10. DATA REPORT: MAJOR AND TRACE ELEMENT DATA FOR LEG 202 SITES 1233 AND 1234¹

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INTRODUCTION

The exchange of waters between the Pacific and the Southern Oceans occurs along the eastern boundary of the South Pacific. Because water masses of the Antarctic provide a connection among the world's ocean basins, these water masses maintain the ability to influence changes in ocean circulation and climate (Lynch-Stieglitz et al., 1996). One of the primary goals of Ocean Drilling Program (ODP) Leg 202 was to exploit the sediments underlying the southeast Pacific continental margin to ascertain how changes in past ocean circulation (i.e., water mass distributions) have affected global carbon, heat, and nutrient balances.

In the southeast Pacific, oxygen-rich Antarctic Intermediate Water (AAIW) combines with (low oxygen) North Pacific Intermediate Water to produce a steep water column–dissolved oxygen gradient between depths of ~0.5 and 1 km. Shallower in the water column, the classical oxygen minimum zone (OMZ) impinges along the continental margin. These different water masses thus produce a "double" OMZ, with low-oxygen waters straddling the oxygen-rich AAIW. Given this distribution, changes in the intensity of water mass source functions through time should leave behind a depth transect of changing proxy distributions in response to changing bottom water oxygen concentrations.

Sediments at Site 1233 are bathed by AAIW at a water depth of 838 m, whereas Pacific Central Water bathes the overlying waters at Site 1234. Site 1234 is located north of Site 1233 at 1015-m water depth. Because of rapid erosion of the high Andes, terrigenous sedimentation rates at these sites are in the range of 1-2 m/k.y.

¹McManus, J., 2006. Data report: major and trace element data for Leg 202 Sites 1233 and 1234. *In* Tiedemann, R., Mix, A.C., Richter, C., and Ruddiman, W.F. (Eds.), *Proc. ODP, Sci. Results*, 202: College Station, TX (Ocean Drilling Program), 1–9. doi:10.2973/odp.proc.sr.202.202.2006 ²College of Oceanic and Atmospheric Sciences, Oregon State University, 104 Ocean Administration Building, Corvallis OR 97331-5503, USA. mcmanus@coas.oregonstate.edu

Initial receipt: 6 September 2004 Acceptance: 7 July 2006 Web publication: 3 November 2006 Ms 202SR-202

To assess changes in the reducing nature of these sediments through time, a number of geochemical indicators were determined. The solubility of uranium, molybdenum, cadmium, and vanadium decreases under the reducing conditions common along the continental margin seafloor; thus changes in their distribution may signify changes in the reducing character of the surface sediment. A number of other, primarily ancillary, elements were also measured. Most of these elements are used to assess terrigenous inputs.

METHODS

Samples from Sites 1233 and 1234 were analyzed for a suite of major (K, Ca, Mg, Fe, and Ti) and minor (Mn, Cu, Ba, U, Cd, Mo, and V) elements. Samples were dried, ground, and stored in glass vials. Approximately 50 mg of sediment was used for analyses. To the dried sediment, 2 mL of 30% H₂O₂ was initially added. The sample was then placed (covered) in an oven at 60°C overnight. The following day the sample was removed from the oven and evaporated on a hotplate. Concentrated HF (1 mL) was then added to the sample, which was then placed (covered) in an ultrasonic bath for 0.5 hr, after which point we added 1 mL of HNO₃ (16 N) and placed the sample in an oven at 90°C overnight. The following day the sample was cooled and the lids removed and rinsed (twice) into vials with 25 mL of 6-N HCl. The solution was then evaporated close to dryness. Two additions of 0.5 mL of 6-N HCl were added with an evaporation step following each addition. Next, 0.5 mL of 16-N HNO₃ and 0.5 mL of 8-N HNO₃ were added with an evaporation step following each addition. Finally, 8 mL of 8-N HNO₃ was added; this final solution constitutes the working solution.

Prior to our sample analyses, the above technique was compared to an alkaline fusion technique and a microwave-enhanced acid dissolution technique (Table T1). This comparison was accomplished by analyzing standard reference materials in triplicate using each technique. Our results generally show agreement among the techniques and with the reported value (e.g., Potts et al., 1992), but there are notable exceptions. The Mg results for the U.S. Geological Survey (USGS) AGV-1 and MAG-1 reference materials using the microwave-assisted technique and the Ba results for the USGS W-2 standard for both the technique employed here and the microwave-assisted technique are low (also see Pozebon and Martins, 2002). Recognizing these individual exceptions, this comparison suggests that each technique resulted in complete sediment digestion and there was no obvious pattern of residual material for any of the techniques. In addition to these standard reference materials, we also digested the USGS standard SDO-1 and the National Institute of Standards and Technology standard reference material (SRM) 1645 along with the samples reported here. For the major elements, all analytes agree to within 15%.

In the case of the minor elements Mo and U, we also ran a number of samples for these analytes as well (Table T2). Agreement is typically within 16% or better with the exception of the SDO-1 value for Mo and the SRM 1645 for U. The precision of each analysis is generally superior to the agreement with the standard reference materials, indicating that each technique provides internally consistent results. One exception to this generalization is that the significantly different results for Mg and Ba referred to above (Table T1) also tend to have less precise results. This observation suggests that results that exhibit a high degree of sam-

T1. SRM for method calibration, p. 7.

T2. SRM for method calibration, p. 8.

ple-to-sample variability should be treated with caution until further work can validate the veracity of individual sample values.

RESULTS

The results of metal analyses are presented in Table **T3** along with the meters composite depth (mcd). Our primary target for this and future work is understanding the relationship between sedimentary signatures of ocean biogeochemistry and climate. Toward this end we compare the U/Mo ratio at the two study sites as an indicator of the relative change in bottom water oxygen from the last glacial to the present. Although this bottom water oxygen proxy (Fig. **F1**) is still under development, it exhibits significant promise (McManus et al., 2006). The data suggest relatively little change in bottom water oxygen at ~24 k.y. before present (BP). Site 1233 exhibits considerably more variability over the last slacial as compared to the more recent Holocene, but a distinct minimum between ~8 and 10 k.y. BP (Fig. **F2**).

The relationships between climate change and intermediate water mass circulation are poorly defined. Yet because intermediate water masses interact with the euphotic zone and can outcrop in subpolar regions, they are significant both in terms of global nutrient transport and the global CO_2 balance. Our lack of understanding regarding this relationship stems in part from the limited availability of high-resolution sediment records and the complexity of existing continental margin records. Future work from Sites 1233 and 1234 will continue to build upon that data assembled here toward an improved understanding the climate–ocean interactive relationship.

ACKNOWLEDGMENTS

This research used samples and/or data provided by the Ocean Drilling Program (ODP). ODP is sponsored by the U.S. National Science Foundation (NSF) and participating countries under management of Joint Oceanographic Institution (JOI), Inc. Reviewer comments from K.A. Kryc and A. Mix are appreciated. Financial support was also provided by JOI/U.S. Science Support Program (USSSP) for shore-based analyses. Andy Ross and Angela Bice assisted in the laboratory with analyses. **T3.** Elemental concentrations, Sites 1233 and 1234, p. 9.

F1. U/Mo ratio as a function of bottom water oxygen concentration, p. 5.



F2. U/Mo ratio as a function of depth, Sites 1233 and 1234, p. 6.



