

# Data Repository item 2002126

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)	Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
Pj 1-1 V	Vein (quartz)	21.2		Ow 4-1 H	Whole-rock (silicate)	18.2	
Pj 1-1 H	Whole-rock (silicate)	18.5		Ow 4-2 H	Whole-rock (silicate)	18.8	
Pj 1-2 V	Vein (quartz)	21.5		Ms 5-1 V1	Vein (quartz)	16.6	
Pj 1-2 H	Whole-rock (silicate)	19.0		Ms 5-1 V1	Vein (calcite)	13.8	-12.5
Pj 1-3 V1	Vein (quartz)	22.0		Ms 5-1 V2	Vein (quartz)	16.3	
Pj 1-3 V2	Vein (quartz)	21.5		Ms 5-1 V2	Vein (calcite)	14.7	-10.6
Pj 1-3 V3	Vein (quartz)	21.7		Ms 5-1 H	Whole-rock (silicate)	13.9	
Pj 1-3 H	Whole-rock (silicate)	17.1		Ms 5-1 H	Whole-rock (calcite)	15.9	-12.7
Pj 1-4 V	Vein (quartz)	20.8		Ms 5-2 V	Vein (quartz)	16.7	
Pj 1-5 V	Vein (quartz)	21.7		Ms 5-2 V	Vein (calcite)	14.5	-4.5
Pj 1-5 H	Whole-rock (silicate)	20.0		Ms 5-2 H	Whole-rock (silicate)	13.8	
Pj 2-1 Va	Vein (quartz)	18.4		Ms 5-2 H	Whole-rock (calcite)	21.8	-10.3
Pj 2-1 Vb	Vein (quartz)	18.3		Pj 6-1 V	Vein (quartz)	20.2	
Pj 2-1 Vc	Vein (quartz)	18.5		Pj 6-1 H	Whole-rock (silicate)	18.4	
Pj 2-1 Vd	Vein (quartz)	18.5		Pj 6-2 V	Vein (quartz)	20.4	
Pj 2-1 Ve	Vein (quartz)	18.7		Pj 7-1 V1	Vein (quartz)	20.5	
Pj 2-1 Vf	Vein (quartz)	18.3		Pj 7-1 V2	Vein (quartz)	20.4	
Pj 2-1 Vg	Vein (quartz)	18.4		Pj 7-1 H	Whole-rock (silicate)	14.3	
Pj 2-1 Vh	Vein (quartz)	18.4		Pj 7-2 V	Vein (quartz)	20.6	
Pj 2-1 Vi	Vein (quartz)	18.6		Pj 7-2 H	Whole-rock (silicate)	14.2	
Pj 2-1 Vj	Vein (quartz)	18.4		MDa 8-1 V	Vein (quartz)	23.3	
Pj 2-1 Vk	Vein (quartz)	18.6		MDa 8-1 H	Whole-rock (silicate)	22.0	
Pj 2-1 V	Vein (quartz) average	18.5		MDa 8-2 V	Vein (quartz)	23.3	
Pj 2-2 V	Vein (quartz)	18.4		MDa 8-3 V	Vein (quartz)	23.4	
Pj 2-2 H	Whole-rock (silicate)	15.9		MDa 8-3 H	Whole-rock (silicate)	22.3	
Pj 2-3 V1a	Vein (quartz)	18.4		MDa 8-4 V	Vein (quartz)	23.1	
Pj 2-3 V1b	Vein (quartz)	18.5		MDa 8-4 H	Whole-rock (silicate)	21.9	
Pj 2-3 V1c	Vein (quartz)	18.4		Obf 9-1 V1	Vein (quartz)	25.0	
Pj 2-3 V1	Vein (quartz) average	18.4		Obf 9-1 V2	Vein (quartz)	25.0	
Pj 2-3 V2a	Vein (quartz)	18.3		Obf 9-1 H	Whole-rock (silicate)	25.4	
Pj 2-3 V2b	Vein (quartz)	18.2		Obf 9-2 V1a	Vein (quartz)	25.3	
Pj 2-3 V2c	Vein (quartz)	18.3		Obf 9-2 V1b	Vein (quartz)	25.5	
Pj 2-3 V2	Vein (quartz) average	18.3		Obf 9-2 V1c	Vein (quartz)	25.3	
Pj 2-3 V3a	Vein (quartz)	18.3		Obf 9-2 V1d	Vein (quartz)	25.5	
Pj 2-3 V3b	Vein (quartz)	18.4		Obf 9-2 V1	Vein (quartz) average	25.4	
Pj 2-3 V3c	Vein (quartz)	18.3		Obf 9-2 V2	Vein (quartz)	24.3	
Pj 2-3 V	Vein (quartz) average	18.3		Obf 9-2 H	Whole-rock (silicate)	25.2	
Pj 2-3 H	Whole-rock (silicate)	15.7		Ow 10-1 V1	Vein (quartz)	18.8	
Oby 3-1 V	Vein (quartz)	17.9		Ow 10-1 V1	Vein (calcite)	16.3	-2.9
Oby 3-1 V	Vein (calcite)	19.8	-0.7	Ow 10-1 V2	Vein (quartz)	19.1	
Oby 3-1 H	Whole-rock (silicate)	16.9		Ow 10-1 V2	Vein (calcite)	16.4	-2.2
Oby 3-1 H	Whole-rock (calcite)	17.4	0.5	Ow 10-1 H	Whole-rock (silicate)	16.4	
Oby 3-2 V	Vein (quartz)	17.9		Ow 10-1 H	Whole-rock (calcite)	16.2	-2.6
Ow 4-1 V1a	Vein (quartz)	19.3		Ow 10-2 V	Vein (quartz)	18.7	
Ow 4-1 V1b	Vein (quartz)	19.4		Ow 10-2 V	Vein (calcite)	16.1	-2.9
Ow 4-1 V1c	Vein (quartz)	19.4		Ow 10-2 H	Whole-rock (silicate)	18.2	
Ow 4-1 V1	Vein (quartz) average	19.4		Ow 10-2 H	Whole-rock (calcite)	16.0	-2.7
Ow 4-1 V2	Vein (quartz)	19.3		Ow 10-3 V	Vein (quartz)	18.9	
Ow 4-1 V3	Vein (quartz)	19.7		Ow 10-3 V	Vein (calcite)	16.1	-2.9

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)	Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
Ow 10-3 H	Whole-rock (silicate)	18.7		Oc 12-2 H	Whole-rock (silicate)	18.8	
Ow 10-3 H	Whole-rock (calcite)	15.8	-2.8	Oc 12-2 H	Whole-rock (calcite)	19.9	-2.7
Ow 11-1 V1	Vein (quartz)	18.3		Ocm 13-1 V	Vein (quartz)	18.7	
Ow 11-1 V1	Vein (calcite)	15.3	0.6	Ocm 13-1 H	Whole-rock (silicate)	14.1	
Ow 11-1 V1H	Whole-rock (silicate)	16.8		Ocm 13-2 V	Vein (quartz)	18.8	
Ow 11-1 V1H	Whole-rock (calcite)	16.6	-0.1	Ocm 13-2 H	Whole-rock (silicate)	14.4	
Ow 11-1 V2	Vein (quartz)	18.2		Pj 14 V	Vein (quartz)	19.1	
Ow 11-1 V2	Vein (calcite)	15.3	0.5	Pj 14 H	Whole-rock (silicate)	17.8	
Ow 11-1 V2H	Whole-rock (silicate)	16.7		Pj 15-1	Single crystal (quartz)	19.5	
Ow 11-1 V2H	Whole-rock (calcite)	16.1	0.2	Pj 15-2 Va	Single crystal (quartz)	19.0	
Ow 11-2 V1	Vein (quartz)	18.2		Pj 15-2 Vb	Vein (quartz)	18.9	
Ow 11-2 V1	Vein (calcite)	15.3	0.0	Pj 15-2 H	Whole-rock (silicate)	15.8	
Ow 11-2 V1H	Whole-rock (silicate)	14.9		Pj 15-3	Vein (quartz)	19.1	
Ow 11-2 V1H	Whole-rock (calcite)	18.7	-0.4	Pj 15-4 V	Vein (quartz)	19.1	
Ow 11-2 V2	Vein (quartz)	18.0		Pj 15-4 H	Whole-rock (silicate)	15.5	
Ow 11-2 V2	Vein (calcite)	15.3	0.3	Pj 15-5 V	Vein (quartz)	19.2	
Ow 11-2 V2H	Whole-rock (silicate)	16.6		Pj 15-5 H	Whole-rock (silicate)	15.8	
Ow 11-2 V2H	Whole-rock (calcite)	15.7	0.1	Pj 15-6	Vein (quartz)	19.5	
Ow 11-3 V	Vein (quartz)	18.0		Pj 15-6	Cookeite	15.8	
Ow 11-3 V	Vein (calcite)	16.1	0.4	Pj 15-7	Single crystal (quartz)	19.2	
Ow 11-3 H	Whole-rock (silicate)	14.9		Pj 15-7	Ankerite	16.1	-7.4
Ow 11-3 H	Whole-rock (calcite)	21.4	-1.4	Pj 16-1 V	Vein (quartz)	20.1	
Oc 12-1 Va	Vein (quartz)	19.4		Pj 16-1 H	Whole-rock (silicate)	16.9	
Oc 12-1 Vb	Vein (quartz)	19.8		Pj 16-2 V	Vein (quartz)	18.9	
Oc 12-1 Vc	Vein (quartz)	19.9		Pj 16-2 H	Whole-rock (silicate)	16.7	
Oc 12-1 Vd	Vein (quartz)	19.9		Pj 16-3 V1	Vein (quartz)	18.9	
Oc 12-1 Ve	Vein (quartz)	19.9		Pj 16-3 V2	Vein (quartz)	19.0	
Oc 12-1 Vf	Vein (quartz)	19.4		Pj 16-3 H	Whole-rock (silicate)	16.2	
Oc 12-1 V	Vein (quartz) average	19.7		Smm 17-1 V	Vein (quartz)	21.2	
Oc 12-1 V	Vein (calcite)	16.9	-3.5	Smm 17-1 H1	Whole-rock (silicate)	13.6	
Oc 12-1 H	Whole-rock (silicate)	17.1		Smm 17-1 H2	Whole-rock (silicate)	17.2	
Oc 12-1 H	Whole-rock (calcite)	19.0	-3.2	MDa 17-2 H	Whole-rock (silicate)	27.9	
Oc 12-2 Va	Vein (quartz)	19.7		Sb 18 V	Vein (quartz)	20.3	
Oc 12-2 Va	Vein (calcite)	18.9	-3.0	Sb 18 H1	Whole-rock (silicate)	17.1	
Oc 12-2 Vb	Vein (quartz)	19.5		Sb 18 H2	Whole-rock (silicate)	15.6	
Oc 12-2 Vb	Vein (calcite)	19.2	-3.1	MDa 19 H	Whole-rock (silicate)	27.2	
Oc 12-2 Vc	Vein (quartz)	19.7		Smm 20-1 V1	Vein (quartz)	20.0	
Oc 12-2 Vc	Vein (calcite)	21.1	-2.8	Smm 20-1 V2	Vein (quartz)	19.4	
Oc 12-2 Vd	Vein (quartz)	19.5		Smm 20-1 H	Whole-rock (silicate)	18.5	
Oc 12-2 Vd	Vein (calcite)	21.9	-3.0	Smm 20-2 V	Vein (quartz)	20.5	
Oc 12-2 Ve	Vein (quartz)	19.7		Smm 20-2 H1	Whole-rock (silicate)	17.4	
Oc 12-2 Vf	Vein (quartz)	19.2		Smm 20-2 H2	Whole-rock (silicate)	16.7	
Oc 12-2 Vf	Vein (calcite)	17.0	-3.4	Obf 21-1 V	Vein (quartz)	23.3	
Oc 12-2 Vg	Vein (quartz)	19.7		Obf 21-1 H	Whole-rock (silicate)	21.9	
Oc 12-2 Vg	Vein (calcite)	18.6	-2.9	Obf 21-2 V	Vein (quartz)	23.0	
Oc 12-2 Vh	Vein (quartz)	19.7		Obf 21-2 H	Whole-rock (silicate)	21.5	
Oc 12-2 Vh	Vein (calcite)	20.6	-1.5	Obf 22 V	Vein (quartz)	21.3	
Oc 12-2 V	Vein (quartz) average	19.6		Obf 22 H	Whole-rock (silicate)	18.1	
Oc 12-2 V	Vein (calcite)	18.7	-3.1	Obf 23-1 V	Vein (quartz)	22.0	

