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=====
=   DEEP SEA DRILLING PROJECT   =
=  CARBON/CARBONATE DATA BASE  =
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I. INTRODUCTION

A. BACKGROUND AND METHODS

The Deep Sea Drilling Project (DSDP) Carbon/Carbonate data base contains the results of chemical analyses designed to determine the weight percentage of total carbon, organic carbon, and calcium carbonate in deep sea sediments. Although other carbonates may be present, all acid-soluble carbon is calculated as calcium carbonate. Included in the data set is carbonate bomb data collected independently by Drs. T.C. Moore, B. Simoneit, R. Kidd, D.S. Cronan, A.P. Lisitzen and Tj. van Andel. Below is a list of methods and the legs on which they were used.

Method	Legs
=====	=====
LECO 70-Second Analysis	1-9,15-23,28-31,33-34
LECO WR-12 Analysis	35-79
LECO Acid-Base Analysis	7,9-16,24-28,32
LECO (type unknown)	75
Wet Combustion	6
Gravimetric	16
Gasometric Technique	75
CHN Analysis	75,93
Carbonate Bomb Analysis	3,8,9,12,16,18-21,24,29-32, 41,42,47,49,50,63,64,68, 70-82,84-87,89,90,93-96

A short description of each method appears below, for a more extensive explanation consult the reference section of this document.

LECO METHODS:

The total carbon content of a sediment sample is determined by measuring the thermal conductivity of the gaseous products of pyrolysis of the sample. The analysis may also be conducted on an acidified sample to determine the organic carbon content. The weight percentages of total carbon (TC), organic carbon (OC), and calcium carbonate (CaCO₃) are related by the equation: $(TC - OC) * 8.33 = CaCO_3$. The actual file value for CaCO₃ may vary from this formula by as much as 1.67 percent ($0.2 * 8.33$) due to an early procedural error which truncated rather than rounded the values reported for total carbon and organic carbon.

LECO 70-Second Analyzer:

Measures the thermal conductivity of a set volume of all the gaseous products liberated from the sample.

LECO WR-12 Analyzer:

Separates the liberated CO₂ from the other combustion products then measures it using a gas chromatograph equipped with a thermal conductivity detector.

LECO Acid-Base Semi Automatic Carbon Determinator:

The liberated gas of carbon dioxide and oxygen is volumetrically measured (corrected for STP) and then passed through a potassium hydroxide solution which preferentially absorbs carbon dioxide. The volume of gas is measured a second time. The volume of the carbon dioxide gas is the difference of the two volumetric measurements.

Note: "LECO" is an abbreviation for Laboratory Equipment Corporation of St. Joseph, Michigan.

CARBONATE BOMB METHOD:

The calcium carbonate content of a sample is determined by measuring the increase in gas pressure caused by acidifying a dried sediment sample in a closed vessel. The percent carbonate is then read from a pressure-concentration curve constructed from standard runs.

GASOMETRIC METHOD:

This method of measuring the percent calcium carbonate was used only on leg 75 sediments. It employed a volumetric technique outline by Hulsemann(1966).

GRAVIMETRIC METHOD:

This method of measuring the percent calcium carbonate was used only on on leg 16 sediments. It employed a technique outlined by Cronan and Bode(1973).

CHN METHOD:

A Carbon-Hydrogen-Nitrogen (CHN) analyzer was used only on legs 75 and 93 to measure the percent organic carbon in a sample.

WET COMBUSTION METHOD:

The technique as mentioned in Lisitzin(1971) uses a Knopp-Frezenius device to measure calcium carbonate and organic carbon by the wet combustion method. This method was used only on leg 6 sediments.

B. LEGS IN DATA SET

The data base contains data for legs 1-96 with the exception of legs 46, 83, 88, 91 and 92.

C. REFERENCES

Appendix III: Shore-based Laboratory Procedures. In: Bader, R.G. et al., 1970. Initial Reports of the Deep Sea Drilling Project, Volume IV. Washington (U.S. Government Printing Office) pp. 745-753.

Boyce, R.E. and Bode, G.W., 1972, Carbon and Carbonate Analyses, Leg 9, Deep Sea Drilling Project. In: Hays, J.D. et al., 1972, Initial Reports of the Deep Sea Drilling Project, Volume IX. Washington (U.S. Government Printing Office) pp. 797-816.

Cronan, D.S. and Bode, G.W., 1973. Carbon and Carbonate Analyses, Leg 16. In: van Andel, T.H., Heath, G.R., et al., 1973, Initial Reports of the Deep Sea Drilling Project, Volume XVI. Washington (U.S. Government Printing Office) pp. 521-528.

Hulsemann, J., 1966. On the Routine Analysis of Carbonates in Unconsolidated Sediments. J. Sediment. Petrol., Volume 36, pp. 622-625.