REFERENCES

- Lamy, F., Kaiser, J., Ninnemann, U., Hebbeln, D., Arz, H.W., and Stoner, J., 2004. Antarctic timing of surface water changes off Chile and Patagonian ice sheet response. *Science*, 304(5679):1959–1962. doi:10.1126/science.1097863
- Lynch-Stieglitz, J., van Geen, A., and Fairbanks, R.G., 1996. Interocean exchange of glacial North Atlantic Intermediate Water: evidence from subantarctic Cd/Ca and carbon isotope measurements. *Paleoceanography*, 11(2):191–201. doi:10.1029/ 95PA03772
- McManus, J., Berelson, W.M., Severmann, S., Poulson, R.L., Hammond, D.E., Klinkhammer, G.P., and Holm, C., 2006. Molybdenum and uranium geochemistry in continental margin sediments: paleoproxy potential. *Geochim. Cosmochim. Acta.*, 70(18):4643-4662. doi:10.1016/j.gca.2006.06.1564
- Mix, A.C., Tiedemann, R., Blum, P., et al., 2003. *Proc. ODP, Init. Repts.*, 202: College Station, TX (Ocean Drilling Program). doi:10.2973/odp.proc.ir.202.2003
- Potts, P.J., Tindle, A.G., and Webb, P.C., 1992. *Geochemical Reference Material Compositions:* Boca Raton (CRC Press Inc.).
- Pozebon, D., and Martins, P., 2002. Marine sediment analysis using inductively coupled plasma optical emission spectrometry. *At. Spectrosc.*, 23(4):111–118.
- Wieser, M.E., and DeLaeter, J.R., 2000. Molybdenum concentrations measured in eleven USGS geochemical reference materials by isotope dilution thermal ionisation mass spectrometry. *Geostand. Newsl.*, 24(2):275–279.

Figure F1. The U/Mo ratio as a function of bottom water oxygen concentration (from McManus et al., 2006). Note that there are several sites from the Chile margin used for the data calibration. These sites were from the site survey cruise associated with ODP Leg 202. Data point in parentheses is not used for the statistical fit.



Figure F2. The U/Mo ratio as a function of depth for Sites 1233 and 1234. The age designations are taken from the age model of Lamy et al., (2004) for Site 1233 and A. Mix (pers. comm., 2006) for Site 1234.



| | | Concentration (µg/g) | | | | | | | | | | | |
|----------|-----------------|----------------------|-----------|--------|-------|--------|-------|---------|--------|-------|------|-------|----|
| Standard | Sample ID* | Ti | ± | Ca | ± | Mg | ± | Fe | ± | Mn | ± | Ва | ± |
| BCR-1 | F7-A, B, C | 13,147 | 166 | 54,401 | 1,300 | 21,972 | 287 | 96,952 | 1,595 | 1,475 | 12 | 654 | 15 |
| | S7-A, B, C | 13,770 | 125 | 50,585 | 4,247 | 21,546 | 99 | 96,832 | 1,333 | 1,467 | 8 | 618 | 14 |
| | M7-A, B, C | 13,538 | 91 | 48,225 | 980 | 21,694 | 513 | 96,669 | 734 | 1,468 | 9 | 640 | 8 |
| | Literature | 13,428 | | 49,670 | | 21,000 | | 93,870 | | 1,394 | | 681 | |
| | Meas./Lit. | 1.00 1.03 | | | 1.04 | | 1.03 | | 1.05 | | 0.94 | | |
| AGV-1 | F5-A, B, C | 5,881 | 116 | 36,844 | 508 | 9,356 | 162 | 45,839 | 622 | 716 | 15 | 1,176 | 10 |
| | S5-A, B, C | 6,227 | 67 | 32,816 | 152 | 8,810 | 122 | 47,222 | 741 | 703 | 18 | 1,204 | 18 |
| | M5-A, B, C | 6,395 | 322 | 34,644 | 204 | 6,240 | 384 | 48,566 | 2,013 | 776 | 20 | 1,248 | 66 |
| | Literature | 6,355 | | 35,306 | | 9,227 | | 47,279 | | 744 | | 1,221 | |
| | Meas./Lit. | 0.97 0.98 | | 0.88 | | 1.00 | | 0.98 | | 0.99 | | | |
| W-2 | F6-A, B, C | 6,356 | 46 | 84,119 | 1,678 | 40,097 | 656 | 77,886 | 1,077 | 1,343 | 24 | 144 | 5 |
| | S6-A, B, C | 6,525 | 45 | 77,027 | 329 | 40,928 | 131 | 78,133 | 1,273 | 1,333 | 4 | 56 | 9 |
| | M6-A, B, C | 6,537 | 254 | 77,854 | 3,050 | 40,210 | 1,152 | 78,396 | 2,154 | 1,341 | 29 | 83 | 14 |
| | Literature | 6,355 | | 77,688 | | 38,417 | | 75,116 | | 1,262 | | 170 | |
| | Meas./Lit. | 1.02 | | 1.03 | | 1.05 | | 1.04 | | 1.06 | | 0.55 | |
| MAG-1 | F4-A, B, C | 3,952 | 28 | 10,684 | 32 | 18,296 | 53 | 47,066 | 756 | 727 | 12 | 456 | 4 |
| | S4-A, B, C | 4,085 | 56 | 7,699 | 55 | 18,113 | 149 | 47,604 | 420 | 701 | 2 | 401 | 10 |
| | M4-A, B, C | 4,167 | 56 | 7,562 | 285 | 3,701 | 1,197 | 47,953 | 990 | 736 | 20 | 411 | 48 |
| | Literature | 4,502 | | 9,791 | | 18,093 | | 47,559 | | 759 | | 479 | |
| | Meas./Lit. | 0.90 | | 0.88 | | 0.74 | | 1.00 | | 0.95 | | 0.88 | |
| SDO-1 | SDO-1-A, B, C | 3,921 | 242 | 7,384 | 700 | 8,790 | 616 | 61,031 | 3,530 | 289 | 19 | 396 | 23 |
| | Literature | 4,200 | 185 | 7,500 | 336 | 9,300 | 229 | 65,324 | 1,469 | 325 | 39 | 397 | 38 |
| | Meas./Lit. | 0.93 | 0.93 0.98 | | 0.95 | | 0.93 | | 0.89 | | 1.00 | | |
| SRM 1645 | NBS1645-A, B, C | 564 | 44 | 28,692 | 755 | 6,954 | 173 | 98,421 | 1,157 | 704 | 12 | 344 | 4 |
| | Literature | | | | | 7,400 | 200 | 100,000 | 12,000 | 785 | 97 | | |
| | Meas./Lit. | | | | | 0.94 | | 0.87 | | 0.90 | | | |

Table T1. Standard reference materials for method calibration.

Notes: * = sample IDs for each reference material (BCR-1, AGV-1, W-2, and MAG-1) correspond to their digestion technique F (fusion), S (hotplate acid digestion), and M (microwave-assisted acid digestion). Designations A, B, and C are individual sample digestions that compose the average. SDO-1 and SRM 1645 samples were analyzed according to the hotplate acid digestion technique as described in "Methods," p. 2. Literature = published value of SRM. Meas./Lit. = accuracy ratio. Italics = outliers.

| | Concentration (µg/g) | | | | Meas./ | Concen (µg/ | tration g) | | | Meas./ | |
|----------|-------------------------|------|--------|------------|--------|----------------|---------------|-------|------------|--------|--|
| Standard | Мо | ± | Ν | Literature | Lit. | U | ± | Ν | Literature | Lit. | |
| BCR-1 | 1.64 | 0.06 | 13 (5) | 1.54 | 1.06 | 2.0 | | 1 | 1.8 | 1.16 | |
| MAG-1 | 1.14 | 0.08 | 11 (5) | 1.17 | 0.97 | 2.5 | 0.2 | 3 (3) | 2.7 | 0.93 | |
| AGV-1 | 2.4 | 0.1 | 7 (3) | 2.1 | 1.14 | | | | | | |
| W-2 | 0.47 | 0.03 | 7 (3) | 0.44 | 1.07 | | | | | | |
| SDO-1 | 192 | 12 | 3 (3) | 134 | 1.43 | 56 | 5 | 3 (3) | 49 | 1.14 | |
| SRM 1645 | 11.3 | 0.5 | 3 (3) | | | 0.3 | 0 | 3 (3) | 1.1 | 0.27 | |

Table T2. Standard reference materials for method calibration.