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)	Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
Obf 23-1 H	Whole-rock (silicate)	19.1		Oc 39 Vc	Vein (calcite)	20.0	-1.0
Obf 23-2 H	Whole-rock (silicate)	21.4		Oc 39 Vd	Vein (quartz)	22.4	
Sb 24-1 V	Vein (quartz)	19.5		Oc 39 Vd	Vein (calcite)	20.3	-0.9
Sb 24-1 H	Whole-rock (silicate)	17.1		Oc 39 Ve	Vein (quartz)	22.4	
Sb 24-2 H	Whole-rock (silicate)	15.1		Oc 39 Ve	Vein (calcite)	20.1	-1.0
Oc 25 V	Vein (quartz)	18.9		Oc 39 Vf	Vein (quartz)	22.5	
Oc 25 H	Whole-rock (silicate)	17.7		Oc 39 Vf	Vein (calcite)	20.0	-0.9
Ow 26 V	Vein (quartz)	19.4		Oc 39 Vg	Vein (quartz)	22.5	
Ow 26 H	Whole-rock (silicate)	18.3		Oc 39 Vg	Vein (calcite)	20.0	-1.0
Sb 27 V	Vein (quartz)	19.4		Oc 39 Vh	Vein (quartz)	22.6	
Sb 27 H	Whole-rock (silicate)	18.3		Oc 39 Vh	Vein (calcite)	19.9	-1.0
Sb 28-1 V	Vein (quartz)	22.6		Oc 39 Vi	Vein (quartz)	22.5	
Sb 28-1 H	Whole-rock (silicate)	20.3		Oc 39 Vi	Vein (calcite)	19.9	-1.1
Sb 28-2 H	Whole-rock (silicate)	18.8		Oc 39 Vj	Vein (quartz)	22.4	
MDa 29 V	Vein (quartz)	26.4		Oc 39 Vj	Vein (calcite)	20.0	-0.9
MDa 29 H	Whole-rock (silicate)	27.4		Oc 39 Vk	Vein (quartz)	22.6	
Sb 30-1 V	Vein (quartz)	19.6		Oc 39 Vk	Vein (calcite)	20.2	-0.9
Sb 30-1 H	Whole-rock (silicate)	19.3		Oc 39 Vl	Vein (quartz)	22.2	
Sb 30-2 H	Whole-rock (silicate)	17.5		Oc 39 Vl	Vein (calcite)	20.0	-1.2
Opc 31 V1	Vein (quartz)	21.0		Oc 39 Vm	Vein (quartz)	22.2	
Opc 31 V2	Vein (quartz)	21.1		Oc 39 Vm	Vein (calcite)	20.2	-1.1
Opc 31 H	Whole-rock (silicate)	18.3		Oc 39 Vn	Vein (quartz)	22.7	
Ocm 32 V1	Vein (quartz)	20.0		Oc 39 Vn	Vein (calcite)	20.0	-0.8
Ocm 32 V2	Vein (quartz)	19.8		Oc 39 Vo	Vein (quartz)	22.5	
Ocm 32 H	Whole-rock (silicate)	19.2		Oc 39 Vo	Vein (calcite)	20.1	-0.9
Oc 33 V	Vein (quartz)	17.8		Oc 39 V	Vein (quartz) average	22.5	
Oc 33 H	Whole-rock (silicate)	16.3		Oc 39 V	Vein (calcite) average	20.1	-1.0
Oc 34 V	Vein (quartz)	19.3		Oc 39 H	Whole-rock (silicate)	19.5	
Oc 34 H	Whole-rock (silicate)	18.4		Oc 39 H1	Whole-rock (calcite)	20.8	-1.6
Oc 35 V	Vein (quartz)	19.4		Oc 39 H2	Whole-rock (calcite)	20.3	-1.7
Oc 35 H	Whole-rock (silicate)	18.3		Oc 39 H3	Whole-rock (calcite)	20.6	-1.8
Ow 36-1 V	Vein (quartz)	20.1		Oc 39 H4	Whole-rock (calcite)	20.2	-1.8
Ow 36-1 H	Whole-rock (silicate)	17.4		Ow 40-1 V	Vein (quartz)	19.8	
Ow 36-2 V	Vein (quartz)	20.9		Ow 40-1 V	Vein (calcite)	16.7	0.1
Ow 36-2 H	Whole-rock (silicate)	18.6		Ow 40-1 H1	Whole-rock (silicate)	16.5	
Ow 37-1 V1	Vein (quartz)	20.0		Ow 40-1 H1	Whole-rock (calcite)	17.0	-3.9
Ow 37-1 V1	Vein (calcite) white	17.6	0.0	Ow 40-1 H2	Whole-rock (silicate)	18.2	
Ow 37-1 V1	Vein (calcite) black	17.8	0.7	Ow 40-2 V	Vein (quartz)	19.5	
Ow 37-1 H	Whole-rock (silicate)	18.1		Ow 40-2 H1	Whole-rock (silicate)	18.4	
Ow 37-1 H	Whole-rock (calcite)	19.0	-0.5	Ow 40-2 H1	Whole-rock (calcite)	22.1	-5.3
Ow 37-2 V	Vein (quartz)	20.4		Ow 40-2 H2	Whole-rock (silicate)	17.6	
Ow 37-2 H	Whole-rock (silicate)	19.7		Ow 40-2 H2	Whole-rock (calcite)	21.7	-5.1
Ocm 38 V	Vein (quartz)	19.4		Ow 40-3 V	Vein (quartz)	18.9	
Ocm 38 H	Whole-rock (silicate)	13.2		MDa 41 V	Vein (quartz)	23.2	
Oc 39 Va	Vein (quartz)	22.5		MDa 41 H	Whole-rock (silicate)	21.6	
Oc 39 Va	Vein (calcite)	20.3	-1.0	MDa 42 V	Vein (quartz)	24.7	
Oc 39 Vb	Vein (quartz)	22.5		MDa 42 H1	Whole-rock (silicate)	24.6	
Oc 39 Vb	Vein (calcite)	20.0	-0.9	MDa 42 H2	Whole-rock (silicate)	23.1	
Oc 39 Vc	Vein (quartz)	22.6		Om 43 V	Vein (quartz)	18.7	

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)	Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
Om 43 H	Whole-rock (silicate)	13.7		Ow 54-1 H	Whole-rock (silicate)	21.9	
Oby 44-1 V	Vein (quartz)	19.4		Ow 54-1 H	Whole-rock (calcite)	22.6	-0.3
Oby 44-1 H	Whole-rock (silicate)	13.6		Ow 54-2 V1	Vein (quartz)	23.6	
Oby 44-2 H	Whole-rock (silicate)	17.8		Ow 54-2 V1	Vein (calcite)	19.2	-0.8
Ocm 45-1 V	Vein (quartz)	21.2		Ow 54-2 V1H	Whole-rock (silicate)	20.9	
Ocm 45-1 V	Vein (calcite)	19.0	-1.4	Ow 54-2 V1H	Whole-rock (calcite)	20.8	-1.6
Ocm 45-1 H	Whole-rock (silicate)	20.1		Ow 54-2 V2	Vein (quartz)	23.3	
Ocm 45-1 H	Whole-rock (calcite)	18.1	-0.9	Ow 54-2 V2	Vein (calcite)	20.9	-1.0
Ocm 45-2 V	Vein (quartz)	21.4		Ow 54-2 V2H	Whole-rock (silicate)	17.5	
Ocm 45-2 V	Vein (calcite)	18.8	-0.9	Ow 54-2 V2H	Whole-rock (calcite)	20.2	2.2
Ocm 45-2 H	Whole-rock (silicate)	20.6		Oby 55-1 V	Vein (quartz)	22.6	
Ocm 45-2 H	Whole-rock (calcite)	19.7	-0.1	Oby 55-1 H1	Whole-rock (silicate)	15.9	
Ocm 45-3 V	Vein (quartz)	21.3		Oby 55-1 H2	Whole-rock (silicate)	17.2	
Ocm 45-3 V	Vein (calcite)	18.5	0.1	Oby 55-2 V	Vein (quartz)	20.5	
Ocm 45-3 H	Whole-rock (silicate)	19.8		Oby 55-2 H1	Whole-rock (silicate)	17.2	
Ocm 45-3 H	Whole-rock (calcite)	19.3	-0.4	Oby 55-2 H2	Whole-rock (silicate)	16.6	
Ow 46 V	Vein (quartz)	19.0		Om 56-1 V	Vein (quartz)	19.2	
Ow 46 H1	Whole-rock (silicate)	15.8		Om 56-1 H	Whole-rock (silicate)	14.5	
Ow 46 H2	Whole-rock (silicate)	17.5		Om 56-2 V	Vein (quartz)	19.1	
Om 47 V	Vein (quartz)	22.9		Om 56-2 H	Whole-rock (silicate)	18.4	
Om 47 V	Vein (calcite)	20.6	-0.6	Ocm 57-1 V	Vein (quartz)	18.1	
Om 47 H1	Whole-rock (silicate)	19.5		Ocm 57-1 H	Whole-rock (silicate)	18.3	
Om 47 H1	Whole-rock (calcite)	19.9	-1.6	Ocm 57-2 H	Whole-rock (silicate)	16.2	
Om 47 H2	Whole-rock (silicate)	20.4		Ocm 57-3 V	Vein (quartz)	18.1	
Om 47 H2	Whole-rock (calcite)	20.3	-1.2	Oby 58-1 V	Vein (quartz)	21.1	
Om 48 V	Vein (quartz)	20.5		Oby 58-1 H1	Whole-rock (silicate)	14.5	
Om 48 H1	Whole-rock (silicate)	17.2		Oby 58-1 H2	Whole-rock (silicate)	16.6	
Om 48 H2	Whole-rock (silicate)	15.2		Oby 58-2 V	Vein (quartz)	21.0	
Oby 49 V	Vein (quartz)	26.3		Oby 58-2 H1	Whole-rock (silicate)	15.4	
Oby 49 H	Whole-rock (silicate)	25.7		Oby 58-2 H2	Whole-rock (silicate)	15.8	
Ow 49 H	Whole-rock (silicate)	25.7		Ms 59 V	Vein (quartz)	17.6	
Oby 50 V	Vein (quartz)	20.1		Ms 59 H1	Whole-rock (silicate)	15.2	
Oby 50 H	Whole-rock (silicate)	14.5		Ms 59 H2	Whole-rock (silicate)	14.2	
Opc 51-1 V	Vein (quartz)	25.7		Ms 60 V	Vein (quartz)	16.9	
Opc 51-1 H1	Whole-rock (silicate)	22.8		Ms 60 H	Whole-rock (silicate)	13.0	
Opc 51-1 H2	Whole-rock (silicate)	26.0		Oby 61 V	Vein (quartz)	19.4	
Opc 51-2 V1	Vein (quartz)	26.0		Oby 61 H1	Whole-rock (silicate)	16.2	
Opc 51-2 V1H	Whole-rock (silicate)	23.9		Oby 61 H2	Whole-rock (silicate)	16.1	
Opc 51-2 V2	Vein (quartz)	26.1		Ms 62-1 V	Vein (quartz)	17.6	
Opc 51-2 V3	Vein (quartz)	26.3		Ms 62-1 H1	Whole-rock (silicate)	15.0	
Opc 51-2 V3H	Whole-rock (silicate)	25.8		Ms 62-1 H2	Whole-rock (silicate)	15.0	
Ms 52 V	Vein (quartz)	16.5		Ms 62-2 V	Vein (quartz)	18.9	
Ms 52 H1	Whole-rock (silicate)	12.9		Ms 62-2 H1	Whole-rock (silicate)	15.2	
Ms 52 H2	Whole-rock (silicate)	14.9		Ms 62-2 H2	Whole-rock (silicate)	13.4	
Ms 53 V	Vein (quartz)	18.4		Ms 63 V	Vein (quartz)	16.6	
Ms 53 H1	Whole-rock (silicate)	15.6		Ms 63 H1	Whole-rock (silicate)	14.8	
Ms 53 H2	Whole-rock (silicate)	14.8		Ms 63 H2	Whole-rock (silicate)	12.8	
Ow 54-1 V	Vein (quartz)	22.2		Ms 64 V	Vein (quartz)	16.0	
Ow 54-1 V	Vein (calcite)	19.5	0.0	Ms 64 H1	Whole-rock (silicate)	14.2	

