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Ammonia concentrations at Baikal region and Russian Far East from satellite and near-surface measurements

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Ammonia (NH3) is an important component of nitrogen emissions to the atmosphere. Primarily it is emitted from agriculture and biomass burning. Concentrations of NH3 near the surface are highly variable in space and time.
Baikal region and Russian Far East are the territories influenced by transboundary pollution and forest fires. Several stations of Acid Deposition Monitoring Network in East Asia are located in these regions and perform regular and continuous monitoring of acidifying components in atmosphere including ammonia. The measurements provide high reliable dataset of two weekly average NH3 concentrations at the stations since 2000.
However since NH3 amount in atmosphere is highly variable in time and space local point measurements are not enough for detailed understanding of the situation in the region of interest. For large spatial coverage satellite data may be used.
To assess near-surface ammonia concentrations at Baikal region and Russian Far East we use NH3 total amount retrieved from IASI/MetOp-A measurements since 2008. Concentrations near the surface were recalculated from the total amount using apriori profiles provided in the satellite product.
Comparison of satellite and near-surface measurements shows good agreement for monthly mean values and proved that satellite data may be used for regional air pollution monitoring and seasonal changes assessment. Local features while comparison were taken into account in order to interpret satellite data in the correct way.
The character values of ammonia amount in plumes of smoke were assessed by considering of ammonia amount from satellite data above certain forest fires in the region of interest. Using of statistics of satellite data allowed us to find regions and periods where concentrations highly exceeded mean values. It was shown that such values may be caused by fires in the region or by transboundary air pollution. Those two causes of high amount of NH3 in atmosphere were separated.
Clear seasonal changes with maximum in summer months are observed both from satellite and ground-based measurements in the region.
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