Notes: Standards are as described for Table T1, p. 7. N = the number of individual sample analyses that comprise each value, where the number in parentheses is the number of individually weighed and digested samples. When the two numbers differ it means that an individual sample was rerun on a different day and that number was also used to compute the average value. When the two numbers are the same it means that each individually digested sample was only run on one occasion. Meas./Lit. = the measured value divided by the reported or literature value. For Mo, a more up-to-date review is given in Wieser and DeLaeter (2000).

| Holes, Core, Section, Depting Ca Mg Mn Cu Fee The Ba U Cd Mo V 1233C-1H-1, 40-42 0.40 11,397 45,959 16,458 606 49.7 46,270 4,844 450 3.4 0.20 1.2 193 1233C-1H-1, 276-78 2.27 11,790 50,321 16,120 629 46.8 46,518 4,915 492 3.6 0.20 1.1 191 1233C-1H-2,76-78 8.77 12,879 78,144 17,944 662 46.3 52,525 5,982 2.88 3.7 0.20 1.0 109 1.0 190 1233C-2H-3,76-78 10.41 11,125 61,892 16,022 715 40.7 48,862 5,021 46.3 3.0.25 1.0 3.0 3.0.25 1.0 3.0 3.0.25 1.0 3.0 3.0 1.0 2.1 1.20 1.0 2.0 1.0 2.0 1.0 2.0 1.0 | | Denth | Trace elements (ppm) | | | | | | | | | | | |
|--|-----------------------|-------|----------------------|--------|--------|-------------|------|------------------|----------------|------------|-------------|------|-----|-----|
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | interval (cm) | (mcd) | К | Ca | Mg | Mn | Cu | Fe | Ti | Ва | U | Cd | Mo | V |
| 1233C-1H-2, 76-78 2.27 11,790 50,321 16,120 629 46.5 46,518 4,912 492 3.6 0.20 1.3 195 1233C-2H-3, 76-78 8.73 12,879 78,147 17,944 662 46.3 52,552 5,092 528 3.7 0.23 1.0 207 1233C-2H-3, 76-78 10.24 12,104 63,892 16,032 598 44.0 49,824 5,012 46.3 3.1 0.20 1.6 206 1233C-2H-4, 112-114 112-114 59,178 16,422 684 40.7 48,862 5,660 333 2.6 0.18 1.0 202 1233D-3H-4, 40-42 14,98 11,756 49,376 17,958 735 41.1 49,376 5,290 359 3.6 0.22 1.2 219 1233D-3H-4, 40-42 28.0 12,88 11,88 11,692 58,766 21,906 865 49.2 49,228 4,800 318 0.18 1.6 211 1233D-4H-4, 40-42 33.0 11,692 58,766 21,906 | 1233C-1H-1, 40-42 | 0.40 | 11,397 | 45,959 | 16,458 | 606 | 49.7 | 46,270 | 4,844 | 450 | 3.4 | 0.20 | 1.2 | 193 |
| 1233C-HH-3, 142-144 4.44 11,764 71,744 66,720 629 45.6 50,132 428 527 3.6 0.23 1.0 027 1233C-2H-3, 76-78 10,24 12,104 63,892 16,032 598 44.0 49,824 5,012 463 3.1 0.20 1.6 206 1233C-2H-3, 76-78 10,24 11,184 59,178 40,09 53,122 5,506 474 4.0 10 1.0 109 10 102 1233D-3H-4, 112-114 17,1184 59,178 16,322 715 40.9 53,122 5,526 340 03 3.3 0.22 1.1 202 1233D-3H-4, 112-114 17.20 10,796 61,526 16,128 692 39.7 49,012 5,133 348 3.1 0.18 1.5 211 143,9476 5,290 359 3.6 0.22 1.2 129 1233D-4H-5, 40-42 28.50 12,828 51,188 21,006 855 46.8 50,251 4,900 331 3.8 0.18 1.5 211 < | 1233C-1H-2, 76–78 | 2.27 | 11,790 | 50,321 | 16,120 | 629 | 46.8 | 46,518 | 4,915 | 492 | 3.6 | 0.20 | 1.3 | 195 |
| 1233C2H-2,76-78 8.73 12,879 78,147 17,944 662 46.3 52,552 5,025 288 3.7 0.23 1.0 207 1233C2-H-3,76-78 10.24 12,104 63,892 5,012 46.43 3.1 0.20 1.6 206 1233C2-H-4,112-114 12,15 11,784 79,605 22,369 776 42.8 54,782 5,050 474 2.4 0.19 1.0 199 1233C2-H-5,148-150 14.01 11,325 61,252 61,286 40.9 53,122 5,633 400 3.1 0.24 1.7 228 1233D-3H-4,412-114 11.720 10,796 61,566 16,128 692 3.97 40,12 51.33 348 3.1 0.18 1.1 209 1233D-4H-4,40-42 28.50 12,828 51,188 21,906 855 46.8 80,251 4,900 332 2.8 0.18 1.5 21 1.33 1.82 2.1 1.3 1.8 1.2 21 1.33 1.82 2.2 1.1 1.3 1.82 | 1233C-1H-3, 142–144 | 4.44 | 11,764 | 71,780 | 16,720 | 629 | 45.6 | 50,132 | 4,928 | 527 | 3.6 | 0.23 | 1.1 | 191 |
| 1233C2H-3,76-78 10.24 12,10 63,892 16,032 598 44.0 49,824 5,012 463 3.1 0.20 1.6 200 1233C2H-4,112-114 112.15 17,784 79,605 22,369 776 42.8 54,782 5,005 47.4 2.4 0.18 1.0 202 1233C2H-5,148-150 14.01 11,325 61,222 715 40.9 53,122 5,633 400 3.1 0.24 1.7 228 1233D-3H-4,112-114 17.20 61,596 16,128 692 39.7 49,012 5,133 348 3.1 0.18 1.1 209 1233D-3H-4,10-42 28.50 12,828 51,188 21,006 855 46.0 48,628 5,122 337 2.8 0.21 1.3 213 1233D-3H-4,40-42 33.0 11,492 52,900 17,921 745 48.9 46,026 4,804 319 3.3 0.18 1.6 201 1233D-3H-4,148-150 31.6 1,297 45,178 228 1.46 51.16 49, | 1233C-2H-2, 76–78 | 8.73 | 12,879 | 78,147 | 17,944 | 662 | 46.3 | 52,552 | 5,092 | 528 | 3.7 | 0.23 | 1.0 | 207 |
| 12330-34-4, 112-114 12.15 11,784 79,605 22.369 776 42.8 54,782 5,050 474 2.4 0.19 1.0 190 12330-34-4, 40-42 14.98 11,325 61,225 16,423 684 40.7 48,862 5,266 383 2.6 0.18 1.0 202 12330-34-4, 40-42 14.98 11,076 61,596 16,128 622 39,7 49,012 5,133 348 3.1 0.24 1.7 228 1233D-34-5, 4-6 2265 12,215 48,976 17,958 735 41.1 49,072 5,133 348 0.18 1.8 1.2 219 1233D-44-5, 76-78 30.36 11,692 58,766 19,06 855 46.8 50,251 48,003 312 2.8 0.18 1.0 215 1233D-44-4, 40-42 33.06 11,692 58,766 20,323 805 55.2 47,429 4,800 312 2.8 0.18 1.3 102 121 1233D-344-4,40-42 33.06 1.16,202 2.8 1.1 <t< td=""><td>1233C-2H-3, 76–78</td><td>10.24</td><td>12,104</td><td>63,892</td><td>16,032</td><td>598</td><td>44.0</td><td>49,824</td><td>5,012</td><td>463</td><td>3.1</td><td>0.20</td><td>1.6</td><td>206</td></t<> | 1233C-2H-3, 76–78 | 10.24 | 12,104 | 63,892 | 16,032 | 598 | 44.0 | 49,824 | 5,012 | 463 | 3.1 | 0.20 | 1.6 | 206 |
