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US GEOLOGICAL SURVEY, MENLO PARK, CALIFORNIA RADIOCARBON MEASUREMENTS III

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The analyses in this list were performed between 1977 and 1979. The laboratory utilizes gas counting of carbon dioxide in counters installed 9.5 meters below the ground surface for background reduction. The reported results closely follow the guidelines of Stuiver and Polach (1977), although the standard error for analyses earlier than USGS-500 are based solely upon counting statistics and do not include uncertainty in voltage, pressure, temperature, and $\delta^{13}C$.

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GEOLOGIC SAMPLES

Alaska

USGS-48. Yukon Delta — **820 ± 90**, *Est* $\delta^{13}C = -25‰$

Basal peat ca 1.5m below surface; E bank of Kawanak Pass (62° 55′ N, 164° 06′ W). Dates older part of modern lake of Yukon delta. Coll 1976 and subm by W R Dupré, Univ Houston, Texas.

USGS-49. Black River — **1350 ± 80**, *Est* $\delta^{13}C = -25‰$

Basal peat from outcrop along Black R (62° 09′ N, 164° 59′ W), ca 5km NW of village of New Knockhock. Dates time when Black R was main course of Yukon R. Coll 1976 and subm by W R Dupré.

USGS-50. Melatolik Creek — **>34,400**, *Est* $\delta^{13}C = -25‰$

Basal peat from abandoned mid-channel bar along Melatolik Creek (62° 02′ N, 165° 14′ W). Dates time when Melatolik Creek was main course of Yukon R. Coll 1976 and subm by W R Dupré.

USGS-51. Kashunuk River — **1200 ± 60**, *Est* $\delta^{13}C = -25‰$

Log in basal peat exposed along S bank of Kashunuk R (61° 32′ N, 164° 46′ W), ca 1km W of Nuigalak Lake. Dates time when Kashunuk R was main course of Yukon R. Coll 1976 and subm by W R Dupré.

USGS-52. Panawat Spit — **Modern**, *Est* $\delta^{13}C = -25‰$

Wood fragment from near base of sea cliff where Pleistocene marine terrace deposits are exposed, ca 4km N of Dall Pt (61° 36′ N, 166° 10′ W). Date indicates contamination by modern roots. Coll 1976 and subm W R Dupré.

5070 ± 60

USGS-215. Panawat Spit *Est* $\delta^{13}C = -25‰$

Peat ca 2m from top of sea cliff, ca 4km N of Dall Pt (61° 36′ N, 166° 10′ W). Probably dates filling of thaw lake on uplifted marine terrace deposits exposed in lower part of sea cliff. Coll 1977 and subm by W R Dupré.

1930 ± 70

USGS-217. Manokinak River *Est* $\delta^{13}C = -25‰$

Basal peat ca 1.2m below top of cut bank along N side of Manokinak R (63° 23′ 32″ N, 164° 31′ 41″ W). Dates time when Manokinak was major course of Yukon R. Coll 1977 and subm by W R Dupré.

1800 ± 90

USGS-218. Kwikiuak *Est* $\delta^{13}C = -25‰$

Peat ca 1.5m from top of cut bank along S side of Kwikiuak Pass (62° 37′ 06″ N, 164° 41′ 10″ W). Dates min age of intermediate age beach ridge/chenier plain S of modern Yukon delta (compare with USGS-53, below: 1890 ± 85). Coll 1977 and subm by W R Dupré.

1550 ± 80

USGS-225. Black River *Est* $\delta^{13}C = -25‰$

Basal peat ca 1.7m below top of cut bank on N side of Black R (62° 18′ 32″ N, 164° 59′ 22″ W). Dates relatively young truncation of beach ridges within chenier plain S of modern Yukon delta (approx correlative with USGS-212, below: 1430 ± 50). Coll 1977 and subm by W R Dupré.

2570 ± 70

USGS-226. Eleutak *Est* $\delta^{13}C = -25‰$

Basal peat ca 0.8m below top of cut bank on SW side of Kwemeluk Pass (62° 29′ 08″ N, 164° 51′ 45″ W), ca 6km S of Sheldon Pt. Dates one of oldest beach ridges in chenier plain S of modern Yukon delta (compares with USGS-214, below: 2420 ± 80). Coll 1977 and subm by W R Dupré.

1890 ± 90

USGS-53. Black River *Est* $\delta^{13}C = -25‰$

Basal peat along SW side of Black R, ca 2.5km NW of Uksuk (62° 19′ N, 165° 12′ W). Dates middle of chenier plain/beach ridge complex that postdates most of time Black R was main course of Yukon R. Coll 1976 and subm by W R Dupré.

