

Interactive comment on “A Marine Aerosol Reference Tank system as a breaking wave analogue” by M. D. Stokes et al.

Anonymous Referee #1

Received and published: 6 March 2013

In this contribution, Stokes et al. report on a new experimental device i.e., the Marine Aerosol Reference Tank (MART), designed to closely reproduce the aerosols created by breaking oceanic waves. Special attention was given to mimic an evolving bubble plume and surface foam patch. For this purpose, MART takes benefit of an intermittently plunging sheet of water and large volume tank reservoir to simulate turbulence, plume and foam formation. The produced aerosols are discussed to show size distributions close (or even identical) to those observed in larger systems (large seawater breaking wave channels) or even in real marine environments.

This paper appears to be well written and appropriately illustrated. The paper provides most (but maybe not all) technical information to reproduce the set-up.

C4037

While detailed information is given to the production of the bubbles and their evolution, less attention is given the characteristics of the water film. What is its thickness and falling speed? Combined with the falling height, are these key parameters associated to the production of bubbles large enough? Can you provide more information in these aspects, as these may be of interest to the reader? In fact, when creating aerosol plumes using plunging water, the falling water sheet must have the required scale/scale before impacting the bulk water surface to get the targeted wider particle size distribution.

The intermittency in particle production is presented as being a key parameter to correctly reproduce foam production or evolution. But finally, this aspect appears to be poorly described. Can you provide more information about associated frequency, foam coverage in the tank, etc. ...?

The resulting particle size distribution generated within the MART are presented as having similar characteristics than those from breaking waves, and finally quite different to those produce by means of sintered glass filters (frits) sparged with air in an enclosed tank (which have narrower size distributions). But what about plunging water jets and those being used by Sellegri et al. or Fuentes et al.? Only the influence of the tank size is discussed. But would an appropriate sized jet based system provide the appropriate aerosol size distribution. More comparison between the plunging sheet and jet approaches would be welcome.

Finally, would the authors suggest that MART to be a standard design for producing SSA?

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 8701, 2012.

C4038