



Post-Tsunami coastal defences along Pondicherry : Impact on cloud microphysics

S. Sarkar (1), R. Jha (1), R. Bardhan (1), R. Raj (1) and S. Ghosh (1,2)

1. School of Mechanical and Building Sciences, Vellore Institute of Technology, Vellore, Tamil Nadu, India
2. School of Earth and Environment, University of Leeds, Leeds, U/K.

Satyajitg@vit.ac.in/Fax : + 91-416-2243092

Coastal defences in the form of concrete and rocks with roughness lengths typically of the order of 2-3 m have been put in place along the Pondicherry coast-line since the December 2004 Boxing day Tsunami. The originally French Enclave of Pondicherry is a popular Tourist destination situated along the South-Eastern part of India, along the Bay of Bengal. Since the devastating Tsunami, parts of the coast-line have been protected by coastal defences extending to several kms. In this paper, we have investigated the cloud-microphysical implications of these structures. Since Sea-Spray aerosol formation is directly dependent on the surface wind speed, it is expected that the coastal defences would tend to inhibit sea-spray formation owing to the slowing down of the surface wind-speed. However, current parametrizations that estimate sea-spray number concentrations from surface wind speed, use open-ocean conditions where the extent of white-capping is typically of the order of 1%. A photographic examination reveals that the extent of white-capping is close to 100% for much of the day along the Pondicherry Coastline. The net effect is an overall increase in sea-spray number concentration. We use a detailed micro-physical parcel model to study cloud droplet spectra generated from marine aerosol spectra. In addition, we contrast the coast-line cloud droplet spectra with open-ocean spectra in order to isolate the effect of the coastal defences. Finally, we discuss and contrast the cloud-microphysical implications of the two cases.