

SEOUL NATIONAL UNIVERSITY ACCELERATOR MASS SPECTROMETRY (SNU-AMS) RADIOCARBON DATE LIST IV

M Youn¹ • Y M Song¹ • J Kang¹ • J C Kim¹ • M K Cheoun²

INTRODUCTION

The accelerator mass spectrometry (AMS) facility at Seoul National University (SNU-AMS) was accepted in December 1998 and results reported first at the Vienna AMS conference in October 1999 and at the 17th Radiocarbon Conference in Israel, June 2000. At the Vienna conference, we reported our accelerator system and sample preparation systems (Kim et al. 2000). Recent developments of the AMS facility have been regularly reported at AMS conferences (Kim et al. 2001, 2004, 2007). Meanwhile, about 1000 unknown archaeological, geological, and environmental samples have been measured every year. In this report, the archaeological and geological data carried out in 2002 are presented in terms of years BP (before present, AD 1950), following the SNU-AMS date lists I and II published in *Radiocarbon* (Kim et al. 2006a,b).

ARCHAEOLOGICAL SAMPLES

VIETNAM

Bai Ong Series

The Bai Ong site (108°23'10"N, 15°15'20"E) samples were submitted by Lee Seonbok in 1999. Samples come from ancient dwellings, assumed to date to the beginning of the Metal Age in Vietnam.

SNU02-184	3230 ± 40
SNU02-185	3470 ± 60

Samples are charcoals at 80–100 cm and 105 cm depth, respectively.

KOREA

Jigok Series A

Jigok site A (36°01'98"N, 129°19'16"E; 79 m height), investigated by Kyungju Museum and thought to date to the Chosun Dynasty, is an ancient roofing tile factory in Pohang-si, Gyengbuk-do.

SNU02-011	570 ± 40
SNU02-012	380 ± 40

Samples are charcoals from a combustion furnace in the ancient factory.

Jigok Series B

Jigok site B (36°01'86"N, 129°19'00"E; 84 m height), investigated by Kyungju Museum, comprises ancient dwellings in Pohang-si, Gyengbuk-do.

¹Inter-University Center for Natural Science Research Facility, Building 139-1, Seoul National University, Seoul 151-742, Korea.

²Department of Physics, Soongsil University, Dongjak-Gu, Seoul 156-743, Korea. Corresponding author. Email: cheoun@ssu.ac.kr.

SNU02-013	570 ± 40
SNU02-014	660 ± 40

Samples are charcoals.

SNU02-015	2490 ± 40
SNU02-016	2420 ± 40

Samples are charcoals, assumed Bronze Age.

Jugjeon Series

The Jugjeon site (37°19'N, 127°07'E; 94 m height) comprises ancient dwellings, assumed Bronze Age, in Suji-up, Yongin-si, Gyenggi-do.

SNU02-026	2650 ± 40
SNU02-027	2880 ± 80
SNU02-028	2780 ± 40
SNU02-029	2550 ± 60
SNU02-030	2640 ± 60
SNU02-033	2440 ± 60
SNU02-034	2920 ± 80

Samples are charcoals, assumed Bronze Age.

SNU02-031	640 ± 60
SNU02-032	660 ± 50

Samples are charcoals, assumed Bronze Age but suspected to be contaminated by precipitated water.

Angol Series

The Angol site (37°26'N, 126°49'E) comprises ancient dwellings (presumably 5th–10th century BC) in Gyesu-dong, Siheung-si, Gyenggi-do.

SNU02-041	2410 ± 40
SNU02-042	2830 ± 30
SNU02-043	2580 ± 40

Samples are charcoals from the 1st, 2nd, and 3rd dwellings, respectively, from the uppermost sample.

Sangbang Series

The Sangbang site (34°44'N, 126°52'E) was investigated and samples submitted by Mokpo University Museum in 2001. Samples come from ancient dwellings (AD 3rd to 4th century; 53.83 m height) in Dae-ri, Yuchi-myon, Jangheung-gun, Jeonnam-do.

