Preliminary assessment of ambient air quality assessment methods in Iceland

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1 Introduction

This report documents the first preliminary assessment of ambient air quality assessment methods in Iceland according to European Directive 2008/50/EC and 2004/107/EC. As part of this work, a review of Iceland's methods for assessing air quality has been carried out as a starting point for a new initiative to protect human and environmental health. The new initiative aims to ensure that Iceland is protected from the adverse effects of air pollution in a proportionate way with the requirements of the European Directives on ambient air quality as a foundation.

As part of this review, this report presents;

- The planned air quality management zones for Iceland
- A classification of each zones in relation to air quality assessment thresholds or long-term objectives for pollutants covered by the air quality Directives
- Existing air quality monitoring activities that will continue as a part of an on-going plan or regime for the assessment of air quality in Iceland
- Recommendations to extend Iceland's existing assessment regimes to fill gaps in their scope and coverage with regard to the relevant European ambient air quality Directive

2 General approach

Directives 2008/50/EC and 2004/107/EC and their forerunners established an obligation for Member States and other signatory countries to carry out a preliminary assessment of pollutant levels for each air quality management zone within their jurisdiction. The Directives set up a common framework for establishing uniformly proportionate methods for on-going assessment of air quality throughout Europe.

In summary, the Directives require countries to carry out the following steps;

- Establish air quality management zones throughout their territory.
- Classify each zone in relation to an assessment threshold(s) or long-term objective for each pollutant regulated by Directives 2008/50/EC and 2004/107/EC
- Based on the classification and the population of the zone identify proportionate assessment needs
- Implement the assessment needs defined as part of an assessment regime

The assessment needs shall be reviewed every 5-years or more frequently in the event of significant changes in activities relevant to the ambient air quality concentrations. Typically, this classification process will be based on measurement (or other assessments) over a 5-year time period, although where this is not possible, results from high quality measurement campaigns of short duration, carried out when and where levels are likely to be at their highest, may be combined with the results obtained from indicative measurements, emission inventories and modelling in order to generate an evidence base on the likely levels of air pollution. When combining evidence in this way countries are encouraged to be cautious of underestimating pollution levels.

A range of options available for defining assessment regimes and these can be tailored to best meet country needs and expected air quality levels. These options are set out in a later section of this report. Air quality assessment and management shall be carried out in all zones within a country's jurisdiction. Thresholds classifying zones in relation to pollutants covered by Directive 2008/50/EC

Article 5 of Directive 2008/50/EC establishes a requirement for each air quality management zone to be classified in relation to lower and upper assessment thresholds (LAT and UAT) for the following pollutants:

- Sulphur dioxide
- Nitrogen dioxide,
- Oxides of nitrogen
- Particulate Matter (PM_{10} & $PM_{2.5}$)
- Lead
- Benzene
- Carbon monoxide

The classification shall be reviewed at least every 5- years based on the procedure lay down in Section B of Annex II

"Exceedances of upper and lower assessment thresholds shall be determined on the basis of concentrations during the previous five years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least three separate years out of those previous five years."

Annex II, section A of 2008/50/EC Directive set out the lower and upper assessment thresholds which are summarised in **Table 1** for SO_2, NO_2, NO_x, PM_{10}, $PM_{2.5}$, lead, Benzene and CO can be summarized as follows:

Table 1 Assessment thresholds for SO_2, NO_2, NO_x, PM_{10}, $PM_{2.5}$, lead, Benzene and CO set out by Directive 2008/50/EC

Pollutant	Metrics	Protection Target	Lower Assessment Threshold (LAT)	Upper Assessment Threshold (UAT)	Limit Value (LV)
Sulphur dioxide (SO_2)	Daily mean	Health	50 µg/m³ (≤ 3 times per year)	75 µg/m³ (≤ 3 times per year)	125 µg/m³ (≤ 3 times per year)
	Winter mean	Vegetation	8 µg/m³	12 µg/m³	20 µg/m³
Nitrogen dioxide (NO_2)	Hourly mean	Health	100 µg/m³ (≤ 18 times per year)	140 µg/m³ (≤ 18 times per year)	200 µg/m³ (≤ 18 times per year)
	Annual mean	Health	26 µg/m³	32 µg/m³	40 µg/m³
Oxides of nitrogen (NO_x)	Annual mean	Vegetation	19.5 µg/m³	24 µg/m³	30 µg/m³
Particles <10 µm (PM_{10})	Annual mean	Health	20 µg/m³	28 µg/m³	40 µg/m³
Particles <10 µm (PM_{10})	Daily mean	Health	25 µg/m³ (≤ 35 times per year)	35 µg/m³ (≤ 35 times per year)	50 µg/m³ (≤ 35 times per year)

Pollutant	Metrics	Protection Target	Lower Assessment Threshold (LAT)	Upper Assessment Threshold (UAT)	Limit Value (LV)
Particles <2.5 µm ($PM_{2.5}$)	Annual mean	Health	12 µg/m^3	17 µg/m^3	20 µg/m^3
Carbon monoxide (CO)	Eight-hour mean	Health	5 mg/m^3	7 mg/m^3	10 mg/m^3
Benzene (C_6H_6)	Annual mean	Health	2 µg/m^3	3.5 µg/m^3	5 µg/m^3
Lead (Pb)	Annual mean	Health	0.25 µg/m^3	0.35 µg/m^3	0.5 µg/m^3

For ozone, the long-term objective (LTO) is analogous to the assessment threshold and Article 9 of Directive 2008/50/EC effectively requires zones to be classified in relation to the relevant LTO. Article 9 (1) stipulates that if the LTO is exceeded, fixed measurements shall be required;

"1. Where, in a zone or agglomeration, concentrations of ozone have exceeded the long-term objectives specified in Section C of Annex VII during any of the previous five years of measurement, fixed measurements shall be taken.