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)	Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
Ms 64 H2	Whole-rock (silicate)	14.2		Pj 69-3 V2	Vein (quartz)	21.1	
Ms 65 H	Whole-rock (silicate)	24.3		Pj 69-3 V2H	Whole-rock (silicate)	16.9	
Ms 66 V	Vein (quartz)	18.4		Pj 69-4 V	Vein (quartz)	21.2	
Ms 66 H1	Whole-rock (silicate)	15.0		Pj 69-4 H	Whole-rock (silicate)	16.0	
Ms 66 H2	Whole-rock (silicate)	14.8		Obf 70-1 V	Vein (quartz)	19.8	
Opc 67-1 V1	Vein (quartz)	24.0		Obf 70-1 H	Whole-rock (silicate)	18.2	
Opc 67-1 V1H	Whole-rock (silicate)	24.0		Obf 70-1 H	Whole-rock (calcite)	20.7	-4.9
Opc 67-1 V2	Vein (quartz)	24.1		Ow 70-2 V	Vein (quartz)	19.8	
Opc 67-1 V2H	Whole-rock (silicate)	23.9		Ow 70-2 H	Whole-rock (silicate)	17.6	
Obf 67-2 V1	Vein (quartz)	24.2		Om 70-2 V	Vein (quartz)	19.9	
Obf 67-2 V1H	Whole-rock (silicate)	23.3		Om 70-2 H	Whole-rock (silicate)	17.4	
Obf 67-2 V2	Vein (quartz)	23.6		Om/Ow 70-2 V	Vein (quartz)	20.2	
Obf 67-2 V2H	Whole-rock (silicate)	23.3		Ow 71-1 V	Vein (quartz)	19.0	
Obf 67-3 Va	Vein (quartz)	22.2		Ow 71-1 V	Vein (calcite)	16.8	-2.4
Obf 67-3 VaH	Whole-rock (silicate)	21.5		Ow 71-1 H	Whole-rock (silicate)	17.3	
Obf 67-3 Vb	Vein (quartz)	22.1		Ow 71-1 H	Whole-rock (calcite)	16.7	-2.4
Obf 67-3 VbH	Whole-rock (silicate)	21.7		Ow 71-2 V	Vein (quartz)	19.5	
Obf 67-3 Vc	Vein (quartz)	22.2		Ow 71-2 V	Vein (calcite)	16.9	-2.4
Obf 67-3 VcH	Whole-rock (silicate)	22.1		Ow 71-2 H	Whole-rock (silicate)	17.8	
Obf 67-4 V	Vein (quartz)	22.4		Ow 71-2 H	Whole-rock (calcite)	16.7	-2.4
Obf 67-4 H	Whole-rock (silicate)	21.9		Ow 71-3 V	Vein (quartz)	19.7	
Obf 67-5 V	Vein (quartz)	22.4		Ow 71-3 V	Vein (calcite)	17.2	-2.4
Obf 67-5 H	Whole-rock (silicate)	22.1		Ow 71-3 H	Whole-rock (silicate)	13.7	
Obf 67-6 V1	Vein (quartz)	22.0		Ow 71-3 H	Whole-rock (calcite)	16.6	-2.9
Obf 67-6 V1H	Whole-rock (silicate)	21.6		Sb 72 V	Vein (quartz)	19.3	
Obf 67-6 V2	Vein (quartz)	20.8		Sb 72 H	Whole-rock (silicate)	17.0	
Obf 67-6 V2H	Whole-rock (silicate)	19.9		Obf 73 V	Vein (quartz)	26.3	
Ow 67-7 V1	Vein (quartz)	21.5		Obf 73 H	Whole-rock (silicate)	27.1	
Ow 67-7 V1H	Whole-rock (silicate)	21.4		Ocm 74 V1	Single crystal (quartz)	19.0	
Ow 67-7 V2	Vein (quartz)	21.6		Ocm 74 V2	Single crystal (quartz)	18.8	
Ow 67-7 V2H	Whole-rock (silicate)	21.1		Ocm 74 V3	Single crystal (quartz)	18.9	
Ow 67-8 V	Vein (quartz)	23.7		Ocm 74 V4	Single crystal (quartz)	19.2	
Ow 67-8 H	Whole-rock (silicate)	22.5		Ocm 74 V5	Single crystal (quartz)	19.0	
Pj 68-1 V	Vein (quartz)	20.3		Ocm 74 H	Whole-rock (silicate)	15.4	
Pj 68-1 H1	Whole-rock (silicate)	19.0		MDa 75 V	Vein (quartz)	24.3	
Pj 68-1 H2	Whole-rock (silicate)	16.2		MDa 75 H	Whole-rock (silicate)	25.5	
Pj 68-2 V	Vein (quartz)	21.3		MDa 76 V	Vein (quartz)	22.1	
Pj 68-2 H1	Whole-rock (silicate)	18.5		MDa 76 H	Whole-rock (silicate)	20.9	
Pj 68-2 H2	Whole-rock (silicate)	16.8		Ow 77 V1	Vein (quartz)	20.8	
Pj 68-3 V	Vein (quartz)	20.4		Ow 77 V2	Vein (quartz)	21.1	
Pj 68-3 H	Whole-rock (silicate)	16.2		Ow 77 H1	Whole-rock (silicate)	14.5	
Pj 69-1 V	Vein (quartz)	21.3		Ow 77 H2	Whole-rock (silicate)	18.5	
Pj 69-1 H1	Whole-rock (silicate)	18.4		Ow 77 V3	Vein (quartz)	21.2	
Pj 69-1 H2	Whole-rock (silicate)	16.7		Ow 77 V3H	Whole-rock (silicate)	21.0	
Pj 69-2 V	Vein (quartz)	21.2		Ow 77 V4	Vein (quartz)	19.1	
Pj 69-2 H1	Whole-rock (silicate)	17.3		Ow 77 V4	Vein (calcite)	17.1	0.4
Pj 69-2 H2	Whole-rock (silicate)	16.7		Ow 77 V4H	Whole-rock (silicate)	16.0	
Pj 69-3 V1	Vein (quartz)	20.9		Ow 77 V4H	Whole-rock (calcite)	17.3	0.8
Pj 69-3 V1H	Whole-rock (silicate)	17.0		Pj 78 V	Vein (quartz)	19.6	

