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Cross Track Infrared Sounder (CrIS) satellite observations of ammonia: Updates with initial application examples

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The spatial coverage provided by current satellites provides the opportunity to enhance our knowledge of atmospheric deposition through the fusion of the satellite observations with ground-based observations and air quality models. Presented is a brief update of the recent Cross-Track Infrared Sounder (CrIS) satellite observations of ammonia (NH3) and their initial evaluation against available ground-based observations. Also provided are initial examples of applications using the CrIS NH3 observations. These applications include air quality model evaluation, deriving emission estimates from point sources and wildfires, and atmospheric dry deposition estimates of reactive nitrogen from ammonia and nitrogen dioxide using a combination of CrIS and Ozone Monitoring Instrument (OMI). Some key findings show that emissions from large forest fires can be significant compared to annual anthropogenic emissions over a region (e.g. Fort McMurray wildfires accounted for $\sim$20% of the Alberta, Canada provincial anthropogenic emissions), and that satellite estimates of NH3 and NO_2 dry deposition indicate that the NH3 dominates over most regions across the North America, especially during the warm season.