



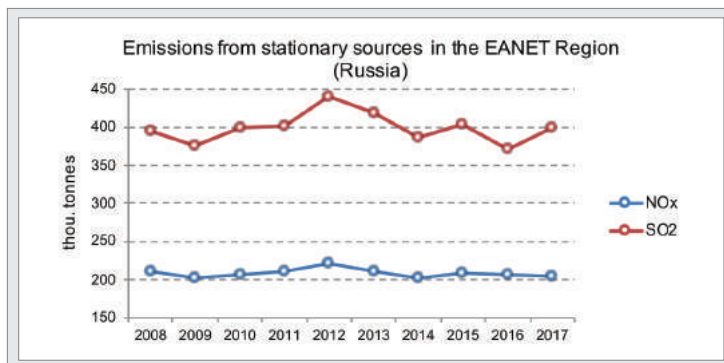
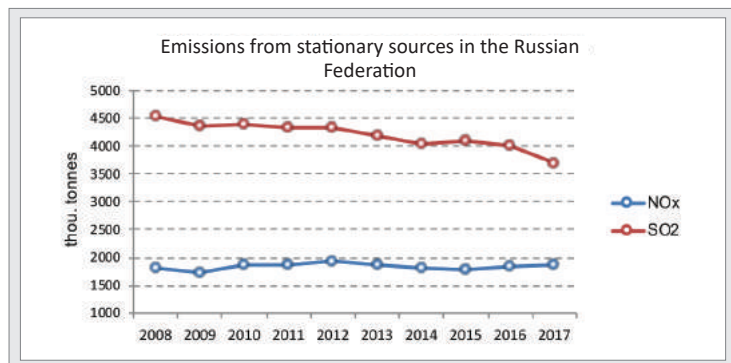
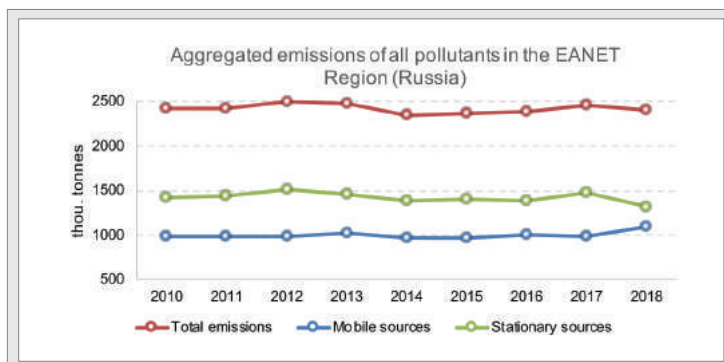
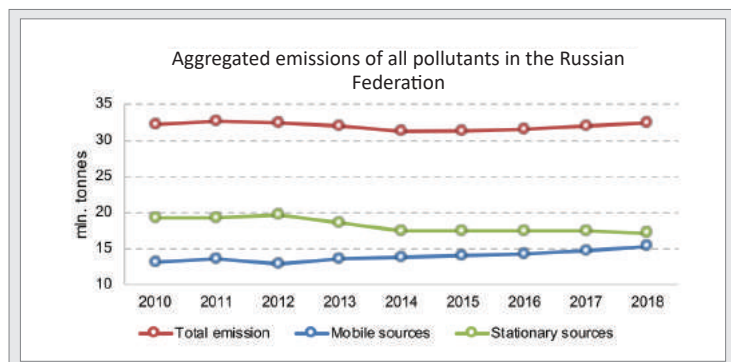
RUSSIAN FEDERATION

