An overview of sea spray aerosol production, scaling, and surface-layer interactions

C.W. Fairall
NOAA Earth Systems Research Laboratory
Boudler, CO 80305
Chris.fairall@noaa.gov

Breaking waves lead to the production of sea spray aerosols with sizes ranging from 0.01 μm to more than 1 mm radius. Number production is dominated by submicron drops generated by air-bubble bursting at the interface but at high winds the spume mechanism dominates the generation of droplet mass. Sea spray aerosols are of interest in cloud physics, global salt budgets, and global radiative balance; spume drops are hypothesized to play a role in heat and moisture surface fluxes of tropical cyclones. Quantitative evaluations of these effects involve several key issues:

*Characterization of the production of spray (the surface source function) as a function of drop size and forcing (wind speed or more direct variables such as wave breaking energy)

*Development of droplet flux-profile relationships for the surface layer that account for the mean gravitational fall speed and the inertial properties of larger drops.

*Understanding the interaction of evaporating spray with the thermodynamic profiles and effects on sensible and latent heat fluxes.

*Development of simple parameterizations that can be used in numerical models from global aerosol/chemical models to hurricane models.