 500 | 10.728 | 34.310 | 26.287 |
| 600 | 8.190 | 34.189 | 26.609 |
| 700 | 5.842 | 34.164 | 26.912 |
| 800 | 4.801 | 34.230 | 27.088 |
| 900 | 4.266 | 34.281 | 27.186 |

| Station | OS08221 |
|---|---|
| Longitude | 26-51.3N |
| Latitude | 142-20.3E |
| Depth(m) | 1460 |

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 25.845 | 34.539 | 22.736 |
| 10 | 25.845 | 34.547 | 22.742 |
| 20 | 25.806 | 34.550 | 22.756 |
| 30 | 25.439 | 34.521 | 22.847 |
| 40 | 23.869 | 34.683 | 23.442 |
| 50 | 22.036 | 34.705 | 23.985 |
| 75 | 20.351 | 34.755 | 24.483 |
| 100 | 19.289 | 34.779 | 24.779 |
| 125 | 18.714 | 34.775 | 24.923 |
| 150 | 18.280 | 34.768 | 25.026 |
| 200 | 17.716 | 34.755 | 25.155 |
| 250 | 17.294 | 34.741 | 25.246 |
| 300 | 16.854 | 34.709 | 25.326 |
| 400 | 13.330 | 34.452 | 25.902 |
| 500 | 10.626 | 34.260 | 26.266 |
| 600 | 7.920 | 34.112 | 26.589 |
| 700 | 5.820 | 34.094 | 26.859 |
| 800 | 4.651 | 34.176 | 27.061 |
| 900 | 4.165 | 34.250 | 27.172 |
| 1000 | 3.616 | 34.324 | 27.287 |

| Station | OS08222 |
|---|---|
| Longitude | 27-10.5N |
| Latitude | 142-24.6E |
| Depth(m) | 960 |

| Press. | Temp. | Sal. | SIG-T |
|---|---|---|---|
| 5 | 25.636 | 34.366 | 22.670 |
| 10 | 25.636 | 34.395 | 22.692 |
| 20 | 25.436 | 34.380 | 22.742 |
| 30 | 25.048 | 34.333 | 22.825 |
| 40 | 24.675 | 34.317 | 22.925 |
| 50 | 24.478 | 34.280 | 22.956 |
| 75 | 22.693 | 34.525 | 23.663 |
| 100 | 21.164 | 34.687 | 24.212 |
| 125 | 20.210 | 34.715 | 24.490 |
| 150 | 19.191 | 34.709 | 24.751 |
| 200 | 18.251 | 34.728 | 25.003 |
| 250 | 17.592 | 34.714 | 25.154 |
| 300 | 16.705 | 34.664 | 25.327 |
| 400 | 15.239 | 34.564 | 25.584 |
| 500 | 11.716 | 34.333 | 26.125 |
| 600 | 8.250 | 34.134 | 26.557 |
| 700 | 6.025 | 34.087 | 26.828 |
| 800 | 5.005 | 34.145 | 26.997 |
| 900 | 4.292 | 34.226 | 27.140 |