| 12330-3H-2, 40-42 13.47 11,184 59,178 16,462 788 40.7 48,862 52,266 383 2.6 0.18 1.0 202 12330-3H-3, 40-42 14.98 11,096 66,866 16,322 715 40.9 50,122 5,133 408 3.1 0.24 1.7 228 1233D-3H-4, 112-114 17.20 10,796 61,596 16,128 692 39.7 49,012 5,133 348 3.1 0.18 1.1 209 1233D-3H-4, 40-42 26.65 12,315 48,915 18,674 794 46.0 48,628 5,122 337 2.8 0.21 1.3 211 1233D-4H-5, 76-78 30.36 11,692 58,766 21,906 865 49.2 49,228 4,800 332 2.8 0.18 1.0 215 1233B-3H-4, 146-150 31.13 11,823 52,930 17,921 745 48.94 46,026 4,804 319 3.3 0.18 1.0 215 1233B-3H-4, 148-150 34.14 12,107 40,117 12,799< | 1233C-2H-4, 112–114 | 12.15 | 11,784 | 79,605 | 22,369 | 776 | 42.8 | 54,782 | 5,050 | 474 | 2.4 | 0.19 | 1.0 | 199 |
| 1233C2+F5, 148-150 14.01 11,325 61,295 16,462 738 40.9 53,122 5,633 400 3.1 0.24 1.7 228 1233D3-H4, 112-114 17.20 10,796 61,596 16,128 692 39.7 49,012 5,133 348 3.1 0.18 1.1 209 1233D-H4, 40-42 19.48 11,756 49,376 17,958 735 41.1 49,376 5,290 359 3.6 0.22 1.2 219 1233D-H4, 4, 40-42 28.50 12,828 51,188 21,006 855 46.8 50,251 49,003 34 3.8 0.18 1.0 215 1233B-H4, 440-42 33.06 11,692 58,766 20,323 805 55.2 47,429 48.0 332 2.8 0.18 1.3 1235 1233B-H4, 148-150 37.44 12,794 45,218 18,855 807 56.2 47,629 47.15 342 2.8 0.18 1.3 126 1233B-H4, 148-150 37.14 12,797 47,828 25,076 | 1233D-3H-2, 40–42 | 13.47 | 11,184 | 59,178 | 16,423 | 684 | 40.7 | 48,862 | 5,266 | 383 | 2.6 | 0.18 | 1.0 | 202 |
| 1233D-3H-3, 40-42 14.98 11,096 66,866 16,322 715 40.9 50,222 5,110 383 3.3 0.25 1.0 209 1233D-3H-6, 40-42 19.48 11,756 49,376 17,958 735 41.1 49,376 5,290 359 3.6 0.22 1.2 219 1233D-4H-3, 4-6 26.65 12,315 48,915 18,674 794 46.0 48,628 5,122 337 2.8 0.21 1.3 213 1233D-4H-5, 76-78 30.36 11,692 58,766 21,906 865 46.2 49,224 4,024 310 31.0 11.6 10 215 1233B-3H-4, 148-150 31.14 12,107 40,117 12,799 659 50.1 46,564 5,182 288 8.018 1.3 196 1233C-5H-1, 148-150 34.14 12,107 40,117 12,799 659 50.1 46,591 4,343 3.0 0.18 1.3 196 1233C-5H-2, 112-114 38.73 12,395 47,164 20,735 831 46.0 <td>1233C-2H-5, 148–150</td> <td>14.01</td> <td>11,325</td> <td>61,295</td> <td>16,462</td> <td>738</td> <td>40.9</td> <td>53,122</td> <td>5,633</td> <td>400</td> <td>3.1</td> <td>0.24</td> <td>1.7</td> <td>228</td> | 1233C-2H-5, 148–150 | 14.01 | 11,325 | 61,295 | 16,462 | 738 | 40.9 | 53,122 | 5,633 | 400 | 3.1 | 0.24 | 1.7 | 228 |
| 1233D-3H-4, 112-114 17,20 10,796 61,596 16,128 692 39.7 49,012 5,133 348 3.1 0.18 1.1 209 1233D-3H-4, 40-42 28.65 12,315 48,915 18,674 794 46.0 48,628 5,122 337 2.8 0.21 1.3 213 1233D-4H-4, 40-42 28.50 12,828 51,188 21,006 855 46.8 50,221 4,900 334 3.8 0.18 1.6 201 1233D-4H-5, 76-78 30.36 11,262 58,766 21,906 865 49.22 4,900 332 2.8 0.18 1.6 201 1233B-3H-4, 40-42 33.06 11,940 54,875 20,323 805 55.2 47,429 4,715 342 2.4 0.17 1.4 198 1233B-3H-4, 148-150 31.43 11,637 45,218 18,855 807 56.2 46,991 4,936 352 2.8 0.18 1.3 122 1233D-6H-5, 14-6 17.17 12,901 40,608 27,215 10,002 | 1233D-3H-3, 40–42 | 14.98 | 11,096 | 66,866 | 16,322 | 715 | 40.9 | 50,222 | 5,110 | 383 | 3.3 | 0.25 | 1.0 | 209 |
| 12310-3H-6, 40-42 19,48 11,756 49,376 17,958 735 41.1 49,376 5,290 359 3.6 0.22 1.2 219 12330-4H-4, 40-42 28,50 12,828 51,188 21,006 855 46.8 50,251 4,900 334 3.8 0.18 1.5 211 12330-4H-5, 76-78 30.36 11,692 58,766 21,906 865 49.2 49,228 4,800 332 2.8 0.18 1.6 201 12338-3H-4, 148-150 31.13 11,823 52,901 17,921 745 48.9 46,026 4,804 319 3.3 0.18 1.0 215 12338-3H-4, 148-150 31.14 12,107 40,117 12,799 659 50.1 46,564 5,182 2.8 0.18 1.3 219 12335-3H-2, 112-114 38,73 12,395 47,164 20,735 831 46.0 51,190 5,004 324 3.3 0.19 1.9 202 12335-6H-2, 148-150 40.60 12,477 47,823 25,076 911< | 1233D-3H-4, 112–114 | 17.20 | 10,796 | 61,596 | 16,128 | 692 | 39.7 | 49,012 | 5,133 | 348 | 3.1 | 0.18 | 1.1 | 209 |
| 12310-4H-3, 4-6 26,65 12,315 48,915 18,674 794 46.0 48,628 5,122 337 2.8 0.21 1.3 211 12330-4H-4, 40-42 28,50 12,828 51,188 21,006 855 46.8 50,251 4,900 334 3.8 0.18 1.6 211 1233B-3H-2,148-150 31.13 11,823 52,930 17,921 745 48.9 46,026 4,804 319 3.3 0.18 1.0 215 1233B-3H-4,144-150 31.14 12,107 40,117 12,799 659 50.1 46,564 5,182 28 2.8 0.18 1.3 223 1233C-5H-1,112-114 38.73 12,974 45,218 18,855 807 56.2 46,991 4,936 322 2.8 0.18 1.3 223 1233C-5H-4,148-150 40.60 12,477 47,823 25,076 941 49.0 50.889 4,874 334 3.4 0.20 1.8 212 1233C-6H-4,148-150 40.13 11,603 44,068 2,717 | 1233D-3H-6, 40–42 | 19.48 | 11,756 | 49,376 | 17,958 | 735 | 41.1 | 49,376 | 5,290 | 359 | 3.6 | 0.22 | 1.2 | 219 |