2. Where fewer than five years' data are available, Member States may, for the purposes of determining whether the long-term objectives referred to in paragraph 1 have been exceeded during those five years, combine the results from measurement campaigns of short duration carried out when and where levels are likely to be at their highest, with the results obtained from emission inventories and modelling."

The LTOs for ozone are defined in **Table 2**.

Table 2 Long-term objectives for ozone set out by Directive 2008/50/EC

Pollutant	Metrics	Protection Target	Long-term Objective (LTO)
Ozone (O_3)	Maximum daily 8-hour mean	Health	120 µg/m^3
	AOT40	Vegetation	6,000 µg.hours

2.1 Thresholds classifying zones in relation to pollutants covered by Directive 2004/107/EC

Article 4 of 2004/107/EC Directive establishes a requirement for each air quality management zone to be classified in relation to the lower and upper assessment thresholds (LAT and UAT) for the following pollutants:

- Arsenic
- Cadmium
- Nickel
- Benzo[a]pyrene

The classification shall be reviewed at least every 5- years based on the procedure lay down in Section II of Annex II

> *"The upper and lower assessment thresholds for arsenic, cadmium, nickel and benzo(a)pyrene in ambient air shall be those laid down in Section I of Annex II. The classification of each zone or agglomeration for the purposes of this Article shall be reviewed at least every five years in accordance with the procedure laid down in Section II of Annex II. Classification shall be reviewed earlier in the event of significant change in activities relevant to concentrations of arsenic, cadmium, nickel and benzo(a)pyrene in ambient air."*

Section I, Annex II of Directive 2004/107/EC sets out the lower and upper assessment thresholds for heavy metals and benzo[a]pyrene. These are summarised in **Table 3**

Table 3 Lower and upper assessment thresholds for heavy metals and benzo[a]pyrene set out by Directive 2004/107/EC

Pollutant	Metrics	Protection Target	Lower Assessment Threshold (LAT)	Upper Assessment Threshold (UAT)	Limit Value (LV)
Arsenic (As)	Annual mean	Health	2.4 ng/m^3	3.6 µg/m^3	6 µg/m^3
Nickel (Ni)	Annual mean	Health	10 ng/m^3	14 ng/m^3	20 µg/m^3
Cadmium (Cd)	Annual mean	Health	2 ng/m^3	3 ng/m^3	5 µg/m^3
Benzo[a]pyrene (BaP)	Annual mean	Health	0.4 ng/m^3	0.6 ng/m^3	1 µg/m^3

2.2 Options for configuring assessment regimes based on the zone classification

Member States shall assess the air quality with respect to the thresholds and long-term objectives defined by Directives 2008/50/EC and 2004/107/EC in each zone and classify each zone accordingly. Depending on the classification of the zone in relation to these assessment regime options may be applied.

1. For SO_2, NO_2, NO_X, PM_{10}, $PM_{2.5}$, lead, Benzene and CO
   a. Where the level of pollutants exceeds UAT, at least 1 fixed measurement station shall operate in order to assess the ambient air quality[1]
   b. Where the level of pollutants is in between LAT and UAT, a combination of fixed measurements, modelling and/or indicative measurements may be used to assess ambient air quality
   c. Where the level of pollutants is below LAT, modelling or objective estimation or both are sufficient to assess ambient air quality.

[1] Section A, Annex V of Directive 2008/50/EC sets out a scheme specifying the number and typology of the stations required based on the population of each zone.

2. For ozone
    a. Where the levels exceed the LTO, fixed measurements are required.
3. For heavy metals and benzo[a]pyrene
    a. Where the level of pollutants is above the LAT, fixed measurement is mandatory but may be supplemented by modelling
    b. Where the level of pollutants are below LAT, the sole use of modelling and/or objective estimation techniques for assessing ambient air quality are sufficient.

3 Air quality assessment and management zones in Iceland

For the purposes of on-going air quality assessment and management Iceland has been divided into nine zones; one national zone as shown in **Figure 1** and eight sub-national zones as shown in **Figure 2**. The national zone presented in **Figure 1** has been established to assess and manage air quality for pollutants that have shown only small variations in concentrations across Iceland e.g. ozone, carbon monoxide and Benzene and for emissions from industrial point sources e.g. heavy metals, benzo-a-pyrene and lead. Concentrations for these pollutants are generally low and their sources are stable throughout Iceland.

Figure 1 Icelandic air quality management zone for ozone, carbon monoxide, heavy metals, benzo-a-pyrene, lead, benzene, SO_2-vegetation and NO_x-vegetation

