

Chemical composition of aerosol precursors in the Finnish subarctic

Tuija Jokinen

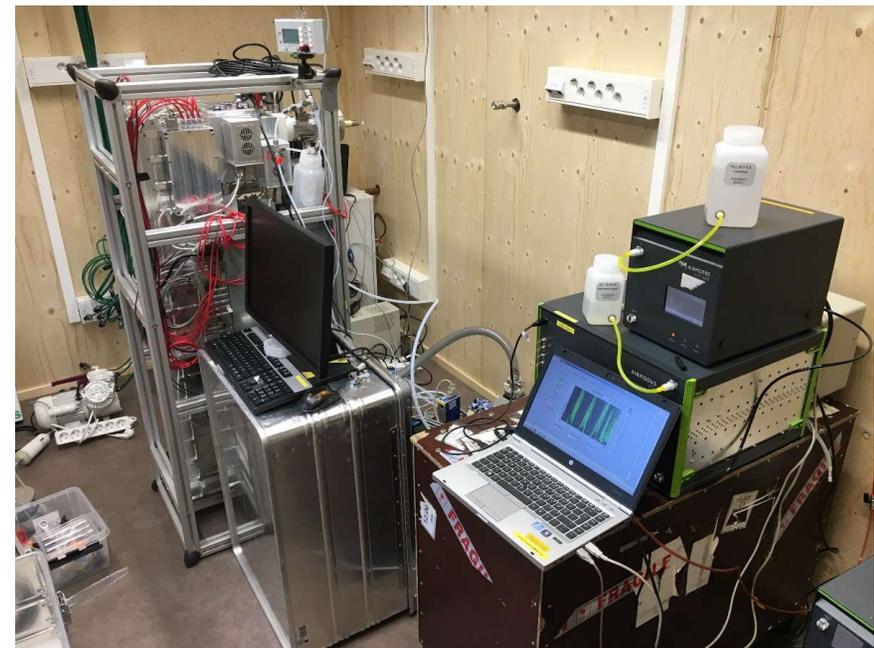
Institute for Atmospheric and Earth System Research (INAR)

