

MONACO RADIOCARBON MEASUREMENTS V

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Most of the ^{14}C measurements reported here were made between October 74 and March 76. The usual procedures and methods of sample preparation are those described in R, 1964, v 6, p 194-196. The electronic apparatus was constructed by J Galliot from results of studies on background of proportional counters (Delibrias & Rapaire, 1967) and was described briefly in R, 1966, v 8, p 286-291.

Age calculations are based on a contemporary value equal to 0.95 of the activity of NBS oxalic acid and conventional half-life for ^{14}C of 5568 years. Given errors are $\pm 1\sigma$, and are calculated according to the method described in R, 1965, v 7, p 156-161. The proportional counter is filled with CO_2 at a pressure of $740 \pm 1\text{ mm Hg}$. The statistical error on the counting rate of background and NBS standard are equivalent to a counting time of 4000 min. When CO_2 of the sample is insufficient, inactive CO_2 is added. No measurements of $\delta^{13}\text{C}$ are made.

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SAMPLE DESCRIPTIONS

I. SOIL SAMPLES

These measurements are used to determine the residence time of fulvic acids, soluble in an acid solution, humic acids, precipitated in an acid solution, and non-extractable fraction in alkaline reactives, or humin, in a soil assumed to be in equilibrium. The box model and the equations are given by Lobo (1974). Extraction technique uses $\text{Na}_4\text{P}_2\text{O}_7$ at pH 10 and sample weight is usually 1kg. Measurements are given in apparent ages.

Pariacabo series

The Savannah of Pariacabo ($5^\circ 10' \text{ N}$, $52^\circ 39' \text{ W}$), French Guyana, alt + 10m, 3km from sea. Topography is characteristic of an old offshore bar deposit, with undulations smoothed by erosion and warping. Progressive lateral change between hydromorphic podzols with humic hard pan (plinthaquiltic tropaquad) can be observed at the summit of the landscape, and ferrallitic soils (dystropeptic haplorthox or plinthic ochraquilt) towards the base (Turenne, 1975). Samples represent progressive individualization in the deep profile, of a humic accumulation level, and correspond each time to the maximum of deep organic matter accumulation observed. Only PAR 91 comes from the surface. Samples coll and

subm 1973 by J F Turenne, Office Recherche Sci & Tech Outre Mer (ORSTOM), Bondy, France.

MC-1020. PAR 91, humic acids $\delta^{14}\text{C} = + 128 \pm 16\text{‰}$
Level 1 to 13cm; carbon content 1.1‰; dilution factor 2.

MC-1021. PAR 91, humin $\delta^{14}\text{C} = + 217 \pm 11\text{‰}$
Level 1 to 13cm; carbon content 5.6‰.

MC-1022. PAR 91, fulvic acids $\delta^{14}\text{C} = + 427 \pm 43\text{‰}$
Level 1 to 13cm; carbon content 0.5‰; dilution factor 6.

MC-1008. PAR 43, humic acids 270 ± 150
AD 1680
Level 37 to 47cm; carbon content 0.6‰; dilution factor 4.

MC-1009. PAR 43, humin 570 ± 210
AD 1380
Level 37 to 47cm; carbon content 3‰; dilution factor 1.3.

MC-1010. PAR 43, fulvic acids 1030 ± 90
AD 920
Level 37 to 47cm; carbon content 2.2‰.

MC-1017. PAR 54, humic acids $\delta^{14}\text{C} = + 28 \pm 56\text{‰}$
Level 55 to 70cm; carbon content 0.6‰; dilution factor 8.

MC-1018. PAR 54, humin 2270 ± 100
320 BC
Level 55 to 70cm; carbon content 3.1‰.

MC-1019. PAR 54, fulvic acids 2500 ± 100
550 BC
Level 55 to 70cm; carbon content 2.8‰.

MC-1014. PAR 85, humic acids 5270 ± 460
3360 BC
Level 74 to 82cm; carbon content 1.1‰; dilution factor 4.

MC-1015. PAR 85, humin 3560 ± 90
1610 BC
Level 74 to 82cm; carbon content 2.5‰.

MC-1016. PAR 85, fulvic acids 3300 ± 100
1350 BC
Level 74 to 82cm; carbon content 7‰.

