

Table A.1

**KECK CARBON CYCLE AMS FACILITY**  
*EARTH SYSTEM SCIENCE DEPT, UC IRVINE*

<sup>14</sup> C results			Paleotec/Bednarski				Mar 17 2013			
UCIAMS #	Sample name	Other ID	δ <sup>13</sup> C (‰)	±	fraction Modern	±	D <sup>14</sup> C (‰)	±	<sup>14</sup> C age (BP)	±
122339	11-BJB-011		-1.7	0.1	0.0026	0.0004	-997.4	0.4	47800	1300
122340	12-BJB-004		-0.6	0.1	0.1971	0.0006	-802.9	0.6	13045	25
122341	12-BJB-012		0.1	0.1	0.0050	0.0004	-995.0	0.4	42500	680
122342	Cochrane-H2, Box 36, Bag 1		-0.1	0.1	0.0017	0.0004	-998.3	0.4	51200	2000
122343	Cochrane-H2, Box 36, Bag 2		1.8	0.1	0.0013	0.0004	-998.7	0.4	53300	2600

Radiocarbon concentrations are given as fractions of the Modern standard, D<sup>14</sup>C, and conventional radiocarbon age, following the conventions of Stuiver and Polach (Radiocarbon, v. 19, p.355, 1977).

Sample preparation backgrounds have been subtracted, based on measurements of <sup>14</sup>C-free calcite.

All results have been corrected for isotopic fractionation according to the conventions of Stuiver and Polach (1977), with δ<sup>13</sup>C values measured on prepared graphite using the AMS spectrometer. These can differ from δ<sup>13</sup>C of the original material, if fractionation occurred during sample graphitization or the AMS measurement, and are not shown.

Comments:

δ<sup>13</sup>C values shown above were measured to a precision of <0.1‰ relative to standards traceable to PDB, using a Thermo Finnigan Delta Plus stable isotope ratio mass spectrometer (IRMS) with Gas Bench input.

Table A.2

**KECK CARBON CYCLE AMS FACILITY**  
*EARTH SYSTEM SCIENCE DEPT, UC IRVINE*

<sup>14</sup> C results			Paleotec/Bednarski				Mar 21 2013			
UCIAMS #	Sample name	Other ID	δ <sup>13</sup> C (‰)	±	fraction Modern	±	D <sup>14</sup> C (‰)	±	<sup>14</sup> C age (BP)	±
122474	12-BJB-002		-22.7	0.1	0.9801	0.0022	-19.9	2.2	160	20

Radiocarbon concentrations are given as fractions of the Modern standard, D<sup>14</sup>C, and conventional radiocarbon age, following the conventions of Stuiver and Polach (Radiocarbon, v. 19, p.355, 1977).

Sample preparation backgrounds have been subtracted, based on measurements of <sup>14</sup>C-free wood.

All results have been corrected for isotopic fractionation according to the conventions of Stuiver and Polach (1977), with δ<sup>13</sup>C values measured on prepared graphite using the AMS spectrometer. These can differ from δ<sup>13</sup>C of the original material, if fractionation occurred during sample graphitization or the AMS measurement, and are not shown.

Comments:

δ<sup>13</sup>C values shown above were measured to a precision of <0.1‰ relative to standards traceable to PDB, using a Thermo Finnigan Delta Plus stable isotope ratio mass spectrometer (IRMS) with Gas Bench input.

