Portable Ozone Monitoring Systems (POMS)

Introduction

The Air Resources Division has developed a small, low-power, self-contained system for monitoring ozone and weather parameters in remote locations. These systems do not require the infrastructure of a normal monitoring station such as utilities, a shelter, a sampling tower, or road access. The standard configuration has an ozone analyzer, weather sensors, a datalogger, solar-power system, and a communications package. Ozone data is collected as hourly averages and transmitted back to a central office for validation checks and storage in a database. Currently, the ozone analyzer is not EPA certified as a reference method for regulatory purposes, however, we have done extensive intercomparisons and temperature tests on the analyzers and find them to be quite reliable. The "portable" aspect is that they can easily be shipped to a site and assembled in a few hours. Relocation over short distances can be done by disconnecting a few parts, picking up the unit (two person operation), and transporting in a pickup truck. Thus, moving a system is much less effort and expense than with a standard monitoring station.

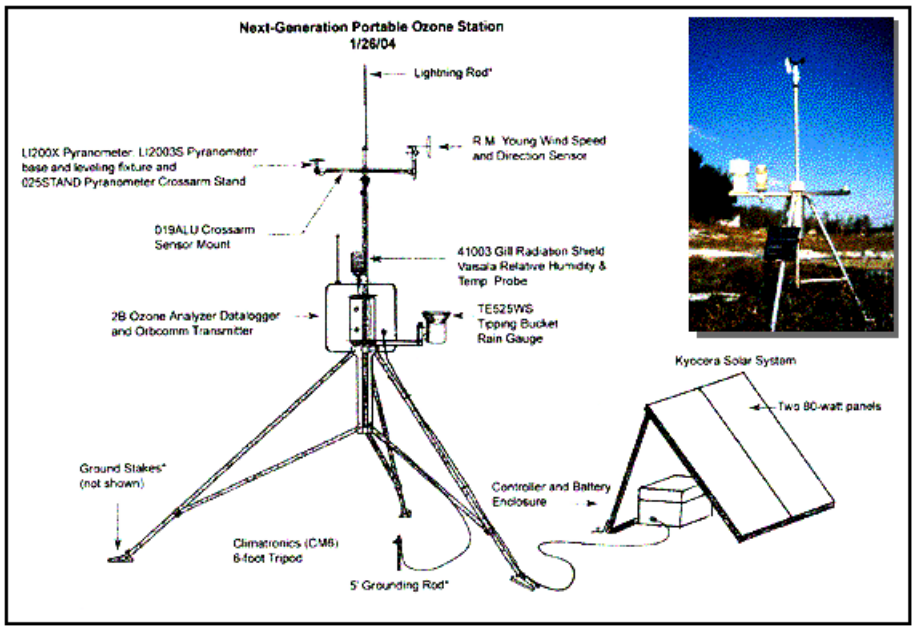

Figure 1. Diagram of the portable ozone monitoring system and components. Inset picture is approximately what the unit will look like in the field.

Uses for the portable ozone system

The portable system is recommended for warm season use as a temporary station (1 – 5 years) in remote areas where power, phone, access, and shelter are not easily provided. The monitoring objectives may include survey monitoring to establish a baseline, monitoring in associate with vegetation injury studies, spatial distribution studies, or for monitoring of areas

where changes in ozone from development, fires, or other pollutant source activities are expected.

ARD portable ozone systems facility

Initial development and testing was done by ARD of the portable systems. Fourteen systems have been built by ARD for use in parks. Since deployments are meant to be temporary, these units will be available for use in other parks than their initial locations. We also have the facilities to build more portable ozone systems, though not necessarily the budget to do so. The central office, field support, and database functions are available through our field support contractor to handle the currently deployed systems and additional systems.

What this means for potential users is that the current batch of portable ozone systems will be redeployed according to a ranked priority scheme as units become available. Alternatively, park units, networks, or regions with funds to help build additional units can "lease" units for shorter deployments or buy units if they intend to use them long-term. ARD will provide the option of support services through our field support contractor.

Costs to operate the portable ozone systems

At present the initial fabrication, testing, and deployment of a standard unit costs approximately $20k. Annual operational expenses are expected to be about $8k. ARD presently provides a small amount of support to help cover an operator and other costs to a park. We do not anticipate being able to expand this kind of support, however, so parks may have to provide an operator without additional compensation. Fortunately, operator duties are only about 1-2 hours per week over the course of a season. "Leasing" options can be discussed.

Options available for system configurations

Flexibility is part of the design for the portable ozone monitoring systems. The table below shows the options that are readily available and have been tested with our monitoring equipment.

Table 1.

Base system	Pollutant measurements	Weather sensors	Communications	Power
Tripod tower*	Ozone analyzer*	Winds*	Cell phone	Solar panel, battery pack – DC*
Campbell datalogger*	CASTNet-style filter-pack (SO2, NO3, SO4, HNO3)	Relative humidity**	Satellite modem*	AC line power
Instrument box*	eBAM or eSampler	Solar radiation**	Storage module	
Automated zero check system*		Ambient temperature*	Near real-time web data presentation	
Inlet with Teflon filter*		Rainfall*	Hard-line phone	
		Other sensors	Radio phone extension	

* Standard configuration components

Further Information

As more information, test results, examples of deployments, and data become available, they will be posted on the web site at http://www2.nature.nps.gov/air/studies/portO3.htm .

A monitoring protocol document describing the portable ozone system and other ozone monitoring options is being prepared.

Contacts

The NPS Air Resources Division is available for consultation and has the facility and contractors to help put these units into field locations. Call or email:

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