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How the cumulonimbus cloud affects redistribution of the SO_2 emitted from a thermal power station?

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A type of the fossil fuel that is burnt in the thermal power stations (TPS) determines the type of the pollutants that are released into the atmosphere. In the most types of the fossil fuels that are used, the sulphur is prevalent. A large amount of the sulphur dioxide in the atmosphere is a consequence. In the air, cloud water and rainwater, the sulphuric acid and sulphates are produced due to the gaseous and aqueous chemical reactions. All this causes the environmental issues and posing the detrimental effects on the human health.
At the distance of approximately of 40 km south-west of the Serbian capital Belgrade is situated Obrenovac, the city known as the source of the production of the energy fromthe TPS. Obrenovac is located in the flat terrain surrounded by hills and mountains.
Object of this paper is to research how the cumulonimbus cloud (Cb) affects the redistribution of SO_2 (that is released from the TPS Obrenovac) in the atmosphere. To accomplish this goal, we used the complex 3D cloud-resolving model coupled with the chemistry module. A high spatial resolution was applied: 500 m in horizontal and 250 m in vertical. We include realistic sounding which provides the profiles of temperature and air velocity, an advective scheme that conserves the mass of scalar, iterative solving of kinetic mass transfer, several aqueous-phase chemical reactions, tracking of solute concentrations in different hydrometeors, and realistic topography. This allows the most detailed analysis of time-dependent partitioning of SO_2 among the gas phase, different hydrometeors, and precipitation.To simulate a plume from the TPS we used the real data for the release height, emission rate, gas exit temperature, gas exit velocity and inside diameter of the chimney.
The several numerical experiments are conducted.They show that the plume rise is closely related to the vertical air velocity into the cloud. When Cb with the strong updrafts passed over the TPS, SO_2 is transported to the higher altitudes; the scavenging of the SO_2 increased, as well as acidity of the rainwater.