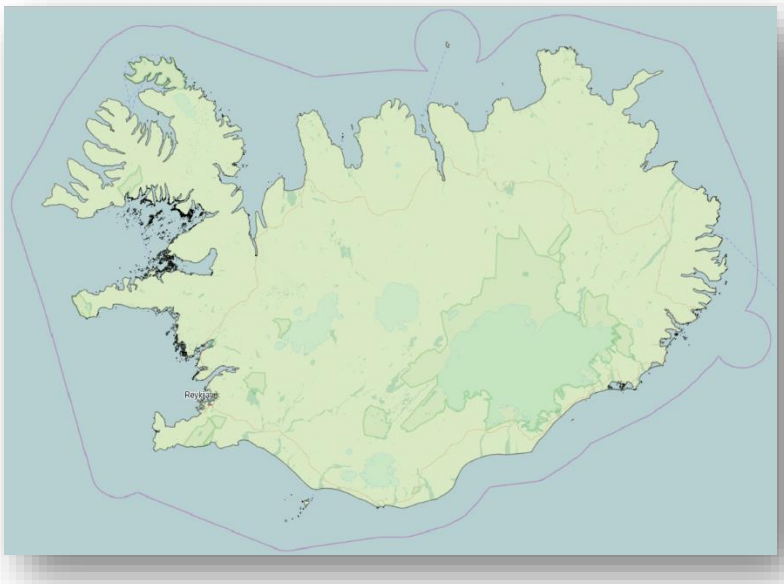
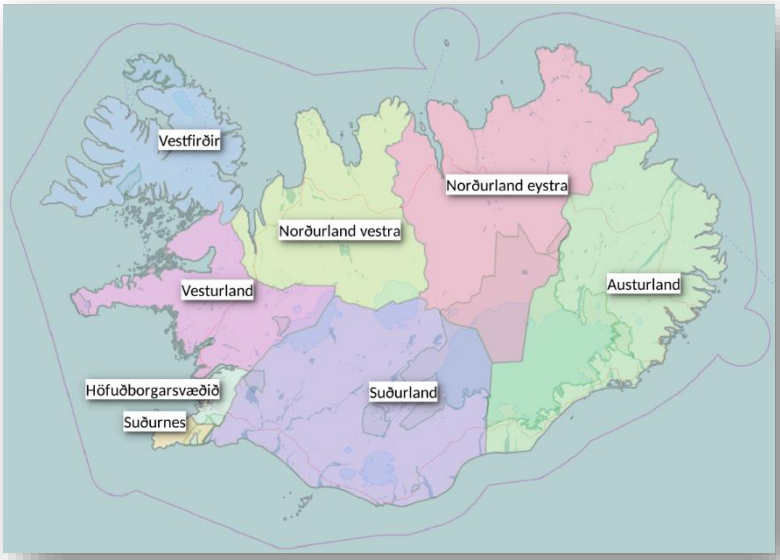


Figure 2 Icelandic air quality management zones for nitrogen dioxide, sulphur dioxide, PM_{10} and $PM_{2.5}$



The eight sub-national zones have been established to assess and manage air quality for pollutants that are strongly linked to anthropogenic activity e.g. road transport and shipping and to natural sources e.g. volcanic activity, geothermal activity and resuspension of dusts. The zones presented in **Figure 2** have been established for nitrogen dioxide, sulphur dioxide and particulate matter.

The eight sub-national zones are consistent with the Public Health Authority boundaries, with the exception that all the small Public Health Authority areas in the Reykjavik area. Aligning air quality zones with Public Health Authority zones will bring benefits in the eventuality of an air quality management issue arising –matching air quality and Public Health Authority jurisdictional boundaries facilitates the attribution of responsibility for managing and improving air pollution hotspots to single or multiple authorities for action.

The area covered by each zone and resident population are presented in **Table 4**. These statistics are important inputs into the calculation fixed monitoring requirements.

Table 4 Area of coverage and resident population of Icelandic air quality management zones

Code	Name	Area (km^2)	Population
IS0001	Vestfirðir	8,844	5,968
IS0002	Vesturland	9,527	16,211
IS0003	Austurland	22,013	11,847
IS0004	Suðurland	24,676	25,341
IS0005	Norðurland vestra	13,468	8,988
IS0006	Suðurnes	815	22,787
IS1001	Höfuðborgarsvæðið	1,046	218,084
IS1002	Norðurland eystra	22,323	29,123
IS1003	Iceland	102,712	338,349

4 Classification status of Icelandic zones

The classification of zones in relation the LAT, UAT and LTOs specified by Directives 2008/50/EC and 2004/107/EC has been carried out using data available from fixed measurements in Iceland.

Historical data for pollutants other than benzene are generally available from 2010 onward, whereas for benzene measurements are available over the period 2004-2010, after which measurements ceased. Data availability and pollutants measured by station is presented in **Table 5** below, time series of measured levels for the station / pollutant combinations are presented in Appendix A.

Table 5 Data availability by stations and pollutant

Station name	Pollutants	Data availability
Akureyri	NOx, NO_2, PM_{10}	2011-2014
Dalsmari	NOx, NO_2, PM_{10}, $PM_{2.5}$, SO_2, H_2S	2014-2015
Digranesheiði	NOx, NO_2, PM_{10}, $PM_{2.5}$, SO_2, H_2S	2011
FHG	NOx, NO_2, PM_{10}, $PM_{2.5}$	2011-2014
Grensás	NOx, NO_2, PM_{10}, $PM_{2.5}$, SO_2, H_2S, O_3, CO	2011-2015
Grensás	Benzene	2004-2010
Grindavík	H_2S	2014-2015
Gröf	NOx, NO_2, PM_{10}, $PM_{2.5}$, SO_2, H_2S	2014-2015
Hellisheiði	SO_2, H_2S	2011 & 2015
Húsavík	H_2S	2015
Húsdýragarður	NOx, NO_2, PM_{10}, $PM_{2.5}$	2015
Hvaleyrarholt	NOx, NO_2, PM_{10}, $PM_{2.5}$, SO_2, H_2S	2011-2015
Hveragerði	SO_2, H_2S	2011 & 2015
Kelduhverfi	SO_2, H_2S	2014-2015
Kirkjubæjarklaustur	PM10, PM2.5	2011-2012
Kríuvarða	NOx, NO_2, PM_{10}, $PM_{2.5}$, SO_2, H_2S	2010-2015
Lækjarbotnar	H_2S	2015
Mývatn Reykjahlíð	H_2S	2011
Naustafjara	SO_2, H_2S	2015
Nesjavellir	H_2S	2015
Norðlingaholt	SO_2, H_2S	2011 & 2015
Raufarfell	PM10	2011-2014
Reyðarfjörður-St1	SO_2	2012-2015
Reyðarfjörður-St2	SO_2	2012-2015
Reyðarfjörður-St3	SO_2	2012-2015
Reyðarfjörður St4	SO_2	2012-2015
Reykjahlíð	SO_2, H_2S	2015
RVK Færanleg-Sleppa	NOx, NO_2, PM_{10}	2015
Stekkjarás	SO_2, H_2S	2014-2015
Vogar við Mývatn	SO_2, H_2S	2015

4.1 Handling low data capture and intermittent operational status of monitoring stations

It should be noted that;

1. Measurements for all pollutants are not made at all monitoring stations
2. Complete coverage of all regulated pollutants does not extend to all zones – some zones have been established for management of air quality in relation to specific pollutants. Within the timeframe for measurements considered by this report, 3 zones (Vestfirðir, Norðurland vestra and Suðurnes) had not commenced measurements of any sort, although plans to commission monitoring stations were in place. In addition, the time series of observations for some pollutant was intermittent.
3. Data capture for some pollutants was low i.e. <75% data capture in a calendar year
4. The operational status of some stations and pollutant channels was intermittent over the period(s) identified above.