SNU02-236	1770 ± 70
SNU02-237	1670 ± 60
SNU02-238	1760 ± 60
SNU02-241	1740 ± 40
SNU02-244	1770 ± 60
SNU02-245	1810 ± 40
SNU02-248	1680 ± 40
SNU02-250	1620 ± 40
SNU02-251	1630 ± 70
SNU02-252	1660 ± 40
SNU02-253	1650 ± 60

SNU02-254	1590 ± 50
SNU02-255	1620 ± 60
SNU02-256	1670 ± 40
SNU02-257	1660 ± 60
SNU02-258	1700 ± 50
SNU02-259	1740 ± 50
SNU02-260	1280 ± 40
SNU02-261	1650 ± 40
SNU02-262	1610 ± 40
SNU02-263	1860 ± 40
SNU02-264	1860 ± 60
SNU02-265	1700 ± 60

Samples are charcoals, 20~30 cm depth, but SNU02-238 and -248 are carbonized cereals.

Okgog Series

The Okgog site (35°48'28"~57"N, 128°43'55"E~44'21"E; 56.5 m height) comprises ancient (Bronze Age) dwellings in Kyungsan-si, Gyungbuk-do.

SNU02-268	2700 ± 40
SNU02-269	2830 ± 80
SNU02-270	2720 ± 70
SNU02-271	2720 ± 40
SNU02-272	2640 ± 60

Samples are woods, about 60~80 cm under the surface.

Inwang Series

The Inwang site (35°49'20"N, 129°12'38"E) was investigated and samples submitted by Kyungju Cultural Properties Research Institute in 2002. Samples are from the Namcheon river bed, Inwang-dong, Kyungju-si, Gyeongnam-do.

SNU02-285	1120 ± 60
SNU02-286	1290 ± 40
SNU02-287	1310 ± 40
SNU02-288	1290 ± 60
SNU02-289	1230 ± 60
SNU02-290	1300 ± 80
SNU02-291	1250 ± 50

Samples are woods from the eastern embankment of the river bed.

Singari Series

The Singari site (35°02'33"N, 126°46'42"E) was investigated and samples submitted by Dongshin University Museum in 2002. Samples are from ancient kilns (AD 5th–6th century) in Naju-si, Jeonnam-do.

SNU02-298	1370 ± 60
SNU02-299	1480 ± 80
SNU02-300	1390 ± 80
SNU02-301	1510 ± 60

Samples are charcoals from the 1st, 2nd, 3rd, and 4th kilns, respectively.

Oryangdong Series

The Oryangdong site (34°94'78"N, 126°67'33"E) was investigated and samples submitted by Dongshin University Museum in 2001. Samples are from ancient kilns (AD 5th century) in Naju-si, Jeonnam-do.

SNU02-303	1400 ± 40
SNU02-304	1560 ± 40
SNU02-305	1460 ± 40

Samples are charcoals from the 9th kiln.

SNU02-306	1620 ± 50
SNU02-307	1540 ± 50

Samples are charcoals from the 3rd kiln.

Jugnaeri Series

The Jugnaeri site (35°6'39"N, 127°26'21"E; 70 m height) was investigated and samples submitted by Chosun University Museum. Samples are from cultural beds thought to date to the Paleolithic.

SNU02-345	4980 ± 150
SNU02-346	19,510 ± 380
SNU02-347	23,500 ± 1000
SNU02-348	28,230 ± 110

Samples are soils from the 4th, 3rd, 2nd, and 1st beds, respectively, from the uppermost sample.

Gangmun Series

The Gangmun site (37°48'N, 128°55'E) comprises ancient dwellings in Gangneung, Gangwon-do. This site is at present a seaside sand dune.

SNU02-368	1700 ± 40
SNU02-370	1870 ± 40

Samples are charcoals from the 1st and 2nd dwellings, respectively, from the AD 1st to 2nd century.

SNU02-371	1430 ± 40
SNU02-372	1570 ± 30
SNU02-373	1400 ± 60

Samples are charcoals from the 2nd dwelling, from the AD 3rd to 5th century.

Geoduri Series

The Geoduri site (37°50'87"~51'00"N, 127°45'27"~35"E; 89 m height) comprises ancient dwellings in Dongnae-myun, Chuncheon-si, Gangwon-do.

SNU02-374	2240 ± 70
SNU02-375	2320 ± 40
SNU02-376	2870 ± 40
SNU02-377	2940 ± 40
SNU02-378	710 ± 30
SNU02-379	2520 ± 40
SNU02-380	2480 ± 40

Samples are charcoals from the 9th, 11th-1, 12th, 14th, 14th-1, 17th, and 19th dwellings, respectively, from the uppermost sample.