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)	Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
Pj 78 H	Whole-rock (silicate)	14.9		Oc 89 V2H	Whole-rock (silicate)	18.6	
Oc 79 V	Vein (quartz)	17.5		Oc 89 V2H	Whole-rock (calcite)	17.4	-3.4
Oc 79 H	Whole-rock (silicate)	14.2		Oc 89 V3	Vein (quartz)	18.9	
Ms 80 V	Vein (quartz)	19.3		Oc 89 V3	Vein (calcite)	20.5	-5.4
Ms 80 H1	Whole-rock (silicate)	18.0		Oc 89 V3H	Whole-rock (silicate)	18.2	
Ms 80 H2	Whole-rock (silicate)	16.8		Oc 89 V3H	Whole-rock (calcite)	16.6	-2.8
Smm 81 V	Vein (quartz)	24.3		Oc 89 V4	Vein (quartz)	18.9	
Smm 81 H	Whole-rock (silicate)	21.9		Oc 89 V4	Vein (calcite)	16.7	-3.4
Sb 82 V	Vein (quartz)	26.3		Oc 89 V4H	Whole-rock (silicate)	17.9	
Sb 82 H1	Whole-rock (silicate)	26.6		Oc 89 V4H	Whole-rock (calcite)	17.1	-3.0
Sb 82 H2	Whole-rock (silicate)	23.6		Om 90 V	Vein (quartz)	19.4	
Opc 83 V	Vein (quartz)	22.9		Om 90 V	Vein (calcite)	21.7	-4.8
Opc 83 H	Whole-rock (silicate)	20.6		Om 90 H1	Whole-rock (silicate)	18.4	
Opc 84 V1	Vein (quartz)	23.3		Om 90 H1	Whole-rock (calcite)	22.7	-4.4
Opc 84 V1H	Whole-rock (silicate)	21.7		Om 90 H2	Whole-rock (silicate)	16.5	
Opc 84 V2	Vein (quartz)	23.1		Ow 91 V	Vein (quartz)	17.7	
Opc 84 V2H	Whole-rock (silicate)	23.2		Ow 91 H	Whole-rock (silicate)	14.8	
Ocm 85 V1	Vein (quartz)	17.9		Ms 92 V	Vein (quartz)	19.3	
Ocm 85 V1H	Whole-rock (silicate)	16.3		Ms 92 H	Whole-rock (silicate)	16.4	
Ocm 85 V2	Vein (quartz)	17.8		Pj 93 V	Vein (quartz)	18.9	
Ocm 85 V2H	Whole-rock (silicate)	16.5		Pj 93 H	Whole-rock (silicate)	18.2	
Ocm 85 V3	Vein (quartz)	18.0		Ms 94 V	Vein (quartz)	19.4	
Ocm 85 V3H	Whole-rock (silicate)	17.2		Ms 94 H	Whole-rock (silicate)	17.1	
Ocm 85 H2	Whole-rock (silicate)	19.3		Ms 95 V	Vein (quartz)	19.0	
Oc 86-1 V1	Vein (quartz)	18.8		Ms 95 H	Whole-rock (silicate)	16.3	
Oc 86-1 V1H	Whole-rock (silicate)	14.1		Om/Ms 96 V	Vein (quartz)	19.2	
Oc 86-1 V2	Vein (quartz)	18.8		Om 97 V	Vein (quartz)	19.7	
Oc 86-1 V3	Vein (quartz)	18.8		Om 97 H	Whole-rock (silicate)	19.1	
Oc 86-1 V4	Vein (quartz)	18.7		Ms 98 H	Whole-rock (silicate)	16.1	
Oc 86-1 V4H	Whole-rock (silicate)	15.3		Om 99 V	Vein (quartz)	20.6	
Oc 86-1 V5	Vein (quartz)	18.7		Om 99 H	Whole-rock (silicate)	17.6	
Oc 86-1 V5H	Whole-rock (silicate)	16.7		Om 100 H	Whole-rock (silicate)	18.3	
Oc 86-2 V1	Vein (quartz)	18.7		Ms 101-1 H	Whole-rock (silicate)	19.8	
Oc 86-2 V1H	Whole-rock (silicate)	14.4		Obf 101-2 H	Whole-rock (silicate)	28.2	
Oc 86-2 V2	Vein (quartz)	18.9		Ow 101-3 H	Whole-rock (silicate)	24.9	
Oc 86-2 V2H	Whole-rock (silicate)	15.9		Ow 101-4 H	Whole-rock (silicate)	27.1	
Oc 86-2 V3	Vein (quartz)	18.7		Obf 101-5 H	Whole-rock (silicate)	28.0	
Oc 86-2 V3H	Whole-rock (silicate)	15.9		Opc101-6 H	Whole-rock (silicate)	19.6	
Oc 87 V	Vein (quartz)	18.6		Smm 101-7 H	Whole-rock (silicate)	19.5	
Oc 87 H1	Whole-rock (silicate)	17.4		Opc 101-8 H	Whole-rock (silicate)	21.9	
Oc 87 H2	Whole-rock (silicate)	16.7		Smm 101-9 H	Whole-rock (silicate)	18.8	
Oc 88 V	Vein (quartz)	17.6		MDa 101-10 H	Whole-rock (silicate)	27.5	
Oc 88 H	Whole-rock (silicate)	15.1		MDa 101-11 H	Whole-rock (silicate)	22.9	
Oc 89 V1	Vein (quartz)	19.0		MDa 101-12 H	Whole-rock (silicate)	29.1	
Oc 89 V1	Vein (calcite)	16.8	-2.2	MDa 101-13 Ha	Whole-rock (silicate)	30.1	
Oc 89 V1H	Whole-rock (silicate)	18.8		MDa 101-13 Hb	Whole-rock (silicate)	23.1	
Oc 89 V1H	Whole-rock (calcite)	17.3	-3.9	MDa 101-14 Ha	Whole-rock (silicate)	27.4	
Oc 89 V2	Vein (quartz)	19.1		MDa 101-14 Hb	Whole-rock (silicate)	28.5	
Oc 89 V2	Vein (calcite)	18.8	-3.3	MDa 101-14 Hc	Whole-rock (silicate)	27.5	

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Sample	Type	$\delta^{18}\text{O}$ (SMOW)	$\delta^{13}\text{C}$ (PDB)
MDa 101-15 Ha	Whole-rock (silicate)	25.8	
MDa 101-15 Hb	Whole-rock (silicate)	30.5	
MDa 101-16 Ha	Whole-rock (silicate)	23.3	
MDa 101-16 Hb	Whole-rock (silicate)	29.3	
Ms 101-17 H	Whole-rock (silicate)	22.6	
Ms 102 H	Whole-rock (silicate)	22.4	
MDa 103-1 Ha	Whole-rock (silicate)	29.7	
MDa 103-1 Hb	Whole-rock (silicate)	31.7	
Smm 103-2 Ha	Whole-rock (silicate)	22.8	
Smm 103-2 Hb	Whole-rock (silicate)	20.2	
Smm 103-2 Hc	Whole-rock (silicate)	20.4	
Smm 103-3 Ha	Whole-rock (silicate)	18.5	
Smm 103-3 Hb	Whole-rock (silicate)	17.3	
Smm 103-3 Hc	Whole-rock (silicate)	20.6	
Obf 103-4 Ha	Whole-rock (silicate)	31.6	
Obf 103-4 Hb	Whole-rock (silicate)	29.9	
Obf 103-5 H	Whole-rock (silicate)	31.7	
Obf 103-6 Ha	Whole-rock (silicate)	30.6	
Obf 103-6 Hb	Whole-rock (silicate)	29.2	
Obf 103-7 Ha	Whole-rock (silicate)	30.4	
Obf 103-7 Hb	Whole-rock (calcite)	26.1	0.2
Obf 103-7 Hc	Whole-rock (calcite)	25.9	-0.8
Ow 103-8 H	Whole-rock (silicate)	24.3	
Ow 104-1a V	Single crystal (quartz)	20.2	
Ow 104-1b V	Vein (quartz)	20.2	
Ow 104-2a V	Single crystal (quartz)	20.4	
Ow 104-2b V	Vein (quartz)	20.2	
Ow 104-3a V	Single crystal (quartz)	20.1	
Ow 104-3b V	Vein (quartz)	20.1	
Ow 104-4a V	Single crystal (quartz)	20.5	
Ow 104-4b V	Vein (quartz)	20.4	
Ow 104-5a V	Single crystal (quartz)	20.4	
Ow 104-5b V	Vein (quartz)	20.2	
Ow 104-6 V	Vein (quartz)	20.3	
Ow 104-7 V	Vein (quartz)	20.2	
Ow 104 V	Vein (quartz) average	20.3	
Ow 104-8 H	Whole-rock (silicate)	17.1	

## **Ouachita Mountains sample locations**

### **Arkansas**

**Sample location 1:** (NE1/4 SE1/4 sec. 2 T2N R20W, Perry County) 2.2 miles S of Hollis on highway 7, dirt road to E leads to spillway for Little Bear Creek Dam. Stop 14 of Stone and Haley, 1984, stop 12 of Stone and Haley, 1986. Bedding parallel quartz vein (Pj 1-1 V) in shale (Pj 1-1 H). 1 cm bedding perpendicular quartz vein (Pj 1-2 V) in sandstone (Pj 1-2 H). Cross cutting quartz veins (Pj 1-3 V) in sandstone (Pj 1-3 H). Bedding parallel quartz vein (Pj 1-4 V) in shale between two sandstone layers. Bedding perpendicular quartz vein (Pj 1-5 V) in sandstone (Pj 1-5 H).

**Sample location 2:** (SE1/4 NE1/4 sec. 27 T2N R20W, Perry County) E side of highway 7, 2.8 miles N of Garland County line. 12 cm wide bedding perpendicular quartz vein (Pj 2-1 V) in sandstone (Pj 2-1 H). Bedding parallel quartz veins (Pj 2-2 V, Pj 2-3 V) in sandstone (Pj 2-3 H).

**Sample location 3:** (SE1/4 NE1/4 sec. 6 T1S R19W, Garland County) E side of highway 7, 100 m S of intersection with highway 298 at Blue Springs. Bedding perpendicular quartz-calcite vein (Oby 3-1 V) in sandstone (Oby 3-1 H). Bedding perpendicular quartz vein (Oby 3-2 V).

**Sample location 4:** (NE1/4 NW1/4 sec. 34 T1S R19W, Garland County) In stream on W side of highway 7, 3.7 miles N of intersection with highway 5. Quartz vein (Ow 4-1 V) in sandstone (Ow 4-1 H) within shale (Ow 4-2 H) that does not contain any veins.

**Sample location 5:** (NE1/4 SW1/4 sec. 18 T3S R19W, Garland County) N side of on ramp for highway 270 bypass from McLeod St. Quartz vein (Ms 5-1 V) in sandstone (Ms 5-1 H) at S end of outcrop. Quartz vein (Ms 5-2 V) in sandstone (Ms 5-2 H).

**Sample location 6:** (SE1/4 NW1/4 sec. 13 T6S R20W, Clark County) Spillway for DeGray Lake Dam. Stop 41 of Stone and McFarland, 1981, stop 28 of Stone and others 1986. Quartz vein (Pj 6-1 V) in sandstone (Pj 6-1 H). Quartz vein (Pj 6-2 V) in badly weathered sandstone.

**Sample location 7:** (NW1/4 NW 1/4 sec. 14 T1N R24W, Montgomery County) 0.2 miles W of Muddy Creek along Muddy Creek Wildlife Management road, 2.9 miles W of highway 27. Small (0.5 cm) clear quartz crystals (Pj 7-1 V1) and associated milky quartz vein (Pj 7-1 V2) form exposure surface on sandstone (Pj 7-1 H). Quartz vein and crystals (Pj 7-2 V) form vuggy exposure surface on sandstone (Pj 7-2 H).

**Sample location 8:** (NE1/4 SE1/4 sec. 14 T1S R24W, Montgomery County) E side of highway 27 at intersection with highway 88, opposite Washita Grocery and Bait store. Stop 21 of Stone and McFarland, 1981, stop 16 of Stone and Haley, 1984, stop 8 of Stone and others, 1986. Folded quartz vein in red, black and gray banded chert with interlayered shale. Bedding perpendicular quartz vein (MDa 8-1 V) in red and gray chert (MDa 8-1 H). Bedding parallel quartz vein (MDa 8-2 V). Bedding perpendicular quartz vein (MDa 8-3 V) in gray chert (MDa 8-3 H). Bedding perpendicular quartz vein (MDa 8-4 V) in gray chert (MDa 8-4 H).

**Sample location 9:** (SW1/4 SE1/4 sec. 14 T1S R24W, Montgomery County) 0.2 miles S of MDa 8 on highway 27. Stop 21 of Stone and McFarland, 1981, stop 16 of Stone and Haley, 1984, stop 8 of Stone and others, 1986. Bedding oblique quartz veins (Obf 9-1 V1, Obf 9-1 V2) in black chert (Obf 9-1 H). 5 to 10 cm thick bedding parallel quartz vein (Obf 9-2 V) in black chert (Obf 9-2 H).



**Sample location 10:** (NE1/4 NW1/4 sec. 9 T2S R24W, Montgomery County) W side of highway 27 at intersection with highway 188. Bedding parallel fibrous quartz-calcite vein (Ow 10-1 V1) in calcareous shale (Ow 10-1 V1H). Bedding perpendicular quartz-calcite vein (Ow 10-1 V2) in calcareous shale (Ow 10-2 V2H). Quartz-calcite vein (Ow 10-2 V) in calcareous shale (Ow 10-2 H). Massive quartz-calcite vein (Ow 10-3 V) in calcareous shale (Ow 10-3 H).

