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MODELING FOR PREDICTION OF SPM, NOX AND SO_2 FROM EMISSIONS OF A CEMENT FACTORY USING AERMOD DISPERSION MODEL

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ABSTRACT

Industrial activities are sources of high emission rates of suspended particulate matter, SO_2, NOx, and other pollutants. The existence of many such industrial plants close to a populated area can have a severe effect on human health **(**Alexander Cohan et al (2011)). The effects can be even worse when these emissions are added to existing background concentration levels. This paper deals with the case study for the prediction of the SPM, NO_x, and SO_2, pollution caused by industrial activities close to the villages of Tadipatri in Anantapur district, Andhra Pradesh state. An atmospheric dispersion model AERMOD 9.1 was used. Meteorological data for one year was processed using AERMET processor (z. mousavi et al (2014)). The model was run for pollutants SPM, SO_2, NOx with different scenarios. Model runs were made for yearly, monthly, averaged emission scenarios. The output files for the parameters Suspended particulate matter (SPM), Sulfur dioxide (SO_2), and Nitrogen oxides (NO_x) were evolved for all the months of the study period from January 2014 to December 2014. The isopleths were plotted for the same and these concentration contours are very important in determining the spatial distribution of Suspended particulate matter (SPM), Sulfur dioxide (SO_2), and Nitrogen oxides (NO_x) over the modeled area. For the Ambient Air Quality Monitoring Stations, the predicted concentrations were found to be in good agreement with the measured data. For AERMOD model, values of coefficient of determination R^2 are in the range 0.79 to 0.90. The model outputs were compared with NAAQS, 2009 norms. It may therefore be inferred that AERMOD model gives better results. The results demonstrated that the AERMOD model can be applied to study the dispersion of criteria air pollutant concentrations and that the predictions are of reasonable accuracy and may be used for any other industry in its vicinity up to 50 km Diameter.

KEYWORDS: Pollutant, Dispersion, Impact, Modeling, Isopleths