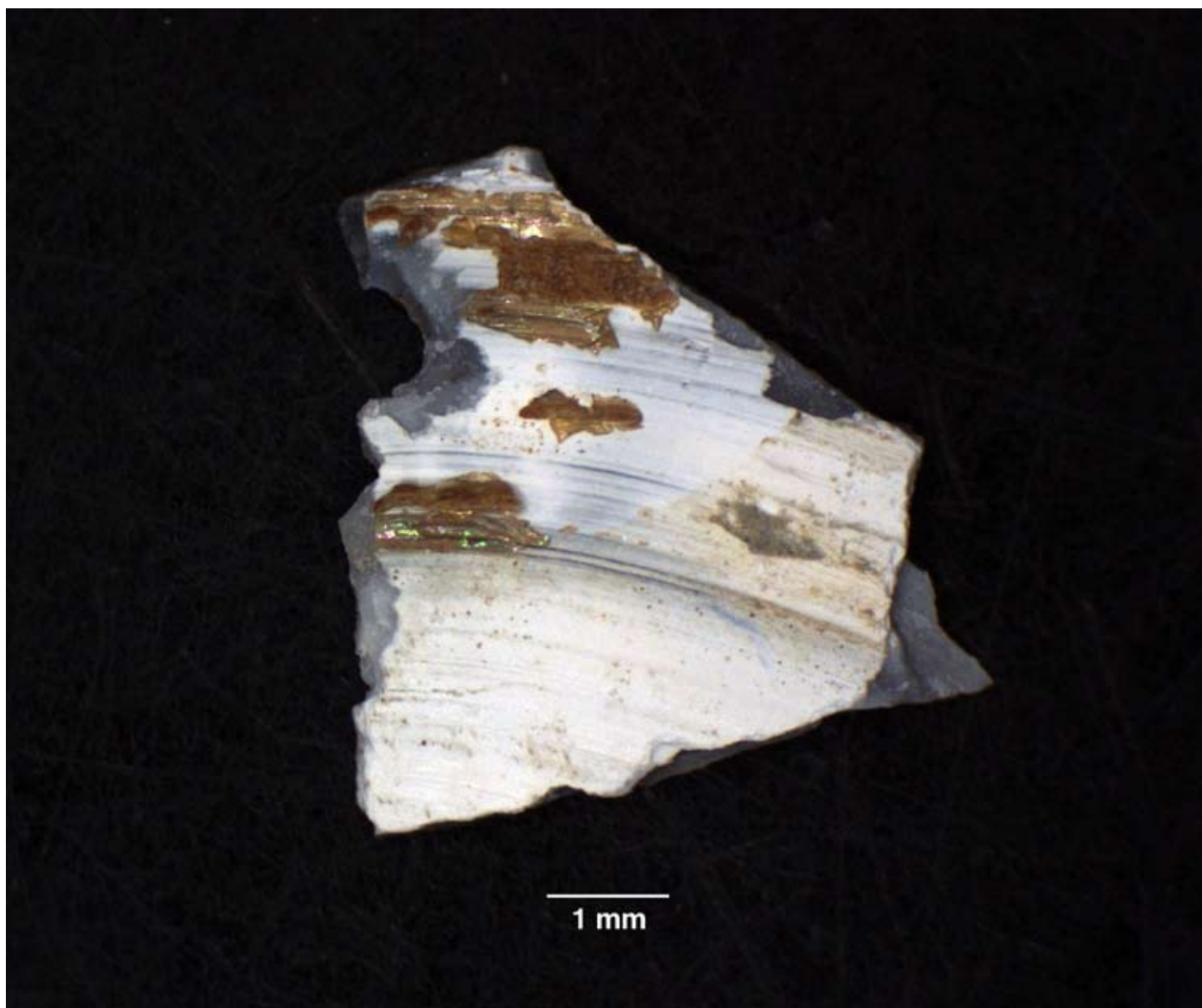


Figure A1. Sample **11-BJB-011**. Dorsal view of shell fragment weighing 58.88 mg was AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of  **$47800 \pm 1300$  yr BP** (UCI-AMS-122339) was obtained on the dated shell fragment (Mar. 17/13). Estimated  $^{14}\text{C}$  age  $>35,000$  yr BP.

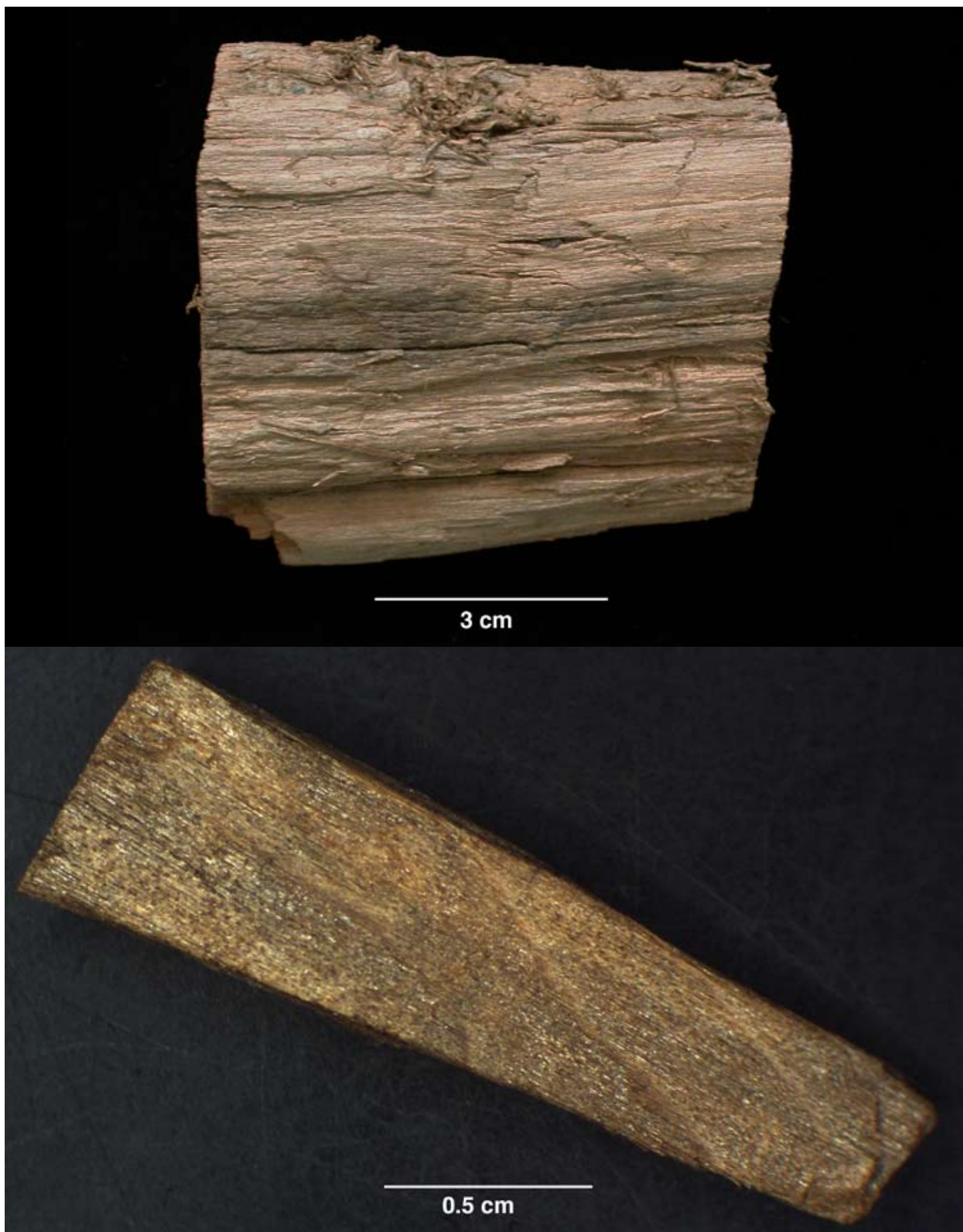


Figure A2. Top: Wood sample 12-BJB-002. Bottom: A subsample of the wood was AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of  **$160 \pm 20$  yr BP** (UCI-AMS-122474) was obtained on the dated wood (Mar. 21/13). Estimated  $^{14}\text{C}$  age  $\sim 12000$  yr BP.



Figure A3. Sample 12-BJB-004. Select bivalve fragments were AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of **13045  $\pm$  25 yr BP** (UCIAMS-122340) was obtained on the dated shell fragments (Mar. 17/13). Estimated  $^{14}\text{C}$  age  $\sim$ 12000 yr BP.