Lisitzin, A.P., et al., 1971. Geochemical, Mineralogical, and Paleontological Studies. In: Fischer, A.G., et al., 1971, Initial Reports of the Deep Sea Drilling Project, Volume VI. Washington (U.S. Government Printing Office) pp. 840-841.

Muller, G. and Gastner, M., 1971. The "Karbonat-Bombe", a Simple Device for the Determination of Carbonate Content in Sediment, Soils, and Other Materials. Neues Jahrbuch Mineralogie. Volume 10, pp. 466-469.

II. FORMAT AND FIELD DESCRIPTIONS

A. DATA FORMAT

Record length = 78 characters (34162 records)
 (Originally 80, 2 blank fields removed by NGDC)

COLUMN	FIELD	FORMAT
=====	=====	=====
1-2	LEG	A2
3-5	SITE	A3
6	HOLE	A1
7-9	CORE	A3
10-11	SECTION	A2
12-15	TOP INTERVAL DEPTH (centimeters)	F4.1
16-19	BOTTOM INTERVAL DEPTH (centimeters)	F4.1
20-27	TOP OF CORE DEPTH (meters)	F8.2
28-35	SAMPLE DEPTH (meters)	F8.2
36-41	PERCENT TOTAL CARBON	F6.1
42-47	PERCENT ORGANIC CARBON	F6.1
48-53	PERCENT CALCIUM CARBONATE (CaCO ₃)	F6.1
54-68	METHOD CODE	A15
69-78	DATA SOURCE CODE	A10

B. FIELD DESCRIPTIONS

The definition of leg, site, hole, core and section may be found in the explanatory notes. In addition, the special core designations, as well as the methods of sample labeling and calculating absolute sample depths are discussed.

INTERVAL DEPTH:

The depth, in centimeters, within a section at which the top or bottom of a measurement was taken. Values are encoded with an implicit decimal point, therefore an encoded value of 805 represents 80.5 centimeters.

CORE DEPTH:

The subbottom depth in meters to the top of the core.

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SAMPLE DEPTH:

The subbottom depth in meters to the point of measurement.

PERCENT TOTAL CARBON:

The weight percent of total carbon measured by one of the LECO analyzers.

PERCENT ORGANIC CARBON:

The weight percent of organic carbon measured by a LECO analyzer, CHN analyzer or by the wet combustion method.

PERCENT CALCIUM CARBONATE:

The weight percent of calcium carbonate (CaCO3) may be measured directly by the carbonate bomb, gasometric, gravimetric or wet combustion methods. It may also be calculated from values determined for total and organic carbon.

METHOD CODE:

CODE	METHOD (parameter measured)
LECO	LECO (TYPE UNKNOWN) (total and/or organic)
LECO70	LECO 70-SECOND ANALYZER (total and/or organic)
LECO12	LECO WR-12 ANALYZER (total and/or organic)
LECOAB	LECO ACID-BASE ANALYZER (total and/or organic)
BOMB	CARBONATE BOMB (CaCO3 only)
CHN	CARBON-HYDROGEN-NITROGEN ANALYZER (organic)
GAS	GASOMETRIC ANALYSIS (CaCO3 only)
CHN/BOMB	CHN ANALYZER (organic carbon)/BOMB (CaCO3)
LECO/GAS	LECO (organic carbon)/GASOMETRIC (CaCO3)
GRAVIMETRIC	GRAVIMETRIC ANALYSIS (CaCO3 only)
WETCOMBUSTION	WET COMBUSTION (organic carbon and/or CaCO3)
LECOAB/LECO70	LECOAB (total carbon)/LECO70 (organic carbon)
LECO70/LECOAB	LECO70 (total carbon)/LECOAB (organic carbon)

DATA SOURCE CODE:

CODE	SOURCE	LEGS
=====	=====	=====
DSDP/SHORE	DSDP Shore laboratory	1-45,47-71,73,74,76-79
DSDP/CHAL	DSDP Shipboard	50,63,68,70-82,84-87, 89,90,93-96
LISITZIN	Dr. A.P. Lisitzin	6
CRONAN	Dr. David S. Cronan	16
KIDD	Dr. Robert Kidd	42
SIMONEIT	Dr. Bernd R. Simoneit	64
GARDNER	Dr. James V. Gardner	75
VANANDEL	Dr. Tjeerd H. Van Andel	19,20,21,30,31,32
MOORE	Dr. Theodore C. Moore	3,8,9,12,16,18,21,24, 29,30,31,32,41,47,49

NGDC NOTES: (list of deviations from field descriptions)

Description of deviation	Record Number(s)
=====	=====
Method code (CHN/GAS)not listed in documentation file	27146,27312,27346,27353, 27367,27514,27559,27603, 27606,27631,27670,27696, 27739,27789
Top interval depth exceeds bottom	33325

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