

Monitoring at Norwegian-Russian cross-border territories (new data April 2010 - March 2011)

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The Norwegian-Russian seminar:

Interaction between governmental structures, business, academia and civil society – an instrument for improving environmental safety in the region

26.-27. October 2011



Outline

- **Norwegian monitoring program; Svanvik, Karpdalen, Viksjøfjell, Karpbukt**
- **Results from April 2010 – March 2011**
- **Model development**
- **Emissions**



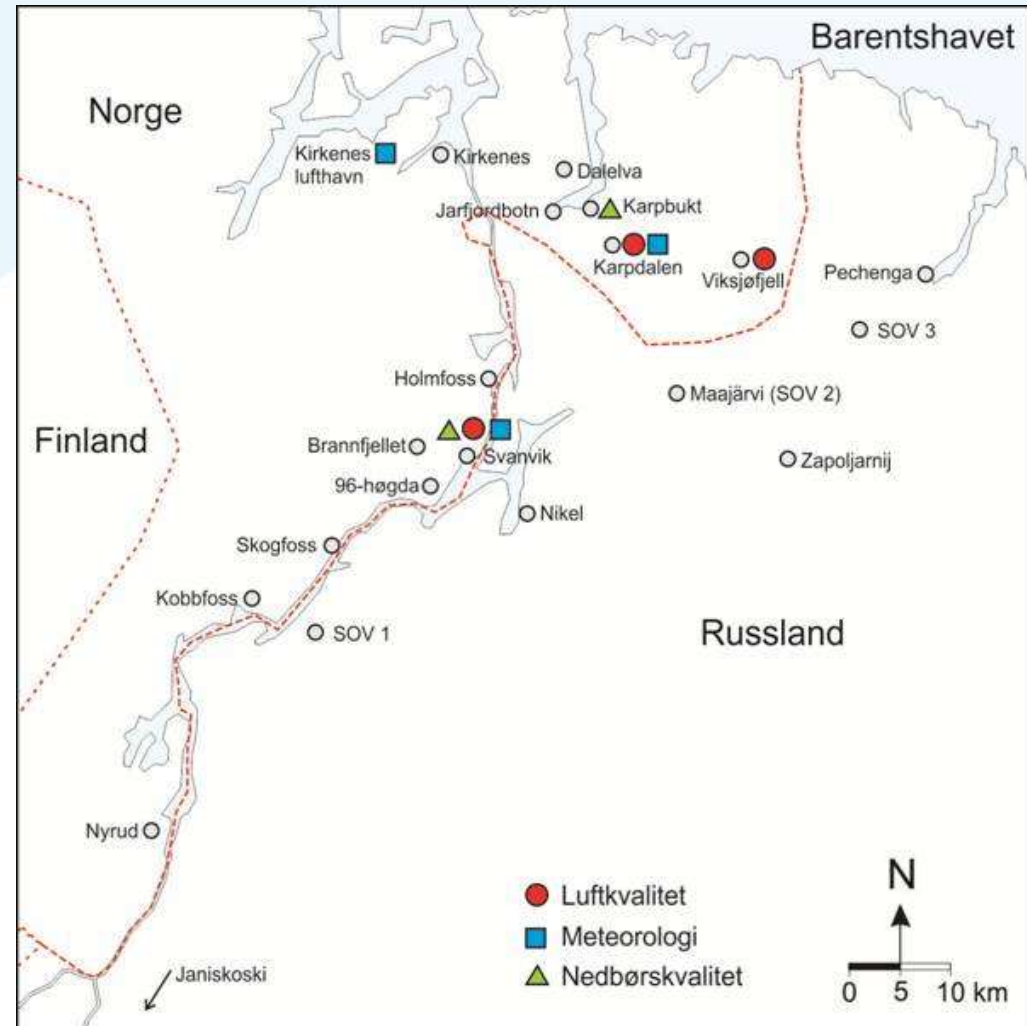
Photo: Hildur Eikås,
Sør-Varanger library

Norwegian monitoring program



**KLIMA- OG
FORURENSNINGS-
DIREKTORATET**

MILJØVERNDEPARTEMENTET



Svanvik (Сванвик)



- SO₂ monitor
- Heavy metals in air/particles
- Heavy metals in precipitation
- Meteorology
- Results on www.luftkvalitet.info
- In collaboration with Bioforsk Soil and Environment

Karpdalen (Карпдален)

