

MARITIME AEROSOL NETWORK AS A COMPONENT OF AERONET – FIRST STEPS

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1. INTRODUCTION

The World Ocean covers almost 70% of Earth’s surface. Satellite-borne aerosol optical depth measurements over the oceans provide global coverage however require ground-based validation. Not all areas of the World Ocean can be studied from islands therefore ship-based measurements are the only source of data for such regions. Knowledge of aerosol optical properties over the oceans is important for computations of various aerosol radiative effects in the climate change research, for satellite remote sensing (satellite validation and atmospheric correction), for validation of global aerosol transport simulations, and for global aerosol distribution studies. The interest in the data is high in various scientific communities. Aerosol Robotic Network (AERONET) is a worldwide network of automated sun/sky radiometers [1, 2], that currently operates over 400 instruments worldwide. Clearly the limitation to the global distribution is our terrestrial and island observations. The establishment of the Maritime Aerosol Network (MAN) as a component of AERONET, affiliated with the AERONET calibration and data processing, complements island-based AERONET measurements, spatially extending data collection to the areas where no islands exist.

2. MARITIME AEROSOL NETWORK STATUS

Maritime Aerosol Network (MAN) has started systematically collecting data over the oceans in November of 2006 and since then made some progress in the data collection and archiving. With more than seventy cruises completed and ongoing (and many more planned) the MAN database keeps growing. Measurement areas included various parts of the Atlantic Ocean, Northern and Southern Pacific, South Indian Ocean, South Ocean, and inland seas. Data collection included areas that earlier have had no coverage at all, in particular vast areas of the South Ocean. The data collected will enhance our knowledge on aerosol optical properties over the oceans. We foresee a continuation of this effort on various ships of opportunity. The aerosol optical depth data collection will provide the international scientific community with the much needed data for the satellite retrieval validation, atmospheric correction and aerosol transport modeling. Also our collaborative effort is essential in the fundamental scientific aspect of aerosol optical studies over the oceans. A public domain web-based database dedicated to the MAN activity can be found at http://aeronet.gsfc.nasa.gov/new_web/maritime_aerosol_network.html

Maritime Aerosol Network deploys hand held sunphotometer Microtops and utilizes the calibration and data processing traceable to AERONET [3, 4, 5]. MAN products are:

- a) spectral aerosol optical depth (level 1.0, 1.5 and 2.0)
- b) Angstrom parameter (level 1.0, 1.5, and 2.0)
- c) columnar precipitable water (level 1.0, 1.5, and 2.0)
- d) aerosol optical depth at 500 nm partitioned into fine and coarse components (level 1.0 and 1.5 only) [6, 7].

Aerosol optical depth data are computed for three data quality levels: level 1.0 (unscreened), level 1.5 (cloud-screened), and level 2.0 (cloud-screened and quality-assured). Aerosol optical depth partition products may have additional quality checks.

The whole data archive schematically mapped in Figure 1 where various cruise tracks and daily averages at the level 1.5 are presented. Obviously vast areas still have no or limited coverage. Our ongoing effort hopefully will help closing those gaps.

CONCLUSIONS

The Maritime Aerosol Network stimulates research and international collaboration in various scientific areas. Data are easily accessible in the web-based public data archive. Currently it contains over 1200 measurement days. A number of publications [8-22] dedicated to the data analysis have become already available. The program exemplifies the mutually beneficial international, multi-agency effort in atmospheric aerosol optical studies.

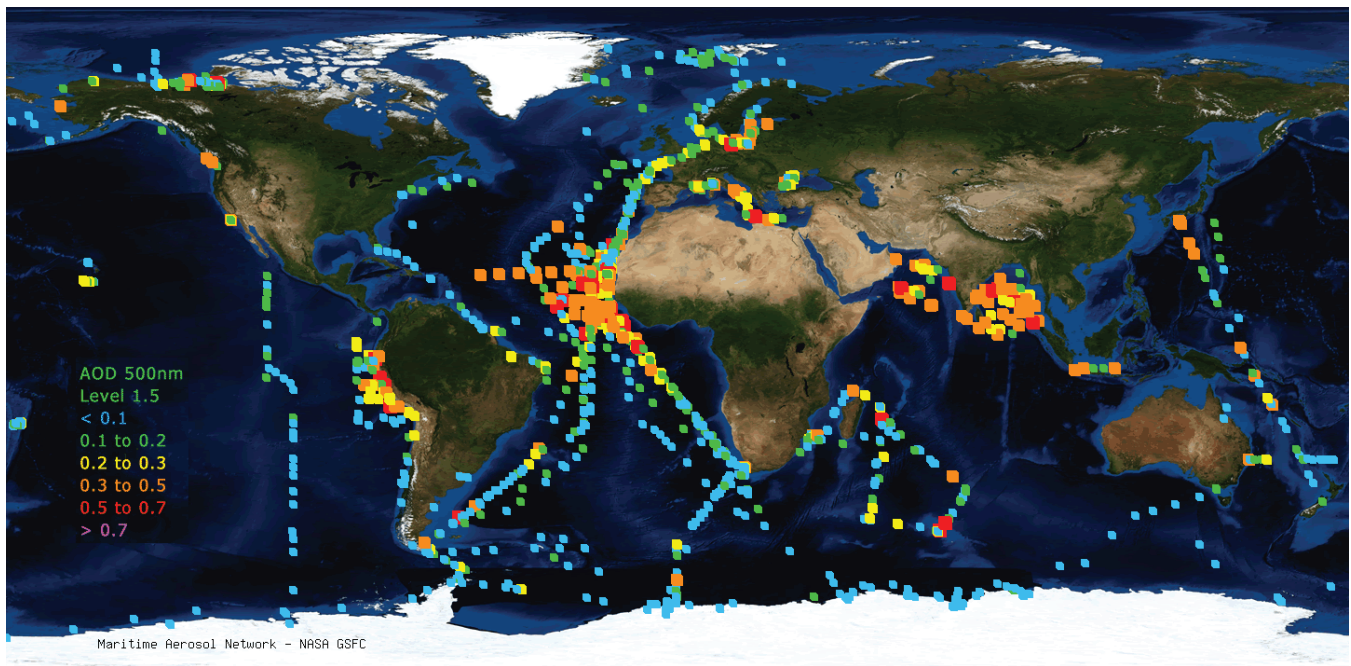


Figure 1. Maritime Aerosol Network global coverage: cruise tracks and daily averages of aerosol optical depth are shown

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