| 12310-41-4, 40-42 28.50 12,828 51,188 21,006 855 46.8 50,251 4,900 334 3.8 0.18 1.6 201 1233B-41-4, 44-57 67.8 30.36 11,692 58,766 21,906 865 49.22 49,228 4,800 319 3.3 0.18 1.0 215 1233B-31-4, 40-42 33.06 11,940 54,875 20,323 805 55.2 47,429 4,715 342 2.4 0.17 1.4 198 1233B-31+4, 148-150 37.54 12,974 45,218 18,855 807 56.2 46,991 4,936 352 2.8 0.18 1.3 196 1233C-5H-2, 112-114 38.73 12,395 47,164 20,735 831 46.0 51,190 5,044 336 2.9 0.17 1.4 228 1233D-6H-2, 148-150 44.13 11,639 44,068 27,215 1,002 50.5 33,151 5,046 336 2.9 0.17 1.4 228 1233D-6H-2, 148-150 41.17 12,492 2,413< | 1233D-4H-3, 4–6 | 26.65 | 12,315 | 48,915 | 18,674 | 794 | 46.0 | 48,628 | 5,122 | 337 | 2.8 | 0.21 | 1.3 | 213 |
| 12310-4H-5, 76-78 30.36 11,692 58,766 21,906 865 49.22 4,800 332 2.8 0.18 1.0 215 12338-3H-4, 148-150 31.13 11,823 52,930 17,921 745 48.9 46,026 4,804 319 3.3 0.18 1.0 215 12338-3H-4, 148-150 31.14 12,107 40,117 12,799 659 50.1 46,564 5,182 228 2.8 0.18 1.3 223 1233C-5H-2, 112-114 38.73 12,297 47,164 20,735 831 46.0 51,190 5,004 342 3.3 0.19 1.9 202 1233C-5H-4, 148-150 40.60 12,477 47,823 25,076 941 49.05 50,889 4,874 334 3.4 0.20 1.8 212 1233D-6H-5, 4-6 47.17 12,901 46,937 18,213 860 53.4 47,499 4,834 343 3.2 0.17 1.4 228 1233D-6H-5, 4-6 47.17 12,901 46,937 18,213 56,61 <td>1233D-4H-4, 40–42</td> <td>28.50</td> <td>12,828</td> <td>51,188</td> <td>21,006</td> <td>855</td> <td>46.8</td> <td>50,251</td> <td>4,900</td> <td>334</td> <td>3.8</td> <td>0.18</td> <td>1.5</td> <td>211</td> | 1233D-4H-4, 40–42 | 28.50 | 12,828 | 51,188 | 21,006 | 855 | 46.8 | 50,251 | 4,900 | 334 | 3.8 | 0.18 | 1.5 | 211 |
| 12338-3H-2, 148-150 31.13 11,823 52,930 17,921 745 48.9 46,026 4,804 319 3.3 0.18 1.0 215 12338-3H-4, 40-42 33.06 11,940 54,875 20,323 805 55.2 47,429 4,715 342 2.4 0.17 1.4 198 12336-3H-1, 148-150 34.14 12,107 40,117 12,799 659 50.1 46,564 5,182 298 2.8 0.18 1.3 223 1233C-5H-1, 148-150 36.0 12,477 47,623 25,076 941 49.0 50,889 4,874 334 3.4 0.20 1.8 212 1233D-6H-2, 148-150 44.13 11,639 44,068 27,215 1,002 50.5 53,151 5,046 336 31.0 0.22 0.20 118 1.22 22.0 211 1233D-6H-2, 148-150 44.13 11,637 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 197 1234A-1H-1, 26-2 0.66 13,471 | 1233D-4H-5, 76–78 | 30.36 | 11,692 | 58,766 | 21,906 | 865 | 49.2 | 49,228 | 4,800 | 332 | 2.8 | 0.18 | 1.6 | 201 |
| 1238-3H-4, 40-42 33.06 11,940 54,875 20,323 805 55.2 47,429 47,15 342 2.4 0.17 1.4 198 1238-3H-4, 4148-150 37.54 12,974 45,218 18,855 807 56.2 46,991 4,936 352 2.8 0.18 1.3 196 1233C-5H-2, 112-114 38.73 12,395 47,164 20,735 831 46.0 51,190 5,004 342 3.3 0.19 1.9 202 1233C-5H-2, 114-118 46.01 12,477 47,823 25,076 941 49.05 6,889 4,874 334 3.4 0.20 1.8 212 1233D-6H-2, 148-150 44.13 11,639 44,068 27,215 1,002 50.5 53,151 5,046 336 2.9 0.17 1.4 228 1233D-6H-5, 4-6 47,17 12,901 46,937 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 127 1234A-1H-1, 6-8 0.06 13,471 35,484 18,036 | 1233B-3H-2, 148–150 | 31.13 | 11,823 | 52,930 | 17,921 | 745 | 48.9 | 46,026 | 4,804 | 319 | 3.3 | 0.18 | 1.0 | 215 |
| 12336-3H-4, 148-150 37.54 12,974 40,117 12,799 659 50.1 40,564 5,182 298 2.8 0.18 1.3 223 1233C-5H-2, 112-114 38.73 12,974 45,218 18,855 807 56.2 46,991 4,936 352 2.8 0.18 1.3 196 1233C-5H-2, 112-114 38.73 12,974 47,823 25,076 941 490 50,889 4,874 334 3.4 0.20 1.8 212 1233D-6H-2, 148-150 44.13 11,639 44,068 27,215 1,002 50.5 53,151 5,046 336 2.9 0.17 1.4 222 2.0 211 1233D-6H-5, 4-6 47.17 12,901 46,937 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 197 1234A-1H-1, 26-28 0.26 13,083 28,433 13,973 522 37.3 43,610 4,332 399 4.6 0.42 2.7 146 1234A-1H-2, 16-8 1.57 13,963 | 1233B-3H-4, 40–42 | 33.06 | 11,940 | 54,8/5 | 20,323 | 805 | 55.2 | 47,429 | 4,/15 | 342 | 2.4 | 0.17 | 1.4 | 198 |
| 1233C-5H-1, 148-150 37, 54 12,974 45,218 18,853 807 56.2 46,991 4,936 352 2.8 0.18 1.3 196 1233C-5H-2, 112-114 38,73 12,395 47,164 20,735 831 46.0 51,190 5,004 342 3.3 0.019 1.9 202 1233C-5H-4, 148-150 40.60 12,477 47,823 25,076 941 49.0 50,889 4,874 334 3.4 0.20 1.8 212 1233D-6H-2, 148-150 46.19 12,013 42,366 19,706 825 55.7 49,056 4,683 332 3.1 0.22 2.0 211 1233D-6H-5, 4-6 47.17 12,901 46,937 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 197 1234A-1H-1, 26-8 0.26 13,083 28,433 13,973 522 37.3 43,610 4,322 399 4.6 0.42 2.7 146 1234A-1H-1, 26-8 1.57 13,936 33,802 13,576 | 1233B-3H-4, 148-150 | 34.14 | 12,107 | 40,117 | 12,799 | 659 | 50.1 | 46,564 | 5,182 | 298 | 2.8 | 0.18 | 1.3 | 223 |