In order to accommodate the observations in 1-4 above, which in some instances precludes the obtaining the formal data availability requirements (≥3 years of valid data), a system of expert judgement has been used to aide classification of zones in a systematic way. This classification scheme includes the following points as part of the decision-making process;

1. Calculate annual zone classifications based on the LAT, UAT and LTOs for each calendar year with available data (no data capture threshold set for the calculation of relevant metrics)
2. Calculate overall zone classification using the annual classifications calculated in (1) using the logic below;
    i. If 3 years of data are available zones have been classified as per Directive instructions
    ii. Where >3 years of data is available and the results are inconclusive e.g. 2-years <LAT, 2-years LAT-UAT or >UAT, the zone has been classified using the higher threshold / objective exceedance.
    iii. Where ≤3 years of data is available and the results are inconclusive e.g. 2-years <LAT, 1-years LAT-UAT or >UAT, the zone has been classified using the higher threshold / objective exceedance.
    iv. Where <3 years of data is available the classification was set to LAT-UAT or >LTO

Implementing this decision-making scheme delivers a proportionate approach which does not under estimate the potential for unobserved exceedances in years with no or low data capture.

4.2 Classification of zones in relation the LAT, UAT and LTOs specified by Directive 2008/50/EC

Table 6 and **Table 7**, present the overall classification of each zone in relation to all LAT, UAT and LTOs using data available and the scheme outlined above. Where more than one monitoring station was in operation within a zone, the worst-case exceedance situations have been used. Note that some pollutants have more than one assessment threshold or long-term objective; the worst-case exceedance classification will be carried through to the final classifications presented in section 4.3.

Table 6 Classification of Icelandic air quality management zones in relation to the assessment thresholds for SO_2, NO_2, NO_x, PM_{10}, $PM_{2.5}$, lead, Benzene & carbon monoxide

Zone Code	Zone Name	SO_2 - 24-hour (Health)	NO_2 - 1h (Health)	NO_2 - Annual (Health)	PM_{10} - 24-hour (Health)	PM_{10} - Annual (Health)	$PM_{2.5}$ - Annual (Health)
IS0001	Vestfirðir	nm	nm	nm	nm	nm	nm
IS0002	Vesturland	>UAT	<LAT	<LAT	LAT-UAT	>UAT	<LAT
IS0003	Austurland	LAT-UAT	nm	nm	nm	nm	nm
IS0004	Suðurland	<LAT	nm	nm	<LAT	>UAT	<LAT
IS0005	Norðurland vestra	nm	nm	nm	nm	nm	nm
IS0006	Suðurnes	nm	nm	nm	nm	nm	nm
IS1001	Höfuðborgarsvæðið	LAT-UAT	LAT-UAT	<LAT	<LAT	>UAT	LAT-UAT
IS1002	Norðurland eystra	>UAT	<LAT	<LAT	<LAT	>UAT	nm
IS1003	Iceland	--	--	--	--	--	--

Zone Code	Zone Name	Lead - Annual (Health)	Benzene - Annual (Health)	CO – 8-hour (Health)	SO_2 - Winter (Vegetation)	NO_x - Annual (Vegetation)
IS0001	Vestfirðir	--	--	--	--	--
IS0002	Vesturland	--	--	>UAT	>UAT	<LAT
IS0003	Austurland	--	--	--	>UAT	--
IS0004	Suðurland	--	--	--	<LAT	--
IS0005	Norðurland vestra	--	--	--	--	--
IS0006	Suðurnes	--	--	--	--	--
IS1001	Höfuðborgarsvæðið	--	<LAT	LAT-UAT	>UAT	<LAT
IS1002	Norðurland eystra	--	--	--	>UAT	<LAT
IS1003	Iceland	<LAT	<LAT	>UAT	>UAT	><LAT

"nm" denotes that no measurements were made; "--" denotes that zone was not established for the specified pollutant

Table 7 presents the classification of zones with measurement data for ozone against the long-terms objectives set out by Directive 2008/50/EC.

Table 7 Classification of Icelandic air quality management zones in relation to the long-term objectives for ozone set out by Directive 2008/50/EC

Zone Code	Zone Name	O_3 - Max daily 8-hour Mean (Health)	O_3 – AOT40 (Vegetation)
IS0001	Vestfirðir	--	--
IS0002	Vesturland	--	--
IS0003	Austurland	--	--
IS0004	Suðurland	--	--
IS0005	Norðurland vestra	--	--
IS0006	Suðurnes	--	--
IS1001	Höfuðborgarsvæðið	>LTO	<LTO
IS1002	Norðurland eystra	--	--
IS1003	Iceland	>LTO	<LTO