MC-1004. PAR 95, humic acids $11,300 \pm 270$
9350 BC
Level 82 to 96cm; carbon content 1.7‰; dilution factor 2.

MC-1005. PAR 95, humin 7250 ± 100
5300 BC
Level 82 to 96cm; carbon content 2.3‰.

MC-1006. PAR 95, fulvic acids**7160 ± 120
5210 BC**

Level 82 to 96cm; carbon content 12.5‰.

General Comment (JFT): apparent age determination of Bh horizons and those of different organic fractions composing them enable understanding of stages of podzolization. Two conclusions can be drawn: 1) for a mean age gradient increasing towards the summit, podzolization began at the summit of the soil chain and progressed to the base; 2) two processes can explain age gradient differing according to the humic fraction: a) insolubilization of young precursors producing humic acids; in the 1st stages of formation of Bh level. Modern age of these components: MC-1017; MC-1008. b) maturation and slow bio-degradation that affect inequally all fractions. Humic acids appear to undergo, from the moment of their insolubilization in the profile, the weakest renovation. Their age represents, at the top, the beginning of their insolubilization and gets a lower limit of the start of podzolization, 11,000 yr BP.

Lateral movement of podzolization front corresponds to a progressive rise of water level appearing 1st at the center of the location and then invading all the landscape; this is in connection with the progressive warping of water courses and rise of the sea level, diminishing drainage flow in the savannahs.

II. ARCHAEOLOGIC SAMPLES

*A. Argentina, Tierra del Fuego***Lancha Packewaia series**

Six charcoal samples coll from a stratified shell midden on N shore of Beagle channel (54° 49' S, 68° 10' W) Jan-Feb 1975, by A E Sala, L A Orquera, E L Piana, A H Tapia, Fund Antropol Argentina, Zarnatu 1375, Buenos Aires, subm by E C Saxon, Dept Antropol, Univ Durham, England.

MC-1062. Lancha Packewaia VI/13/B **280 ± 85
AD 1670**

MC-1064. Lancha Packewaia III/10/B **280 ± 85
AD 1670**

Samples from uppermost midden levels of 2 trenches 30m apart. Site is on fossil beach, at + 7m, 18km E of Ushuaia.

MC-1066. Lancha Packewaia III/14/C **410 ± 75
AD 1540**

MC-1063. Lancha Packewaia VI/14/C **455 ± 85
AD 1495**

Samples from humus layers underlying uppermost midden levels. Tree-ring calibration places upper midden in 16th century and underlying soil in 15th century (Stuiver and Suess, 1966).

1080 \pm 100

MC-1065. Lancha Packewaia VI/18/D **AD 870**

Sample from middle midden layer, stratigraphically underlying Soil "C".

4215 \pm 305

MC-1068. Lancha Packewaia VI/21/E **AD 2265**

Sample from surface of fossil beach, underlying 3rd lowest shell midden. Too old, age may be considered maximum. Sample diluted with old CO₂. Dilution factor: 4.

General Comments (ECS): 3 occupation periods recorded at this shell midden correspond well with those at Lautá, Isla Navarino, Chile, on opposite shore of Beagle Channel from Lancha Packewaia (Ortiz-Troncoso, 1971). Upper units at Lautá are exactly contemporaneous, suggesting gap in occupation between ca AD 1100 and 1500 is real (Lautá 1: Gif-2728: 280 \pm 90; Lautá 1a: R-45-42/1: 1080 \pm 60; Lautá 3: Gif-2729: 2780 \pm 110). The Ona occupation of the continental site, Fell's Cave, began during this interval (Fell's Cave V: I-5139: 685 \pm 90) which corresponds to period of secondary climatic optimum in Britain. (LAO): 2 cultural phases for region, defined by Bird (1938), are not clearly distinguishable at Lancha Packewaia. Upper midden ("B") contains some glass, iron objects, and a European sherd. Although Beagle Channel was not discovered until 1829, the Yamana Indians were occasional visitors to other places and tribes, already in contact with Europeans in the 16th century. Industry of Upper Midden includes spear points resembling several continental Patagonian types. The distinctive spear point of the Middle and Lower Middens is bipointed and leaf-shaped, but rather thick. Single-shouldered bone harpoons were present in Upper Midden, while Lower Midden is distinguished by its cruciform-base harpoons, as reported from early littoral sites in neighboring Chile (Ortiz-Troncoso, 1973). Also present in this level are bifaces, coarse pebble tools, and bolas.