1430 ± 50

USGS-212. Sheldon Point *Est* $\delta^{13}C = -25‰$

Log in basal peat ca 2m below surface, exposed on S bank of Kwemeluk Pass (62° 32′ 08″ N, 164° 52′ 37″ W) at village of Sheldon Point. Dates age of one of youngest well-developed beach ridges in chenier plain S of modern Yukon delta. Coll 1977 and subm by W R Dupré.

600 ± 70

USGS-213. Emmonak *Est* $\delta^{13}C = -25‰$

Wood ca 1.5m from top of cut bank, N side of Kwiguk Pass (62° 45′ 30″ N, 164° 30′ W) at village of Emmonak. Dates intermediate age part

of modern Yukon delta, indicating it is relatively young geol feature (of USGS-48). Coll 1977 and subm by W R Dupré.

2420 ± 80

USGS-214. Kwikiuak Pass *Est* $\delta^{13}C = -25‰$

Wood from SE side of Kwikiuak Pass (62° 37′ 20″ N, 164° 40′ 22″ W), ca 13km NE of Sheldon Pt. Dates one of oldest beach ridges in chenier plain S of modern Yukon delta. Also marks period of max transgression of Holocene shoreline in area. Coll 1977 and subm by W R Dupré.

13,770 ± 210

USGS-352. Norton Sound *Est* $\delta^{13}C = -25‰$

Lenses of peat, from 1.4m below top of vibracore taken 20m below msl, 40km S of Nome (64° 10′ 6″ W, 165° 27′ 45″ N). Dates top of Pleistocene freshwater sediment, below Holocene marine transgressive sediment. Coll 1977 and subm by C H Nelson, USGS.

3070 ± 40

USGS-353. Norton Sound *Est* $\delta^{13}C = -25‰$

Peat laminations, 3 to 9cm below top of boxcore taken 10m below msl, 30km W of Yukon R delta (62° 58′ 12″ W, 165° 16′ 15″ N). Dates storm surges in N Bering Sea near Yukon delta. Date may be anomalously old due to epiclastic nature of peat recycled to offshore locations from original onshore delta sources. Coll 1977 and subm by C H Nelson.

3590 ± 140

USGS-354. Norton Sound *Est* $\delta^{13}C = -25‰$

Peat layers, interbedded with silt, from 13 to 16cm below top of boxcore taken 10m below msl, 40km NW of Yukon R delta (63° 31′ 30″ W, 165° 43′ 37″ N). Dates storm surges in N Bering Sea near Yukon delta. Date may be anomalously old due to epiclastic nature of peat recycled to offshore locations from original onshore delta sources. Coll 1977 and subm by C H Nelson.

16,540 ± 200

USGS-356. Northern Bering Sea *Est* $\delta^{13}C = -25‰$

Peat layer with wood fragments, from 120cm below top of vibracore taken 28m below msl 30km W of Port Clarence spit (65° 7′ 14″ W, 167° 30′ 49″ N). Dates top of Pleistocene freshwater sediment, below Holocene marine sediment in region subject to uplift. Coll 1977 and subm by C H Nelson.

15,450 ± 250

USGS-357. Northern Bering Sea *Est* $\delta^{13}C = -25‰$

Peaty silt, 40cm below top of vibracore taken 31m below msl, 35km W of Port Clarence spit (65° 7′ 51″ W, 167° 35′ 45″ N). Dates top of Pleistocene freshwater sediment, below Holocene marine sediment in region subject to uplift. Coll 1977 and subm by C H Nelson.

11,570 ± 130

USGS-358. Norton Sound *Est* $\delta^{13}C = -25‰$

Peat layers, 85 to 90cm below top of vibracore taken 17m below msl, 35km NW of Stuart I. (63° 53′ 6″ W, 163° 1′ 26″ N). Dates top of Pleistocene freshwater sediment, below Holocene marine transgressive sediment. Coll 1977 and subm by C H Nelson.

Kealok Creek series

From bluff 27m high on Kealok Creek in eolian sand (70° 22′ 18″ N, 153° 12′ 12″ W). Dates episodes of dune activity and stabilization. USGS-377 and -378 date rapid eolian accretion; USGS-448 and -379 bracket episode of stabilization; USGS-380 dates brief interval of stabilization following renewed activity. Coll 1977 and subm by L D Carter, USGS.

940 ± 110

USGS-380. *Est* $\delta^{13}C = -25‰$

Peaty sand from bed, 15cm thick, 2m below top of bluff.

5250 ± 80

USGS-379. *Est* $\delta^{13}C = -25‰$

Peat from top of peat bed, 50cm thick, that occurs 4m below top of bluff.