Policies and Practices Concerning Acid Deposition

1. CURRENT SITUATION AND PROGRESS

General Evaluation

As per World Bank Report, in the Russian Federation over the period 2010-2017 the yearly average level of PM_{2.5} decreased from 19.5 to 16.2 $\mu\text{g}/\text{m}^3$, which was about 1.5 times higher than the WHO guideline of 10 $\mu\text{g}/\text{m}^3$ but lower than the Maximum Permissible Concentration (MPC) in Russia. Federal State Statistics Service of the Russian Federation reported the decrease in total annual emissions of SO₂ from stationary sources by 12% for the period 2013-2017 but in the EANET region the SO₂ emissions have slightly fluctuated from year to year and, in general, remained fairly stable. According to the monitoring data, the average annual concentrations of SO₂ in urban and industrial centers decreased by 7% for the last 5 years. However, in the EANET region we observe a rise in SO₂ air concentrations and sulfate in precipitation both at urban and rural sites. The concentrations of sulfur oxides were lower in the mid-summer and higher during the winter period. Federal Service for Hydrometeorology and Environmental Monitoring in Russia (Roshydromet) evaluates urban air quality based on monitoring data with a set of several parameters. The main of them is an integrated Index of Atmospheric Pollution (IAP) calculated as a combination of average annual concentrations of priority pollutants. It reflects the degree of chronic long-term air pollution. Cities are annually graded and ranked with IAP. In 2017, Roshydromet reported that about 13.5 million people in 44 cities (or 12 percent of the Russian urban population) are exposed to high levels of ambient air pollution.



Main Pollution Sources and Trends

From 2012 in the Russian Federation the ratio between industrial and mobile emissions has changed from 60/40 to 52/48 (in %). However, in major cities the contribution of mobile sources in total emissions might exceed 80%. In the EANET region the annual total emissions have been around at the same level over the past years; the industrial emissions have been higher than mobile ones and annually evaluated at about 60%.

Participation in EANET

The Russian Federation has been participating in EANET since 1998. The following is an institutional arrangement for the implementation of the EANET activities in the Russian Federation:

- National Focal Point: Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet, Environmental Pollution Monitoring Department) and Yu. A. Izrael Institute of Global Climate and Ecology (IGCE)
- Scientific Advisory Committee Members: Yu. A. Izrael Institute of Global Climate and Ecology (IGCE)
- National QA/QC Manager: Regional Headquarter of Academy of Sciences for Limnological Institute
- National Data Center: Regional Headquarter of Academy of Sciences for Limnological Institute
- National Center of the EANET activities: Institute of Global Climate and Ecology, Yu. A. Izrael Institute of Global Climate and Ecology (IGCE)

2. SITE INFORMATION

EANET monitoring stations were established in the south-eastern parts of the East-Asian part of Russia, including the Far East region. Besides measuring atmospheric deposition of airborne pollutants there is a monitoring of soil and vegetation, and the inland aquatic environment at EANET sites.

Monitoring Sites	Site Classification	Location			Parameters Measured			
		Latitude	Longitude	Altitude (m)	Wet Dep.	Dry Dep.	Soil & Veg.	Inland water
Mondy	Remote	51°40'N	101°00'E	2005	✓	✓	✓	
Listvyanka (Pereemnaya River)	Rural	51°51'N	104°54'E	700	✓	✓	✓	✓
Irkutsk	Urban	52°14'N	104°15'E	400	✓	✓	✓	
Primorskaya (Komarovka River)	Rural	43°42'N	132°07'E	84	✓	✓	✓	✓



Monitoring Parameters

Monitoring Type	Parameters	Frequency
Wet Deposition	pH, EC, Na ⁺ , K ⁺ , Mg ²⁺ , Ca ²⁺ , NH ₄ ⁺ , HCO ₃ ⁻ , Cl ⁻ , SO ₄ ²⁻ , NO ₃ ⁻ , NO ₂ ⁻ , Br ⁻ , F ⁻ , PO ₄ ³⁻ , Si ⁻ (optional)	Daily
Dry Deposition	SO ₂ , HNO ₃ , HCl, NH ₃ , passive ozone, components in PM	Weekly/Bi-weekly
Soil & Vegetation	pH (H ₂ O), pH (KCl), exchangeable (Na ⁺ , K ⁺ , Mg ²⁺ , Ca ²⁺ , Al ³⁺ , H ⁺) exchangeable acidity, ECEC, Carbonate, T-C, T-N, observation of tree decline, description of trees	3 - 5 years
Inland aquatic environment	T°C water, pH, EC, alkalinity, Na ⁺ , K ⁺ , Mg ²⁺ , Ca ²⁺ , NH ₄ ⁺ , HCO ₃ ⁻ , Cl ⁻ , SO ₄ ²⁻ , NO ₃ ⁻ , NO ₂ ⁻ , PO ₄ ³⁻ , Ptotal, Si, O ₂ , Fe, water color, transparency, DOC	4 - 5 times per year



