DOCUMENT CONTROL SHEET

Sl. No.	Item	Description
1	**Document No. and Date**	**NIAS/NSE/EECP/U/RR/03/23**
2	**Title**	Geospatial modelling for estimation of PM2.5 concentrations in Major cities of Peninsular India
3	**Type of Document**	Research Report
4	**No. of Pages and Figures**	64 + vii pages, 21 Tables, 20 Figures
5	**No. of References**	50
6	**Authors**	V. P. Lavanyaa; R. Srikanth; S. Varshini; K. M. Harshitha
7	**Originating School**	Natural Sciences and Engineering
8	**Program**	Energy, Environment and Climate Change (EECP)
9	**Collaboration**	NA
10	**Sponsoring Agency**	Ministry of Earth Sciences (MOES), Government of India
11	**Abstract**	Fine particulate matter ($PM_{2.5}$) pollution is a primary global public health concern. Exposure to $PM_{2.5}$ pollution beyond the safe limits of exposure is associated *inter alia* with respiratory and cardio-vascular mortality and morbidity. However, the baseline and background levels of PM2.5 concentration in megacities in India are significantly higher than the WHO Air Quality Guidelines which are based on studies conducted in regions with very low ambient PM concentrations. Human susceptibility to air pollution may vary based on age distribution, nutritional intake, access to health care, meteorological conditions, and any natural immunity. Therefore, it is essential to study the exposure-response function(s) specific to India using the local air pollution exposure studies. On the other hand, the air quality monitoring stations used to measure ambient $PM_{2.5}$ concentration are sparse and non-uniformly distributed in urban areas and nearly-absent in rural areas leading to the misclassification of exposure in India. Therefore, the authors have developed a Linear Mixed Effects model in the present study to estimate $PM_{2.5}$ levels in four major cities in peninsular India at a spatial resolution of 1 km x 1 km. Bengaluru (801 grids), Hyderabad (873 grids), Madurai (81 grids), and Vijayawada (88 grids) have been selected for this study since they are useful to estimate air pollution exposures for cities with different geographical, climatical, demographic and topographical

		conditions.
12	**Keywords**	Aerosol Optical Depth (AOD), Linear Mixed Effects (LME) model, LULC classification, Spatiotemporal maps, Particulate Matter
13	**Security Classification**	Unrestricted