8180 ± 80

USGS-448. *Est* $\delta^{13}C = -25‰$

Peat from base of peat bed, 50cm thick, that occurs 4m below top of bluff.

10,700 ± 120

USGS-378. *Est* $\delta^{13}C = -25‰$

Salix sp (willow) wood in growth position 6m below top of bluff.

10,980 ± 80

USGS-377. *Est* $\delta^{13}C = -25‰$

Salix sp (willow) wood from 10m below top of bluff.

Chipp River series

From bluff 15m high on Chipp R (70° 22′ 30″ N, 155° 03′ W). Dates alluvium of former flood plain of Chipp R. Coll 1977 and subm by L D Carter.

10,670 ± 80

USGS-449. *Est* $\delta^{13}C = -25‰$

Wood in growth position 9m above base of bluff.

10,030 ± 40

USGS-456. *Est* $\delta^{13}C = -25‰$

Detrital wood (*Salix* sp) 12.5m above base of bluff.

Ikpikpuk River series

From alluvium exposed in bluff 16m high on Ikpikpuk R (69° 42′ 36″ N, 154° 52′ 36″ W). Dates periods of alluviation and alluvial terrace formation. Coll 1977 and subm by L D Carter.

13,570 ± 120

USGS-457. *Est* $\delta^{13}C = -25‰$

Detrital wood 4.5m below top of bluff.

>49,000

USGS-632. *Est* $\delta^{13}C = -25‰$

Detrital wood 1m above base of bluff.

36,400 ± 560

USGS-807. $\delta^{13}C = -21.8‰$

Limb element of *Mammuthus* sp 2m above base of bluff; one of many bones from single individual of this sp that were present over lower 3m of surface of bluff.

6040 ± 80

USGS-316. Hidden Lake, Kenai Peninsula *Est* $\delta^{13}C = -25‰$

Carbonaceous sediments from core HL-4-M between 122 to 130cm below bottom of Hidden Lake (60° 29′ 37″ N, 150° 22′ 38″ W). Calibrates varve counts in older part of core and dates volcanic ash beds derived from volcanoes on Alaskan Peninsula. Sample helps date time of deglaciation of area. Coll 1977 by J D Sims and M J Rymer; subm by J D Sims, USGS.

10,380 ± 240

USGS-317. Hidden Lake, Kenai Peninsula *Est* $\delta^{13}C = -25‰$

Carbonaceous sediments from core HL-4-M between 205 and 215cm below bottom of Hidden Lake (60° 29′ 37″ N, 150° 22′ 38″ W). Calibrates varve counts in older part of core and dates volcanic ash beds derived from volcanoes on Alaska Peninsula. Sample helps date time of deglaciation of area previously thought to be much earlier (Karlstrom, 1964). Coll 1977 by J D Sims and M J Rymer; subm by J D Sims.

4560 ± 170

USGS-338. Tangle Lake *Est* $\delta^{13}C = -25‰$

Peaty sediments from core TNG-1 between 518 to 523cm below bottom of Tangle Lake (63° 1′ 42″ N, 146° 3′ 24″ W). Dates Holocene sedimentation and pollen accumulation in this area to S of Alaska Range that has adjacent archaeol sites. Coll 1977 by J D Sims and M J Rymer; subm by J D Sims.

2880 ± 70

USGS-339. Tangle Lake *Est* $\delta^{13}C = -25‰$

Peaty sediments from core TNG-1 between 233 or 237cm below bottom of Tangle Lake (63° 1′ 42″ N, 146° 3′ 42″ W). Dates Holocene sedimentation and pollen accumulation in this area to S of Alaska Range that has adjacent archaeol sites. Coll 1977 by J D Sims and M J Rymer; subm by J D Sims.

2730 ± 40

USGS-431. Hidden Lake, Kenai Peninsula *Est* $\delta^{13}C = -25‰$

Carbonaceous sediments from core HL-1-D between 74 and 79cm below bottom of Hidden Lake (60° 29′ 37″ N, 150° 22′ 38″ W). Calibrates

varve counts in older part of core and dates volcanic ash beds derived from volcanoes on Alaska Peninsula. Coll by J D Sims and M J Rymer; subm by J D Sims.

California

1440 ± 130

USGS-68. Little Lake *Est* $\delta^{13}C = -25‰$

Charcoal picked from hearth exposed on S side of gravel pit near Little Lake Hotel, Little Lake (36° 56′ 12″ N, 117° 54′ 24″ W). Sample found 0.75m below surface of alluvial gravels and indicates time when this horizon was at surface and occupied by man. Coll 1976 and subm by G I Smith, USGS.

