1.3. SAMOA OBSERVATORY

D. HOLT, J. MICHALSKI, AND E. SANDBERG

1.3.1. OPERATIONS

Operations at the American Samoa Observatory (SMO) were relatively uneventful during 1998-1999, with the station chief completing his term and changes in station engineer at the end of 1998.

The most significant change to the station came with a cooperative agreement between NOAA and the new cellular phone company, Blue Sky Communications. Blue Sky saw Matatula Point as an ideal location for one of its many cellular phone towers. Since NOAA's own meteorological tower was nearing the end of its useful life, it became an excellent opportunity to allow Blue Sky use of the property while allowing NOAA to use Blue Sky's new tower. The tower was completed in May 1999, and throughout the year the experiments that depended on the old tower were gradually moved to the new one. This process continued into 2000.

Effective Internet access to the observatory was still not available. Despite meetings with the local phone company and Peace Sat, a Pacific Islands initiative to connect schools and government agencies to the Internet, no effective connection scheme was found, although there is optimism that a connection will be possible sometime in 2000.

The backup diesel generator remains operational but is in urgent need of maintenance and part replacements. Although the diesel unit is in decent condition, the radiator, water pump and electronic controls all require immediate attention.

The station facilities are also in need of renovation. Because the roof has some minor leaks, a complete repainting is necessary. The interior of the main laboratory is in need of repainting and other upgrades, including new electrical wiring and lighting. Finally, the old Plexiglass windows have turned translucent from UV exposure and will to be replaced in 2000.

1.3.2. PROGRAMS

Table 1.3 summarizes the programs at SMO for 1998-1999. Operational highlights are as follows:

Carbon Dioxide

In situ monitoring and Airkit samples continued without interruption during this reporting period.

Surface Ozone

The Dasibi ozone monitor failed completely in March 1999. Because the newer Thermo Electron Instrument (TEI) UV photometric ozone analyzer was operational, the loss of the Dasibi was not critical. Plans for a new or repaired Dasibi are on order for 2000.

Total Ozone

The Dobson spectrophotometer continued to operate reliably during this reporting period. In December 1998 a new dome was installed to replace the old dome that had rusted so badly that it could no longer turn to face the sun.

Ozonesonde Balloons

Weekly ozonesonde flights continued during this reporting period using the National Weather Service (NWS) balloon inflation facility at the Tafuna airport.

Halocarbons and Other Atmospheric Trace Species

The new Chromatograph for Atmospheric Trace Species (CATS) gas chromatograph was installed in December 1998 and ran alongside the older Radiatively Important Trace Species (RITS) system. Intercomparison continued through this reporting period, and plans for the removal of the RITS system will be carried out in 2000.

Aerosols

The only aerosol measuring instrument at Samoa is a Pollak counter. Daily Pollak observations were conducted throughout the year.

Solar Radiation and Meteorology

The solar radiation and meteorological instruments continued to operate with no significant problems. A member of the CMDL Ozone and Water Vapor (OZWV) group visited during October 1999 to add an IR pyranometer and to take a current theodolite observation of obstructions to the horizon.

Cooperative Programs

A complete list of SMO cooperative projects is found in Table 1.3. All operated essentially without problems during this reporting period.

TABLE 1.3. Summary of Measurement Programs at SMO in 1998-1999

Program	Instrument	Sampling Frequency
Gases		
CO_2	Siemens Ultramat-5E analyzer	Continuous
CO_2, CH_4	0.5-L glass flasks, through analyzer	1 pair wk^{-1}
	2.5-L glass flasks, MAKS pump unit	1 pair wk^{-1}
CO_2, CH_4, CO, and ^{13}C, ^{18}O of CO_2	2.5-L glass flasks, AirKit	1 pair wk^{-1}
Surface O_3	Dasibi ozone meter	Continuous
	TEI UV photometric ozone analyzer	Continuous
Total O_3	Dobson spectrophotometer no. 42	4 day^{-1}
N_2O, CFC-11, CFC-12, CFC-113, CH_3CCl_3, CCl_4	850-mL, 2.5-L, and 3-L stainless steel flasks	1 sample wk^{-1}
N_2O, CFC-11, CFC-12, CFC-113, CH_3CCl_3, CCl_4, SF_6, HCFC-22, HCFC-141b, HCFC-142b, CH_3Br, CH_3Cl, CH_2Cl_2, $CHCl_3$, C_2HCl_3, C_2Cl_4, H-1301, H-1211, H-2402, HFC-134a	850-mL, 2.5-L, and 3-L stainless steel flasks	1 sample wk^{-1}
CFC-11, CFC-12, CFC-113, N_2O, CCl_4, CH_3CCl_3	HP5890 automated GC	2 sample h^{-1}
N_2O	Shimadzu automated GC	2 sample h^{-1}
CFC-11, CFC-12, CFC-113, N_2O, CH_3CCl_3, CCl_4, CH_3Br, CH_3Cl, H-1211, SF_6, HCFC-22	Automated CATS GC	1 sample h^{-1}
Aerosols		
Condensation nuclei	Pollak CNC	1 day^{-1}
Solar Radiation		
Global irradiance	Eppley pyranometers with Q and RG8 filters	Continuous
Direct irradiance	Eppley pyrheliometer with Q filter	Continuous
	Eppley pyrheliometer with Q, OG1, RG2, and RG8 filters	Discrete
Diffuse irradiance	Eppley pyrgeometer with shading disk and Q filter	Continuous
Meteorology		
Air temperature	Thermistors (2)	Continuous
Dewpoint temperature	Polished mirror	Continuous
Pressure	Capacitance transducer	Continuous
	Mercurial barometer	1 wk^{-1}
Wind (speed and direction)	R.M. Young Windbird	Continuous
Precipitation	Rain gauge, tipping bucket	Continuous
	Rain gauge, plastic bulk	1 day^{-1}
Cooperative Programs		
CO_2, ^{13}C, N_2O (SIO)	5-L evacuated glass flasks	1 set wk^{-1} (3 flasks set^{-1})
GAGE/AGAGE project: CFC-11, CFC-12, CFC-113, N_2O, CCl_4, CH_3CCl_3, CH_4 (SIO)	HP5880/HP5890 Series II gas chromatograph	3 h^{-1}
Various trace gases (OGIST)	Stainless steel flasks	1 set wk^{-1} (3 flasks set^{-1})
Bulk deposition (DOE)	Ion exchange column	Continuous (1 filter mo^{-1})
Total suspended particulates (DOE)	High-volume sampler	Continuous (1 filter wk^{-1})
Total suspended particulates (SEASPAN)	High-volume sampler	Continuous (1 filter wk^{-1})
CH_4 ($^{13}C/^{12}C$ ratio) (Univ. of Wash.)	30-L pressurized cylinder	Biweekly
Light hydrocarbons (UCI)	1-L evacuated stainless steel flasks	3-4 flasks qtr^{-1}
O_2 (Princeton Univ.)	2.5-L glass flasks	2 pair mo^{-1}
O_2 (SIO)	3-L glass flasks	2 sets mo^{-1} (3 flasks set^{-1})

SIO - Scripps Institution of Oceanography
OGIST - Oregon Graduate Institute of Science and Technology
DOE - Department of Energy
SEASPAN - Sea-Air Exchange Experiment
UCI - University of California, Irvine
URI - University of Rhode Island