**Sample location 11:** (SW1/4 SW1/4 sec. 13 T2S R25W, Montgomery County) W side of highway 27, 0.5 miles N of intersection with highway 270. 3 cm thick bedding parallel quartz-calcite vein (Ow 11-1 V1) and 1 cm thick oblique to bedding quartz-calcite vein (Ow 11-1 V2) in calcareous shale (Ow 11-1 V1H, Ow 11-1 V2H). 0.5 cm to 1 mm thick quartz-calcite oblique to layering veins (Ow 11-2 V1) in calcareous shale (Ow 11-2 V1H) that become 1 cm thick layering perpendicular quartz-calcite veins (Ow 11-2 V2) in calcareous sandstone (Ow 11-2 V2H). Bedding parallel quartz-calcite vein (Ow 11-3 V) in calcareous shale (Ow 11-3 H).

**Sample location 12:** (NE1/4 NE1/4 sec. 34 T2S R26W, Montgomery County) E side of United States Forest Service road 215 0.2 miles N of intersection with Lybrand road. Stop 17 of Stone and Haley, 1984, stop 10 of Stone and others, 1986. 8 cm thick quartz-calcite vein (Oc 12-1 V) in calcareous black shale (Oc 12-1 H). Massive quartz-calcite vein (Oc 12-2 V) in calcareous shale (Oc 12-2 H). Layer perpendicular quartz-calcite vein (Oc 12-3 V) in calcareous sandstone (Oc 12-3 H) interlayered with calcareous shale. Layer parallel quartz-calcite veins also present.

**Sample location 13:** (SE1/4 SE1/4 sec. 4 T3S R24W, Montgomery County) E end of Fisher Mountain quartz crystal mine. Crystalline milky white quartz vein (Ocm 13-1 V) in quartzite (Ocm 13-1 H). Quartz vein (Ocm 13-2 V) in weathered quartzite (Ocm 13-2 H).

**Sample location 14:** (NW1/4 SW1/4 sec. 21 T3N R11W, Pulaski County) E side of highway 107, 0.1 miles N of Gravel Ridge. Bedding oblique quartz vein (Pj 14 V) in sandstone (Pj 14 H).

**Sample location 15:** (NE1/4 NW1/4 sec. 8 T2N R12W, Pulaski County) Jeffrey Quarry. Single quartz crystal (Pj 15-1 V). Quartz vein (Pj 15-2 Vb) and associated quartz crystals (Pj 15-2 Va) in sandstone (Pj 15-2 H). Quartz vein (Pj 15-3 V). Quartz vein (Pj 15-4 V) in sandstone (Pj 15-4 H). Quartz vein (Pj 15-5 V) in sandstone (Pj 15-5 H). Quartz crystals (Pj 15-6 quartz) associated with cookeite (Pj 15-6 cookeite). Quartz crystals (Pj 15-7 quartz) associated with ankerite (Pj 15-7 ankerite).

**Sample location 16:** (SW1/4 SW1/4 sec. 22 T2N R13W, Pulaski County) Both sides of highway I-430 just N of junction with highway 10. Stop 2 of Stone and Haley, 1986, stop 1 of McFarland, 1988. E side of highway: Bedding perpendicular quartz vein (Pj 16-1 V) in sandstone (Pj 16-1 H). Bedding parallel quartz vein with crystals (Pj 16-2 V) in sandstone (Pj 16-2 H). W side of highway: Bedding perpendicular quartz vein with crystals (Pj 16-3 V1) and massive quartz vein with crystals (Pj 16-3 V2) in sandstone (Pj 16-3 H).

**Sample location 38:** (NW1/4 NW1/4 sec. 31 T2S R22W, Garland County) S side of highway 270, 3.4 miles E of Joplin. Stop 2-3 of Stone and others, 1973, stop 27 of Stone and McFarland, 1981, stop 6 of Stone and others, 1986. Quartz vein with minor quartz crystals (Ocm 38 V) in quartzite (Ocm 38 H).

**Sample location 39:** (SW1/4 NE1/4 sec. 31 T2S R22W, Garland County) 0.5 miles E of Ocm 38 in Murphy Creek, N of highway 270. Stop 26 of Stone and McFarland, 1981, stop 5 of Stone and others, 1986. Quartz-calcite vein (Oc 39 V) in massive limestone (Oc 39 H).

**Sample location 40:** (SW1/4 NE1/4 sec. 19 T1S R22W, Garland County) Approximately 50 m S of stop 3-5 of Haley and others, 1973; 1979. Bedding perpendicular quartz-calcite vein (Ow 40-1 V) in gray limestone (Ow 40-1 H1) and interlayered shale (Ow 40-1 H2). Bedding parallel quartz vein in fault zone (Ow 40-2 V) with limestone (Ow 40-2 H1) above vein and shale (Ow 40-2 H2) below vein. Massive quartz (Ow 40-3 V).

**Sample location 41:** (NE1/4 NW1/4 sec. 9 T1S R22W, Garland County) 0.1 miles E of locality N of Haley and others, 1973; 1979. Quartz vein (MDa 41 V) in shale (MDa 41 H).

**Sample location 42:** (SW1/4 NW1/4 sec. 8 T1S R22W, Garland County) Stop 3-6 of Haley and others, 1973; 1979. Bedding perpendicular folded quartz vein (MDa 42 V) in chert (MDa 42 H1) and shale (MDa 42 H2).

**Sample location 43:** (NW1/4 NE1/4 sec. 19 T1S R22W, Garland County) Locality G of Haley and others, 1973; 1979. Quartz vein (Om 43 V) in shale (Om 43 H).

**Sample location 44:** (SE1/4 NE1/4 sec. 33 T1S R21W, Garland County). Locality 11 of Craig and others, 1993. Quartz vein (Oby 44-1 V) in sandstone (Oby 44-1 H). 5 m W of Oby 44-1: Shale (Oby 44-2 H).

**Sample location 45:** (SW1/4 NW1/4 sec. 8 T2S R22W, Garland County) Photo 3-A of Haley and others, 1973; 1979. Massive quartz-calcite vein (Ocm 45-1 V) in gray limestone (Ocm 45-1 H). Quartz-gray calcite vein (Ocm 45-2 V) in gray sandstone (Ocm 45-2 H). Quartz vein (Ocm 45-3 V) in gray limestone (Ocm 45-3 H).

**Sample location 46:** (NE1/4 NE1/4 sec. 7 T2S R22W, Garland County) Point 30 on Lake Ouachita on NW corner of island. 0.9 miles E of stop 3-1 of Haley and others, 1973; 1979. Quartz vein (Ow 46 V) in very weathered sandstone (Ow 46 H1) with interlayered shale (Ow 46 H2).

**Sample location 47:** (SE1/4 NW1/4 sec. 17 T2S R21W, Garland County) 0.1 miles E of stop 3-3 of Haley and others, 1973; 1979. Surface quartz-calcite vein (Om 47 V) in limestone (Om 47 H1) and shale (Om 47 H2).

**Sample location 48:** (SW1/4 NW1/4 sec. 17 T2S R21W, Garland County) 0.2 miles W of stop 3-3 of Haley and others, 1973; 1979. Just below the contact between Om and Oby. Quartz vein (Om 48 V) in sandstone (Om 48 H1) and shale (Om 48 H2).

**Sample location 49:** (SW1/4 SE1/4 sec. 7 T2S R21W) Stop 3-4 of Haley and others, 1973, 1979, Lake Ouachita float trip stop K, point 3 on Lake Ouachita. Quartz in fault zone (Obf 49 V) between chert (Obf 49 H) and shale (Ow 49 H).

**Sample location 50:** (NE1/4 NE1/4 sec. 8 T2S R21W, Garland County) End of walkway to Lake Ouachita at Brady Mountain Marina. Quartz vein (Oby 50 V) in massive sandstone (Oby 50 H).

**Sample location 51:** (NW1/4 NE1/4 sec. 35 T4S R27W, Montgomery County) NE side of highway 369 1.3 miles N of Pike County line. Sample location OUA 37, 38 and 39 of Gleason and others, 1995. Quartz vein and crystals (Opc 51-1 V) in sandstone (Opc 51-1 H1) within black graphitic shale (Opc 51-1 H2). N side of highway 369 0.2 miles NW of Opc 51-1: 2 cm wide bedding perpendicular quartz vein (Opc 51-2 V1) in black shale (Opc 51-2

V1H). Massive bedding parallel quartz vein (Opc 51-2 V2) associated with bedding perpendicular quartz veins with minor quartz crystals (Opc 51-2 V3) in sandstone (Opc 51-2 V3H).

**Sample location 52:** (SE1/4 SW1/4 sec. 34 T4S R24W, Montgomery County) 1.4 miles N of Glenwood, 0.1 miles N of Pike County line on highway 8-27. Stop 1 of Zimmerman and Ford, 1988. Bedding perpendicular quartz vein (Ms 52 V) in badly weathered sandstone (Ms 52 H1) with interlayered shale (Ms 52 H2).

**Sample location 53:** (NE1/4 NW1/4 sec. 34 T4S R24W, Montgomery County) Ditch on E side of highway 8-27, 0.7 miles N of Ms 52. Stop 2 of Zimmerman and Ford, 1988. Quartz vein (Ms 53 V) in badly weathered sandstone (Ms 53 H1) with interlayered shale (Ms 53 H2).

**Sample location 54:** (NE1/4 SW1/4 sec. 11 T4S R25W, Montgomery County) Approximately 50 m E of bridge over Mill Creek at Manfred. Stop 2-9 of Stone and others, 1973. Massive calcite vein (Ow 54-1 V) in graphitic shale (Ow 54-1 H). Bedding parallel quartz-calcite vein (Ow 54-2 V1) in graphitic shale (Ow 54-2 V1H). Bedding perpendicular quartz-calcite vein (Ow 54-2 V2) in calcareous sandstone (Ow 54-2 V2H).

**Sample location 55:** (NE1/4 NW1/4 sec. 12 T4S R25W, Montgomery County) Intersection of highway 8-27 with Collier Creek. Stop 2-8 of Stone and others, 1973. Quartz vein (Oby 55-1 V) in sandstone (Oby 55-1 H1) with interlayered shale (Oby 55-1 H2). Oby 55-1 at S end of bridge in road cut. Bedding perpendicular quartz vein (Oby 55-2 V) in interlayered sandstone (Oby 55-2 H1) and shale (Oby 55-2 H2). Oby 55-2 under S end of bridge.

**Sample location 56:** (SW1/4 SE1/4 sec. 21 T3S R25W, Montgomery County) E side of highway 27 0.6 miles N of Norman. Stop 2-7 of Stone and others, 1973. Quartz vein (Om 56-1 V) in shale (Om 56-1 H). Massive quartz vein (Om 56-2 V) in shale (Om 56-2 H).

**Sample location 57:** (SE1/4 NE1/4 sec. 8 T3S R25W, Montgomery County) W side of highway 27 5.0 miles S of Mt. Ida. Stop 2-5 of Stone and others, 1973. Bedding parallel quartz vein (Ocm 57-1 V) in very badly weathered shale (Ocm 57-1 H). Badly weathered sandstone (Ocm 57-2 H). Massive quartz (Ocm 57-3 V).