2060 ± 60

USGS-70. Mono Lake $\delta^{13}C = +6.6‰$

Tufa on wood coll on S shore Mono Lake ca 1.5km N of Lee Vining (37° 58′ 42″ N, 119° 67′ W). Sample was 3m above present lake level and gives indication of pre-nuclear era concentrations of ^{14}C in lake water. Coll 1976 and subm by G I Smith.

1090 ± 40

USGS-222. Mecca $\delta^{13}C = +2.1‰$

Freshwater gastropods from drainage ditch bank in Lake Cahuilla (33° 32′ 30″ N, 116° 5′ W) sediments. Dates probable earthquake-induced deformational structures. Coll 1977 and subm by J D Sims.

1300 ± 50

USGS-223. Mecca $\delta^{13}C = +2.2‰$

Freshwater gastropods from bank of drainage ditch in Lake Cahuilla sediments (33° 32′ 7″ N, 116° 3′ 38″ W). Dates lacustrine sediments that contain penecontemporaneously-formed probable earthquake-induced deformational structures. Coll 1977 and subm by J D Sims.

2900 ± 130

USGS-315. Blue Lakes, Lake County *Est* $\delta^{13}C = -25‰$

Carbonaceous sediments from core BL-2-M between 555 and 557.5cm below lake bottom of upper Blue Lakes (39° 10′ 15″ N, 123° 00′ 37″ W); date level in core and provide estimate of sedimentation rate in this tectonically-controlled lake near Clear Lake, Lake Co. Coll 1977 by J D Sims.

4590 ± 120

USGS-607. Willow Springs Fault *Est* $\delta^{13}C = -25‰$

Charcoal from colluvial deposits displaced ca 70cm on steep reverse fault near Willow Springs (34° 52′ 43″ N, 118° 17′ 50″ W). Coll 1978 by D B Burke; subm by C W Hedel, USGS.

Koehn Lake series

Lithoid tufa in near-surface gravel of pluvial lake shoreline bar in Fremont Valley (35° 22′ 40″ N, 117° 48′ 55″ W), offset left-laterally ca 80m along Garlock fault. Date is apparently that of most recent high-lake stand, but soil development in bar gravels indicates that bar construction

was more than 100,000 yr ago. Coll 1978 by M M Clark; subm by D B Burke, USGS.

12,700 ± 100
Est $\delta^{13}C = 0‰$

USGS-634.
Outermost rind, ca 2 to 4mm thick.

13,460 ± 80
$\delta^{13}C = 3.0‰$

USGS-635.
Inner rind, ca 3 to 5mm thick.

14,700 ± 130
$\delta^{13}C = 4.6‰$

USGS-388. Koehn Lake
Surface-water ostracodes from interstratified mud and fine sand in unoxidized deep-water deposits of most recent deep pluvial lake stand in Fremont Valley (35° 22′ 00″ N, 117° 51′ 30″ W). Ostracode-bearing deposits have been deformed at least 9 and possibly as many as 17 times where they are offset by Garlock fault. Coll 1977 by M M Clark and D B Burke; subm by C W Hedel.

10,260 ± 70
Est $\delta^{13}C = -25‰$

USGS-337. Livermore Landslide, Napa Co
Peat, from 5.3m below surface of sag pond on landslide (38° 40′ 17″ N, 122° 34′ 14″ W). Date is min for last occurrence of slide movement. Coll 1977 and subm by R Witham, USGS.

18,500 ± 230
Est $\delta^{13}C = -25‰$

USGS-381. Clear Lake, Lake Co
Carbonaceous sediments from Clear Lake Core 8 between 2037 and 2047cm (lowermost 10cm) below base of Clear Lake (39° 5′ 48″ N, 122° 51′ 42″ W). Dates level in core that has paleomagnetic stratigraphy and tephrachronology (Sims, 1976) and is correlated with seven other cores from lake. Coll 1977 and subm by J D Sims.

13,070 ± 180
Est $\delta^{13}C = -25‰$

USGS-382. Clear Lake, Lake Co
Carbonaceous sediments from Clear Lake Core 3 between 890 and 900cm below base of Clear Lake (39° 2′ 54″ N, 122° 50′ 24″ W). Dates sedimentation rates and volcanic ash beds and helps correlate seven other cores from lake. Coll 1977 and subm by J D Sims.

pM = 2.9 ± 0.16%
$\delta^{13}C = -10.2‰$

USGS-385. Castle Crag Soda Spring
Strontium carbonate precipitate formed by adding ammonical strontium chloride to CO_2-charged spring water. Precipitation of strontium carbonate carried out at field site (41° 8′ 7″ N, 122° 17′ 49″ W). Coll by R Mariner 1977; subm by Ivan Barnes, USGS.