Northern Tierra del Fuego series

Three samples from grassland zone known to have been occupied by various Indian cultures, Gif-1034: 9590 \pm 210, until European conquest ca AD 1895. Coll Jan 1975 and subm by E C Saxon.

1100 \pm 95

MC-1069. Cabeza de Leon **AD 850**

Wood charcoal (53° 19' S, 68° 35' W) from depth 30cm, within rock shelter. Assoc artifacts show fine pressure flaking.

135 \pm 85

MC-1070. Tres Arroyos **AD 1815**

Wood charcoal (53° 22' S, 68° 50' W) from depth 50cm, at rear of N facing rock shelter. Tres Arroyos, Chile, and Cabeza de Leon, Argentina are the only stratified inland sites known on Tierra del Fuego.

MC-1071. Castillo**Modern**

Charcoal flecks (53° 40' S, 68° 28' W) from wind-eroded scarp under collapsed rock shelter. Area has several surface sites, but no other shelters.

B. Brazil, Pernambuco

All materials found at the following sites, except that of Derbi, are described by A F G Laroche (1975).

Pedra do Caboclo series

Charcoals from levels of archaeol site formed by numerous caves and rock shelters at alt 290m near Bom Jardim (7° 47' 59" S, 35° 35' 35" W). Samples coll and subm 1974 by A F G Laroche, Col Estadual Pernambuco, Brazil.

MC-1003. Pedra do Caboclo, Rock Shelter 1 **8400 ± 200**
6450 BC

Sq 1a, level 100cm.

MC-1025a. Pedra do Caboclo, Rock Shelter 2 **90 ± 75**
AD 1860

Sq 1b, level 30 to 40cm. *Comment:* another sample of same origin was dated at : 145 ± 85; MC-1025b.

MC-1040. Pedra do Caboclo, Rock Shelter 2 **2900 ± 95**
950 BC

Sq 16, level 50 to 60cm.

MC-1024. Pedra do Caboclo, Rock Shelter 2 **300 ± 85**
AD 1650

Sq 1b, level 80 to 90cm.

MC-1051. Pedra do Caboclo, Rock Shelter 2 **3450 ± 100**
1500 BC

Sq 1b, level 110 to 130cm.

MC-1023a. Pedra do Caboclo, Rock Shelter 2 **+1600**
3450
-1300
1500 BC

Sq 16, level 150 to 180cm; dilution factor: 9. *Comment:* rest of sample, 10g charcoal earth, was dated $250 \pm \text{Modern}_{950}$, MC-1023b; dilution factor: 9. Sample contaminated with debris of rootlets.

MC-1041. Pedra do Caboclo, Cave 2 **380 ± 70**
AD 1580

Sq 8, level 0 to 10cm.

MC-1034. Pedra do Caboclo, Cave 2 **1775 ± 100**
AD 180

Sq 4, level 140 to 170cm.

MC-1039. Pedra do Caboclo, Rock Shelter 3 **2620 ± 90**
670 BC

Sq 6, level 40 to 60cm.

MC-1036. Pedra do Caboclo, Rock Shelter 3	4515 ± 115
Sq 6, level 60 to 80cm.	2565 BC
MC-1037. Pedra do Caboclo, Rock Shelter 3	6085 ± 120
Sq 6, level 80 to 100cm.	4135 BC
MC-1038. Pedra do Caboclo, Rock Shelter 3	6225 ± 125
Sq 6, level 100 to 120cm.	4275 BC

General Comment (AFGL): lithic material from level dated by MC-1003 is similar to that found by V Calderon (pers commun) in 1967 at “Grotta do Padre” 7580 ± 140, Si-544. MC-1003 belongs to “Tradição Itaparica, subtradição Bom Jardim”. Samples MC-1024, 1034, 1041 represent “Tradição cerâmica da Pedra do Caboclo”. The others correspond to cultural phases not yet identified. Site described by A F G Laroche (1970).

