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Improving aerosol prediction with data assimilation

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Prediction of aerosols at the surface is especially challenging because of their large spatial and temporal variability. These variability derives from the dependence aerosols on source emissions, state of the boundary layer and also chemical parameterizations, all known to be burdened with large errors. We summarize our experience in predicting aerosols over North America using 3d-Var and EnKF assimilation methodologies. We also shortly address impacts of improved aerosols on meteorology.