| 1233C-Sh-2, 112-114 38.73 12,395 47,164 20,733 831 46.0 51,190 5,004 342 3.3 0.19 1.9 202 1233C-Sh-4, 148-150 44.13 11,639 47,082 25,076 941 49.0 50,0889 4,844 334 3.4 0.20 1.8 212 1233D-6h-2, 148-150 44.13 11,639 42,068 27,215 1,002 50.5 53,151 5,046 336 2.9 0.17 1.4 228 1233D-6h-5, 4-6 47.17 12,901 46,937 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 197 1234A-1h-1, 6-8 0.06 12,492 2,413 9,645 415 47.0 40,626 4,367 434 4.3 0.36 2.7 146 1234A-1h-1, 16-18 1.16 13,695 31,150 13,829 534 34.9 41,391 4,44,355 4,370 44.4 0.40 2.5 158 1234A-1h-2, 166-18 1.57 13,652 37,244 14,310 </td <td>1233C-5H-1, 148-150</td> <td>37.54</td> <td>12,974</td> <td>45,218</td> <td>18,855</td> <td>807</td> <td>56.2</td> <td>46,991</td> <td>4,936</td> <td>352</td> <td>2.8</td> <td>0.18</td> <td>1.3</td> <td>196</td> | 1233C-5H-1, 148-150 | 37.54 | 12,974 | 45,218 | 18,855 | 807 | 56.2 | 46,991 | 4,936 | 352 | 2.8 | 0.18 | 1.3 | 196 |
| 1233C-51-4, 148-150 40.00 12,477 47,823 25,076 941 49.0 30,889 4,874 334 3.4 0.20 1.8 212 1233D-61+2, 148-150 44.13 11,639 44,068 27,215 1,002 50.5 53,151 5,046 336 2.9 0.17 1.4 228 1233D-61+2, 4-6 47.17 12,901 46,937 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 197 1234A-11+1, 6-8 0.06 12,492 22,413 9,645 415 47.0 40,626 4,367 343 4.3 0.36 2.7 159 1234A-11+1, 56-58 0.56 13,471 35,484 18,038 608 39.4 44,355 4,370 434 4.4 0.40 2.5 151 1234A-11+2, 166-18 1.57 13,963 33,802 13,576 524 52.6 43,222 4,488 393 4.7 0.47 2.7 155 1234A-11+2, 166-108 2.57 13,652 37,284 14,311 | 1233C-5H-2, 112-114 | 38./3 | 12,395 | 47,164 | 20,735 | 831 | 46.0 | 51,190 | 5,004 | 342 | 3.3 | 0.19 | 1.9 | 202 |
| 1233D-6h-2, 146-130 44,13 11,639 44,106 27,23 1,002 50.3 35,31 5,046 356 2.9 0.17 1.4 220 1233D-6h-4, 54-56 46,19 12,011 46,937 18,213 860 53.4 47,499 4,834 354 3.2 0.19 1.4 197 1234A-1H-1, 6-8 0.06 12,492 22,413 9,645 415 47.0 40,626 4,367 343 4.3 0.36 2.7 159 1234A-1H-1, 6-8 0.26 13,083 28,433 13,973 522 37.3 43,610 4,332 399 4.6 0.42 2.7 146 1234A-1H-1, 16-118 1.16 13,695 31,150 13,829 534 34.9 41,891 4,404 403 4.9 0.55 2.5 158 1234A-1H-2, 166-108 2.57 13,652 37,284 14,030 569 31.9 4,044 403 4.9 0.55 2.5 158 1234A-1H-2, 166-108 2.57 13,652 37,284 14,310 614 <td< td=""><td>1233C-5H-4, 148-150</td><td>40.60</td><td>12,477</td><td>47,823</td><td>25,076</td><td>941</td><td>49.0</td><td>50,889</td><td>4,874</td><td>334</td><td>3.4</td><td>0.20</td><td>1.8</td><td>212</td></td<> | 1233C-5H-4, 148-150 | 40.60 | 12,477 | 47,823 | 25,076 | 941 | 49.0 | 50,889 | 4,874 | 334 | 3.4 | 0.20 | 1.8 | 212 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1233D-60-2, 146-130 | 44.15 | 12,039 | 44,000 | 27,213 | 1,002 | 50.5 | 33,131 40.056 | 5,040 1 692 | 220 | 2.9 | 0.17 | 1.4 | 220 |
| 1234A-1H-1, 6-8 0.06 12,492 22,413 9,645 415 47.0 40,626 4,367 343 0.36 2.7 159 1234A-1H-1, 26-28 0.26 13,083 28,433 13,973 522 37.3 43,610 4,332 399 4.6 0.42 2.7 146 1234A-1H-1, 56-58 0.56 13,471 35,484 18,038 608 39.4 44,355 4,370 434 4.4 0.40 2.5 151 1234A-1H-2, 66-8 1.57 13,652 37,284 14,116 14,030 569 31.9 43,048 4,570 367 4.4 0.38 2.5 158 1234A-1H-2, 56-58 2.07 13,652 37,284 14,311 614 34.4 43,593 4,703 379 4.1 0.40 2.5 156 1234A-1H-2, 166-108 2.57 13,652 37,284 14,311 614 34.4 43,593 4,703 379 4.1 0.40 2.5 17 159 1234A-1H-5, 18890 3.75 14,616 37,893 1 | 12330-00-4, 34-30 | 40.19 | 12,015 | 42,300 | 19,700 | 023 860 | 52 / | 49,030 | 4,005 | 251 251 | 2.1 | 0.22 | 2.0 | 211 |
| 1234A-1H-1, 26-28 0.26 13,083 22,4713 13,973 522 37.3 43,610 4,322 399 4.6 0.42 2.7 146 1234A-1H-1, 26-28 0.26 13,471 35,484 18,038 608 39.4 44,355 4,370 434 4.4 0.40 2.5 151 1234A-1H-1, 56-58 0.56 13,471 35,484 18,038 608 39.4 44,355 4,370 434 4.4 0.40 2.5 151 1234A-1H-2, 6-8 1.57 13,936 33,802 13,576 524 52.6 43,222 4,488 393 4.7 0.47 2.7 155 1234A-1H-2, 166-108 2.57 13,632 36,404 14,030 569 31.9 43,048 4,570 367 4.4 0.38 2.5 162 1234A-1H-2, 146-148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234B-1H-3, 58.8-60 3.45 13,861 39,512 14,626 | 12340-11-1 6 8 | 47.17 | 12,901 | 22 /13 | 9.645 | <i>4</i> 15 | 47.0 | 47,499 | 4,054 | 3/3 | J.∠ ∕/ 3 | 0.19 | 2.7 | 150 |
| 1234A-11+1, 56-58 0.56 13,471 35,484 18,038 608 39.4 44,355 4,370 434 4.4 0.40 2.5 151 1234A-11+1, 56-58 0.56 13,471 35,484 18,038 608 39.4 44,355 4,370 434 4.4 0.40 2.5 151 1234A-11+2, 6-8 1.57 13,936 33,802 13,576 524 52.6 43,222 4,488 393 4.7 0.47 2.7 155 1234A-11+2, 166-108 2.57 13,652 37,284 14,311 614 34.4 43,593 4,703 379 4.1 0.40 2.1 166 1234A-11+2, 146-148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234A-11+2, 146-148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234B-11+3, 58.8-60 3.75 14,616 37,893 16,112 | 12344-11-1 26-28 | 0.00 | 13 083 | 22,413 | 13 973 | 522 | 373 | 43 610 | 4 332 | 399 | 4.5 4.6 | 0.30 | 2.7 | 146 |