Angico series

Charcoals from levels of archaeol site formed by 1 cave and 2 grottoes at alt 316 to 350m near Bom Jardim (7° 48' 25" S, 35° 32' 20" W). Samples coll and subm in 1974 by AFG Laroche.

MC-1031. Angico Funeral Cave 2	1515 ± 80
Sq C, level 40cm.	AD 435
MC-1035. Angico Funeral Cave 2	300 ± 85
Sq E, level 35cm.	AD 1650
MC-1002. Angico, Grotte S	440 ± 50
Sq 3, level 70cm.	AD 1510
MC-1011. Angico, Grotte S	540 ± 70
Sq 3, level 125cm.	AD 1410
MC-1007. Angico, Grotte N	4650 ± 150
Sq A, level 110cm.	2700 BC

General Comment (AFGL): MC-1007 related to culture “fase precerâmica Paquevira”, the other samples to “tradição cerâmica da Pedra do Caboclo”. MC-1002 and 1031 are charcoal from funeral urns. Site described by AFG Laroche (1969, 1973, 1976).

Cercado series

Charcoal from rock shelter on right bank of Orobo R (7° 43' 20" S, 35° 31' 10" W) at alt 270m near “Fazenda Paquevira”. Samples coll and subm 1973 by AFG Laroche.

MC-1030. Cercado **1295 ± 95**
AD 655
Sq 2, level 65cm.

MC-1033a. Cercado **1010 ± 85**
AD 940
Sq A, level 30cm.

MC-1033b. Cercado **Modern**
Sq C, level 30cm.

General Comment (AFGL): site corresponds to “tradição cerâmica da Pedra do Caboclo”.

Coati

Charcoal from rock shelter (7° 47' 59" S, 35° 35' 23" W) near Bom Jardim on bank of stream at alt 300m; coll and subm 1974 by AFG Laroche.

MC-1032. Coati **295 ± 85**
AD 1655
Sq 2, level 30cm.

General Comment (AFGL): level contains ceramic, lithic objects, ornaments, human remains represent end of “tradição cerâmica da Pedra do Caboclo”.

MC-1012. Nunes **195 ± 75**
AD 1755
Charcoal from cave top of rocky escarpment, Sq N, level 150cm (7° 43' 20" S, 35° 30' 59" W) near Paquevira, at alt 280m; coll 1974 by A Soares and subm by AFG Laroche. *Comment* (AFGL): very coarse lithic culture. Date is too young.

MC-1047. Camara **195 ± 75**
AD 1755
Charcoal from rock shelter, Sq 1, level 30 to 40cm (7° 44' 30" S, 35° 33' 11" W) near Bom Jardim, coll and subm 1974 by AFG Laroche. *Comment* (AFGL): recent indigenous occupation.

Derbi series

Charcoals from levels of open-air archaeol site (7° 47' 35" S, 35° 35' 23" W) at alt 360m on bank of Tracunhaém R, outside urban perimeter of town Bom Jardim. Samples coll and subm 1975 by AFG Laroche.

MC-1073. Derbi **1470 ± 270**
AD 480
Sq 1, level 10 to 20cm.

MC-1074. Derbi **1510 ± 150**
AD 440
Sq 3, level 0 to 10cm.

MC-1075. Derbi **730 ± 115**
AD 1220
Sq 4, level 0 to 10cm.

MC-1076. Derbi **620 ± 100**
AD 1330
Sq 4, level 10 to 20cm; dilution factor: 3.8.

MC-1077. Derbi **Modern**
Sq 5, level 0 to 10cm.

MC-1079. Derbi **1050 ± 120**
AD 900
Sq 5, level 20 to 30cm.

MC-1080. Derbi **1100 ± 120**
AD 850
Sq 7, level 30 to 40cm. *Comment* (AFGL): samples are rustic implements of quartz made with quadrangular uniface nuclei. Industry was named "fase Itagiba". MC-1077 and -1079 are too young.

Chã do Caboclo series

Charcoals from different levels of open-air archaeol site (7° 44' 30" S, 35° 33' 10" W), on a plateau at alt 420m, Espera dist near Bom Jardim. Topography of site was levelled by erosion. Four strata, depths of which vary according to loc from 0 to 80cm in relation to actual level of soil, have been found. Samples coll and subm 1974 and 1975 by AFG Laroche.

