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Spatial Ground-Level Particulate Matter (PM₁₀) in Indonesia using Machine Learning

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Large-scale forest fires often occur in Indonesia and affect air quality and human health. The effect of forest fire on air quality quantified by rising PM₁₀ concentration on Indonesia Meteorological, Climatological and Geophysical Agency (BMKG) observation network. A few PM₁₀ observation networks and uneven distribution in Indonesia make it difficult to present spatial ground-level PM₁₀. The aim of this study was to estimate ground-level PM₁₀ in Indonesia and present the spatial distribution of ground-level PM₁₀ using machine learning. Support Vector Regression (SVR) techniques were used to estimate the PM₁₀ content from heterogeneous data sources, including ground measurements provided by BMKG, numerical model data, and hotspot retrieved from NASA/LANCE – FIRMS for satellite imagery. RMSE and MSE were used to evaluate the estimation result. We also present the modeling framework on the forecast of the CAMS Copernicus model in Indonesia. The performance of various input parameter configurations of SVR for estimating the ground-level PM₁₀ as indicated by low prediction errors.