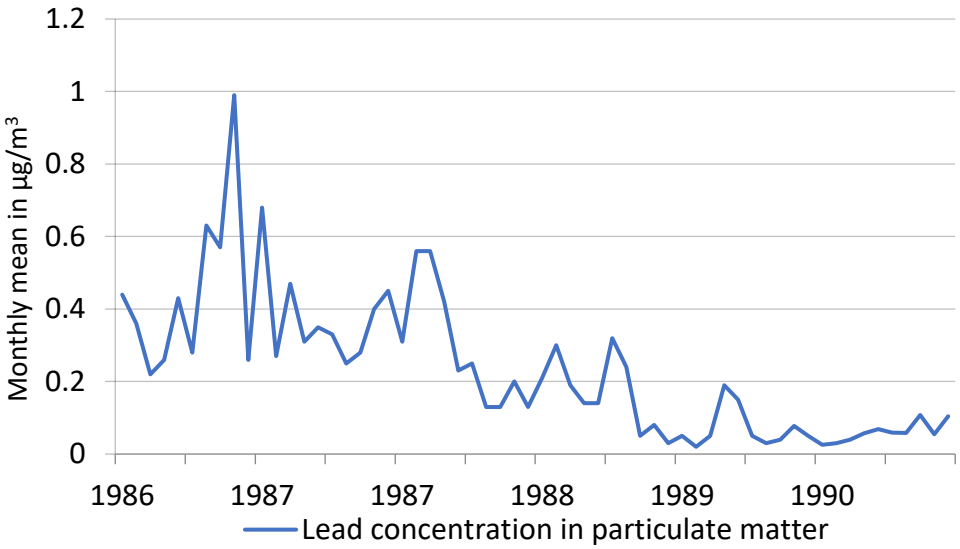
"--"denotes that zone was not established for the specified pollutant

It should also be observed that;

- Several zones had no data available for the pollutants for which they had been established.
- The Iceland zone is configured for SO_2-vegetation, NO_x-vegetation, lead, benzene, carbon monoxide, ozone, heavy metals and benzo-a-pyrene. The worst-case exceedance situation from all constituent sub-national zones has been used to classify the national zone.
- Data from 1986-1990 show a decrease in the concentration of lead in ambient air due to the phasing out of lead in gasoline. **Figure 4** presents a time-series of lead concentrations 1986-1991 at the Miklatorg monitoring station in Reykjavík **Figure 4** shows that levels are consistently below the LAT for lead from the late 1980s.
- A peak in SO_2 levels was observed in 2014/15, (see Appendix B and in **Figure 3** below) which coincided with marked volcanic activity at the Bárðarbunga volcano. Note that, peaks are not reciprocated in pollutants of anthropogenic origin.

Figure 3 Hourly observations of SO_2, H_2S, NO_2, PM_{10} and $PM_{2.5}$ – all stations 2010 - 2015

Figure 4 Lead in air, measured at Miklatorg in Reykjavík 1986-1991



4.3 Final classification of Icelandic air quality management zones

Where more than one assessment threshold has been set for a pollutant e.g. for the PM_{10} and NO_2 human health protection, it is common practice to use the worst-case exceedance situation for each zone. **Table 8** presents the final classification of Icelandic air quality management zones on this basis.

Table 8 Final classification of Icelandic air quality management zones in relation to the assessment thresholds and long-term objectives for pollutants regulated by Directive 2008/50/EC

Zone Code	Zone Name	SO_2 (Health)	NO_2 (Health)	PM (Health)	Lead (Health)	Benzene (Health)	CO (Health)	SO_2 (Veg[1])	NO_x (Veg[1])	O_3 (Health)	O_3 (Veg[1])
IS0001	Vestfirðir	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
IS0002	Vesturland	>UAT	<LAT	>UAT	nm	nm	>UAT	>UAT	<LAT	nm	nm
IS0003	Austurland	LAT-UAT	nm	--	nm	nm	nm	>UAT	nm	nm	nm
IS0004	Suðurland	<LAT	nm	>UAT	nm	nm	nm	<LAT	nm	nm	nm
IS0005	Norðurland vestra	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
IS0006	Suðurnes	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
IS1001	Höfuðborgarsvæðið	LAT-UAT	>UAT	>UAT	nm	<LAT	LAT-UAT	>UAT	>UAT	>LTO	<LTO
IS1002	Norðurland eystra	>UAT	<LAT	>UAT	nm	nm	nm	>UAT	<LAT	nm	nm
IS1003	Iceland	--	--	--	<LAT	<LAT	LAT-UAT	>UAT	<LAT	>LTO	<LTO

"nm" denotes that no measurements were made; "--" denotes that zone was not established for the specified pollutant

A detailed breakdown of the assessment threshold and long-term objective exceedances by year, data capture rates and other statistical metrics specified by Directive 2008/50/EC is presented in Appendix B.

4.4 Assessment regime requirements based on the classification of zones in relation to the LAT, UAT and LTO set by Directive 2008/50/EC

Articles 6 and 9 of Directive 2008/50/EC and its Annexes III and VII, set out a framework for identifying the amount of monitoring required in each zone based on the observed levels of each pollutant, the classifications set out in previous sections and the population or area of the zones.

Table 9 presents the minimum fixed monitoring requirements for compliance with the Directive and, where zones have been classified as below the UAT / LTO, the alternative techniques that may be used to supplement fixed monitoring or replace it are also present. The following assumptions have been applied;

1. Where historical measurements have been demonstrated to be consistently below the lower assessment thresholds or long-term objectives, objective estimation techniques may be used to assess compliance with the relevant Limit Values, Target Values or Long-Term Objectives.
2. Where historical measurements have demonstrated that levels are between the LAT and UAT, a combination of fixed measurements, indicative measurements and modelling shall continue to be used to assess compliance with the relevant Limit Values and Target Values.
3. Where historical measurements have demonstrated that levels are above the UAT or LTO, fixed measurements will continue to be used to assess compliance with the relevant Limit Values, Target Values or Long-Term Objectives. Fixed measurements may also be supplemented with indicative measurements and modelling techniques to the improve spatial of assessments and the concentration gradients adjacent to pollution hotspots.
4. Where no monitoring data has been available to classify the zone, a combination of fixed measurements, indicative measurements and modelling may be implemented to generate an evidence base of general levels in order to re-classify the zone and better define monitoring requirements.