- SO₂ monitor
- Meteorology
- Heavy metals in air/particles from autumn 2011
- Results on www.luftkvalitet.info
- In collaboration with Leif Vonka



Norwegian threshold values

- SO₂ hourly mean: 350 µg/m³ (24 exceedances per year)
- SO₂ daily mean: 125 µg/m³ (3 exceedances per year)
- SO₂ seasonal mean/annual mean: 20 µg/m³

Важные ключевые показатели SO₂ из измерений 1 апреля 2010 г.-31 марта 2011г

Параметр	Сванвик	Карпдален
Наивысший 10-минутный показатель $\mu\text{г}/\text{м}^3$	620	917
Наивысший среднечасовой показатель $\mu\text{г}/\text{м}^3$	433	854
Количество среднечасовых показателей $>350 \mu\text{г}/\text{м}^3$ летом	6	4
Количество среднечасовых показателей $>350 \mu\text{г}/\text{м}^3$ зимой	0	102
Наивысший среднесуточный показатель летом $\mu\text{г}/\text{м}^3$	156	94,9
Наивысший среднесуточный показатель зимой $\mu\text{г}/\text{м}^3$	96	507
Количество среднесуточных показателей $> 125 \mu\text{г}/\text{м}^3$	1	15
Количество среднесуточных показателей $> 90 \mu\text{г}/\text{м}^3$	6	20
Средний показатель лета $\mu\text{г}/\text{м}^3$	7,4	9,4
Средний показатель зимы $\mu\text{г}/\text{м}^3$	8,5	39,1

Viksjøfjell (Викшёфьелл)

- SO₂ passive samplers (exposed 2 weeks)
- Average concentration winter 2010/2011 30 µg/m³

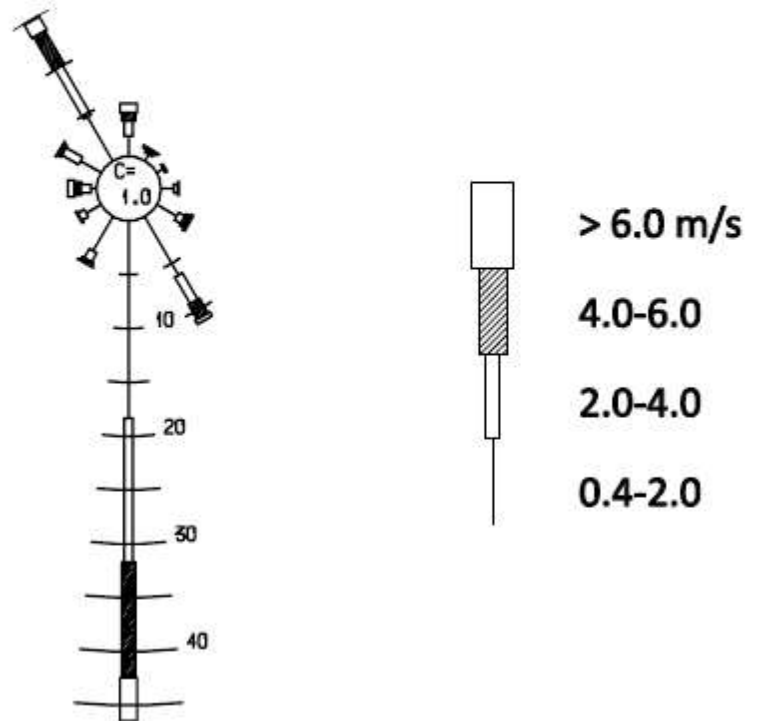


View from Viksjøfjell southwards. One can see the flue gas from stack in Zapoljarnij. Photo: Christoffer Aalerud, County governor of Finnmark

Meteorology

- Karpdalen (Карпдален)
- Prevailing wind direction from south during winter (2/3 of the time)

Stasjon: Karpdalen
Periode: 1.10.10 - 31.3.11
Vinter



Heavy metals

- Svanvik (СВАНВИК)
- Ni, As, Cu and Co trace metals from smelter activity
- Increased levels in precipitation from 2004