MC-1053. Chã do Caboclo, Stratum A1 **370 ± 95**
AD 1580
Sq 39, level 10 to 20cm.

MC-1054. Chã do Caboclo, Stratum A1 **270 ± 85**
AD 1680
Sq 39, level 30 to 40cm.

MC-1057. Chã do Caboclo, Stratum A1 **190 ± 90**
AD 1760
Sq 45, level 0 to 10cm.

MC-1058. Chã do Caboclo, Stratum A1 **295 ± 85**
AD 1655
Sq 45, level 50cm.

MC-1088. Chã do Caboclo, Stratum A1 **295 ± 75**
AD 1655
Sq 53, level 10 to 20cm. *Comment* (AFGL): samples are related to a neo-Brazilian ceramic culture with "Tupiguarani" and "Cariri" influences. MC-1053 and -1054 from charcoal silo. Age of MC-1058 is too young since it does not correspond to material found at that level, which is most probably due to rearrangement of soil around Sq 45.

MC-1082. Chã do Caboclo, Stratum A2	360 ± 135 AD 1590
Sq 51, level 10 to 20cm.	
MC-1083. Chã do Caboclo, Stratum A2	330 ± 110 AD 1620
Sq 51, level 30 to 40cm. <i>Comment</i> (AFGL): stratum contains red and white fragments of tupiguarani ceramic “fase cacimba—subtradição pintada”.	
MC-1052. Chã do Caboclo, Stratum A3	945 ± 85 AD 1005
Sq 36, level 0 to 10cm.	
MC-1086. Chã do Caboclo, Stratum A3	1995 ± 85 45 BC
Sq 52, level 10 to 20cm.	
MC-1026. Chã do Caboclo, Stratum A3	2025 ± 95 75 BC
Sq 3, level 10 to 20cm. <i>Comment</i> (AFGL): stratum corresponds to maximum expansion of “tradição cerâmica da Pedra do Caboclo” and to last traces of lithic phases of “Paquevira”—roughened stones, “Passasunga”—large objects industry, and “subtradição de Bom Jardim”. Also present are polished stones, beads (necklaces, earrings, nose-rings, and various jewelry) and microliths.	
MC-1029. Chã do Caboclo, Stratum A4	2800 ± 95 850 BC
Sq 16, level 30 to 40cm. <i>Comment</i> (AFGL): 1st appearance of lithic material characteristic of “tradição cerâmica da Pedra do Caboclo”.	
MC-1084. Chã do Caboclo, Stratum A5	3650 ± 115 1700 BC
Sq 51, level 40 to 50cm.	
MC-1013. Chã do Caboclo, Stratum A5	4460 ± 100 2510 BC
Test pit, level 20 to 30cm.	
MC-1044. Chã do Caboclo, Stratum A5	4590 ± 100 2640 BC
Sq 19, level 20 to 30cm.	
MC-1043. Chã do Caboclo, Stratum A5	5540 ± 100 3590 BC
Sq 12, level 20 to 30cm.	
MC-1081. Chã do Caboclo, Stratum A5	5600 ± 1300 3650 BC
Sq 53, level 0 to 10cm.	