The numeric values presented in **Table 9** indicate the number of assessment methods required in each zone by pollutant. The alphabetic suffixes indicate the type of regime that may be implemented.

Table 9 Assessment regime requirements in Icelandic air quality management zones for pollutants regulated by Directive 2008/50/EC

Zone Code	Zone Name	SO_2 (Health)	NO_2 (Health)	PM (Health)	Lead (Health)	Benzene (Health)	CO (Health)	SO_2 (Veg[1])	NO_x (Veg[1])	O_3 (Health)	O_3 (Veg[1])
IS0001	Vestfirðir	1(i)	1(i)	1(i)	--	--	--	--	--	--	--
IS0002	Vesturland	1(f)	1(o)	1(f)	--	--	--	--	--	--	--
IS0003	Austurland	1(i)	1(i)	1(i)	--	--	--	--	--	--	--
IS0004	Suðurland	1(o)	1(i)	1(f)	--	--	--	--	--	--	--
IS0005	Norðurland vestra	1(i)	1(i)	1(i)	--	--	--	--	--	--	--
IS0006	Suðurnes	1(i)	1(i)	1(i)	--	--	--	--	--	--	--
IS1001	Höfuðborgarsvæðið	1(i)	1(f)	1(f)	--	--	--	--	--	--	--
IS1002	Norðurland eystra	1(f)	1(o)	1(f)	--	--	--	--	--	--	--
IS1003	Iceland	-	-	-	1(o)	1(o)	1(i)	1(f)	1(o)	1(f)	1(i)

(i) denotes an assessment regime based on indicative measurements / model is required;
(f) denotes an assessment regime based on fixed measurements is required;(o) denotes an assessment regime based on objective estimation is required

5 Recommendations for on-going assessment regimes requirements

Table 10 presents the number of monitoring stations operating in each zone as of 2015 i.e. monitoring stations with >0% data capture by pollutant. The content shows that the new sub-national air quality management zones (Vestfirðir, Norðurland vestra and Suðurnes) have no monitoring implemented yet. In addition, measurements in Suðurland had stopped by 2015, although some pollutants had been measured in earlier years, as indicated by the classifications above and in appendix A.

The numeric values presented in **Table 10** indicate the number of assessment methods required in each zone by pollutant. The alphabetic prefixes indicate the type of monitoring station operating.

Table 10 Fixed measurements operating in Icelandic air quality management zones 2015

Zone Code	Zone Name	SO_2 (Health)	NO_2 (Health)	PM (Health)	Lead (Health)	Benzene (Health)	CO (Health)	SO_2 (Veg[1])	NO_x (Veg[1])	O_3 (Health)	O_3 (Veg[1])
IS0001	Vestfirðir	0	0	0	-	-	-	-	-	-	-
IS0002	Vesturland	3(UI)	2(UI)	4(UI)	-	-	-	-	-	-	-
IS0003	Austurland	3(UI)	0	0	-	-	-	-	-	-	-
IS0004	Suðurland	0	0	0	-	-	-	-	-	-	-
IS0005	Norðurland vestra	0	0	0	-	-	-	-	-	-	-
IS0006	Suðurnes	0	0	0	-	-	-	-	-	-	-
IS1001	Höfuðborgarsvæðið	1(UI), 1(UB), 1(T)	1(UI), 2(UB), 1(T)	2(UI), 4(UB), 2(T)	-	-	-	-	-	-	-
IS1002	Norðurland eystra	2(R), 2(UB)	0	0	-	-	-	-	-	-	-
IS1003	Iceland	--	--	--	--	0	1(T)	2(R)	0	1(T)	0

(UI) denotes an urban / industrial station; (T) denotes a traffic station; (UB) denotes an urban background station; (R) denotes a rural station.

Taking into account the assessment regime requirements (**Table 9**) and the operational fixed monitoring activities in 2015 (

Table 10), a summary of the additional high-quality fixed monitoring in zones where this is essential to meet Directive obligations has been generated. The summary is presented in **Table 11**.

Table 11 Additional high-quality fixed measurements and indicative monitoring or objective estimation requirements based commissioned activities in 2015

Zone Code	Zone Name	SO_2 (Health)	NO_2 (Health)	PM (Health)	Lead (Health)	Benzene (Health)	CO (Health)	SO_2 (Veg[1])	NO_x (Veg[1])	O_3 (Health)	O_3 (Veg[1])
IS0001	Vestfirðir	--	--	--	--	--	--	--	--	--	--
IS0002	Vesturland	0	0	0	--	--	--	--	--	--	--
IS0003	Austurland	--	--	--	--	--	--	--	--	--	--
IS0004	Suðurland	--	--	1	--	--	--	--	--	--	--
IS0005	Norðurland vestra	--	--	--	--	--	--	--	--	--	--
IS0006	Suðurnes	--	--	--	--	--	--	--	--	--	--
IS1001	Höfuðborgarsvæðið	0	0	0	--	--	--	--	--	--	--
IS1002	Norðurland eystra	0	--	1	--	--	--	--	--	--	--
IS1003	Iceland	--	--	--	0	0	0	0	1	0	1

The evidence presented in and an assumption that all fixed measurements operational in 2015 will continue in future year supports the recommendations for on-going assessment regimes outlined below;

Recommendation 1 All fixed measurement regimes operational in 2015 shall continue or where changes are essential, be replaced like-for-like.

Recommendation 2 New regimes based on a combination of fixed measurements, indicative measurements and/or modelling are required in following zones for SO_2, NO_2, and particulate matter in.

- Vestfirðir
- Norðurland vestra
- Suðurnes
- Austurland

Recommendation 3 Where historical measurements have classified zones with levels above the LAT or LTO and where measurements ceased prior to 2015, new or re-commissioned monitoring stations are required in the following zones for particulate matter.

