Chemical composition of aerosol precursors in the Finnish subarctic

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SMEAR I-station

• Värriö Subarctic Research Station
  • located about 120 km north from the Arctic Circle
  • surrounded by a strict nature reserve of 125 km².

• Features for atmospheric research
  • Clean air masses from the Arctic
  • Boreal forest (on the edge)
  • Pollution from Kola Peninsula
  • Midnight sun / polar night

• Measurements of aerosol precursors
  • 4 April – 27 October 2019
  • Nitrate ion CI-APi-ToF
Importance

Transport from the Arctic Ocean (preindustrial)
Pollution from Kola Peninsula (industrial)
Emissions from different ecosystems
Sulfuric acid and iodic acid are abundant in the spring. MSA and HOMs reach their maximum concentration in June. All studied compound have a clear diurnal cycle reflecting the importance of solar irradiation to the formation of precursor gases.
New particle formation events (NPF)

During the 7 months of measurements, we recorded 33 NPF event days (type Ia, Ib and II) and 75 non-event days. An average number size distribution recorder is shown up here.
NPF at the SMEAR I is connected to steep increasing temperature in the morning, higher solar irradiation, ozone, SA, MSA and IA concentrations and lower RH than in non-NPF days. Role of HOMs in NPF needs to be investigated in details.