| 1234A-1H-1, 116-118 1.16 13,695 31,150 13,829 534 34.9 41,891 4,404 403 4.9 0.55 2.5 158 1234A-1H-2, 6-8 1.57 13,936 33,802 13,576 524 52.6 43,222 4,488 393 4.7 0.47 2.7 155 1234A-1H-2, 6-8 1.57 13,632 36,404 14,030 569 31.9 43,048 4,570 367 4.4 0.38 2.5 162 1234A-1H-2, 106-108 2.57 13,652 37,284 14,311 614 34.4 43,593 4,703 379 4.1 0.40 2.1 166 1234A-1H-2, 146-148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234B-1H-3, 58.8–60 3.45 13,861 39,512 14,626 612 82.8 43,973 4,554 379 3.7 0.28 1.5 184 1234B-1H-5, 88.8–90 3.75 14,616 37,893 16,112 | 1234A-1H-1 56-58 | 0.20 | 13 471 | 35 484 | 18 038 | 608 | 39.4 | 44 355 | 4 370 | 434 | 4.0 | 0.42 | 2.7 | 151 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1234A-1H-1, 116–118 | 1.16 | 13,695 | 31,150 | 13,829 | 534 | 34.9 | 41.891 | 4,404 | 403 | 4.9 | 0.55 | 2.5 | 158 |
| 1234A-1H-2, 56–58 2.07 13,632 36,404 14,030 569 31.9 43,048 4,570 367 4.4 0.38 2.5 162 1234A-1H-2, 106–108 2.57 13,652 37,284 14,311 614 34.4 43,593 4,703 379 4.1 0.40 2.1 166 1234A-1H-2, 146–148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234B-1H-3, 58.8–60 3.45 13,861 39,512 14,626 612 82.8 43,973 4,557 376 3.7 0.27 1.9 178 1234B-1H-4, 48.8–50 4.86 14,171 33,621 16,310 622 33.3 41,678 4,418 350 3.4 0.20 1.9 176 1234B-1H-4, 418.8–50 6.07 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234A-2H-2, 108.8–110 7.76 14,675 38,255 15,709 </td <td>1234A-1H-2, 6–8</td> <td>1.57</td> <td>13.936</td> <td>33.802</td> <td>13.576</td> <td>524</td> <td>52.6</td> <td>43.222</td> <td>4.488</td> <td>393</td> <td>4.7</td> <td>0.47</td> <td>2.7</td> <td>155</td> | 1234A-1H-2, 6–8 | 1.57 | 13.936 | 33.802 | 13.576 | 524 | 52.6 | 43.222 | 4.488 | 393 | 4.7 | 0.47 | 2.7 | 155 |
| 1234A-1H-2, 106-108 2.57 13,652 37,284 14,311 614 34.4 43,593 4,703 379 4.1 0.40 2.1 166 1234A-1H-2, 146-148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234B-1H-3, 58.8-60 3.45 13,861 39,512 14,626 612 82.8 43,973 4,557 376 3.7 0.27 1.9 178 1234B-1H-5, 88.8-90 3.75 14,616 37,893 16,112 675 41.4 43,943 4,554 379 3.7 0.28 1.5 184 1234B-1H-4, 48.8-50 4.86 14,171 33,621 16,310 622 33.3 41,678 4,418 350 3.4 0.20 1.9 176 1234B-1H-4, 118.8-200 6.07 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234A-2H-2, 108.8-110 7.76 14,675 38,255 15,70 | 1234A-1H-2, 56–58 | 2.07 | 13.632 | 36,404 | 14.030 | 569 | 31.9 | 43.048 | 4.570 | 367 | 4.4 | 0.38 | 2.5 | 162 |
| 1234A-1H-2, 146-148 2.97 14,066 43,473 18,109 720 36.0 45,965 4,624 413 3.6 0.35 1.7 159 1234B-1H-3, 58.8-60 3.45 13,861 39,512 14,626 612 82.8 43,973 4,557 376 3.7 0.27 1.9 178 1234B-1H-5, 88.8-90 3.75 14,616 37,893 16,112 675 41.4 43,943 4,554 379 3.7 0.28 1.5 184 1234B-1H-4, 48.8-50 4.86 14,171 33,621 16,310 622 33.3 41,678 4,418 350 3.4 0.20 1.9 176 1234B-1H-4, 118.8-200 5.56 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234A-2H-2, 108.8-110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 108.8-140 8.06 14,313 33,804 13, | 1234A-1H-2, 106–108 | 2.57 | 13,652 | 37.284 | 14,311 | 614 | 34.4 | 43,593 | 4.703 | 379 | 4.1 | 0.40 | 2.1 | 166 |
| 1234B-1H-3, 58.8-60 3.45 13,861 39,512 14,626 612 82.8 43,973 4,557 376 3.7 0.27 1.9 178 1234B-1H-5, 88.8-90 3.75 14,616 37,893 16,112 675 41.4 43,943 4,554 379 3.7 0.28 1.5 184 1234B-1H-4, 48.8-50 4.86 14,171 33,621 16,310 622 33.3 41,678 4,418 350 3.4 0.20 1.9 176 1234B-1H-4, 118.8-200 5.56 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234B-1H-5, 18.8-20 6.07 7 14,675 38,255 15,709 640 40.8 44,839 4,667 209 3.9 0.21 1.8 163 1234A-2H-2, 108.8-110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 138.8-140 8.06 14,313 33,804 </td <td>1234A-1H-2, 146–148</td> <td>2.97</td> <td>14,066</td> <td>43,473</td> <td>18,109</td> <td>720</td> <td>36.0</td> <td>45,965</td> <td>4,624</td> <td>413</td> <td>3.6</td> <td>0.35</td> <td>1.7</td> <td>159</td> | 1234A-1H-2, 146–148 | 2.97 | 14,066 | 43,473 | 18,109 | 720 | 36.0 | 45,965 | 4,624 | 413 | 3.6 | 0.35 | 1.7 | 159 |
| 1234B-1H-5, 88.8–90 3.75 14,616 37,893 16,112 675 41.4 43,943 4,554 379 3.7 0.28 1.5 184 1234B-1H-4, 48.8–50 4.86 14,171 33,621 16,310 622 33.3 41,678 4,418 350 3.4 0.20 1.9 176 1234B-1H-4, 118.8–200 5.56 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234B-1H-5, 18.8–20 6.07 6.07 1.5,789 41,338 20,411 775 40.2 45,357 4,651 399 4.2 0.33 1.8 173 1234A-2H-2, 108.8–110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 108.8–140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 335 3.9 0.32 1.6 180 1234A-2H-2, 148.8–150 8.16 14,783 37 | 1234B-1H-3, 58.8–60 | 3.45 | 13,861 | 39,512 | 14,626 | 612 | 82.8 | 43,973 | 4,557 | 376 | 3.7 | 0.27 | 1.9 | 178 |
| 1234B-1H-4, 48.8–50 4.86 14,171 33,621 16,310 622 33.3 41,678 4,418 350 3.4 0.20 1.9 176 1234B-1H-4, 118.8–200 5.56 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234B-1H-5, 18.8–20 6.07 6.07 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234A-2H-2, 88.8–90 7.56 15,789 41,338 20,411 775 40.2 45,357 4,651 399 4.2 0.33 1.8 173 1234A-2H-2, 108.8–110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 138.8–140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 355 3.9 0.32 1.6 180 1234A-2H-2, 148.8–150 8.16 14,783 37,504 15,5 | 1234B-1H-5, 88.8–90 | 3.75 | 14,616 | 37,893 | 16,112 | 675 | 41.4 | 43,943 | 4,554 | 379 | 3.7 | 0.28 | 1.5 | 184 |