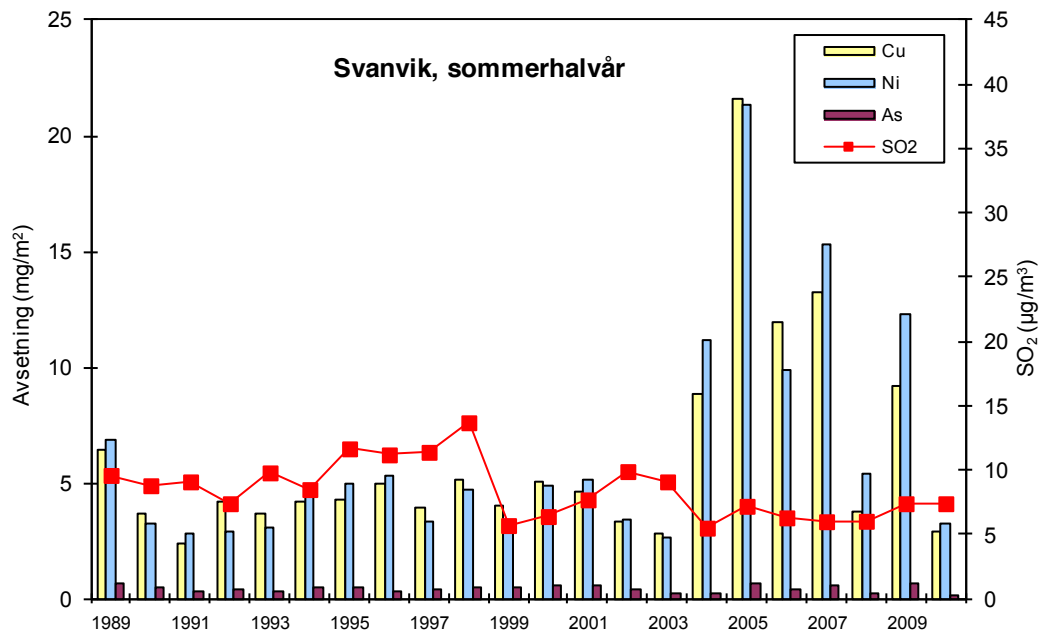
Max daily values in
air 2010/2011:

