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 ~20% of the Alberta, Canada provincial anthropogenic emissions), and that satellite estimates of NH₃ and NO₂ dry deposition indicate that the NH₃ dominates over most regions across the North America, especially during the warm season.