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Research and Development of a Simulation Support System for Evaluating Air Pollution Measures

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Based on the knowledge obtained from the Environment Research and Technology Development Fund and other sources, we have developed a simulation support system for air pollution simulation, called "APOLLO," to facilitate the use of multiscale air-quality models. This simulation support system allows users to generate emissions data, where the user can set any reduction rate for emissions from the regions and industries they specify, and calculation setup files needed for simulation by selecting and specifying calculation setups, etc. via a user-friendly interface. In parallel with the development of the simulation support system, we developed a data assimilation system for ground and satellite observation data, such as air quality monitoring data, and created a data set for analyzing air pollutant concentrations applicable to photochemical oxidants and $PM_{2.5}$ concentrations. We also developed an inverse estimate system for NO_x emissions in Japan based on ground and satellite observation data and verified and improved the accuracy of domestic NO_x emissions. Case studies by several municipalities were conducted using numerical simulations to contribute to the consideration of measures for solving air pollution problems in their regions, while also verifying and demonstrating the simulation support system.

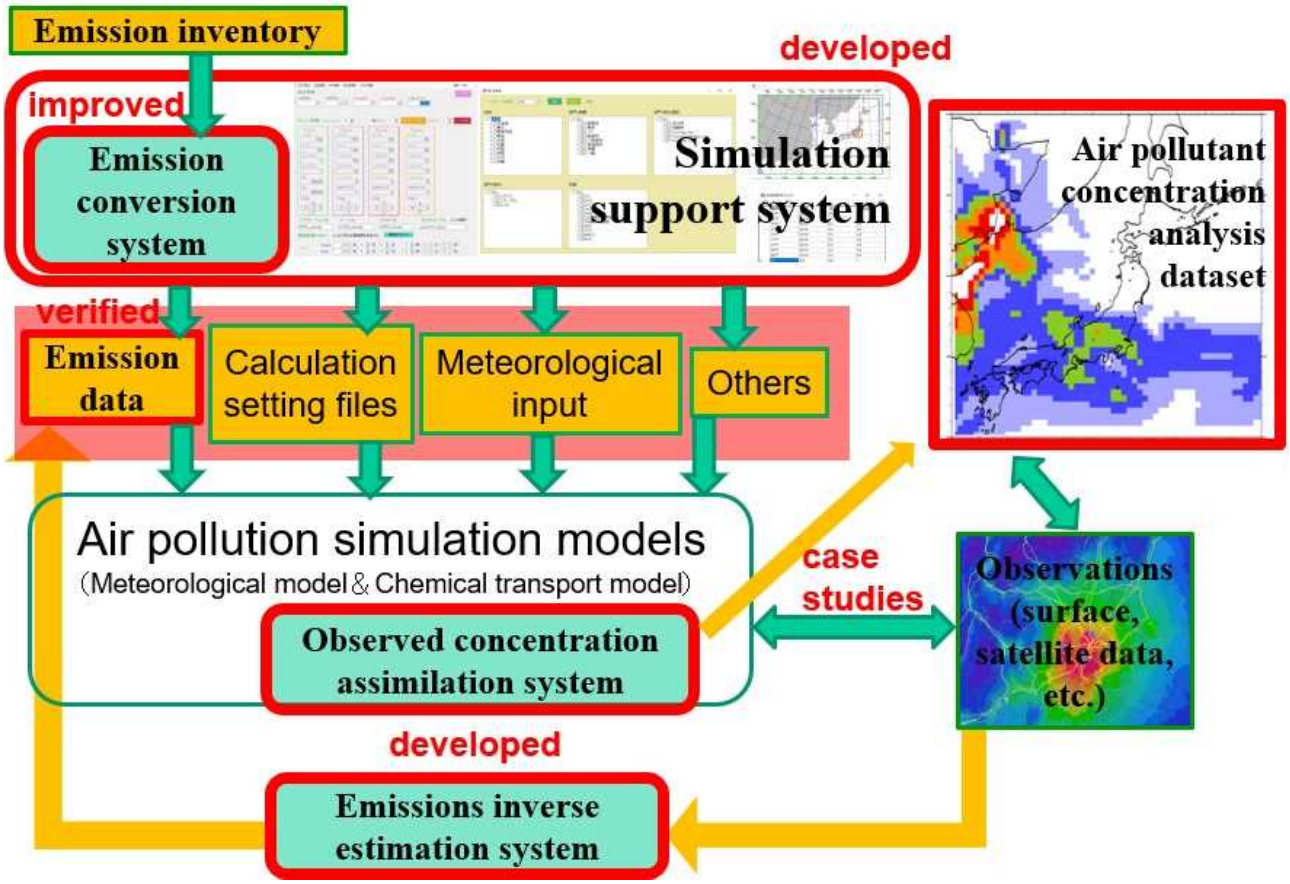

Fig. 1 Diagram representing the relationship between the systems and data in this study. The rectangles represent data and the rounded rectangles represent systems. Areas enclosed by red lines are those developed, refined and examined by this study.