

## 4. Ozone and Water Vapor

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### 4.1. CONTINUING PROGRAMS

#### 4.1.1. TOTAL OZONE OBSERVATIONS

Total ozone observations continued throughout 1998 and 1999 at 15 of the 16 stations that comprise the U.S. Dobson spectrophotometer network (Table 4.1). Of the 16 stations, CMDL personnel operated 5, NOAA National Weather Service (NWS) operated 5, 2 are university stations, and 4 are foreign cooperative stations. All stations are either fully or semi-automated. In addition, a Brewer spectrophotometer was operated on a nearly continuous basis at Boulder.

The Peruvian station became operational in the middle of 1999 when the instrument was installed at the new Global Atmospheric Watch station at Marcapomacocha (11.401°S, 76.324°W, 4513 m

above sea level). The site does not have reliable power, and few observations were made. The instrument was sent to Buenos Aires in December 1999 for a calibration check against the Dobson secondary standard D065. The shelter for the Dobson instrument at the CMDL Samoa Observatory, American Samoa (SMO) was replaced in December 1998. Observations at Tallahassee are continuing at Florida State University until the new NWS office is completed in January 2002. The station in Haute Provence, France, was struck by lightning in October 1999 and was not operational by the end of the year.

Provisional daily total ozone amounts applicable to local apparent noon for the stations listed in Table 4.1 were archived at the World Ozone and Ultraviolet Data Center (WOUDC), 4905 Dufferin Street, Ontario M3H 5T4, Canada, in Ozone Data for the World. Table 4.2 lists the monthly mean total ozone amounts measured at the various stations for 1998 and 1999.

TABLE 4.1. U.S. Dobson Ozone Spectrophotometer Station Network for 1998-1999

Station	Period of Record	Instrument No.	Agency
Bismarck, North Dakota	Jan. 1, 1963-present	33	NOAA
Caribou, Maine	Jan. 1, 1963-present	34	NOAA
Wallops Is., Virginia	July 1, 1967-present	38	NOAA; NASA
SMO	Dec. 19, 1975-present	42	NOAA
Tallahassee, Florida	May 2, 1964-Nov. 30, 1989; Nov. 1, 1992-present	58	NOAA; Florida State University
Boulder, Colorado	Sept. 1, 1966-present	61	NOAA
Fairbanks, Alaska	March 6, 1984-present	63	NOAA; University of Alaska
Lauder, New Zealand	Jan. 29, 1987-present	72	NOAA; NIWA
MLO	Jan. 2, 1964-present	76	NOAA
Nashville, Tennessee	Jan. 2, 1963-present	79	NOAA
Perth, Australia	July 30, 1984-present	81	NOAA; Australian Bureau Meteorology
SPO	Nov. 17, 1961-present	82	NOAA
Haute Provence, France	Sept. 2, 1983-present	85	NOAA; CNRS
Huancayo, Peru	Feb. 14, 1964-Dec. 31, 1992	87	NOAA; IGP
BRW	June 6, 1986-present	91	NOAA
Fresno, California	June 22, 1983-March 13, 1995	94	NOAA
Hanford, California	March 15, 1995-present	94	NOAA

TABLE 4.2. Provisional 1998 and 1999 Monthly Mean Total Ozone Amounts (DU)

Station	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<i>1998</i>												
Bismarck, North Dakota	340	355	343	363	347	334	300	288	297	283	276	328
Caribou, Maine	361	360	[390]	408	[374]	[362]	339	329	318	-	310	334
Wallops Is., Virginia	313	318	359	357	361	332	314	309	295	300	270	291
SMO	233	234	235	246	247	247	256	258	262	267	262	[268]
Tallahassee, Florida	[283]	[263]	312	311	290	-	-	-	-	[261]	270	[255]
Boulder, Colorado	326	346	349	372	328	321	302	294	279	280	264	286
Fairbanks, Alaska	-	[423]	421	430	[387]	363	339	[324]	-	-	-	-
Lauder, New Zealand	275	263	268	267	283	312	341	342	351	367	320	290
MLO	229	245	265	276	282	281	271	263	266	255	246	236
Nashville, Tennessee	317	314	336	340	337	308	303	301	284	268	263	271
Perth, Australia	265	263	266	271	263	289	292	296	320	321	302	284
SPO	267	264	-	-	[266]	[260]	[262]	[243]	-	122	162	252
Haute Provence, France	321	314	[338]	393	363	335	320	316	311	298	292	293
Huancayo, Peru	Not in operation											
BRW	-	-	446	444	409	357	325	321	323	[316]	-	-
Hanford, California	303	332	327	355	356	333	322	-	-	286	268	280
<i>1999</i>												
Bismarck, North Dakota	340	355	343	363	347	334	300	288	297	283	276	328
Caribou, Maine	[344]	341	376	386	354	342	-	[360]	[284]	-	[271]	[331]
Wallops Is., Virginia	299	306	330	341	351	324	312	311	[278]	285	286	299
SMO	257	254	244	240	245	242	248	249	[257]	261	257	244
Tallahassee, Florida	[264]	[264]	[298]	[271]	-	[306]	[288]	287	-	-	-	-
Boulder, Colorado	291	313	313	332	335	317	301	296	296	281	266	309
Fairbanks, Alaska	-	-	-	[433]	376	[337]	317	293	316	[326]	[336]	-
Lauder, New Zealand	264	253	257	274	266	292	312	332	325	340	327	295
MLO	235	232	261	287	278	272	267	264	265	258	257	250
Nashville, Tennessee	292	307	312	306	-	322	305	301	296	279	264	290
Perth, Australia	263	263	263	262	265	276	273	290	318	319	311	283
SPO	257	253	-	[278]	[261]	[246]	[248]	[221]	-	122	164	258
Haute Provence, France	276	327	360	371	340	332	325	302	294	[294]	-	-
Huancayo, Peru	Not in operation											
BRW	-	-	[451]	420	365	319	311	277	292	-	-	-
Hanford, California	273	291	327	355	322	317	297	297	291	273	259	295

Monthly mean ozone values in square brackets are derived from observations made on fewer than 10 days per month.