Oregon

4300 ± 100
Est $\delta^{13}C = -25‰$

USGS-343. Newberry caldera
Silicified wood in pumiceous silicified lakeshore sediment ca 50m S of interlake basaltic andesite flow along E shore of Paulina Lake at Little

Crater campground (43° 00′ N, 121° 14′ 24″ W). Sediment is younger than palagonite tuff of Little Crater and interlake basaltic andesite flow and older than Mazama ash. Age is too young, based on presence of primary deposits of Mazama ash (6700-7000 BP) overlying sediment. Coll 1977 and subm by N S MacLeod, USGS.

1550 ± 120

USGS-344. Newberry volcano *Est* $\delta^{13}C = -25‰$

Charcoal directly underlying youngest pumice fall on E flank of volcano (43° 42′ 6″ N, 121° 8′ 23″ W). Coll from hole dug adjacent to Cinder Hill Rd, 400m N of small spatter cone on NE side of Red Hill. Carbon is overlain by 2m of pumice fall and underlain by 0.8m of Mazama ash. Date agrees with other date on pumice fall from near The Dome (W-2168, 1720 ± 200 BP, Spiker, Kelley, and Rubin, 1978). Coll 1977 and subm by N S MacLeod.

1340 ± 60

USGS-755. Newberry caldera *Est* $\delta^{13}C = -27‰$

Charcoal from burned trees incorporated in Paulina Lake ash flow (43° 42′ 36″ N, 121° 15′ W). Coll at same site, marked by concrete enclosure, from which previous samples were coll, C-657, 2054 ± 230 BP (Libby, 1952); W-2777, 1390 ± 200 BP (Kelley, Spiker, and Rubin, 1978); Tx-245, 1270 ± 60 BP (Pearson, Davis, and Tamers, 1966). Ash flow is virtually identical in major-# and trace-element composition to youngest pumice fall on E flank of volcano (see USGS-344) and to Big Obsidian flow, and was redated to determine if pumice fall and ash flow are essentially same age or if ash flow is significantly younger; small age difference is suggested. Coll 1977 and subm by N S MacLeod.

Washington

pM = 4.13 ± 0.14%

USGS-387. Garland Mineral Spring *Est* $\delta^{13}C = 0‰$

Strontium carbonate precipitate formed by adding ammonical strontium chloride to CO_2-charged spring water. Precipitation of strontium carbonate carried out at field site (47° 53′ 21″ N, 121° 20′ 31″ W). Coll 1977 by R Mariner; subm by Ivan Barnes.

pM = 1.78 ± 0.12%

USGS-386. Longmire Mineral Spring *Est* $\delta^{13}C = 0‰$

Strontium carbonate precipitate formed by adding ammonical strontium chloride to CO_2-charged spring water. Precipitation of strontium carbonate carried out at field site in Mt Rainier Natl Park (46° 45′ 6″ N, 121° 48′ 48″ W). Coll 1977 by R Mariner; subm by Ivan Barnes.

Nevada

Steamboat Springs series

Bicarbonate and carbonate from thermal spring waters at Steamboat Springs (39° 23′ 18″ N, 119° 44′ 25″ W). Values determined are used to study reservoir processes and flow patterns within geothermal system.

USGS-350. Near Spring 27
pM = 1.64 ± 0.16%
$\delta^{13}C = -5.9‰$

USGS-365. Spring 26
pM = 0.46 ± 0.16%
Est $\delta^{13}C = 0‰$

USGS-366. Spring 5
pM = 1.21 ± 0.12%
Est $\delta^{13}C = 0‰$

USGS-367. Spring 8
pM = 0.97 ± 0.13%
Est $\delta^{13}C = 0‰$

Idaho

USGS-318. Wapi Park
2270 ± 50
Est $\delta^{13}C = -25‰$

Charcoal from charred roots of sagebrush found ca 2m under edge of Wapi Lava Field at Wapi Park (42° 55′ N, 113° 15′ W). Date agrees well with mean of previous dates on Kings Bowl Lava Field: Tx-1164, 2090 ± 470; Tx-1165, 2360 ± 150; X-1001, 2130 ± 130 (Valastro, Davis, and Varela, 1978); Tx-1736, 2170 ± 90 (Valastro, Davis, and Varela, 1972) on charred material of similar origin. Combined with information that Wapi and Kings Bowl Lava Fields have identical directions of magnetization, dating suggests two eruptions occurred simultaneously. Coll 1977 by Ron Popson, Univ Arizona and subm by D Champion, USGS.

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