Within the EANET region there is a part of Russian national acid deposition monitoring network with regional and remote sites to measure precipitation chemistry and acidity (including WMO-GAW regional stations). Air pollutant concentrations are monitored in urban sites only, however the total depositions through cold season (both from air and by precipitation) are evaluated from the measurements of national snow cover chemistry network.

National Ambient Air Quality Standards (NAAQS) vs. WHO Guidelines

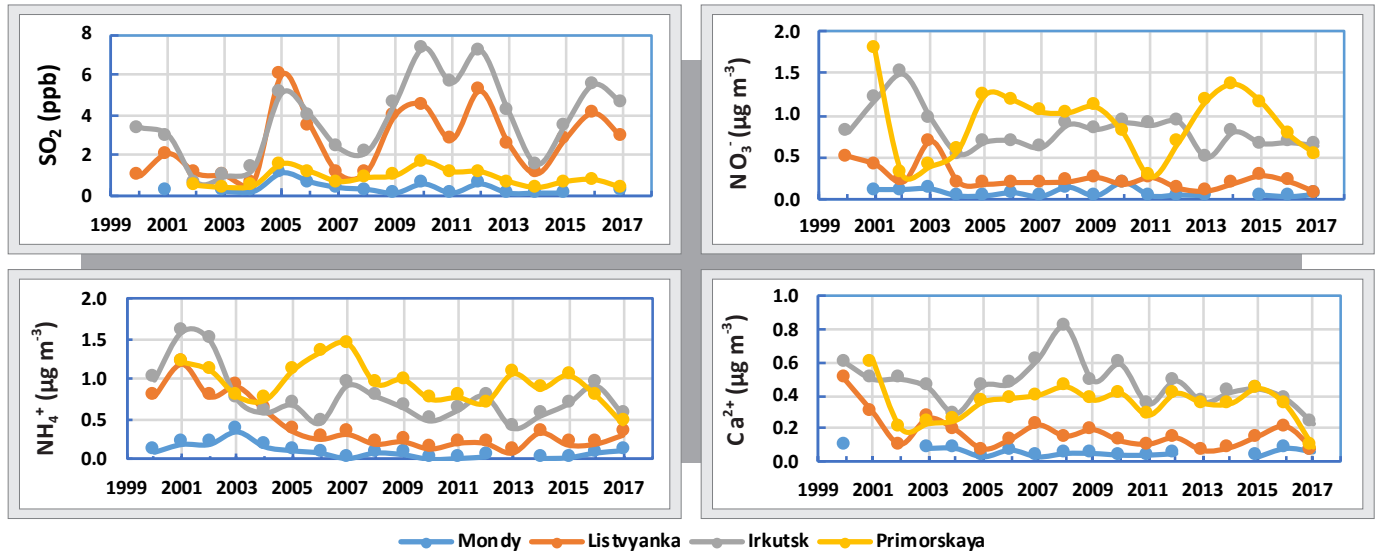
Air Pollutants	MPC / WHO (µg/m ³)	
	24-hr	Maximum
PM ₁₀	60 / 50	300 / -
PM _{2.5}	35 / 25	160 / -
SO ₂	50 / 20	500 / -
NO ₂	40 / 40	200 / 200
O ₃	30 / 100 (8 hrs)	160 / -