Yongam Series

The Yongam site (38°06'30"N, 127°42'00"E; 106 m height) comprises ancient dwellings in Hwacheon-gun, Gangwon-do.

SNU02-383	2430 ± 200
SNU02-384	2600 ± 80
SNU02-385	2700 ± 40
SNU02-386	2770 ± 40
SNU02-387	480 ± 30

Samples are charcoals (probably Bronze Age).

Cheonjeon Series

The Cheonjeon site (37°56'20"N, 127°46'42"E; 85 m height) comprises ancient dwellings in Chuncheon-si, Gangwon-do.

SNU02-388	2320 ± 60
SNU02-389	2590 ± 60
SNU02-390	2410 ± 40
SNU02-391	2080 ± 40
SNU02-392	2300 ± 60

Samples are charcoals (probably Bronze Age).

Nambugdong Series

The Nambugdong site (37°21'N, 126°51'E), investigated and samples submitted by the Seoul National University (SNU) Museum in 2002, is an ancient charcoal brazier on a field (estimated as 2500–1500 BC) in Yongyu-do, Incheon-si. This site is at present a seaside sand dune, 10 m depth.

SNU02-455	3500 ± 40
SNU02-456	3840 ± 40
SNU02-457	4440 ± 50
SNU02-458	4450 ± 50
SNU02-459	4650 ± 40
SNU02-460	4700 ± 60
SNU02-461	4620 ± 60
SNU02-462	3810 ± 40

Samples are charcoals from the 3rd, 9th, 32nd-1, 32nd, 50th, 50-1st, 52nd, and 3rd braziers, respectively, from the uppermost sample.

Eulwang Series

The Eulwang site (37°21'N, 126°51'E) was investigated and samples submitted by the SNU Museum in 2002. Samples are ancient remains (7 m depth; estimated as 2500–1500 BC) from Yongyu-do, Incheon-si.

SNU02-463	4010 ± 60
SNU02-464	4080 ± 60

Samples are shells.

Gwanyangdong Series

The Gwanyangdong site (37°24'12"N, 126°63'05"E) comprises ancient dwellings (10th–7th century BC) in Anyang-si, Gyunggi-do.

SNU02-469	2740 ± 40
SNU02-470	2580 ± 40
SNU02-471	2490 ± 40
SNU02-472	2440 ± 60

Samples are charcoals on the floor of the 6th, 7th, 7th, and 8th dwellings, respectively.

Wonsu Series

The Wonsu site (36°01'13"N, 127°05'45"E) comprises ancient dwellings in Samdo-dong, Gwangju-si, Jeonnam-do.

SNU02-512	2430 ± 60
SNU02-513	2800 ± 30
SNU02-514	2580 ± 80
SNU02-515	2660 ± 40
SNU02-516	2560 ± 40
SNU02-517	2420 ± 40
SNU02-518	2490 ± 60
SNU02-519	2530 ± 60

Samples are charcoals.

Chuidong Series

The Chuidong site (36°00'N, 126°24'E) comprises ancient dwellings (32.55 m height; AD 5th–6th century) in Gunsan-si, Jeonbug-do.

SNU02-520	1700 ± 40
SNU02-521	1640 ± 40

Samples are charcoals from a floor in the 1st dwelling.

SNU02-522	1980 ± 80
SNU02-523	1760 ± 80

Samples are soils from the 4th kiln in the 3rd dwelling.

SNU02-524	1740 ± 60
SNU02-525	1700 ± 60
SNU02-526	1560 ± 60

Samples are from the 4th, 5th, and 6th kilns in the dwellings.

Whangseng Series

The Whangseng site (35°51'92"N, 129°12'59"E) comprises ancient dwellings (presumably Bronze Age) in Kyungju-si, Gyengbuk-do.

SNU02-572	2660 ± 40
SNU02-573	2810 ± 60
SNU02-574	2470 ± 40

Samples are charcoals from ancient woods in the dwellings.

GEOLOGICAL SAMPLES*Nagpo Series*

The Nagpo site (34°51'N, 127°46'E; 61 m height) in Yosu-si, Jeonnam-do, was investigated and samples submitted by Korea Atomic Energy Research Institute (KAERI).