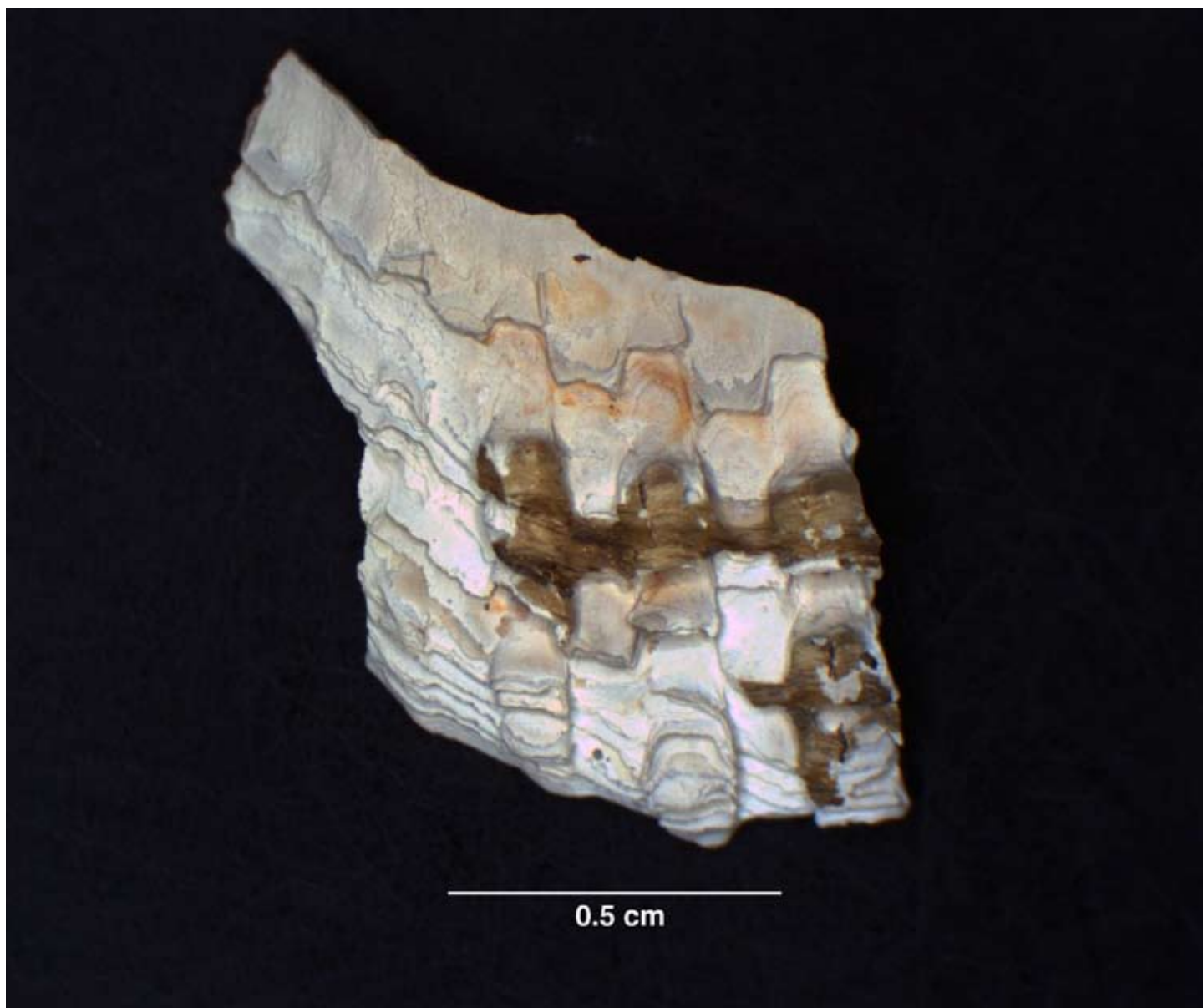


Figure A4. Sample **12-BJB-012**. Dorsal view of shell fragment (*Clinocardium* sp.). This larger fragment along with a smaller, similar preserved fragment weighing ~65 mg were AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of **42500  $\pm$  680 yr BP** (UCIAMS-122341) was obtained on the dated shell fragments (Mar. 17/13). Estimated  $^{14}\text{C}$  age >30,000 yr BP.