MC-1028. Chã do Caboclo, Stratum A5	5780 ± 135 3830 BC
Sq 5, level 20 to 30cm. <i>Comment</i> (AFGL): with exception of MC-1084 is too young, all samples come from scattered fire sites of maximum thickness 20cm. Lithic material of “fase Paquevira, Passasunga and subtradição Bom Jardim” are well represented.	
MC-1059. Chã do Caboclo, Stratum B	6330 ± 125 4380 BC
Sq 47, level 10 to 20cm.	
MC-1061. Chã do Caboclo, Stratum B	6600 ± 150 4650 BC
Sq 48, level 35 to 45cm.	
MC-1045. Chã do Caboclo, Stratum B	6900 ± 135 4950 BC
Sq 24, level 10 to 20cm.	
MC-1027. Chã do Caboclo, Stratum B	7125 ± 140 5175 BC
Sq 4, level 30 to 40cm.	
MC-1060. Chã do Caboclo, Stratum B	7300 ± 140 5350 BC
Sq 48, level 30cm.	
MC-1055. Chã do Caboclo, Stratum B	7820 ± 150 5870 BC
Sq 41, level 30 to 40cm.	
MC-1042. Chã do Caboclo, Stratum B	8100 ± 135 6150 BC
Sq 1, level 30 to 40cm. <i>Comment</i> (AFGL): only lithic material of “subtradição Bom Jardim” was found in stratum, foliaceous arrow heads on one side with convex plan profile, all with grooves; large and short one face triangular points, scrapers, chisels, knife points, microliths.	
MC-1056. Chã do Caboclo, Stratum C	9520 ± 160 7570 BC
Sq 42, level 40 to 50cm.	
MC-1046. Chã do Caboclo, Stratum C	11,000 ± 250 9050 BC
Sq 31, level 10 to 20cm. <i>Comment</i> (AFGL): material from this stratum were again characteristic of “subtradição Bom Jardim”. Most material is still in quartz, but flint, characteristic of older levels, begins to appear.	
MC-1087. Chã do Caboclo, Stratum D	6820 ± 190 4870 BC
Sq 51, level 70 to 100cm. <i>Comment</i> (AFGL): MC-1087 seems much too young. Sample underlay laterite and was assoc with cutting wastes remaining on quartz gravel. Objects coll in stratum are coarsely finished.	

Comment: Sq 51 did not yield expected results; MC-1082 and -1083, although at same age, statistically are reversed. MC-1084, -1087 are too young. MC-1087 is a regrouping of 1.8g charcoal piece, mean surface 1mm², sorted out under binocular microscope from 30g clay from 2 different levels: 70 to 80 and 90 to 100cm. During standard pretreatment of sample with 1 % NaOH, > 1/2 was eliminated in fulvic and humic acids.

III. SEA WATER SAMPLES

As part of a research project on evolution of pollutants from the sea, daily, weekly, monthly and bi-annual sampling is done at surface and in depth off Monaco. Results of measurements of sea water radiocarbon content of 5 sta are given here. Sampling was done by G Hugues and C Emery Oct 20 to 30, 1975.

Immediately after sampling, 80L are filtered on glass wool and stored in 100L barrels in nitrogen atmosphere; CO₂ is extracted by acidification at pH 1 with HCl and bubbling for 6 hr in a close circuit comprising an 0.5L bottle of NaOH 4N. $\delta^{13}\text{C}$ determinations are not made. For all samples, we suppose $\delta^{13}\text{C}_{\text{‰}} = 1 \pm 1$.

Sta 1. (43° 30' N, 8° 35' E)

MC-1501.	Depth, 50m	$\delta^{14}\text{C} = + 97 \pm 13\text{‰}$ $\Delta = + 39 \pm 13\text{‰}$
MC-1502.	Depth, 200m	$\delta^{14}\text{C} = + 89 \pm 13\text{‰}$ $\Delta = + 32 \pm 13\text{‰}$
MC-1503.	Depth, 500m	$\delta^{14}\text{C} = + 57 \pm 11\text{‰}$ $\Delta = + 2 \pm 11\text{‰}$
MC-1504.	Depth, 1500m	$\delta^{14}\text{C} = + 11 \pm 10\text{‰}$ $\Delta = - 42 \pm 10\text{‰}$
MC-1505.	Depth, 2000m	$\delta^{14}\text{C} = + 9 \pm 10\text{‰}$ $\Delta = - 43 \pm 10\text{‰}$
MC-1506.	Depth, 2400m	$\delta^{14}\text{C} = + 20 \pm 11\text{‰}$ $\Delta = - 33 \pm 11\text{‰}$

Sta 2. (42° 55' N, 8° 25' E)

MC-1507.	Depth, 50m	$\delta^{14}\text{C} = + 47 \pm 11\text{‰}$ $\Delta = - 8 \pm 12\text{‰}$
MC-1508.	Depth, 200m	$\delta^{14}\text{C} = + 25 \pm 11\text{‰}$ $\Delta = - 29 \pm 11\text{‰}$
MC-1509.	Depth, 500m	$\delta^{14}\text{C} = + 24 \pm 11\text{‰}$ $\Delta = - 29 \pm 11\text{‰}$
MC-1510.	Depth, 1500m	$\delta^{14}\text{C} = - 49 \pm 10\text{‰}$ $\Delta = - 98 \pm 10\text{‰}$

