Table 2 Summary of measured wood burning effects on airborne particle concentrations

Investigator[a]	Location	Measurement[b]	Concentration Mean	Range	Wood Smoke (wt %)	Method[c]	Comments
Cooper (20)	Portland, OR	$PM_{2.5}$	68	-	36	^{14}C	Single sample at residential location in winter
		total carbon	31.3	-	51		
Wolff et al (97)	Denver, CO	$PM_{2.5}$	39.5	-	12	K/Fe	
		total carbon	27	7-43	33	^{14}C	Five samples during winter
Carlson (15)	Missoula, MT	$PM_{3.5}$	-	-	68	CMB	Average of winter samples
Imhoff (44)	Petersville, AL	$PM_{2.5}$	45	13-86	85	CMB	Seven residential samples in winter
Core et al (22)	Spokane,WA; Seattle, WA; Tacoma, WA; Portland, OR; Boise, ID	$PM_{2.5}$	57	-	71	CMB	Sixty-one 24-hr samples in autumn and winter from 8 sites in WA, 1 site in ID and I site in OR
	Medford, OR	$PM_{2.5}$	17.5	8.8-30.2	55		Annual average values for 3 sites
	Portland, OR		3.0	1.5-3.9	14		Annual average values for 4 sites
Ramdahl et al (76)	Elverum, Norway	total carbon	20	5-50	65	^{14}C	Ten 24-hr winter samples; avg PM_{10} [3] (range 31-101)
Naylor (71)	Las Vegas, NV	total carbon	36	25-46	47	^{14}C	Four 12-hr winter samples (day and night)
Lewis et al (60)	Denver, CO	$PM_{2.5}$	19	?-47	8	MLR	Seventeen 12-hr daytime samples in winter
		$PM_{2.5}$	12	?-41	17		Nineteen 12-hr nighttime samples in winter
K1ouda et a1 (51)	Raleigh, NC	total carbon	-	23-80	95	^{14}C	Four 12-hr daytime samples in winter
		elemental carbon	3.2	-	68		One l2-hr daytime sample in winter
	Albuquerque, NM	total carbon	-	11-71	75	^{14}C	Six 12-hr samples (day & night) at residential site in winter
		elemental carbon	4.6		41		Four 12-hr samples (day & night) at residential site in winter
Lewis et al (59)	Albuquerque, NM	total carbon	-	-	67	MLR	Six 12-hr samples (day or night)
			-	-	68	x1^{4}C	in winter
		EOM	18.9	-	78	MLR	Forty-four l2-hr samples (day & night) in winter
Chow et al (16)	Sparks, NV	PM_{10}	41	?-154	30[d]	CMB	Fifty seven 24-hr samples every 6th day for one year at a residential site
			76		44[d]		Subset of above samples from Oct-Dec period (n = 15)
	Reno, NV		30	?-99	3[d]		Fifty six 24-hr samples every 6th day for one year at an urban site
			46		9[d]		Subset of above samples from Oct-Dec period (n = 15)
Benedict & Naylor (8)	Las Vegas, NV	$PM_{2.5}$	12.5	-	27	CMB	One 24-hr sample during winter

Magliano (65)	Bakersfield, CA	PM_{10}	8.7	-	12.9	CMB	Nine month average of every 6th day
		$PM_{2.5}$	13.8	-	62.8		24-hr samples (March-Dec)
	Fresno, CA	PM_{10}	7.1	-	16.8		
		$PM_{2.5}$	5.3	-	35.5		
Dresser & Baird (29)	Telluride, CO	PM_{10}	-	-	33	CMB	Four 24-hr average spring samples
			205	-	58		Two 24-hr holiday winter samples
Larson et al (56)	Seattle, WA	PM_{10}	39	9-123	6	CMB	Seven 12-hr daytime samples at industrial site in winter of 1987-88
			30	8-61	11		The corresponding seven 12-hr nighttime samples at above site
			45	12-104	54		Ten 12-hr daytime samples at residential site in winter of 1987-88
			75	5-144	82		The corresponding ten 12-hr nighttime samples at above site
			116	75-139	82		The sixteen highest 12-hr nighttime: samples at the same residential site in the winter of 1998-89
Klouda et al (50)	Boise, ID	EOM	-	-	72-89	^{14}C	Reported range of values (average not reported) for nine 12-hr daytime samples at a residential site in winter
		EOM	-	-	52-83		Range of values (average not reported) for nine 12-hr nighttime samples at residential site in winter
Lewis et al (61)	Boise, ID	EOM	22	-	67[d]	MLR	Forty 12-hr samples (day & night)
Larson et al (57)	Seattle, WA	$PM_{2.5}$	14.8	6.0-32.9	71	CMB	Forty eight one-week average composite samples (Jan-Nov) at a residential site. The composite consisted of sampling for 15 min every 2 hr for the entire study period. Wood burning was the dominant source all seasons. of the year, ranging from 60% in summer to 90% in winter

[a]Other investigators have measured elevated concentrations of particulate matter in wood burning communities, but did not use one of the methods cited above to quantify the fraction attributable to wood burning. Methods not listed above include emission inventory/atmospheric dispersion modeling (13, 42, 44, 55, 69, 71, 76, 80, 84), gaseous methyl chloride tracer measurement (47), time series of particle light scattering coefficient (54, 55) and thermography (54).
[b]PM_x

[c]^{14}C = isotopic carbon measurement to determine biogenic carbon concentration, i.e., contemporary carbon from biogenic material ~ 40 years or less old; CMB = chemical mass balance regression model; K/Fe = tracer enrichment method based upon the mass ratio of potassium to iron; MLR = multiple linear regression of individual tracer elements (e.g. potassium for wood and lead for motor vehicles) against mass concentration or relevant measurement listed above.
[d]Estimated from report average concentration of wood smoke divided by average concentration of total mass