**Sample location 58:** (N1/2 SE1/4 sec. 12 T2S R21W, Garland County) Blakely Mountain Dam. Stop 2 of Stone and others, 1986. W end of dam: Surface quartz vein (Oby 58-1 V) in sandstone (Oby 58-1 H1) with interlayered shale (Oby 58-1 H2). E end of dam: Quartz vein (Oby 58-2 V) in sandstone (Oby 58-2 H1) with interlayered shale (Oby 58-2 H2).

**Sample location 59:** (SW1/4 SW1/4 sec. 33 T2S R20W, Garland County) N side of highway 270 0.5 miles W of Greenwood Baptist Church. Bedding parallel quartz vein (Ms 59 V) in sandstone (Ms 59 H1) and shale (Ms 59 H2).

**Sample location 60:** (SW1/4 SW1/4 sec. 36 T2S R21W, Garland County) N side of highway 270 3.1 miles W of Ms 59 in vacant lot between Window Mart and Shell gas station. Quartz vein (Ms 60 V) in green shale (Ms 60 H).

**Sample location 61:** (SE1/4 SW1/4 sec. 32 T2S R22W, Garland County) S side of highway 270 at turn off for Camp Clearfork, at Charlton Recreation Area. Stop 4 of Stone and others, 1986, stop 25 of Stone and McFarland, 1981, stop 2-2 of Stone and others, 1973. Massive quartz vein (Oby 61 V) in sandstone (Oby 61 H1) with interlayered shale (Oby 61 H2).

**Sample location 62:** (SE1/4 SE 1/4 sec. 11 T3S R20W, Garland County) W side of off ramp from highway 270 bypass to highway 70. N end of outcrop: 5 cm bedding parallel quartz vein (Ms 62-1 V) in sandstone (Ms 62-1 H1)

with interlayered shale (Ms 62-1 H2). S end of outcrop: Bedding parallel quartz vein (Ms 62-2 V) in sandstone (Ms 62-2 H1) with interlayered shale (Ms 62-2 H2).

**Sample location 63:** (SE1/4 SW1/4 sec. 18 T3S R19W, Garland County) S side of on ramp for highway 270 bypass from McLeod St. Quartz vein (Ms 63 V) in sandstone (Ms 63 H1) with interlayered shale (Ms 63 H2).

**Sample location 64:** (SE1/4 SE1/4 sec. 25 T3S R20W, Garland County) W side of highway 7 at bridge over Lake Hamilton. Quartz vein (Ms 64 V) in badly weathered sandstone (Ms 64 H1) with interlayered shale (Ms 64 H2).

**Sample location 65:** (NW1/4 SE1/4 sec. 31 T4S R21W, Hot Spring County) E side of highway 7, 1.9 miles N of Bismark. Small (1 mm) quartz veins in massive black chert (Ms 65 H).

**Sample location 66:** (Clark County) E side of highway 7, 0.1 miles N of entrance to DeGray Lake State Park. Quartz (Ms 66 V) in very badly weathered sandstone (Ms 66 H1) and shale (Ms 66 H2).

**Sample location 67:** (SW1/4 SE1/4 sec. 16 T1N R13W, Pulaski County) E side of on ramp to highway I-430 at junction with Colonel Glenn Road. Stop 3 of Stone and Haley, 1986, stop 2 of McFarland, 1988. Very N end of outcrop: Massive quartz vein (Opc 67-1 V1) in black shale (Opc 67-1 V1H). 2 m S: Bedding parallel massive quartz vein (Opc 67-1 V2) in sandstone (Opc 67-1 V2H). Approximately 25 m S of Opc 67-1: Bedding parallel quartz vein (Obf 67-2 V1) in gray chert (Obf 67-2 V1H). Bedding perpendicular massive quartz vein (Obf 67-2 V2) in gray chert (Obf 67-2 V2H). In Obf in the middle of the two igneous dikes: Bedding perpendicular fibrous quartz vein (Obf 67-3 V) in interlayered graphitic shale and chert (Obf 67-3 H). Obf 67-3 Va quartz vein in graphitic shale (Obf 67-3 VaH). Obf 67-3 Vb quartz vein in shale (Obf 67-3 VbH). Obf 67-3 Vc quartz vein in cherty shale (Obf 67-3 VcH). 5 m N of Obf 67-3 and 3 m S of N most dike: Bedding parallel massive quartz vein (Obf 67-4 V) in shale (Obf 67-4 H). 2 m N of N most dike: Folded and rotated quartz veins (Obf 67-5 V) in chert. 10 m S of S most dike: Bedding perpendicular quartz vein (Obf 67-6 V1) in interlayered chert and shale (Obf 67-6 V1H). Bedding parallel quartz vein/fault (Obf 67-6 V2) in weathered shale and chert (Obf 67-6 V2H). At very S end of outcrop: Folded quartz vein (Ow 67-7 V1) in shale (Ow 67-7 V1H). 1 m N of Ow 67-7 V1: Bedding parallel quartz vein (Ow 67-7 V2) in shale (Ow 67-7 V2H). 20 m N of Ow 67-7, just below contact with Obf: Bedding parallel quartz vein (Ow 67-8 V) in shale (Ow 67-8 H).

**Sample location 68:** (NE1/4 NE1/4 sec. 35 T3N R15W, Pulaski County) Highway 10, 0.1 miles E of entrance to Lake Maumelle Marina. N side of road at E end of outcrop: Quartz vein (Pj 68-1 V) in sandstone block (Pj 68-1 H1) in black shale (Pj 68-1 H2). 20 m W of Pj 68-1: Quartz vein (Pj 68-2 V) in sandstone block (Pj 68-2 H1) in black shale (Pj 68-2 H2). S side of road: Quartz vein (Pj 68-3 V) in massive sandstone block (Pj 68-3 H).

**Sample location 69:** (SE1/4 SW1/4 sec. 26 T3N R15W, Pulaski County) Highway 10, 0.8 miles W of Pj 68. S side of outcrop: Quartz veins (Pj 69-1 V) in sandstone (Pj 69-1 H1) in shale (Pj 69-1 H2). N side of outcrop: Folded quartz vein (Pj 69-2 V) in sandstone (Pj 69-2 H1) and shale (Pj 69-2 H2). Approximately 10 m W of Pj 69-2: Bedding perpendicular quartz vein (Pj 69-3 V1) in shale (Pj 69-3 V1H). Bedding parallel quartz vein (Pj 69-3 V2) in weathered shale block (Pj 69-3 V2H). Bedding parallel quartz vein (Pj 69-4 V) in shale (Pj 69-4 H).

**Sample location 70:** (SW1/4 SE1/4 sec. 36 T2N R17W, Saline County) W side of highway 9, 0.2 miles S of Paron. Stop 7 of Stone and Haley, 1986. Approximately 40 m S of N end of road cut: Folded quartz veins (Obf 70-1 V) in

banded shale (Obf 70-1 H). Approximately 20 m N of S end of road cut: 2 m wide massive and fractured quartz in fault zone between Ow and Om. Quartz from N end of fault zone (Ow 70-2 V). 2 m N of Ow 70-2 V: Sandstone (Ow 70-2 H). Quartz from S end of fault zone (Om 70-2 V). 4 m S of Om 70-2 V: Black and gray banded shale/sandstone (Om 70-2 H). Quartz from center of fault zone (Ow-Om 70-2 V).

**Sample location 71:** (NW1/4 NW1/4 sec. 28 T1S R16W, Saline County) N side of highway 5, 6.1 miles E of intersection with highway 298. Bedding parallel quartz-calcite vein (Ow 71-1 V) in calcareous shale (Ow 71-1 H). Bedding parallel, becoming bedding perpendicular quartz-calcite vein (Ow 71-2 V) in calcareous shale (Ow 71-2 H). Bedding perpendicular quartz-calcite vein (Ow 71-3 V) in calcareous sandstone (Ow 71-3 H).

**Sample location 73:** (SW1/4 SW1/4 sec. 26 T4S R27W, Montgomery County) E side of highway 369, 0.6 miles NW of Opc 51. Stop 4 of Stone and Haley, 1984. Bedding perpendicular quartz vein (Obf 73 V) in dark gray chert (Obf 73 H).

**Sample location 74:** (sec. 6 T3S R24W, Montgomery County) Wegner quartz crystal mines. 5.0 miles E of highway 27 on Owley road. Quartz crystals (Ocm 74 V1, V2, V3, V4 and V5) and small (1 mm) quartz veins in quartzite (Ocm 74 H).

**Sample location 75:** (SW1/4 SE1/4 sec. 28 T1N R13W, Pulaski County) W side of highway I-430, 0.3 miles N of Stagecoach Road exit. Stop 4 of Stone and Haley, 1986, stop 3 of McFarland, 1988. Bedding parallel quartz vein (MDa 75 V) in light gray chert (MDa 75 H).

**Sample location 76:** (Pulaski County) E side of Bowman Road 0.5 miles N of intersection with Colonel Glenn Road. Quartz vein (MDa 76 V) in shale (MDa 76 H).

**Sample location 77:** (NE1/4 NW1/4 sec. 13 T1N R15W, Saline County) Warner Soap Stone Pit. Stop 1a-5 of Stone and others, 1973, stop 5 of Stone and Haley, 1986. Massive quartz vein (Ow 77 V1) and fibrous, vuggy quartz vein (Ow 77 V2) in serpentinite (Ow 77 H1). Serpentinite occurs as thin faulted slice in shale (Ow 77 H2). Quartz vein (Ow 77 V3) in sandstone (Ow 77 V3H). Folded calcite-quartz vein (Ow 77 V4) in calcareous shale (Ow 77 V4H).

**Sample location 78:** (NW1/4 SW1/4 sec. 12 T6S R20W, Clark County) W side of highway 7, 0.2 miles S of entrance to highway 7 area of DeGray Lake State Park. Bedding oblique quartz vein (Pj 78 V) in sandstone (Pj 78 H).

**Sample location 92:** (NE1/4 SW 1/4 sec. 29 T2N R17W, Saline County) Drainage ditch, E side of Buffalo Road, 0.3 miles S of Reform. Massive quartz vein (Ms 92 V) in gray shale (Ms 92 H).

**Sample location 93:** (NE1/4 NE 1/4 sec. 31 T2N R17W, Saline County) "End" of dirt road, W side of Buffalo Road, 1.0 miles S of Reform. 4 cm fibrous quartz vein (Pj 93 V), in massive gray sandstone (Pj 93 H).

**Sample location 94:** (SW1/4 NW 1/4 sec. 32 T2N R17W, Saline County) Alum Fork Detachment Fault. W side of Buffalo Road, 1.2 miles S of Reform, opposite gray cinder block house. Massive discontinuous quartz vein (Ms 94 V) in dark gray shale (Ms 94 H).

**Sample location 95:** (NW1/4 SW 1/4 sec. 32 T2N R17W, Saline County) Alum Fork Detachment Fault. W side of Buffalo Road, 1.2 miles S of Reform, opposite gray cinder block house. 1 cm bedding parallel discontinuous quartz vein (Ms 95 V) in brown weathered shale (Ms 95 H).

**Sample location 96:** (NW1/4 SW 1/4 sec. 32 T2N R17W, Saline County) Alum Fork Detachment Fault. W side of Buffalo Road, 1.2 miles S of Reform, opposite gray cinder block house. 2 to 3 cm discontinuous quartz vein (Om/Ms 96 V).

