1. *PREFACE:* DEPTH BELOW SEAFLOOR CONVENTIONS[1]

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This preface briefly explains our conventions for estimating depth below seafloor in presenting downcore data. In general, we follow Ocean Drilling Program (ODP) meters below seafloor (mbsf) convention in positioning the top of recovered sediment at the top of the cored interval and in calculating sub-bottom depths for samples within a particular section using the depth of the top of the section and the depth in the section (see pp. 47–48 of Flood, Piper, Klaus, et al., 1995). Sub-bottom depths determined using the ODP convention are noted on figures as "mbsf." Sediments recovered from many of the holes cored on Leg 155, however, expanded within the core liner, largely as a result of pervasive biogenic methane gas. Core expansion also results from elastic rebound and clay swelling. Because core sections are cut and measured after the sediment has expanded and the core length has stabilized, the recorded length of a core can be greater than the interval cored in the hole (as measured by pipe advance), by as much as a meter per core in extreme cases. In such circumstances in a downcore plot, data from the core catcher would plot below any measurements in the upper meter of the underlying core. For analyses at intervals of a meter or greater, use of the standard ODP convention and "mbsf" does not result in anomalous downcore plots. For more closely spaced analyses, however, expansion resulting from gas and other phenomena must be corrected if downcore plots are to be unambiguous where there is a nominal recovery of more than 100%. We have provided a method that corrects for gas expansion for all holes so that data analyses done by different investigators can be correlated.

For the presentation of closely spaced analyses, we have used a standard method for compressing recovered core to correspond to the cored interval in the hole. In figures, this scale is referred to as "expansion-corrected mbsf." The following steps have been used in calculating "expansion-corrected mbsf":

1. In all cores, we measured and removed all voids >2.5 cm length in cores (including voids at the bottom of sections resulting in cores cut more than 2 cm shorter than the conventional 150 cm). Voids were identified from the shipboard handwritten visual core descriptions and from core photographs.
2. If core recovery exceeded 100% after voids were removed, a linear compression was applied to the entire core length so that the compressed core length was equal to the interval cored.
3. Expansion-corrected mbsf depths within cores were calculated based on steps 1 and 2 by adding the recalculated depths to the depth reported for the top of the cored interval.

Excel (version 4) spreadsheets are provided on the CD-ROM (Tables 1–17) for calculating "expansion-corrected mbsf." To determine the "expansion-corrected mbsf," first scroll down the spreadsheet to the row of the core and section of interest. In this row, enter the interval depth into column I. Note that the spreadsheet calculates the corrected depth scale using units of meters in column I, rather than the commonly used centimeter units used in the identification of sample location. Once a value is entered in column I, the corresponding expansion-corrected mbsf depth is calculated and displayed in column J. Two errors can occur in this procedure. If the interval entered in the row for a specific core and section is longer than the length of the section, a zero value will appear in column J. The character string "#VALUE!" will appear in column J if the interval entered is associated with a void space in the selected section.

Our procedure is a practicality to eliminate data overlap. It provides only a rough approximation to in situ depth, and the error will vary significantly from core to core. In particular, it uses the ODP convention of placing the top of the recovered section at the top of the cored interval. It does not take into account the 1- to 2-m gap between cores that has been recognized from triple coring in pelagic and hemipelagic sediment. As a result, many cores have not been sufficiently compressed to compensate for gas expansion and elastic rebound. In some holes, the availability of wireline log data has allowed short lengths of recovered core to be positioned more accurately than by the ODP convention, for example as shown by Pirmez et al. (this volume).

Note that the graphic sedimentological columns presented in each site chapter and on the back-pocket foldout of Flood, Piper, Klaus, et al. (1995) were prepared by compressing cores with >100% recovery back to cored interval length after removal of large voids only.

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REFERENCE

Flood, R.D., Piper, D.J.W., Klaus, A., et al., 1995. *Proc. ODP, Init. Repts.*, 155: College Station, TX (Ocean Drilling Program).

APPENDIX

Notes on Structure of the Spreadsheet

The spreadsheets have been developed by modifying the shipboard coring summary tables. They are not particularly elegant; these notes are provided for users who may wish to modify them. The files will be more user-friendly and efficient if a template is created. The user can then paste sample identifiers or depths of an entire data set into the template and receive all corrected depths at once. This requires a routine that loops through sections of a particular core and performs the appropriate calculations.

The following columns have been added to the shipboard coring summary spreadsheet:

Column I: User entered interval (in meters) at selected row of core and section.

Column J: Calculated expansion-corrected mbsf (referenced from column AN).

Columns R through AG: Interval within section (in meters) of tops and bottoms of voids.

[1]Flood, R.D., Piper, D.J.W., Klaus, A., and Peterson, L.C. (Eds.), 1997. *Proc. ODP, Sci. Results*, 155: College Station, TX (Ocean Drilling Program).

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Column AH: Total length of voids in section (in meters)

Column AI: Length of each section corrected by subtracting total length of voids (in meters)

Column AJ: This column determines, for each core, whether removal of voids is sufficient to bring the length recovered to be equal to or less than the length of the cored interval. If the "recovery ratio" (column AK) is greater or equal to 1.0, it is set to 1.0 and no further correction is carried out. If the "recovery ratio" is less than 1.0, then each depth in each section of the core is corrected by multiplying by the "recovery ratio." This is termed "compression y/n" in the spreadsheet.

Column AK: For each core, the ratio of the total length cored to the total length recovered less voids, termed the "recovery ratio" on the spreadsheet.

Column AL: The corrected depth of the top of each section (from column N), which is corrected by applying a linear compression throughout the core if the "recovery ratio" is less than 1.0. If the "recovery ratio" is greater than 1.0, then no additional correction is applied.

Column AM: referenced from column I.

Column AN: Expansion-corrected depth (mbsf), which is then referenced to column J. The calculation uses the corrected depth for the top of each section (column AL), applies a linear compression if necessary ("recovery ratio" less than 1.0), and removes all voids in the section that overlie the user-entered depth in section (column I). The spreadsheet first checks that the user entered depth in section (column I) does not fall within a void:

=IF(AND(I[n]>R[n],I[n]<S[n]),"VOID"IF(AND(I[n]>T[n],I[n]<U[n]),"VOID,"IF(AND(I[n]>V[n],I[n]<W[n]),"VOID,"....,IF(AND(I[n]>AD[n],I[n]<AE[n]),"VOID,"I[n])))))), where [n] is the row number.

Provided that this condition is met, then the expansion-corrected depth is determined using the following protocol:

If the user-defined depth in section (column I) is less than or equal to the nominal length of section (column M), then the corrected depth of the top of section (column AL) is added to user-defined depth in section minus the thickness of any void, provided that the bottom of the void is less than the user defined depth in section, and is then multiplied by the "recovery ratio" if it is less than 1.0 (i.e., multiplied by the value in column AJ):

=IF(I[n]<=M[n],AL[n]+(AM[n]-(IF(S[n]<AM[n],S[n]-R[n],0))-(IF(U[n]<AM[n],U[n]-T[n],0))....-(IF(AG[n]<AM[n],AG[n]-AF[n],0)))*AJ[n],0), where [n] is row number.

Since EXCEL 4.0a will only allow seven levels of nested IF statements, cores that have 8 or more voids within a section have been split into two subsections. The subsection is divided at 1.0 m if the section is greater than 1.0 m long or at 0.5 m if the section is between 0.5 and 1.0 m in length.

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