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Comparing regional modeling (CHIMERE) and satellite observations of aerosols (PARASOL): Methodology and case study over Mexico

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Atmospheric suspended particles (aerosols) have significant radiative and environmental impacts, affecting human health, visibility and climate. Therefore, they are regulated by air quality standards worldwide, and monitored by regional observation networks. Satellite observations vastly improve the horizontal and temporal coverage, providing daily distributions. Aerosols are currently estimated using aerosol optical depth (AOD) retrievals, a quantitative measure of the extinction of solar radiation by aerosol scattering and absorption between the point of observation and the top of the atmosphere. Even though remarkable progresses in aerosol modeling by chemistry-transport models (CTM) and measurement experiments have been made in recent years, there is still a significant divergence between the modeled and observed results.
However, AOD retrievals from satellites remains a highly challenging task mostly because it depends on a variety of different parameters such as cloud contamination, surface reflectance contributions and a priori assumptions on aerosol types, each one of them incorporating its own difficulties. Therefore, comparisons between CTM and observations are often difficult to interpret.
In this presentation, we will discuss comparisons between regional modeling (CHIMERE CTM) over Mexico and satellite observations obtained by the POLDER instrument embarked on PARASOL micro-satellite. After a comparison of the model AOD with the retrieved L2 AOD, we will present an alternative methodology for direct comparison to the measured reflectance. Preliminary application to the evaluation of the CHIMERE simulation over Mexico will be presented.