- Suðurland
- Norðurland eystra

Recommendation 4 Within the Iceland national zone monitoring is required NO_2 and ozone at a rural background location.

Recommendation 5 A short-term campaign of measurements for the lead, nickel, cadmium, zinc and benzo-a-pyrene in an urban area, close to a key emissions source, in order to confirm anecdotal estimates of levels and to support on-going objective estimation methods.

6 Recent additions to the Icelandic monitoring networks

As indicated in Section 4, the zone classifications presented in this report are based on data from operation stations 2010-2015, (for benzene, measurements were available over the period 2004-2010). Based on measurements from operational stations and the zone classifications, additional monitoring requirements have been identified (Section 5). In 2017, UST commissioned the following monitoring.

Station	Zone	Pollutants covered
Akureyri	Norðurland eystra	PM_{10}, SO_2, NO_2 / NO_x

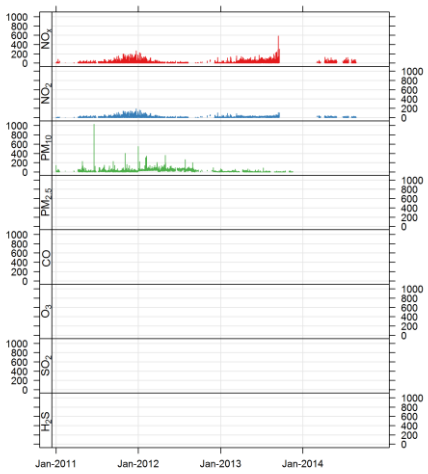
The recommissioning of this station delivers on recommendation 3 presented in Section 5 for the Norðurland eystra zone.

Appendices

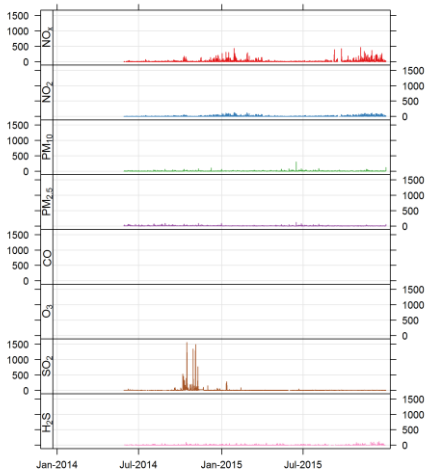
Appendix A	Time series of measured pollutant levels for stations included in this assessment report
Appendix B	Assessment threshold metrics & zone classifications 2010-2015 by station and air quality management zone

Appendix A Time series of measured pollutant levels for stations included in this assessment