SNU02-085	3350 ± 40
SNU02-086	3350 ± 40
SNU02-087	5960 ± 70
SNU02-088	6030 ± 30
SNU02-089	5980 ± 40
SNU02-090	4290 ± 60
SNU02-091	6090 ± 40

Samples are groundwater from a wildcat well in the volcanic rock. Sample depths are 17, 30.5, 35, 74, 78.5, 171.5, and 176 m, respectively.

SNU02-092	3730 ± 40
------------------	------------------

Sample is groundwater from a cavern in the volcanic rock.

Yongsuri Series

The Yongsuri site (37°40'N, 127°45'E), investigated and samples submitted by Kyunghee University, is located in Nam-myeon, Hongcheon-gun, Gangwon-do.

SNU02-161	1830 ± 40
SNU02-162	1880 ± 60
SNU02-163	2550 ± 40

Samples are charcoals, 1.3, 2.3, and 1 m depth, respectively.

Rondeau Series

The Rondeau series (42°19'53"N, 81°50'44"W) comes from Rondeau Provincial Park, Kent, Ontario, Canada. See Coakley (1989) for more detailed description of this site.

SNU02-320	1490 ± 30
SNU02-321	2610 ± 40

Samples are wood fragments collected in 2001 and submitted in 2002 by S Finkelstein.

SNU02-322	1870 ± 30
------------------	------------------

Sample is sediment.

Deokjin Series

The Deokjin site (36°25'30"N, 127°22'25"E; 80 m height) is located in Yuseng-gu, Daejun-si.

SNU02-585	9120 ± 40
SNU02-586	12,440 ± 150
SNU02-587	10,650 ± 150
SNU02-588	14,890 ± 200
SNU02-590	5720 ± 80

SNU02-593 **5100 ± 200**
SNU02-594 **10,850 ± 150**

Samples are groundwater from depths of 299.5, 367.5, 415.5, 455.0, 30, 177, and 252 m, respectively.

Whanghae Series

The Whanghae site, investigated in 2001 by the School of Earth and Environmental Science (SNU), is in the middle of the Yellow Sea, west of the Korean Peninsula.

SNU02-632 (35°15.067'N, 123°10.955'E; 76.5 m depth) **11,350 ± 50**
SNU02-633 (35°55.000'N, 124°50.699'E; 84.6 m depth) **18,150 ± 100**
SNU02-636 (35°15.067'N, 123°10.955'E; 76.5 m depth) **4150 ± 50**
SNU02-637 (35°15.067'N, 123°10.955'E; 73.5 m depth) **60 ± 30**

Samples are foraminifera.

SNU02-634 (35°15.067'N, 123°10.955'E; 75.5 m depth) **7560 ± 50**

Samples are shells.

ACKNOWLEDGMENTS

This work was supported by the Soongsil University Research Fund.

REFERENCES

- Coakley JP. 1989. The origin and evolution of a complex cusped foreland: Pointeaux-Pins, Lake Erie, Ontario. *Geographie Physique et Quaternaire* 43(1):65–76.
- Kim JC, Lee CH, Kim IC, Park JH, Kang J, Cheoun MK, Kim YD, Moon CB. 2000. A new AMS facility in Korea. *Nuclear Instruments and Methods in Physics Research B* 172(1–4):13–7.
- Kim JC, Park JH, Kim IC, Lee C, Cheoun MK, Kang J, Song YM. 2001. Progress at the Seoul National University AMS facility. *Radiocarbon* 43(2A):163–7.
- Kim JC, Youn M, Kim IC, Park JH, Song YM, Kang J, Choi HR. 2004. Status report on the Seoul National University AMS facility. *Nuclear Instruments and Methods in Physics Research B* 223–224:44–9.
- Kim JC, Youn MY, Kim IC, Park JH, Song YM, Kang J, Cheoun MK. 2006a. Seoul National University accelerator mass spectrometry (SNU-AMS) radiocarbon date list I. *Radiocarbon* 48(2):259–66.
- Kim JC, Youn MY, Kim IC, Park JH, Song YM, Kang J, Cheoun MK. 2006b. Seoul National University accelerator mass spectrometry (SNU-AMS) radiocarbon date list II. *Radiocarbon* 48(2):267–83.
- Kim JC, Youn M, Lee SC, Yun CC, Song YM, Kang J, Choi HR, Ashok M, Kwak JW, Kim SK. 2007. Current activities at the Seoul National University AMS facility. *Nuclear Instruments and Methods in Physics Research B* 259(1):57–61.