

An experimental study of particle settling in turbulence

Kiyokatsu Ochiai [1], Takehiro Koyaguchi [2]

[1] ERI, Univ. Tokyo, [2] ERI Univ Tokyo

Settling behavior of solid particles in turbulent fluids is investigated experimentally in order to understand the fallout mechanism of pyroclasts from volcanic umbrella clouds.

Our results show that as the ratio of particle settling velocity to turbulent intensity (r.m.s of velocity fluctuation) increases, gradient in particle concentration is established within the fluid. Under such conditions, the rate of decrease in particle concentration due to settling becomes larger than the cases where the particles are homogeneously mixed due to vigorous turbulence. It is also suggested that the settling rate is systematically smaller in the experiments with free bottom boundary than those with solid bottom boundary.