



First simultaneous space measurements of atmospheric pollutants in the boundary layer from IASI: a case study in the North China Plain

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An extremely severe and persistent smog episode occurred in January 2013 over China. The levels of air pollution have been dangerously high, reaching 40 times recommended safety levels and have affected health of millions of people. China faced one of the worst periods of air quality in recent history and drew worldwide attention. This pollution episode was caused by the combination of anthropogenic emissions and stable meteorological conditions (absence of wind and temperature inversion) that trapped pollutants in the boundary layer. To characterize this episode, we used the IASI (Infrared Atmospheric Sounding Interferometer) instrument onboard the MetOp-A platform. IASI observations show high concentrations of key trace gases such as carbon monoxide (CO), sulfur dioxide (SO₂) and ammonia (NH₃) along with ammonium sulfate aerosol. We show that IASI is able to detect boundary layer pollution in case of large negative thermal contrast combined with high levels of pollution. Our findings demonstrate the ability of thermal infrared instrument such as IASI to monitor boundary layer pollutants, which can support air quality evaluation and management.