**Sample location 97:** (NE1/4 SE 1/4 sec. 31 T2N R17W, Saline County) Alum Fork Detachment Fault. E side of Buffalo Road, 1.2 miles S of Reform, opposite gray cinder block house. 1 to 5 cm discontinuous quartz vein (Om 97 V) in brown weathered shale (Om 97 H).

**Sample location 98:** (NE1/4 SE 1/4 sec. 31 T2N R17W, Saline County) Drainage ditch, E side of Buffalo Road, 1.4 miles S of Reform. Green to gray shale (Ms 98 H).

**Sample location 99:** (SE1/4 SE 1/4 sec. 31 T2N R17W, Saline County) 0.1 miles E of Buffalo Road along dirt road, 1.0 mile N of Cedar Creek Road. 2 to 3 cm quartz vein (Om 99 V) in gray to black shale (Om 99 H).

**Sample location 100:** (SW1/4 SE 1/4 sec. 6 T1N R17W, Saline County) Drainage ditch, E side of Buffalo Road, 0.2 miles N of Cedar Creek Road. Gray to black shale (Om 100 H). Gray and brown banded shale also present in outcrop.

**Sample location 104:** (NE1/4 NE1/4 sec. 27 T2N R15W, Pulaski County) 2.2 miles W of Ferndale on Kanis Road, unnamed road to Eagle Ridge Estates. N side of road, 0.4 miles from intersection with Kanis Road. 40 m long quartz outcrop. W end of outcrop: Clear quartz crystal (Ow 104-1a V). Milky white partial quartz crystal (Ow 104-1b V). 5m E: Clear quartz crystal (Ow 104-2a V). Milky white partial quartz crystal (Ow 104-2b V). 5m E: Clear to milky white quartz crystal (Ow 104-3a V). Massive milky white quartz (Ow 104-3b V). 5m E: Clear quartz crystal (Ow 104-4a V). Milky white partial quartz crystal (Ow 104-4b V). 5m E: Clear quartz crystal (Ow 104-5a V). Milky white partial quartz crystal (Ow 104-5b V). 6m E: Milky white partial quartz crystal (Ow 104-6 V). 4m E: Milky white partial quartz crystal (Ow 104-7 V). 4m E: Gray weathered shale (Ow 104-8 H).

## **Oklahoma**

**Sample location 17:** (SW1/4 NW1/4 sec. 34 T3S R24E, McCurtain County) Summit of Carter Mountain, intersection of highway 259 and dirt road to lookout on E side of road. Stop 3 of Suneson, 1995. Quartz vein (Smm 17-1 V) in finely layered, black shale (Smm 17-1 H1) that outcrops poorly, float collected. 5 m down hill, brown weathered shale (Smm 17-1 H2) occurs in outcrop. 3 m S: Massive chert (MDa 17-2 H).

**Sample location 18:** (SE1/4 NE1/4 sec. 33 T3S R24E, McCurtain County) W side of highway 259 directly NW from Smm/MDa 17. Stop 3 of Suneson, 1995. Sample location OK 126 of Burt, 1993. Surface quartz vein (Sb 18 V) in sandstone (Sb 18 H1) with interlayered shale (Sb 18 H2).

**Sample location 19:** (SW1/4 NW1/4 sec. 16 T5S R25E, McCurtain County) N side of highway 259A 2.5 miles E of highway 259. Stop 1 of Nielsen, 1988. Massive, light gray chert (MDa 19 H). No quartz veins present.

**Sample location 20:** (NE1/4 NE1/4 sec. 9 T5S R25E, McCurtain County) Behind parking lot for swimming area at intersection of highway 259A and road to power station. Beginning of stop 2 of Nielsen, 1988. Quartz vein (Smm 20-1 V1) and massive quartz vein (Smm 20-1 V2) in sandstone (Smm 20-1 H). 15 m NE of Smm 20-1: Quartz vein (Smm 20-2 V) in sandstone (Smm 20-2 H1) associated with gray-green shale (Smm 20-2 H2) that forms cliff.

**Sample location 21:** (NE1/4 NE1/4 sec. 4 T5S R25E, McCurtain County) On shore of Broken Bow reservoir approximately 130 m NE of parking lot for second scenic overlook N of dam on highway 259A. Quartz vein (Obf 21-1 V) in black shale (Obf 21-1 H). 5 m NE of Obf 21-1: Bedding parallel quartz vein (Obf 21-2 V) in sandstone (Obf 21-2 H).

**Sample location 22:** (SE1/4 SW1/4 sec. 32 T4S R25E, McCurtain County) On shore of Broken Bow reservoir approximately 180 m N of parking lot for scenic overlook at Stephens Gap spillway (third scenic overlook N of dam on highway 259A). Massive quartz vein (Obf 22 V) in light gray weathered shale (Obf 22 H).

**Sample location 23:** (SE1/4 SW1/4 sec. 32 T4S R25E, McCurtain County) On shore of Broken Bow reservoir approximately 50 m W of parking lot for scenic overlook at Stephens Gap spillway. Bedding perpendicular quartz vein (Obf 23-1 V) in shale (Obf 23-1 H) and interlayered gray chert (Obf 23-2 H).

**Sample location 24:** (SW1/4 NW1/4 sec. 4 T5S R25E, McCurtain County) Quarry near Stephens Gap spillway. Stop 5 of Nielsen, 1988, stop 1 of Suneson, 1995. Quartz vein (Sb 24 V) in sandstone (Sb 24 H1) with interlayered shale (Sb 24 H2).

**Sample location 25:** (NE1/4 NW1/4 sec. 35 T4S R24E, McCurtain County) E side of highway 259 0.1 miles S of entrance to Carson Creek State Park. Massive quartz vein (Oc 25 V) in shale (Oc 25 H).

**Sample location 26:** (SE1/4 NW1/4 sec. 22 T4S R24E, McCurtain County) E side of highway 259 1.3 miles N of entrance to Carson Creek State Park. Massive quartz vein (Ow 26 V) in weathered shale (Ow 26 H).

**Sample location 27:** (SE1/4 SW1/4 sec. 34 T3S R24E, McCurtain County) W side of highway 259 0.9 miles S of Carter Mountain. Stop 10 of Nielsen, 1982. Quartz vein (Sb 27 V) in weathered sandstone (Sb 27 H).

**Sample location 28:** (SW1/4 SE1/4 sec. 3 T4S R24E, McCurtain County) E side of highway 259, 0.9 miles S of Sb 27. Bedding perpendicular quartz vein (Sb 28 V) in sandstone (Sb 28 H1) and interlayered shale (Sb 28 H2).

**Sample location 29:** (NE1/4 SE1/4 sec. 17 T5S R25E, McCurtain County) Radio tower just W of highway 259A near MDa 19. 1 cm quartz vein (MDa 29 V) in weathered white chert (MDa 29 H). Limited outcrop, sample collected from the top of the hill.

**Sample location 30:** (NW1/4 NE1/4 sec. 16 T5S R25E, McCurtain County) S side of highway 259A 0.1 miles W of entrance to Beavers Bend State Park. Bedding perpendicular quartz vein (Sb 30 V) in interlayered, very weathered sandstone (Sb 30 H1) and shale (Sb 30 H2).

**Sample location 31:** (NW1/4 NW1/4 sec. 4 T5S R25E, McCurtain County) 75 m S of Stephens Gap Dam in creek. Stop 5 of Nielsen, 1988, stop 1 of Suneson, 1995. Bedding oblique quartz veins (Opc 31 V1) in black graphitic shale (Opc 31 H) Massive quartz vein (Opc 31 V2).

**Sample location 32:** (SW1/4 NE1/4 sec. 29 T5S R24E, McCurtain County) Drainage ditch, E side of road, 1 mile N along road that is 6.8 miles W of intersection of highway 259 and highway 3-7. Stop 2 of William, 1956. 1 cm quartz vein (Ocm 32 V1) and > 10 cm massive quartz vein (Ocm 32 V2) in red weathering quartzite (Ocm 32 H).

**Sample location 33:** (NE1/4 SW1/4 sec. 27 T5S R23E, McCurtain County) Creek 0.2 miles S of North Pole Grocery store. 0.1 miles W of stop 4 of William, 1956. 2 cm quartz vein (Oc 33 V) in black shale (Oc 33 H).

**Sample location 34:** (SW1/4 NW1/4 sec. 23 T5S R23E, McCurtain County) 1 mile N along NE-SW trending road from intersection of highway 3-7 at North Pole Grocery store. Bedding parallel quartz vein (Oc 34 V) in weathered shale (Oc 34 H).

**Sample location 35:** (SW1/4 NW1/4 sec. 23 T5S R23E, McCurtain County) 0.1 mile N of Oc 34. Bedding parallel quartz vein (Oc 35 V) in weathered shale (Oc 35 H).

Note: Sample locations 34 and 35 are Collier Shale (Oc) based on geology of Honess, 1923, and Womble-Mazarn Shale (Owm) based on geology of Pitt, 1955.

**Sample location 36:** (SE1/4 SE1/4 sec. 3 T5S R23E, McCurtain County) 0.1 miles E of T-intersection at Caney Mountain. Bedding parallel quartz vein (Ow 36-1 V) in weathered shale (Ow 36-1 H). Quartz vein/poorly formed crystals (Ow 37-2 V) on badly weathered sandstone (Ow 36-2 H).

**Sample location 37:** (SE1/4 NE1/4 sec. 11 T5S R23E, McCurtain County) 8.8 miles along E-W dirt road from highway 259. White quartz-calcite in black calcite vein (Ow 37-1 V) in sandstone (Ow 37-1 H). Massive quartz vein (Ow 37-2 V) in shale (Ow 37-2 H).

**Sample location 72:** (SW1/4 NE1/4 sec. 3 T5S R25E, McCurtain County) On shore of Broken Bow reservoir approximately 50 m E of parking lot for first scenic overlook N of dam on highway 259A. Stop 4 of Nielsen, 1988. Bedding oblique quartz vein (Sb 72 V) in sandstone (Sb 72 H).

**Sample location 79:** (SW1/4 SE1/4 sec. 28 T4S R24E, McCurtain County) Stop 4 of Suneson, 1995. Massive bedding oblique quartz vein (Oc 79V) in badly weathered shale. Unweathered shale (Oc 79 H).

**Sample location 80:** (NE1/4 SW1/4 sec. 10 T4S R24E, McCurtain County) E side of highway 259, 1 mile S of Sb 28. Massive quartz vein (Ms 80 V) in sandstone (Ms 80 H1) with interlayered shale (Ms 80 H2).

**Sample location 81:** (SE1/4 SW1/4 sec. 3 T5S R25E, McCurtain County) Stop 3 of Nielsen, 1988. S end of Broken Bow dam, 0.15 miles NE of parking lot. 2 cm bedding parallel quartz vein (Smm 81 V) in shale (Smm 81 H).

**Sample location 82:** (SE1/4 SW1/4 sec. 3 T5S R25E, McCurtain County) W end of Rockpile Mountain. Massive bedding parallel quartz vein (Sb 82 V) in sandstone (Sb 82 H1) with interlayered shale (Sb 82 H2).