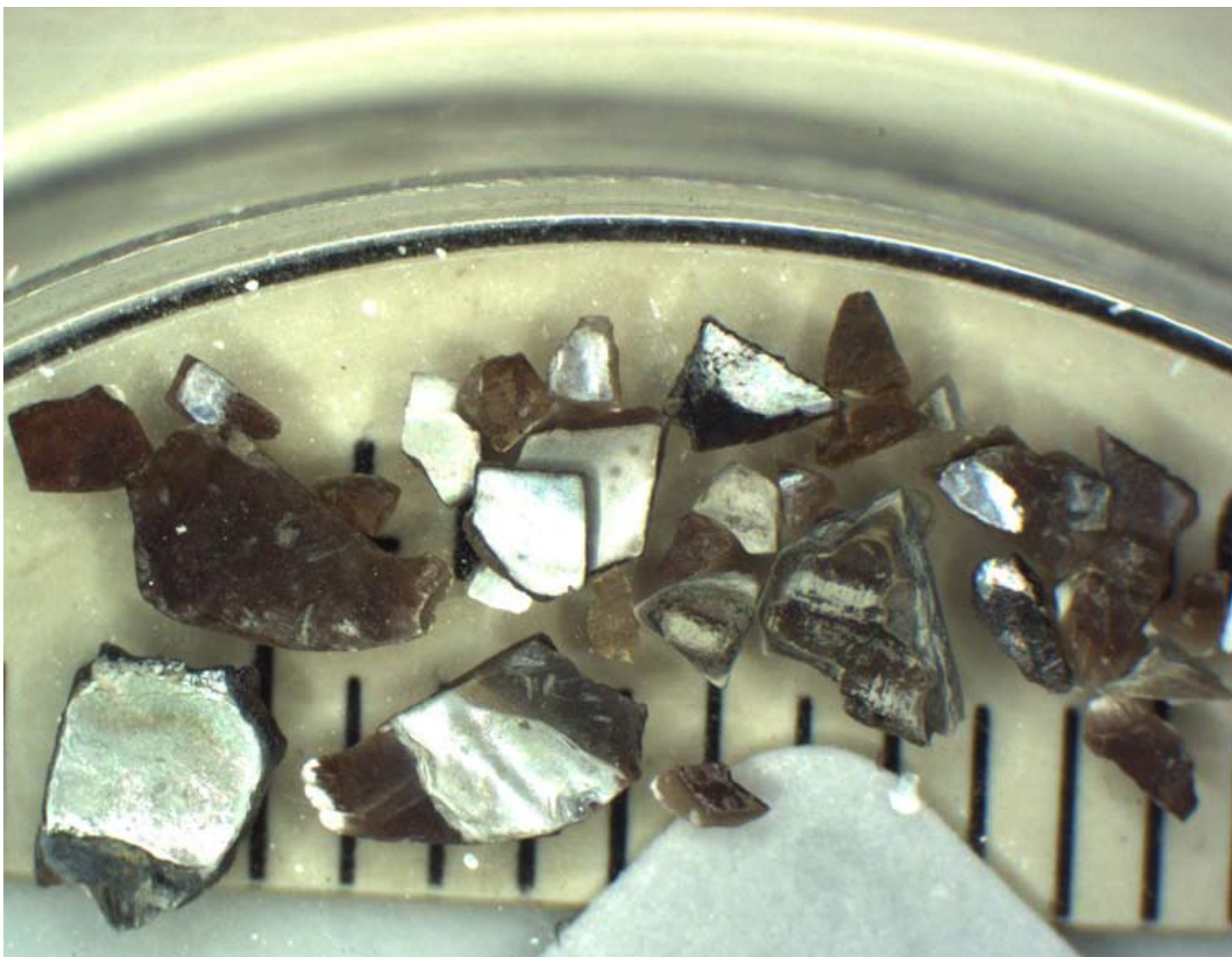


Figure A5. Sample **Cochrane-H2, Box 36, Bag 1**. Select, similar coloured nacre (dark brown) shell fragments were AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of **51200  $\pm$  2000 yr BP** (UCIAMS-122342) was obtained on the dated shell fragments (Mar. 17/13). Estimated  $^{14}\text{C}$  age >20,000 yr BP. For scale, background grid lines are 1 mm.

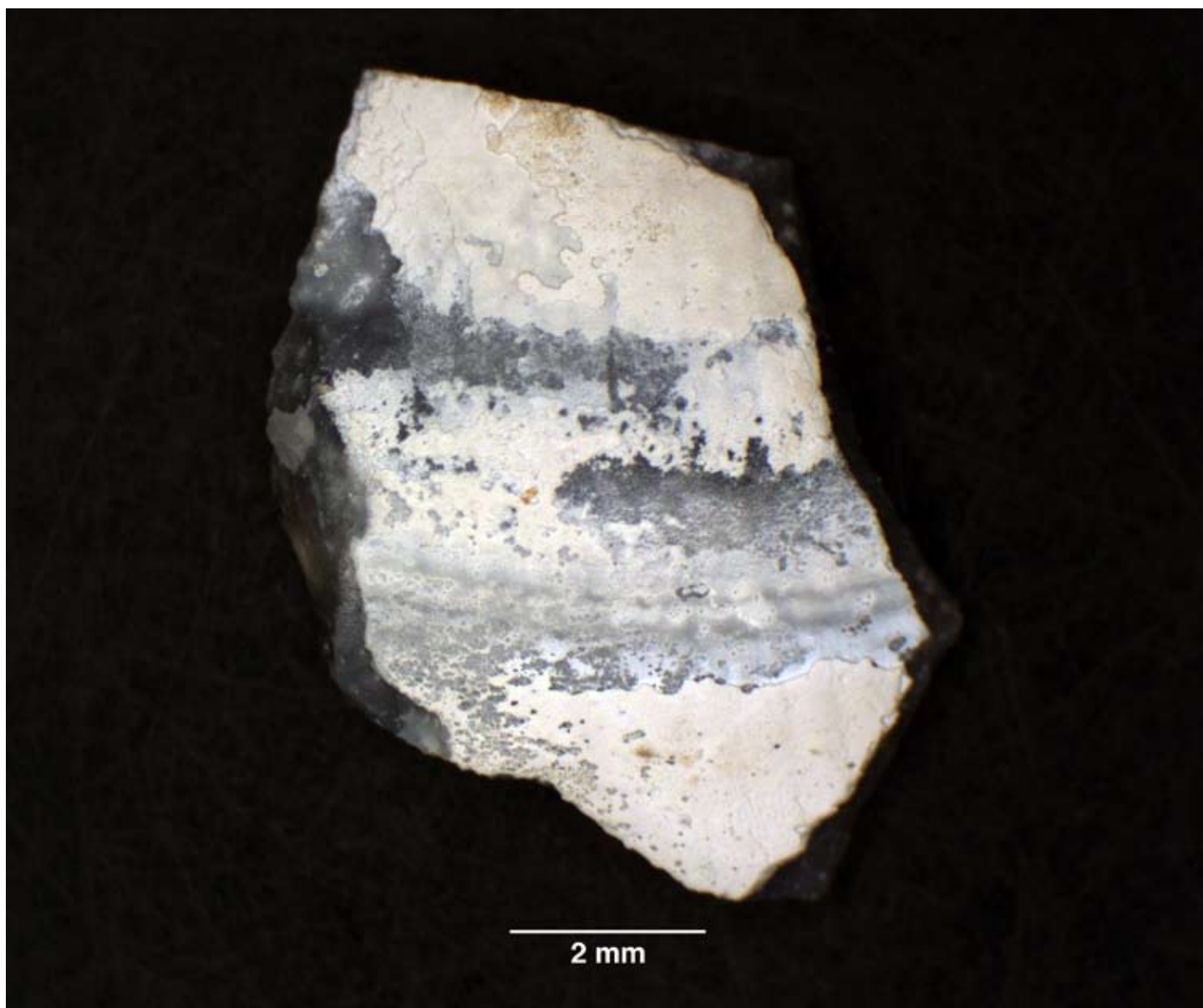


Figure A6. Sample **Cochrane-H2, Box 36, Bag 2**. Dorsal view of shell fragment weighing 103.40 mg was AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of **53300  $\pm$  2600 yr BP** (UCIAMS-122343) was obtained on the dated shell fragment (Mar. 17/13). Estimated  $^{14}\text{C}$  age >20,000 yr BP.

