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Measurements and determination of the marine coarse aerosol fluxes in near marine boundary layer.

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Studies of production and transport of aerosol over the sea are very important for many areas of knowledge. Marine aerosols emitted from the sea surface help to clean the boundary layer from other aerosol particles. The emitted droplets do not dry out in the highly humid surface layer air and because of their sizes most of them are deposited quickly at the sea surface. Therefore, marine aerosols have many features of rain i.e. the deposition in the marine boundary layer in high wind events is controlled not only by the "dry" processes but also by the "wet" scavenging.

During a number of cruises conducted on board of r/v Oceania between 2008 and 2012 we collected much data which were further used to calculate sea salt source function over the Baltic Sea. Measurements were carried out using a gradient method. For this method we used a Laser Particle Counter (PMS model CSASP-100_HV) placed on one of the masts of the boat. Measurements were performed at five different levels above the sea level: 8, 11, 14, 17 and 20 meters. The vertical aerosol concentration gradient was obtained from a minimum of 4 measurement series. Thus each result consists of a 1 hour series with the average sampling time at each elevation equaling to 8 minutes.

Based on the averaged vertical concentration, and using the Monin Obukhov theory, profiles of vertical sea spray fluxes in the near water layer were calculated. Using the results from those experiments the sea spray emission fluxes have been calculated for all particles of sizes at ranges from 0.5 μm to 8 μm, as well as for particles of sizes from fifteen channels of 0.5 μm width. Using these fluxes we calculated the Sea Salt Generation Function (SSGF) over the Baltic Sea. This function provides information on the emission of particles of different sizes, depending on environmental parameters. The emission of sea spray depends on the magnitude of energy lost by the wind waves in the process of their collapse.

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