

New Constraints on Size-resolved Submicron Sea-salt Particle Production from Ocean Breaking Waves

ABSTRACT

Marine aerosols play an important role in controlling the Earth's radiation balance, cloud formation and microphysics. One particular knowledge gap in sea spray aerosol emissions resides in the incompletely characterized contribution of sea-salt to the cloud condensation nuclei (CCN) budget in the marine boundary layer (MBL). The chemical composition of 50 to 200 nm sized sea spray particles, most critical to climate models, is variously described as purely organic, purely sea-salt or mixtures of both. The production fluxes of these sub-micron particles is of particular interest. This project will help developing improved parameterizations for size- and composition-dependent production fluxes of sea spray particles needed to constrain the CCN fluxes of natural aerosols in regional and climate models.

North Carolina State University (NCSU) investigators will deploy a relaxed eddy accumulation (REA) flux system specifically designed to measure turbulent fluxes of size-resolved dry sea-salt (inner) cores. The REA-S flux system will be deployed at the U.S. Army Corps of

Engineers (USACE) 560 m long research pier facility at Duck, NC, chosen to sample representative MBL conditions.

A ship based environmental education program designed for secondary and high school students and their teachers, and development of university and K-12 learning materials and curricula that integrate data analysis into classroom instruction will be used. A goal of this is for increased understanding of factors affecting atmospheric and marine science processes as related to cloud formation and subsequent effects on climate.