Table A.3 Nanaimo, B.C. core samples, Batch #2, Nov. 2013						
Sample No.	Collection Depth	Material	AMS material	AMS	Age Estimate	Id*
SPI-shell-001	Run 48, Bag 3, 63 cm within run, 97.47 m depth from top of hole	two similar valve frgs.	shell frg.	yes	Dashwood glaciomarine >40 ka BP	
SPI-shell-002-insufficient material for AMS	Run 41, Bag 2, 63 cm within run, 86.53 m depth from top of hole	tiny shell frg. 1mm x 1.5 mm	—	No		
CHR-shell-001 (Cochrane Box 36, bag 2)	Run 36, Bag 2, 91.5-97 cm within run, 110.59-100.63 m depth from top of hole	two similar valve frgs.	shell frg.	No		
CHR-shell-002	Run 2, Bag 1, 54 cm within run, 2.95 m depth from top of hole	two similar complete valves (2 cm x 1.5 cm)	shell frg.	yes	Early deglacial ~13 ka BP	Macoma balthica
CHR-shell-003	Run 1, Bag 2, 4 cm within run, 0.67 m depth from top of hole	two shell frgs. (one frg. with hinge)	shell frg.	yes	Early deglacial ~12.5 ka BP	Hiatella arctica
Spider-G, Box 27, bag 2 of 2 (lowermost 10 cm)	205' (65.2 to 62.5 m)	organic sediment	nothing suitable for AMS	No		
Spider-G, Box 26, bag 1 of 3 (lowermost 30 cm)	195' depth (~59.1 to 59.4 m)	organic sediment	conifer needle frgs.	yes	Olympia Non-glacial ~30 ka BP	
12-BJB-011		charcoal	charcoal	yes	>45 ka BP, if in place	

\*Shell ids done by Andre Martel, Canadian Museum of Nature

Table A.4 Organic AMS results.

**KECK CARBON CYCLE AMS FACILITY**  
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<sup>14</sup>C results

Paleotec/Bednarski

Jan 08 2014

UCIAMS #	Sample name	Other ID	$\delta^{13}\text{C}$ (‰)	±	fraction Modern	±	D <sup>14</sup> C (‰)	±	<sup>14</sup> C age (BP)	±
135206	4;Spider-G, Box 26, bag 1 of 3		-27.1	0.1	0.0199	0.0008	-980.1	0.8	31450	340
135207	5;12-BJB-011		-26.3	0.1	0.8286	0.0015	-171.4	1.5	1510	15

Radiocarbon concentrations are given as fractions of the Modern standard, D<sup>14</sup>C, and conventional radiocarbon age, following the conventions of Stuiver and Polach (Radiocarbon, v. 19, p.355, 1977).

Sample preparation backgrounds have been subtracted, based on measurements of <sup>14</sup>C-free wood.

All results have been corrected for isotopic fractionation according to the conventions of Stuiver and Polach (1977), with  $\delta^{13}\text{C}$  values measured on prepared graphite using the AMS spectrometer. These can differ from  $\delta^{13}\text{C}$  of the original material, if fractionation occurred during sample graphitization or the AMS measurement, and are not shown.

## Comments:

$\delta^{13}\text{C}$  values shown above were measured to a precision of <0.1‰ relative to standards traceable to PDB, using a Thermo Finnigan Delta Plus stable isotope ratio mass spectrometer (IRMS) with Gas Bench input.

Table A.5

**KECK CARBON CYCLE AMS FACILITY**  
*EARTH SYSTEM SCIENCE DEPT, UC IRVINE*

<sup>14</sup>C results

Paleotec/Bednarski

Jan 07 2014

UCIAMS #	Sample name	Other ID	$\delta^{13}\text{C}$ (‰)	±	fraction Modern	±	D <sup>14</sup> C (‰)	±	<sup>14</sup> C age (BP)	±
135238	1;SPI-shell-001		-1.4	0.1	0.0021	0.0006	-997.9	0.6	49400	2400
135239	2;CHR-shell-002		-1.1	0.1	0.1888	0.0009	-811.2	0.9	13390	40
135240	3;CHR-shell-003		1.2	0.1	0.1934	0.0007	-806.6	0.7	13195	35

Radiocarbon concentrations are given as fractions of the Modern standard, D<sup>14</sup>C, and conventional radiocarbon age, following the conventions of Stuiver and Polach (Radiocarbon, v. 19, p.355, 1977).

Sample preparation backgrounds have been subtracted, based on measurements of <sup>14</sup>C-free calcite.

All results have been corrected for isotopic fractionation according to the conventions of Stuiver and Polach (1977), with  $\delta^{13}\text{C}$  values measured on prepared graphite using the AMS spectrometer. These can differ from  $\delta^{13}\text{C}$  of the original material, if fractionation occurred during sample graphitization or the AMS measurement, and are not shown.

Comments:

$\delta^{13}\text{C}$  values shown above were measured to a precision of <0.1‰ relative to standards traceable to PDB, using a Thermo Finnigan Delta Plus stable isotope ratio mass spectrometer (IRMS) with Gas Bench input.