| 1234B-1H-4, 118.8-200 5.56 12,669 12,138 6,570 392 35.4 35,943 4,567 209 3.9 0.21 1.8 163 1234B-1H-5, 18.8-20 6.07 6.07 6.07 6.07 6.07 6.07 1234A-2H-2, 88.8-90 7.56 15,789 41,338 20,411 775 40.2 45,357 4,651 399 4.2 0.33 1.8 173 1234A-2H-2, 108.8-110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 138.8-140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 335 3.9 0.32 1.6 180 1234A-2H-2, 148.8-150 8.16 14,783 37,504 15,502 656 37.5 43,130 4,532 363 4.4 0.27 1.8 175 1234A-2H-4, 8,75-10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2. | 1234B-1H-4, 48.8–50 | 4.86 | 14,171 | 33,621 | 16,310 | 622 | 33.3 | 41,678 | 4,418 | 350 | 3.4 | 0.20 | 1.9 | 176 |
| 1234B-1H-5, 18.8–20 6.07 1234A-2H-2, 88.8–90 7.56 15,789 41,338 20,411 775 40.2 45,357 4,651 399 4.2 0.33 1.8 173 1234A-2H-2, 108.8–110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 138.8–140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 335 3.9 0.32 1.6 180 1234A-2H-2, 148.8–150 8.16 14,783 37,504 15,502 656 37.5 43,130 4,532 363 4.4 0.27 1.8 175 1234A-2H-4, 8,75–10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2.6 164 1234A-2H-4, 18.75–20 9.91 | 1234B-1H-4, 118.8–200 | 5.56 | 12,669 | 12,138 | 6,570 | 392 | 35.4 | 35,943 | 4,567 | 209 | 3.9 | 0.21 | 1.8 | 163 |
| 1234A-2H-2, 88.8–90 7.56 15,789 41,338 20,411 775 40.2 45,357 4,651 399 4.2 0.33 1.8 173 1234A-2H-2, 108.8–110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 138.8–140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 335 3.9 0.32 1.6 180 1234A-2H-2, 148.8–150 8.16 14,783 37,504 15,502 656 37.5 43,130 4,532 363 4.4 0.27 1.8 175 1234A-2H-4, 8,75–10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2.6 164 1234A-2H-4, 18.75–20 9.91 | 1234B-1H-5, 18.8–20 | 6.07 | | | | | | | | | | | | |
| 1234A-2H-2, 108.8–110 7.76 14,675 38,255 15,709 640 40.8 44,839 4,672 361 4.6 0.29 2.1 179 1234A-2H-2, 138.8–140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 335 3.9 0.32 1.6 180 1234A-2H-2, 148.8–150 8.16 14,783 37,504 15,502 656 37.5 43,130 4,532 363 4.4 0.27 1.8 175 1234A-2H-4, 8.75–10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2.6 164 1234A-2H-4, 18.75–20 9.91 | 1234A-2H-2, 88.8–90 | 7.56 | 15,789 | 41,338 | 20,411 | 775 | 40.2 | 45,357 | 4,651 | 399 | 4.2 | 0.33 | 1.8 | 173 |
| 1234A-2H-2, 138.8–140 8.06 14,313 33,804 13,796 603 36.5 41,113 4,599 335 3.9 0.32 1.6 180 1234A-2H-2, 148.8–150 8.16 14,783 37,504 15,502 656 37.5 43,130 4,532 363 4.4 0.27 1.8 175 1234A-2H-4, 8.75–10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2.6 164 1234A-2H-4, 18.75–20 9.91 | 1234A-2H-2, 108.8–110 | 7.76 | 14,675 | 38,255 | 15,709 | 640 | 40.8 | 44,839 | 4,672 | 361 | 4.6 | 0.29 | 2.1 | 179 |
| 1234A-2H-2, 148.8–150 8.16 14,783 37,504 15,502 656 37.5 43,130 4,532 363 4.4 0.27 1.8 175 1234A-2H-4, 8.75–10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2.6 164 1234A-2H-4, 18.75–20 9.91 9.91 | 1234A-2H-2, 138.8–140 | 8.06 | 14,313 | 33,804 | 13,796 | 603 | 36.5 | 41,113 | 4,599 | 335 | 3.9 | 0.32 | 1.6 | 180 |
| 1234A-2H-4, 8.75-10 9.81 14,630 34,591 15,594 638 36.9 41,963 4,451 366 4.3 0.44 2.6 164 1234A-2H-4, 18.75-20 9.91 9.91 4.0 0.27 3.9 174 1234A-2H-4, 28.75-30 10.01 15,203 35,292 16,771 697 39.2 44,341 4,555 383 3.8 0.23 2.7 171 1234A-2H-4, 38.75-40 10.11 14,775 34,388 17,048 702 40.8 43,713 4,459 364 4.2 0.23 2.3 174 | 1234A-2H-2, 148.8–150 | 8.16 | 14,783 | 37,504 | 15,502 | 656 | 37.5 | 43,130 | 4,532 | 363 | 4.4 | 0.27 | 1.8 | 175 |
| 1234A-2H-4, 18.75-20 9.91 4.0 0.27 3.9 174 1234A-2H-4, 28.75-30 10.01 15,203 35,292 16,771 697 39.2 44,341 4,555 383 3.8 0.23 2.7 171 1234A-2H-4, 38.75-40 10.11 14,775 34,388 17,048 702 40.8 43,713 4,459 364 4.2 0.23 2.3 174 | 1234A-2H-4, 8.75–10 | 9.81 | 14,630 | 34,591 | 15,594 | 638 | 36.9 | 41,963 | 4,451 | 366 | 4.3 | 0.44 | 2.6 | 164 |
| 1234A-2H-4, 28.75–30 10.01 15,203 35,292 16,771 697 39.2 44,341 4,555 383 3.8 0.23 2.7 171 1234A-2H-4, 38.75–40 10.11 14,775 34,388 17,048 702 40.8 43,713 4,459 364 4.2 0.23 2.3 174 | 1234A-2H-4, 18.75–20 | 9.91 | | | | | | | | | 4.0 | 0.27 | 3.9 | 174 |
| 1234A-2H-4, 38.75–40 10.11 14,775 34,388 17,048 702 40.8 43,713 4,459 364 4.2 0.23 2.3 174 | 1234A-2H-4, 28.75–30 | 10.01 | 15,203 | 35,292 | 16,771 | 697 | 39.2 | 44,341 | 4,555 | 383 | 3.8 | 0.23 | 2.7 | 171 |
| | 1234A-2H-4, 38.75–40 | 10.11 | 14,775 | 34,388 | 17,048 | 702 | 40.8 | 43,713 | 4,459 | 364 | 4.2 | 0.23 | 2.3 | 174 |

 Table T3. Elemental concentrations, Sites 1233 and 1234.

Notes: Missing data are from two samples lost prior to analyses; these samples will be rerun and presented as part of future efforts. Depth is from Mix, Tiedemann, Blum, et al. (2003).