



Fonovaya Observatory for comprehensive atmospheric monitoring in West Siberia: current status and future needs

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To date, it is evident that for the better understanding of the current and future climate change, it is needed to establish as much stations as possible to carry out comprehensive observations all around the world (Kulmala, 2018). Russia occupies a significant part of the land surface area of the Northern Hemisphere (NH), but its observational infrastructure in this field is still too weak.

During recent decades, some progress was reached in developing atmospheric observations in Russia. In particular, in the early 2000s a network for greenhouse gas monitoring (JR-STATION, Japan-Russia Siberian Tall Tower Inland Observation Network; Sasakawa et. al, 2010) was established in Siberia under international collaboration between V.E. Zuev Institute of Atmospheric Optics SB RAS (IAO SB RAS) and National Institute for Environmental Studies (NIES, Japan).

Taking into account possible climate feedback mechanisms, undertaking continuous measurements of GHG only is not enough, and many other trace gases and aerosols should be measured simultaneously in the same place. According to the review made by Markku Kulmala (2018), only two Russian stations have recently begun to extend a nomenclature of measured parameters to meet future needs: the Zotino Tall Tower Observatory (ZOTTO) and the Tiksi Hydrometeorological Observatory. The first is located in the west of East Siberia, and a second one on the coast of the Arctic Ocean. Both stations were built under international collaboration between Russian, European and US institutions.

Fonovaya Observatory located 60 km west of Tomsk (West Siberia) was established by IAO SB RAS in 2009 and initially monitored CO₂ and O₃ only. Later, continuous aerosol measurements have been added. During recent years, its instrumentation was significantly upgraded by combined efforts of IAO, LSCE and NIES. At the moment, its observational facilities allow the following parameters to be measured: concentration of atmospheric CO₂, CH₄, NO, NO₂, SO₂, O₃; GHG fluxes from soil using static chambers; aerosol size distribution; and basic meteorological variables. Despite the progress done, a further development of the Fonovaya Observatory is still needed that can be later used as a basis for the future improvements on the existing JR-STATION network in order to extend comprehensive observations in West Siberia.

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Markku Kulmala. Build a global Earth observatory. *Nature*, 2018; 553 (7686): 21 DOI: 10.1038/d41586-017-08967-y

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