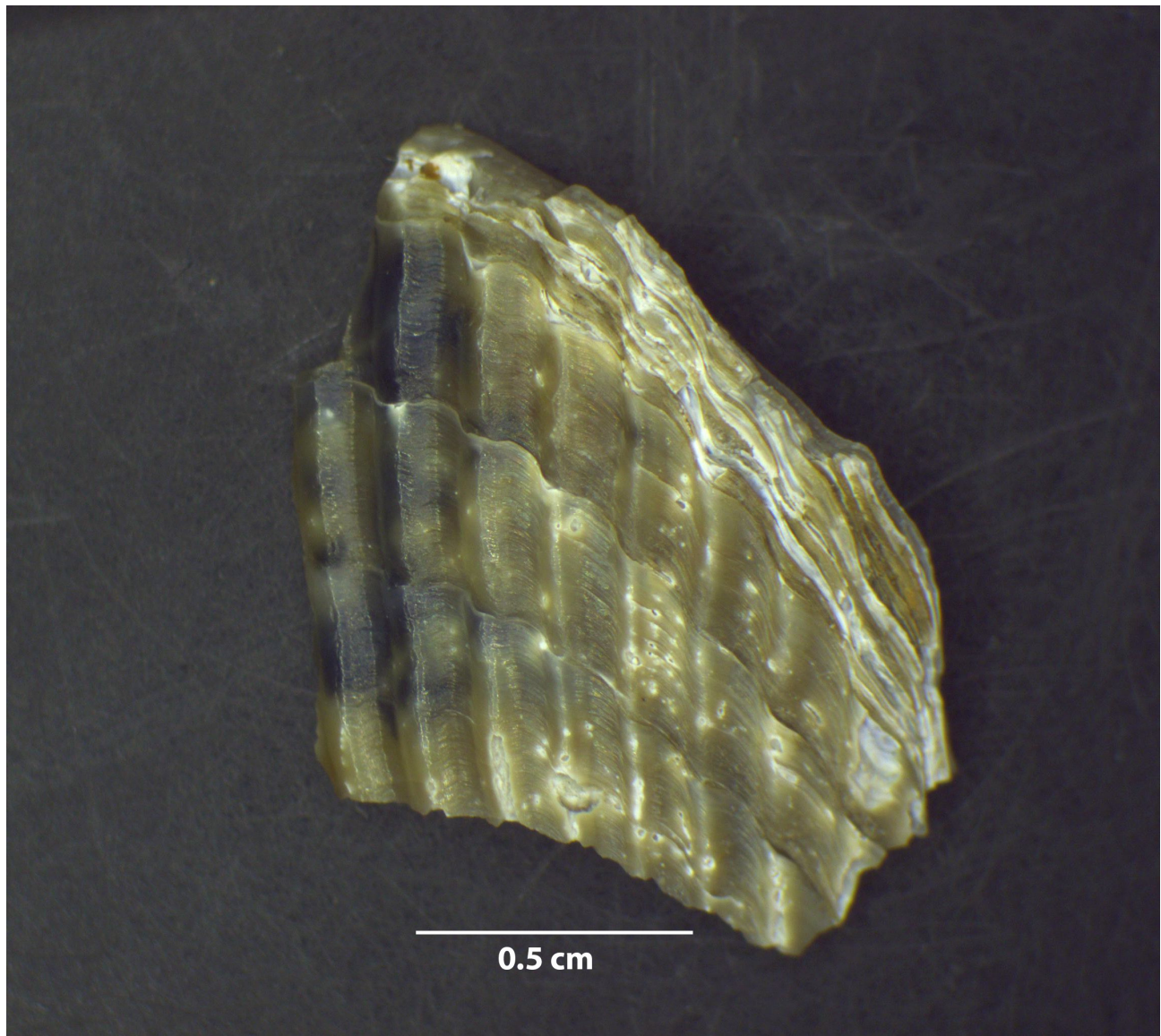


Figure A7. Sample **SPI-shell-001** (Run 48, Bag 3, 63 cm within run, 97.47 m depth from top of hole). This one shell fragment was AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of **49400  $\pm$  2400 yr BP** (UCIAMS-135238) was obtained on the dated shell fragment (Jan. 7/14). Estimated  $^{14}\text{C}$  age >40,000 yr BP (Dashwood glaciomarine).