Ni: 66,90 ng/m³

As: 25,25 ng/m³

Cu: 37,31 ng/m³

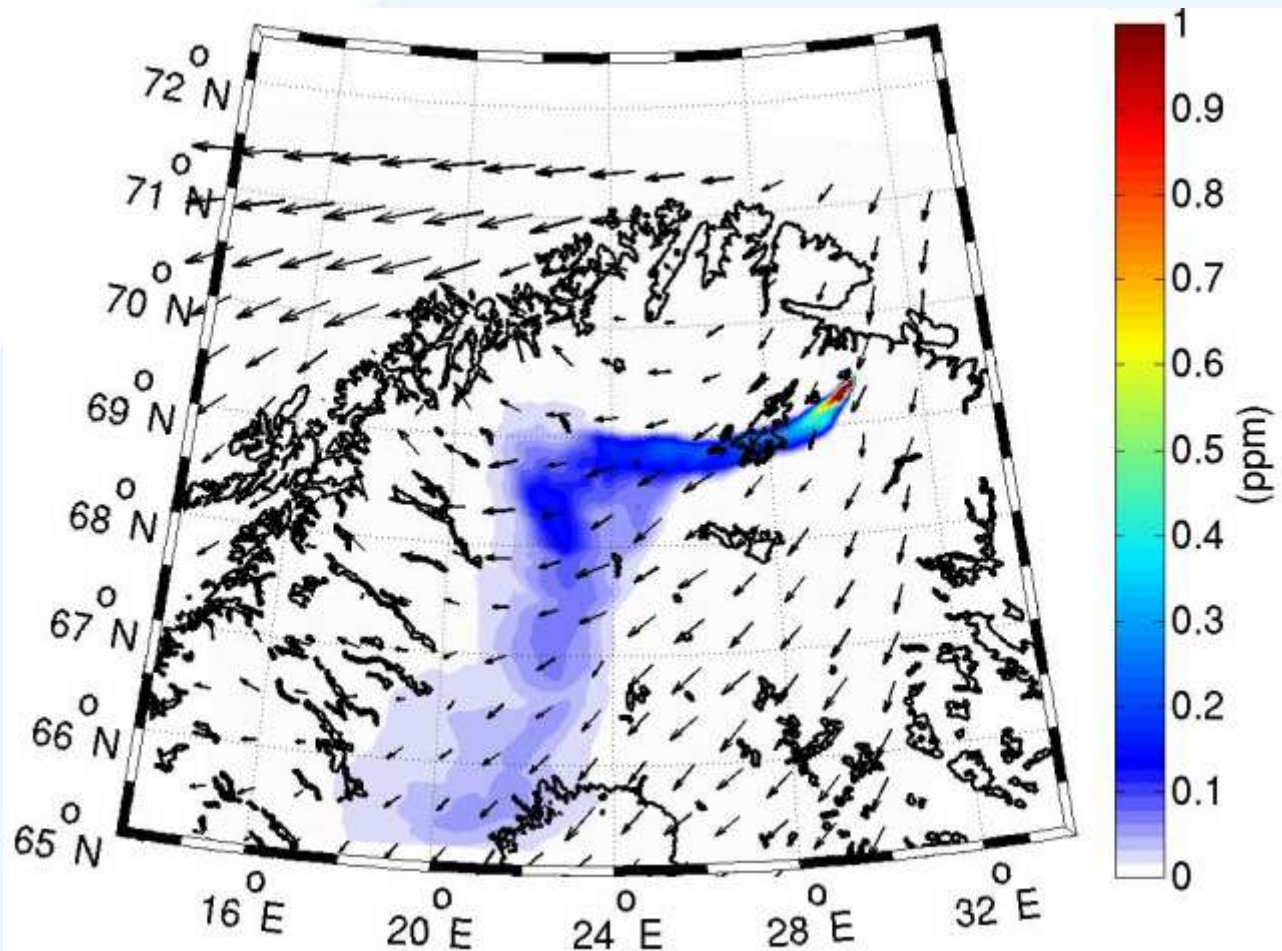
Co: 2,16 ng/m³



Deposition of heavy metals at Svanvik, summer season

Model development

- WRF-Chem (NILU and University of Oslo)



6th July 2007 at 00h

Model development

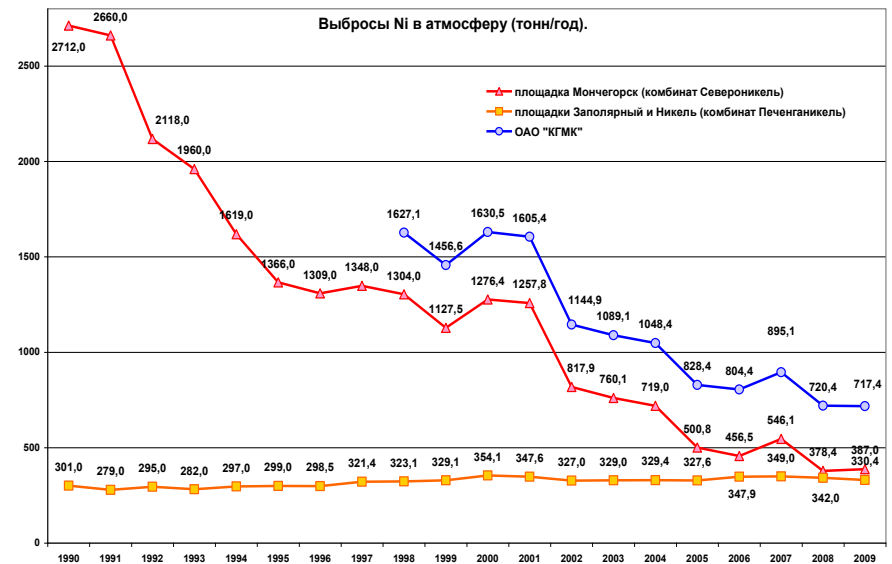
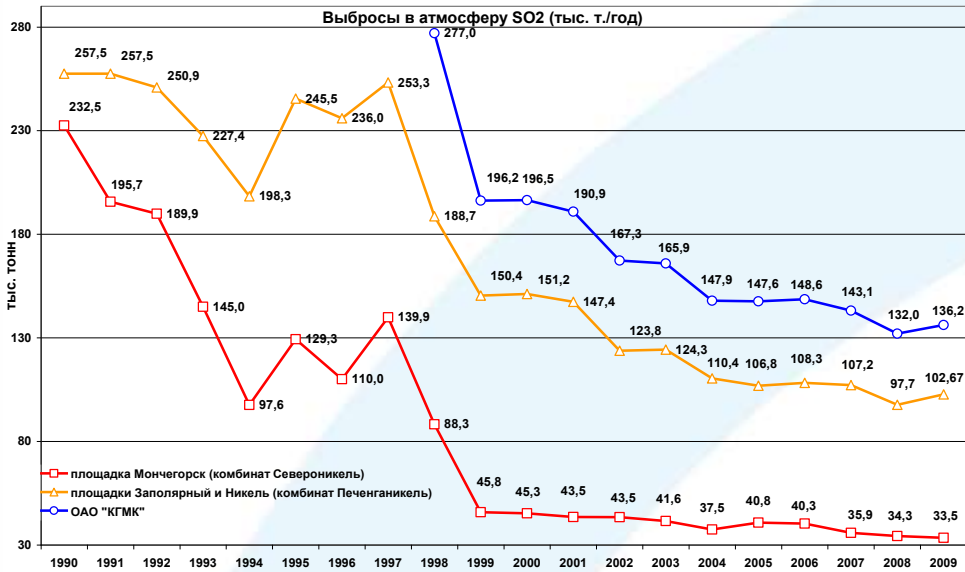
NILU and University of Oslo are working on development of WRF-Chem atmospheric-chemistry model to investigate dispersion and deposition from Nikel and Zapoljarnij

