

Monitoring, modeling and assessment of potential sources, dynamics and atmospheric transport for low and elevated mercury concentrations in Arctic regions



Fidel Pankratov, Institute of Northern Environmental Problem, Kola Science Centre of the Russian Academy of Sciences (INEP KSC RAS)

fidel_ru@mail.ru

Moscow, 23.04.2018

iCUPE Collaborators Datasets

DS on atmospheric mercury measurements at Amderma station

Document version number: 1

The development of a model for the dynamics of mercury (Hg) in the surface layer of the atmosphere is logical extension of the long-term monitoring of Hg in Russian Arctic. The Hg input from the southern and middle latitudes into the Arctic will be assessed using long-term high-resolution data (concentrations of elemental Hg in the atmosphere with a resolution of 1 h from 2001 to present as well as meteorological parameters (temperature, wind direction, humidity) with a resolution of 3 h). Model of the global Hg transport in atmosphere of the Northern hemisphere and especially in the Arctic atmosphere will also be tested. These data will be used to calculate the deposition rates of Hg to the underlying tundra surface, and uptake of the organic forms of Hg through biological chains will be assessed subsequently. At the polar station Amderma the phenomenon of the atmospheric mercury depletion events (AMDEs) was confirmed using the long-term monitoring data. The unique experiment when the atmospheric mercury collection point during the long-term monitoring was consequently moved from the mainland to the coast line of the Kara Sea fixed the increasing number of the AMDEs. The results obtained will be helpful in better understanding of mercury behavior in the Arctic region. The obtained long-term monitoring data at the Amderma station are compared with the results of measurements made at other international Polar Stations. High convergence of the results is shown for all polar stations.

The volcanic eruptions in Iceland are identified as the cause of the unusually high atmospheric mercury concentrations in the background layer at the Amderma Station. These data can be used to identify and evaluate local anthropogenic and natural sources that affect Arctic pollution.

The support was provided by the following projects: AMAP Assessment: Mercury in the Arctic - Arctic Monitoring and Assessment Programme (2001 – 2017)

References

- Pankratov F.F., Mahura A., Korpusova J.V., Katz O.V. Dynamics of atmospheric mercury in the Russian Arctic depending on the measurement position versus coastline. // Extended abstract and Poster, Atmospheric Sciences, The 1st Pan-Eurasian Experiment (PEEX) Science Conference & The 5th PEEX Meeting Helsinki, Finland 10-13 February 2015; <http://www.atm.helsinki.fi/FAAR/reportseries/rs-163.pdf>, (pp. 324 - 329).*
- Pankratov F., Mahura A., Popov V., Katz O. Long-term continuous monitoring of mercury in the Russian arctic: winter increase of atmospheric mercury depletion events. // Synopsis and Poster, Atmospheric Sciences, Pan Eurasian Experiment (PEEX). European Geosciences Union, General Assembly 2014. April 27 – 02 May, 2014, Vienna, Austria: Abstract. <http://meetingorganizer.copernicus.org/EGU2014/posters/15039>*
- Pankratov F. Dynamic of atmospheric mercury in the Russian Arctic. Thesis, November 2015, DOI: 10.13140/RG.2.1.4255.1767.1*