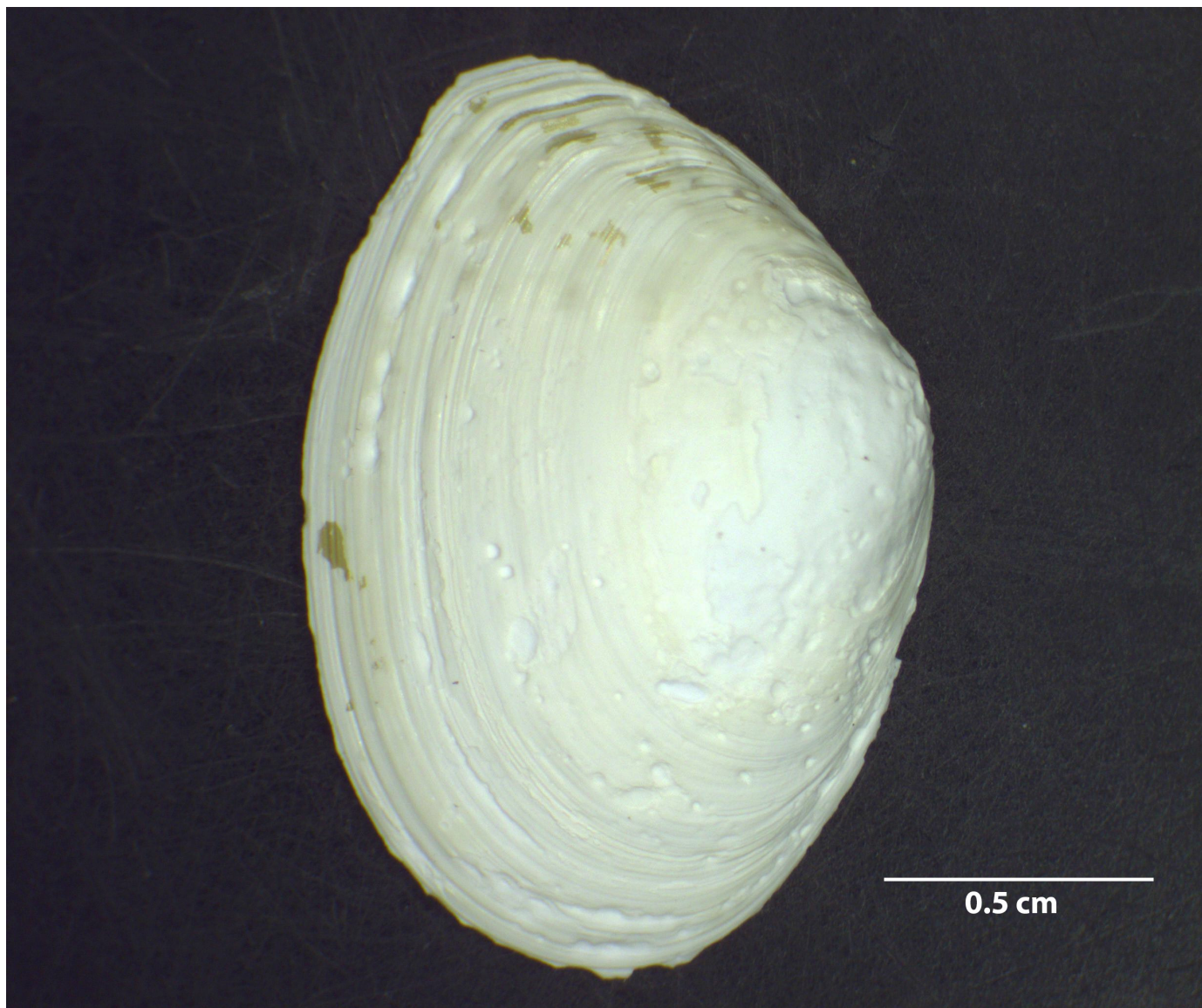


Figure A8. Sample **CHR-shell-002** (Run 2, Bag 1, 54 cm within run, 2.95 m depth from top of hole). One of two similar valves of *Macoma balthica* identified by André Martel (Canadian Museum of Nature) was AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of  $13390 \pm 40$  yr BP (UCIAMS-135239) was obtained on the dated shell (Jan. 7/14). Estimated  $^{14}\text{C}$  age  $\sim 13,000$  yr BP (early deglacial).

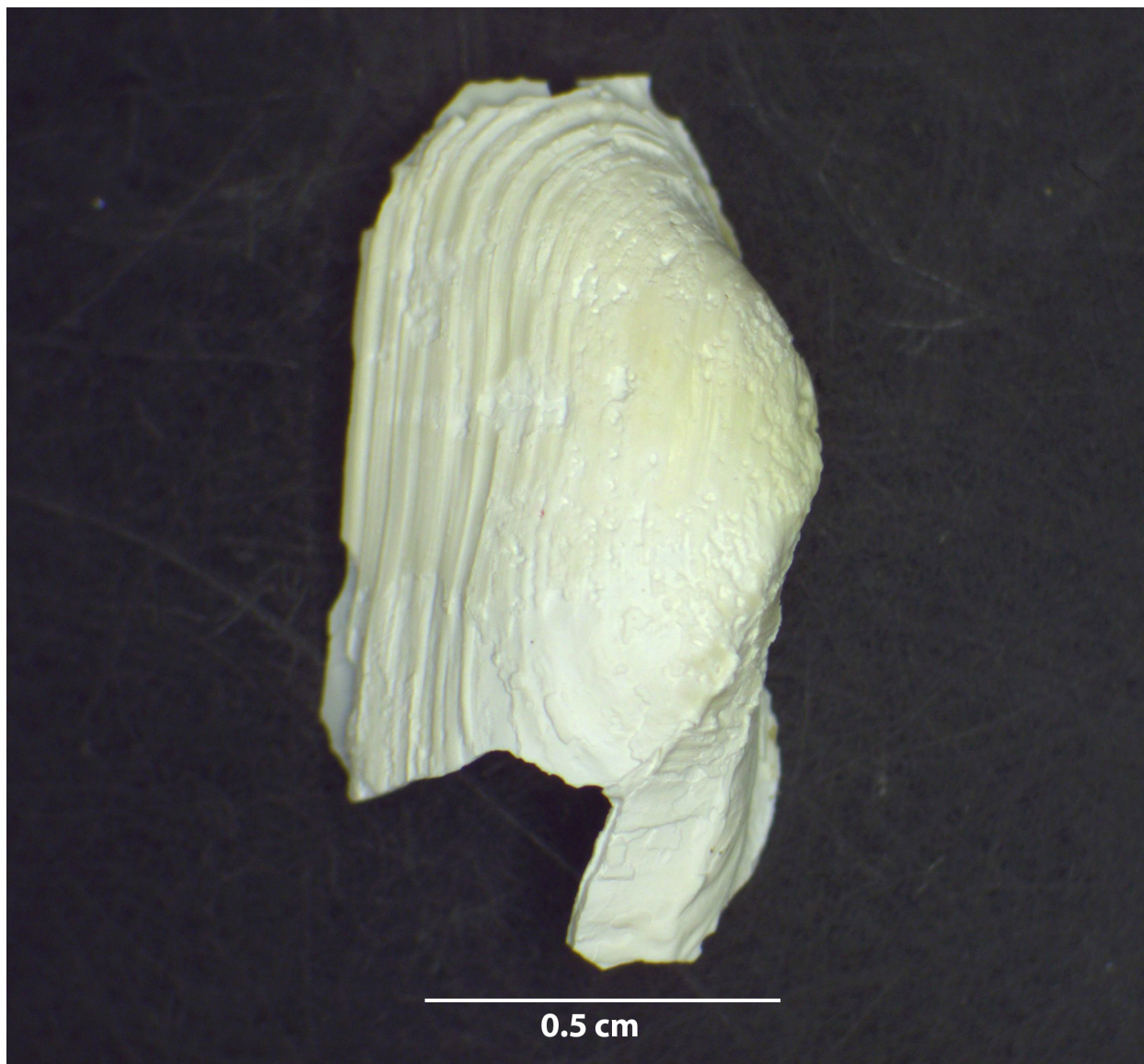


Figure A9. Sample **CHR-shell-003** (Run 1, Bag 2, 4 cm within run, 0.67 m depth from top of hole). One valve of *Hiatella artica* identified by André Martel (Canadian Museum of Nature) was AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of **13195  $\pm$  35 yr BP** (UCIAMS-135240) was obtained on the dated shell (Jan. 7/14). Estimated  $^{14}\text{C}$  age  $\sim$ 12,500 yr BP (early deglacial).