University of Helsinki

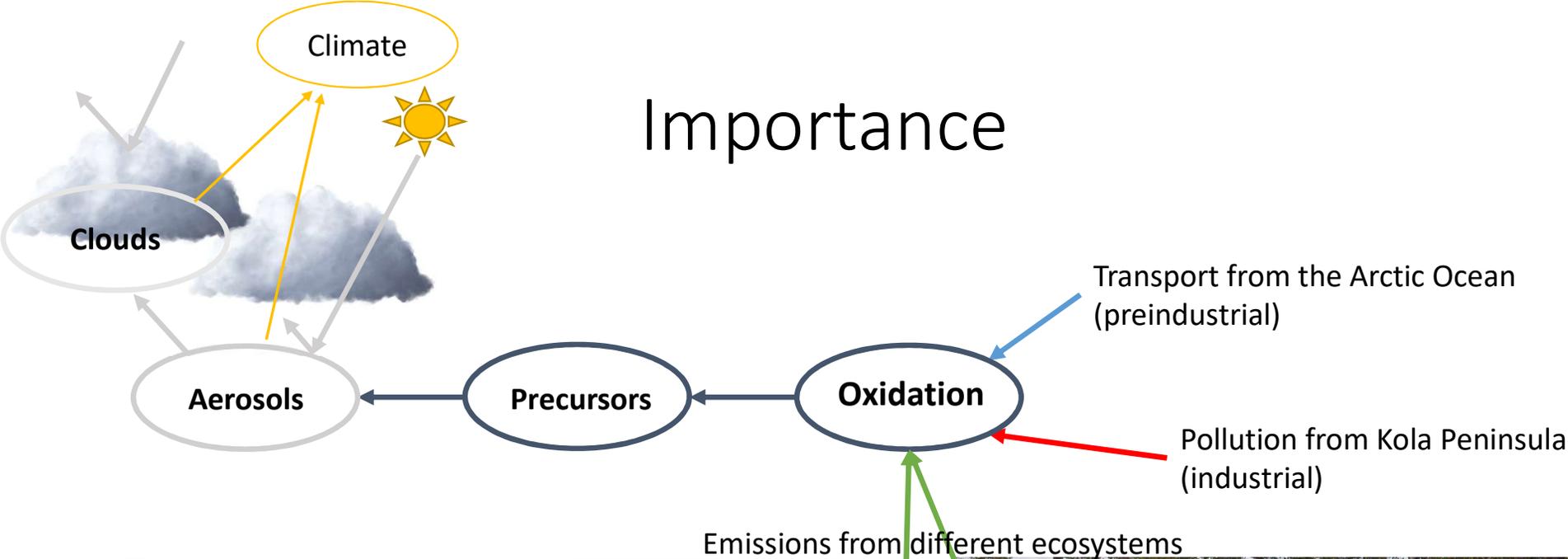
EGU General Assembly 2021, 27.4.2021

SMEAR I-station

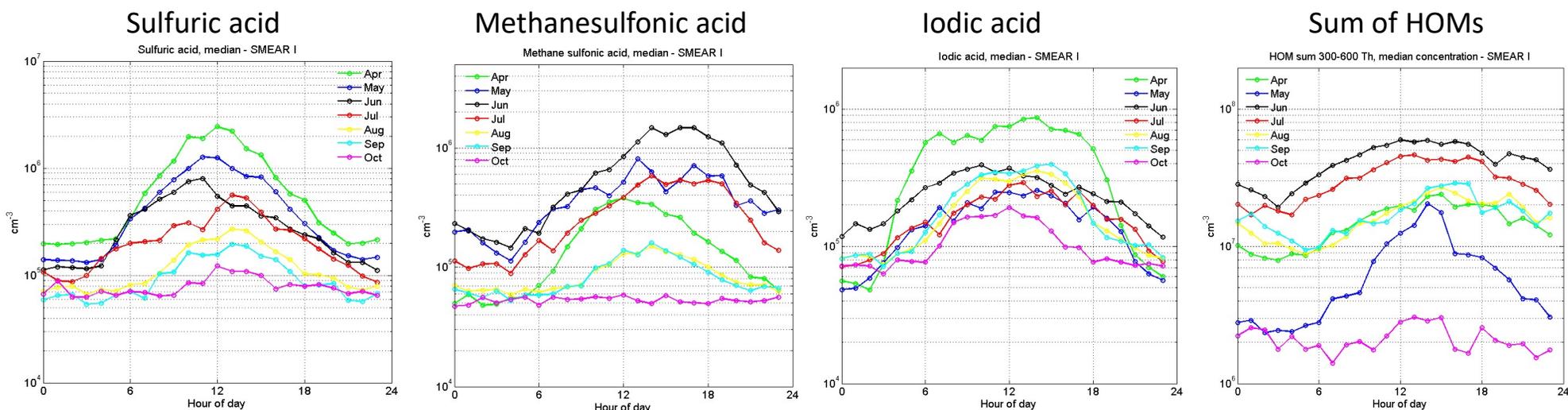
- Värriö Subarctic Research Station
 - located about 120 km north from the Arctic Circle
 - surrounded by a strict nature reserve of 125 km².
- Features for atmospheric research
 - Clean air masses from the Arctic
 - Boreal forest (on the edge)
 - Pollution from Kola Peninsula
 - Midnight sun / polar night
- Measurements of aerosol precursors
 - 4 April – 27 October 2019
 - Nitrate ion Cl-API-ToF