MC-1511.	Depth, 2000m	$\delta^{14}\text{C} = -8 \pm 11\text{‰}$ $\Delta = -59 \pm 11\text{‰}$
MC-1512.	Depth, 2500m	$\delta^{14}\text{C} = -18 \pm 10\text{‰}$ $\Delta = -69 \pm 10\text{‰}$

Sta 3. (42° 22' 30" N, 7° 38' E)

MC-1513.	Depth, 50m	$\delta^{14}\text{C} = +113 \pm 10\text{‰}$ $\Delta = +55 \pm 10\text{‰}$
MC-1514.	Depth, 200m	$\delta^{14}\text{C} = +54 \pm 11\text{‰}$ $\Delta = -1 \pm 12\text{‰}$
MC-1515.	Depth, 500m	$\delta^{14}\text{C} = +56 \pm 13\text{‰}$ $\Delta = +1 \pm 13\text{‰}$
MC-1516.	Depth, 1500m	$\delta^{14}\text{C} = -3 \pm 10\text{‰}$ $\Delta = -55 \pm 10\text{‰}$
MC-1517.	Depth, 2000m	$\delta^{14}\text{C} = +17 \pm 11\text{‰}$ $\Delta = -35 \pm 11\text{‰}$
MC-1518.	Depth, 2500m	$\delta^{14}\text{C} = +46 \pm 10\text{‰}$ $\Delta = -8 \pm 10\text{‰}$

Sta 4. (42° 46' N, 7° E)

MC-1519.	Depth, 50m	$\delta^{14}\text{C} = +76 \pm 11\text{‰}$ $\Delta = +20 \pm 12\text{‰}$
MC-1520.	Depth, 200m	$\delta^{14}\text{C} = +47 \pm 10\text{‰}$ $\Delta = -7 \pm 10\text{‰}$
MC-1521.	Depth, 500m	$\delta^{14}\text{C} = -14 \pm 10\text{‰}$ $\Delta = -66 \pm 10\text{‰}$
MC-1522.	Depth, 1500m	$\delta^{14}\text{C} = -7 \pm 9\text{‰}$ $\Delta = -59 \pm 9\text{‰}$
MC-1523.	Depth, 2000m	$\delta^{14}\text{C} = +29 \pm 11\text{‰}$ $\Delta = -24 \pm 11\text{‰}$
MC-1524.	Depth, 2450m	$\delta^{14}\text{C} = +5 \pm 9\text{‰}$ $\Delta = -47 \pm 9\text{‰}$

Sta 5. (42° 10', 6° 40' E)

MC-1525.	Depth, 50m	$\delta^{14}\text{C} = +98 \pm 10\text{‰}$ $\Delta = +41 \pm 10\text{‰}$
MC-1526.	Depth, 200m	$\delta^{14}\text{C} = +91 \pm 11\text{‰}$ $\Delta = +35 \pm 12\text{‰}$
MC-1527.	Depth, 500m	$\delta^{14}\text{C} = +51 \pm 10\text{‰}$ $\Delta = -3 \pm 11\text{‰}$

MC-1528.	Depth, 1500m	$\delta^{14}\text{C} = + 15 \pm 11\text{‰}$ $\Delta = - 37 \pm 11\text{‰}$
MC-1529.	Depth, 2000m	$\delta^{14}\text{C} = 0 \pm 10\text{‰}$ $\Delta = - 52 \pm 10\text{‰}$
MC-1530.	Depth, 2700m	$\delta^{14}\text{C} = - 2 \pm 11\text{‰}$ $\Delta = - 54 \pm 11\text{‰}$

IV. ATMOSPHERIC RADIOCARBON ACTIVITY, MONACO

This is a routine control of atmospheric CO_2 radiocarbon content. Sample coll from roof of Mus Oceanograph, Monaco ($43^\circ 13' \text{ N}$, $7^\circ 25' \text{ E}$) May 1975.

MC-1050. $\delta^{14}\text{C} = + 413 \pm 12\text{‰}$

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