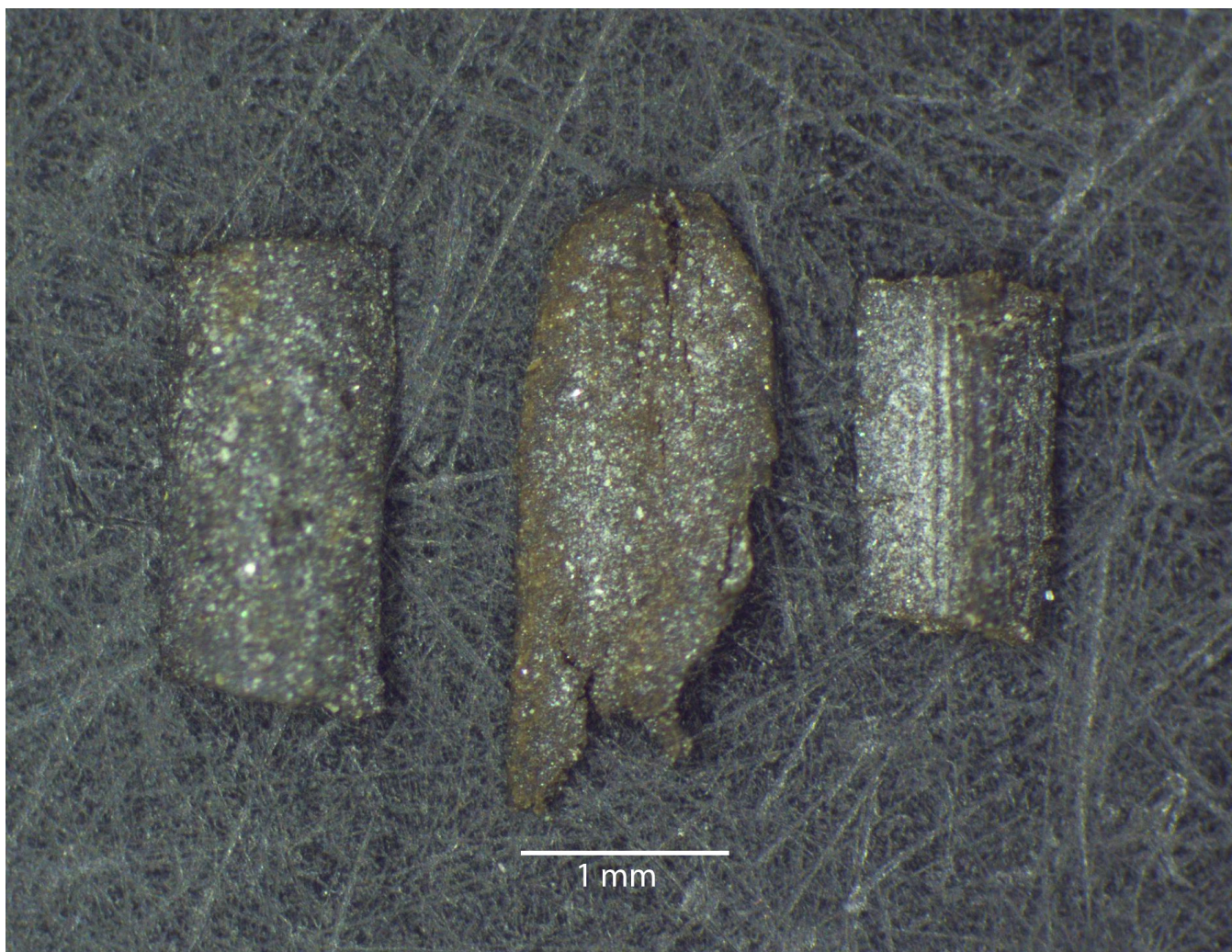


Figure A10. Sample **Spider-G, Box 26, bag 1 of 3 (lowermost 30 cm)** collected 195' depth (~59.1 to 59.4 m). Conifer needle fragments including Lodgepole pine (*Pinus contorta*, 2-needle pine), Ponderosa pine (*Pinus ponderosa*, 3-needle pine) and fir (*Abies* sp.) were AMS radiocarbon dated by the Keck Carbon Cycle AMS Lab, University of California, Irvine. A  $^{14}\text{C}$  age of  $31450 \pm 340$  yr BP (UCIAMS-135206) was obtained on the needle fragments (Jan. 8/14). Estimated  $^{14}\text{C}$  age ~30,000 yr BP (Olympia non-glacial).

ADDITIONAL COMMENTS by A.Telka regarding Figure 4 (2014-02-03):

"In the dating report photo, the left needle fragment is definitely a two-needle pine (see attachment of what is meant for a two-needle pine in cross-section). As such, it is probably a shore pine, a variety of *Pinus contorta* (*Pinus contorta* Dougl. x Loud. var. *contorta*) which grows along a narrow strip of the BC Pacific coast line including Vancouver Is. It may be lodgepole pine but I can't be certain from this small fragment. For the middle image, you're right. It could be Rocky mountain Douglas-fir/Douglas fir (*Pseudotsuga menziesii*) or *Tsuga* (hemlock). Most *Abies* have a notch on the tip (but not all) so I favour the former vs. fir. The right image, I originally thought was a 3-needle pine (see attachment) however no 3-needle pines exist on Vancouver Is. (except for in your 'back yard'). As you stated, it is an interior species. I pulled out my reference collection and compared 5-needle types to 3-needle pines. It is more than likely western white pine, *Pinus monticola*. Unfortunately there's not enough for id, e.g. counting stomatal rows etc. To summarize, we have *Pinus contorta*, another pine (5-needle type) (*Pinus* spa.) of probably white pine and the unknown is more than likely *Pseudotsuga*/*Tsuga*.