Importance

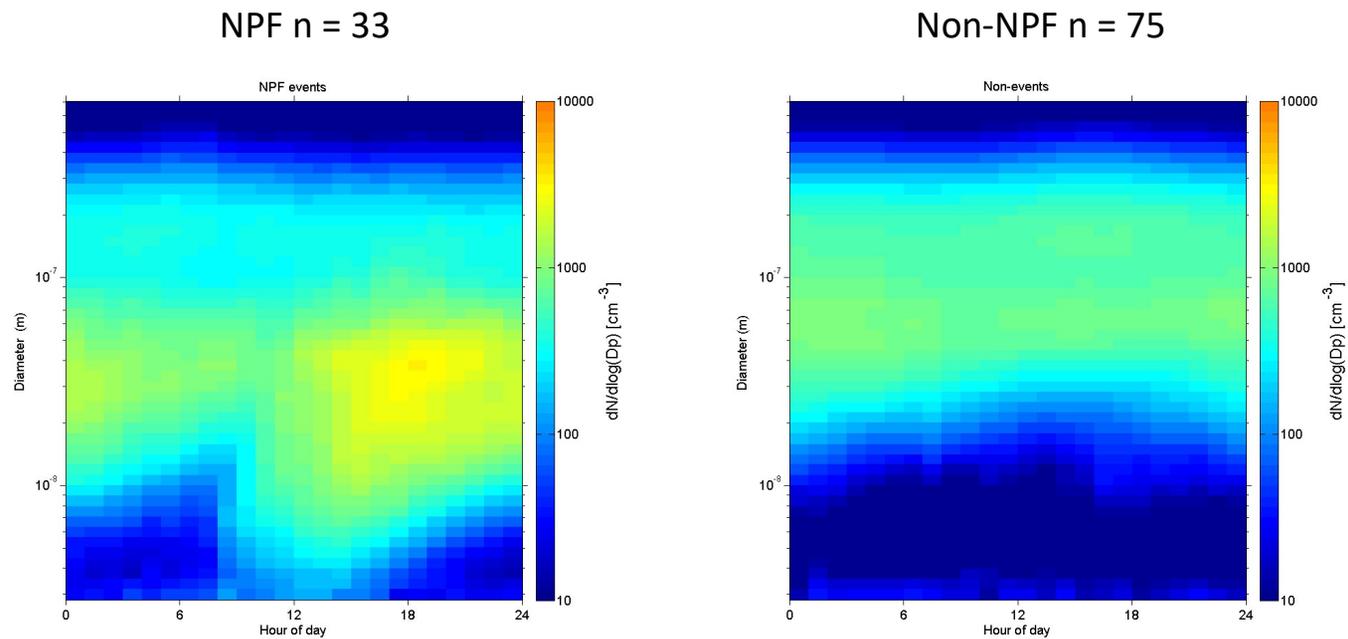


Monthly median concentrations of precursors



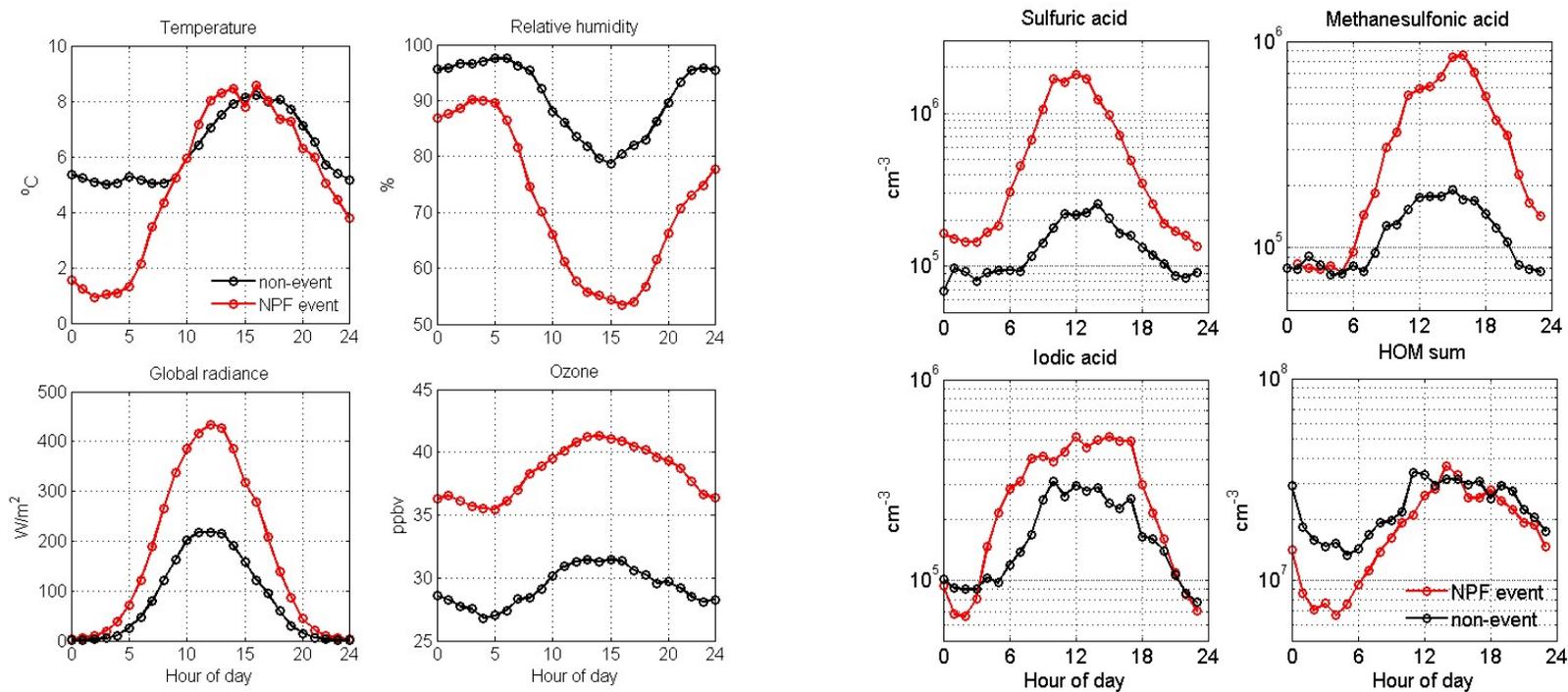
Sulfuric acid and iodic acid are abundant in the spring. MSA and HOMs reach their maximum concentration in June. All studied compound have a clear diurnal cycle reflecting the importance of solar irradiation to the formation of precursor gases.

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 (red) vs non-NPF days (black)



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.