**Sample location 83:** (NE1/4 NW1/4 sec. 4 T5S R25E, McCurtain County) N side of highway 259A, 0.1 miles E of turnout for Beaver Lodge Nature Trail. Quartz (Opc 83 V) in black graphitic shale (Opc 83 H).

**Sample location 84:** (NE1/4 NW1/4 sec. 5 T5S R25E, McCurtain County) N side of highway 259A, 2 miles E of highway 259. Bedding oblique quartz vein (Opc 84 V1) in black graphitic shale (Opc 84 V1H). Bedding parallel quartz vein (Opc 84 V2) in black graphitic shale (Opc 84 V2H).



**Sample location 85:** (NE1/4 NE1/4 sec. 4 T5S R24E, McCurtain County) 0.5 mm bedding oblique quartz vein (Ocm 85 V1) in weathered quartzite (Ocm 85 V1H). 3 cm bedding oblique quartz vein (Ocm 85 V2) in weathered quartzite (Ocm 85 V2H). Cross cutting quartz veins (Ocm 85 V3) in weathered quartzite (Ocm 85 V3H).

**Sample location 86:** (NE1/4 SW1/4 sec. 35 T4S R24E, McCurtain County) W side of highway 259, 0.1 miles S of road to Stephens Gap Recreation Area. Intersection of bedding perpendicular (Oc 86-1 V1, Oc 86-1 V2, Oc 86-1 V3) and bedding parallel (Oc 86-1 V3, Oc 86-1 V4, Oc 86-1 V5) quartz veins in shale (Oc 86-1 V1H, Oc 86-1 V4H, Oc 86-1 V5H). Bedding oblique quartz vein (Oc 86-2 V1, Oc 86-2 V2, Oc 86-2 V3) in shale (Oc 86-2 V1H, Oc 86-2 V2H, Oc 86-2 V3H).

**Sample location 87:** (SW1/4 NW1/4 sec. 32 T4S R25E, McCurtain County) On shore of Broken Bow Lake, 40 m N of public boat ramp at Stephen's Gap Recreation Area. 3 cm bedding parallel quartz vein (Oc 87 V) in weathered shale (Oc 87 H1). Unweathered shale (Oc 87 H2).

**Sample location 88:** (SW1/4 NE1/4 sec. 31 T4S R25E, McCurtain County) N side of road to Stephen's Gap Recreation Area, 0.6 miles E of road to Broken Bow Lodge. Bedding parallel quartz vein (Oc 88 V1) in shale (Oc 88 H). Massive quartz vein (Oc 88 V2).

**Sample location 89:** (SW1/4 NW1/4 sec. 36 T4S R24E, McCurtain County) S side of road to Stephen's Gap Recreation Area, 0.8 miles W of highway 259. Bedding parallel quartz-calcite vein (Oc 89 V1) in shale (Oc 89 V1H). Bedding oblique quartz-calcite vein (Oc 89 V2) in shale (Oc 89 V2H). Bedding perpendicular quartz-calcite vein (Oc 89 V3) in sandstone (Oc 89 V3H). Bedding parallel quartz-calcite vein (Oc 89 V4) in shale (Oc 89 V4H) just below sandstone layer.

**Sample location 90:** (SE1/4 SW1/4 sec. 21 T5S R23E, McCurtain County) S side of highway 3-7, 0.2 miles W of Glover River. 0.5 mm bedding oblique quartz veins (Om 90 V) in sandstone layer (Om H1) in shale (Om 90 H2).

**Sample location 91:** (SW1/4 NE 1/4 sec. 29 T5S R24E, McCurtain County) Bedding parallel quartz vein (Ow 91 V) in shale (Ow 91 H).

**Sample location 101:** (SW1/4 SE1/4 sec. 30 to NE 1/4 sec. 31 T3N R20E, Latimer County) Potato Hills. Stop 23 of Allen (1994). Black shale (Ms 101-1 H) from location 1. Black chert (Obf 101-2 H) from location 1. Weathered gray shale (Ow 101-3 H) 10 m S of location 1. Black shale (Ow 101-4 H) from location 2. Dark gray to black chert (Obf 101-5 H) from location 3. Gray shale (Opc 101-6 H) approximately 40 m N of location 4. Gray shale (Smm 101-7 H) from location 4. Black graphitic shale (Opc 101-8 H) from location 5. Gray shale (Smm 101-9 H) from location 5. Light gray novaculite (MDa 101-10 H). Gray green shale (MDa 101-11 H) within novaculite. Gray chert (MDa 101-12 H). Gray chert/novaculite (MDa 101-13 Ha) with interlayered gray green shale (MDa 101-13 Hb). Shale (MDa 101-14 Ha) light gray chert (MDa 101-14 Hb) dark gray chert (MDa 101-14 Hc). Thinly bedded gray to black shale (MDa 101-15 Ha) up to 5 cm black chert (MDa 101-15 Hb). Weathered gray green shale (MDa 101-16 Ha) interlayered with weathered novaculite (MDa 101-16 Hb). Brown to gray weathered shale (Ms 101-17 H) from location 7.

**Sample location 102:** (SW1/4 NE1/4 sec. 23 T2N R19E, Pushmataha County) Stop 1 of Bennison and Johnson (1959). Weathered light gray shale, black when fresh (Ms 102 H) interlayered with yellow to orange weathering tuffaceous sandstone.

**Sample location 103:** (SE1/4 NW1/4 sec. 10 T1S R12E, Atoka County). Grant's Gap measured stratigraphic section of Hendricks and others (1937). The lower part of the section was also described by Barrick and Haywa-Branch (1994). Light gray chert (MDa 103-1 Ha). Black chert (MDa 103-1 Hb). From Unit 3. Green (Smm 103-2 Ha), gray (Smm 103-2 Hb) and maroon (Smm 103-2 Hc) shale. From Unit 4. Gray (Smm 103-3 Ha) and dark brown sandstone (Smm 103-3 Hb), with interlayered green shale (Smm 103-3 Hc). From Unit 7. Black chert (Obf 103-4 Ha) with thinly layered (up to 1 cm), weathered black shale (Obf 103-4 Hb). Thickly layered (25 cm) black chert (Obf 103-5 H). Thickly layered (up to 50 cm) black chert (Obf 103-6 Ha) with 5 cm thick interlayered shale (Obf 103-6 Hb). From Unit 11. Black chert (Obf 103-7 Ha) with 3 cm thick interlayered gray (Obf 103-7 Hb) and white (Obf 103-7 Hc) weathered limestone. From Unit 14. Black to dark green shale (Ow 103-8 H). From Unit 20.

## References

- Allen, M.W., 1994, Lower Paleozoic section exposed by thrust and compartmental faulting, north-central Potato Hills, Ouachita Mountains, Oklahoma, in Suneson, N.H. and Hemish, L.A., eds., *Geology and resources of the eastern Ouachita Mountains frontal belt and southeastern Arkoma basin, Oklahoma*. Oklahoma Geological Survey Guidebook, 29, p. 122-126.
- Barrick, J.E., and Haywa-Branch, J.N., 1994, Conodont biostratigraphy of the Missouri Mountain Shale (Silurian-Early Devonian?) and the Arkansas Novaculite (Devonian), Black Knob Ridge, Atoka County, Oklahoma, in Suneson, N.H. and Hemish, L.A., eds., *Geology and resources of the eastern Ouachita Mountains frontal belt and southeastern Arkoma basin, Oklahoma*. Oklahoma Geological Survey Guidebook, 29, p. 161-177.
- Bennison, A.P., and Johnson, N.L., 1959, Supplementary log traverse through Potato Hills, in Dallas and Ardmore Geological Societies Ouachita Field Trip Guidebook, p. 65-68.
- Burt, E.A., 1993, Oxygen isotope studies of some sedimentary and metasedimentary rocks of the central and northern Appalachian Mountains, the Colorado Plateau and the Ouachita Mountains. California Institute of Technology, PhD. dissertation, 396 p.
- Craig, W.W., Bellis, J.K., Danielson, D.A., Jr., and Bessler, J., 1993, *Geology of Ouachita Mountain core area, vicinity of east shore of Lake Ouachita, Garland County, Arkansas*, New Orleans Geological Society Guidebook.
- Gleason, J.D., Patchett, P.J., Dickinson, W.R., and Ruiz, J., 1995, Nd isotopic constraints on sediment sources of the Ouachita-Marathon fold belt, *Geological Society of America Bulletin*, v. 107, p. 1192-1210.
- Haley, B.R., Stone, C.G. and Viele, G.W., 1973, *Geological field trip excursion on Lake Ouachita, Arkansas Geological Commission Guidebook*.
- Haley, B.R., Stone, C.G. and McFarland, J.D., III, 1979, *A guidebook to the second geological excursion on Lake Ouachita, Arkansas Geological Commission Guidebook*.

- Hendricks, T.A., Knechtel, M.M., and Bridge, J., 1937, Geology of Black Knob Ridge, Oklahoma. American Association of Petroleum Geologists, v. 21, p. 1-29.
- Honess, C. W., 1923, Geology of the southern Ouachita Mountains of Oklahoma, Geological Survey of Oklahoma Bulletin 32, 278 pp.
- McFarland, J.D., III, 1988, I-430 bypass, Little Rock, Arkansas, *in* Hayward, O. T., ed., Geological Society of America Centennial Field Guide South Central Section, p. 255-258.
- Nielsen, K.C., 1982, Structural styles of the Ouachita Mountains, southeastern Oklahoma. Geological Society of America, South-Central Section Guidebook, Field Trip 3.
- Nielsen, K.C., 1988, Beavers Bend State Park, Broken Bow Uplift, Oklahoma, *in* Hayward, O. T., ed., Geological Society of America Centennial Field Guide South Central Section, p. 195-202.
- Pitt, W.D., 1955, Geology of the core of the Southern Ouachita Mountains of Oklahoma, Oklahoma Geological Survey Circular 34, 34 pp.
- Stone, C.G. and Haley, B.R., 1984, A guidebook to the geology of the central and southern Ouachita Mountains, Arkansas. Arkansas Geological Commission Guidebook 84-2.
- Stone, C.G. and Haley, B.R., 1986, Sedimentary and igneous rocks of the Ouachita Mountains of Arkansas, Part 2. Arkansas Geological Commission Guidebook 86-3.
- Stone, C.G. and McFarland, J.D., III, 1981, Field guide to the Paleozoic rocks of the Ouachita Mountain and Arkansas Valley provinces, Arkansas. Arkansas Geological Commission Guidebook 81-1.
- Stone, C.G., Haley, B.R. and Viele, G.W., 1973, A guidebook to the geology of the Ouachita Mountains, Arkansas. Arkansas Geological Commission Guidebook.
- Stone, C.G., Howard, J.M. and Haley, B.R., 1986, Sedimentary and igneous rocks of the Ouachita Mountains of Arkansas, Part 1. Arkansas Geological Commission Guidebook 86-2.
- Suneson, N.H., 1995, The geology of the Broken Bow uplift: an introduction and field guide. Oklahoma Geological Survey Open File Report 1-95.
- William, D.P.H., 1956, Road log to accompany Stratigraphy of the core of the Ouachita Mountains, Oklahoma by Pitt, W.D. Ouachita Mountain field conference, southeastern Oklahoma: guidebook. Ardmore Geological Society, p. 43-45.