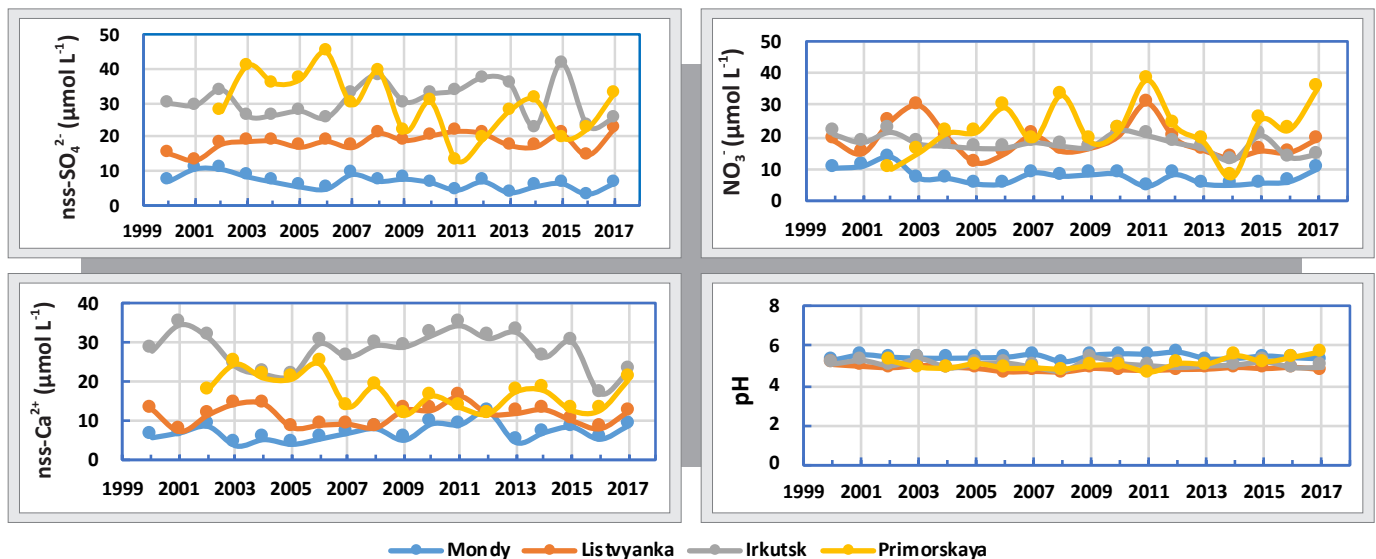
3. HIGHLIGHTS OF MONITORING RESULTS

The following figures demonstrate the time-series trends of annual averages of important acid deposition parameters in the air, precipitation and inland aquatic (rivers) at Russian EANET sites. There were year-to-year fluctuations of airborne sulfur and nitrogen oxides while NH_4^+ and Ca^{2+} shown a decreasing pattern. pH values of precipitation are kept as slightly acidic near the equilibrium natural pH level. In the surface waters the pH is mostly neutral; however, dissolved nitrates demonstrated increasing patterns at Russian Far East.