http://folk.uio.no/torefl/WRF-Chem/Domene3_SO2-SO4_delay10.gif

http://folk.uio.no/torefl/WRF-Chem/Domene2_SO2-SO4_delay10.gif

http://folk.uio.no/torefl/WRF-Chem/Domene1_SO2-SO4_delay10.gif

Emissions

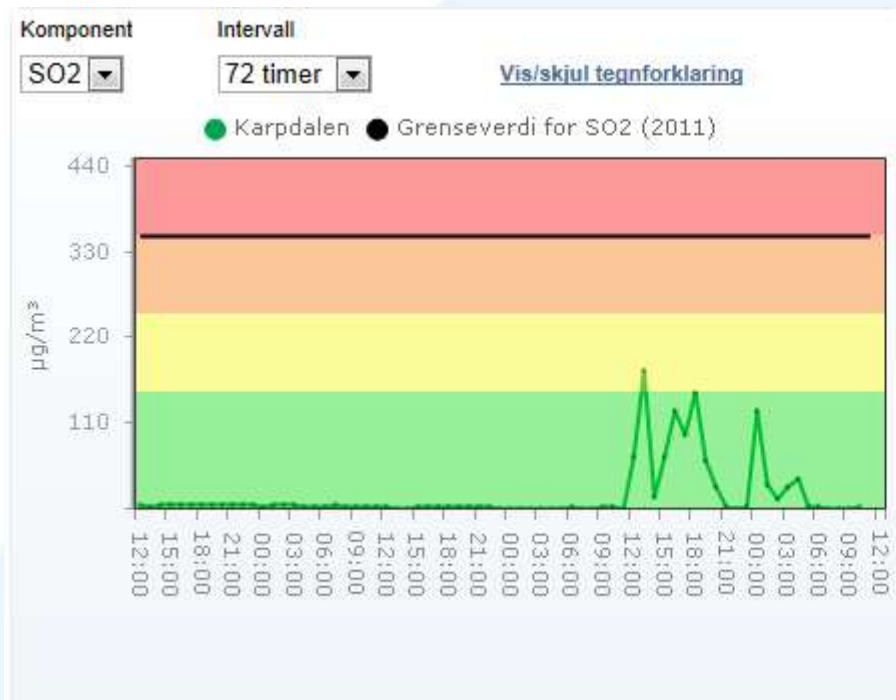


From Kola MMC. Thanks to Bellona for sending the numbers

Diffusive emissions: Smelter and city of Nikel 19. June 2008



Hourly mean concentrations in Nikel (NILU instrument):
1470 $\mu\text{g}/\text{m}^3$ (13h-14h) and 1527 $\mu\text{g}/\text{m}^3$ (14h-15h).



Karpdalen

Stasjonen ligger i Karpdalen, øst for Kirkenes og nord for smelteverket i Nickel, Russland. Dette er en "gammel" stasjon som ble nedlagt i 1999 og gjenåpnet høsten 2008. SO2 og meteorologi måles. Om vinteren er dominerende vindretning fra sør og sør-sørvest. Da bringes utslippene fra Nickel nordover mot Karpdalen og Jarfjordfjellet.



Status: Stasjonen er i normal drift.
Eiet av: NILU (målinger på oppdrag fra KLIF)

Detaljer

- [Se kart](#)
- [Se luftkvalitets index \(Tabell\)](#)
- [Se luftkvalitets data \(Tabell og graf\)](#)

Summary (outline)

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