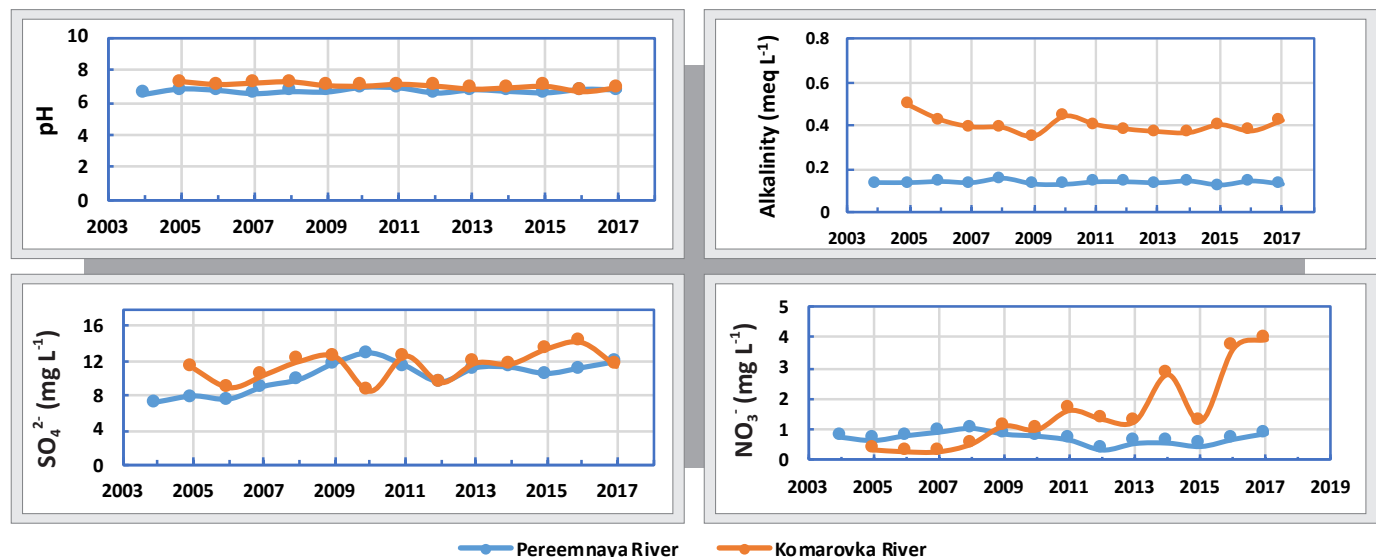
Dry Deposition



Wet Deposition



Inland Water



4. AWARENESS ACTIVITIES, RELEVANT POLICIES AND FUTURE PLAN

- National capacity building and training activities include the series of training courses on monitoring methodology, important technical aspects of data report preparation, data quality control, and improving performance in environmental sample analysis.
- A special course on environmental protection was offered for local university students; it included scientific information and outcomes on acid deposition and its effects on the environment. The ecological school continues its class courses in the Baikal nature museum, including special lectures on acid deposition.
- A brochure "Acid precipitation" was developed as popular scientific publication for public awareness and education. The new Report for Policy Makers is also considered for delivering scientific knowledge to decision-makers and public with possible translation to Russian.
- Regular analysis and generalization of EANET monitoring results, their interpretation, and evaluation of the state of the environment pollution are published annually in the "Yearbook on the state of the environmental pollution in the Russian Federation" by Roshydromet and IGCE.

Policies and Practices Concerning Air Pollution

- The Russian constitution includes the article declaring "everyone shall have the right to a favorable environment, reliable information about its state and restitution for damage inflicted on health and property from ecological transgressions". It is also a base of civil rights to obtain real information on the environmental changes, their causes and consequences.
- Federal laws have been passed for expanding earlier legislation and introducing emission limits, including establishing national air quality standards that are used to set limits for hazardous emissions in industrial and residential areas.
- The national energy strategy adopted in 2009 aimed at a 40 percent increase in the energy efficiency of transport by 2030. New national built and imported vehicles have to be correspondent to Euro 5 standards from 2014, while other imported ones are the subject to an age-based taxation system.
- In 2012, the president approved the principles of state policy in the area of environmental protection development up to 2030. The federal national-wide integrated projects, namely "Ecology: Clean Air" and "Ecology: Implementation of Best Available Technologies" were started in 2018 with acting programs at the regional levels.
- The Government of Russia put also the set of several targets related to air quality to be achieved by 2020, including a 75 percent drop in anthropogenic emissions of 1990 levels, a decreasing the number of cities with high or very high pollutant levels, and to improve air quality for 75 percent of inhabitants being exposed to harmful environmental conditions compared to 2007.

EANET Activities and Future Plan

- Regular monitoring of EANET parameters on the dry deposition, wet deposition, and inland water are conducted at designated monitoring sites with a publication at the national level.
- Participation in the EANET QA/QC activities including inter-laboratory comparison projects, particularly, on Wet Deposition, on Soil properties, and on Inland Aquatic Environment.
- Conducting inter-laboratory comparisons internationally within WMO, EMEP, and national ROSA (Moscow), MGO (St. Petersburg).
- Annual inspecting the performance of national network with visits to monitoring sites, providing necessary maintenance and calibration of equipment.
- Scientific and technological research involving satellite remote observation into the scope of EANET data and assessments.

National Focal Point

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