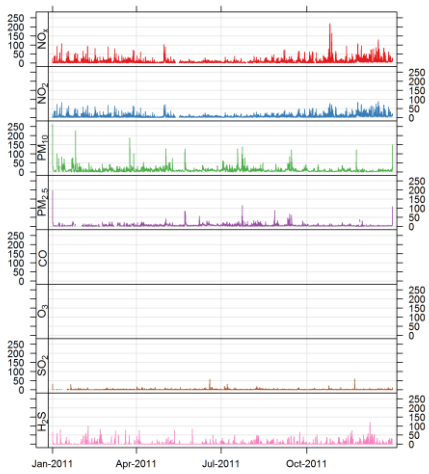
Akureyri



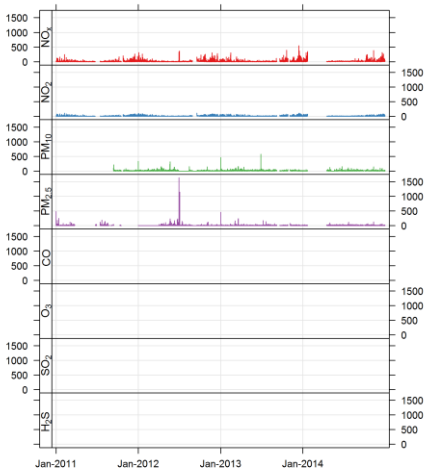
Dalsmari



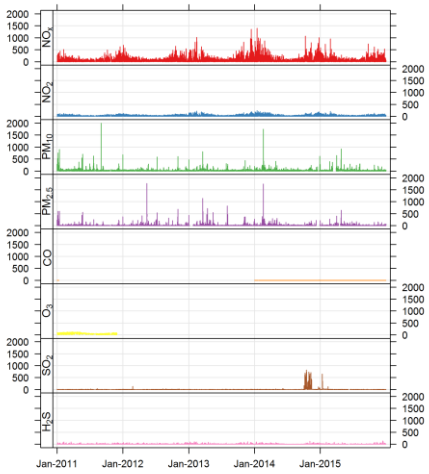
Digranesheiði



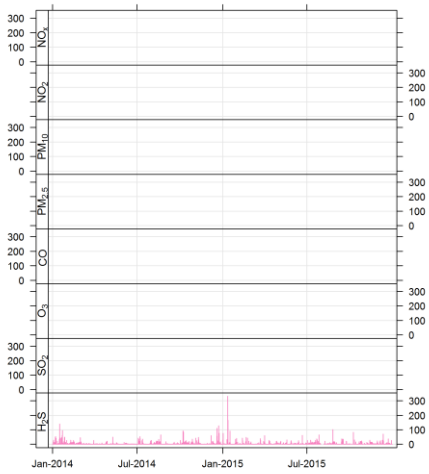
FHG



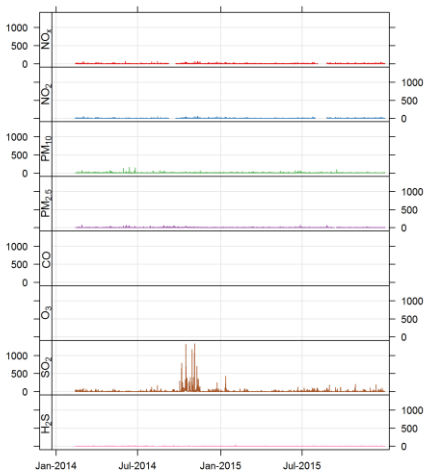
Grensás



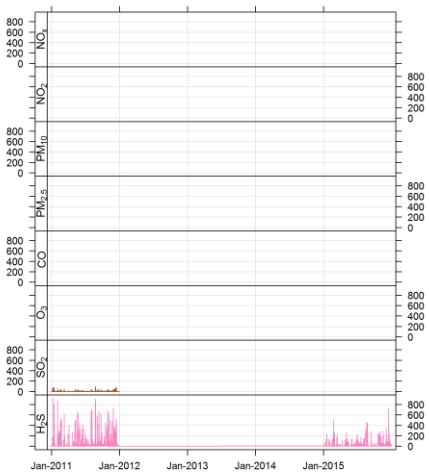
Grindavík



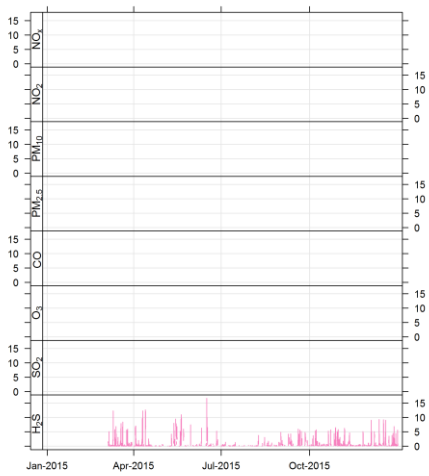
Gröf



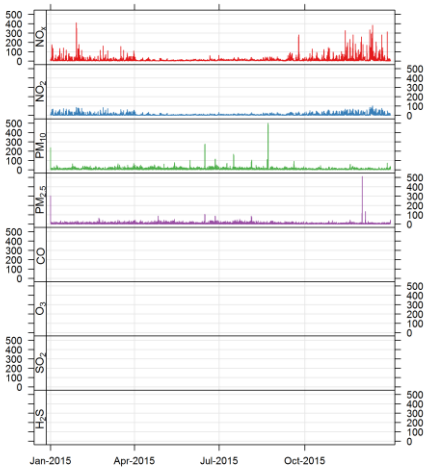
Hellisheiði



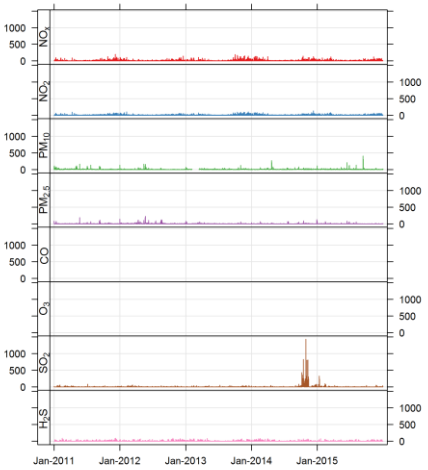
Húsavík



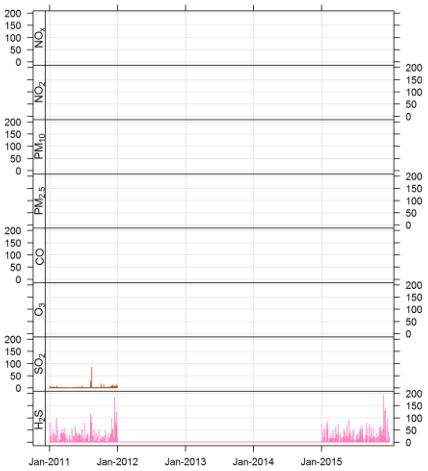
Húsdýragarður



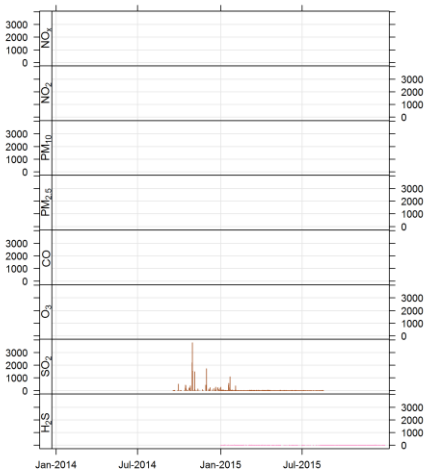
Hvaleyrarholt



Hveragerði



Kelduhverfi



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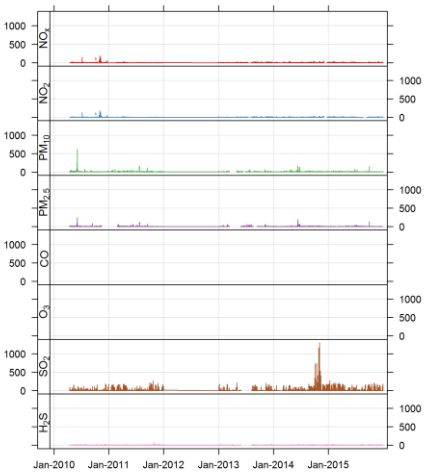

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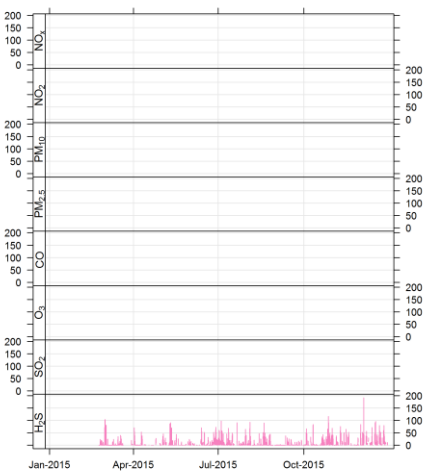
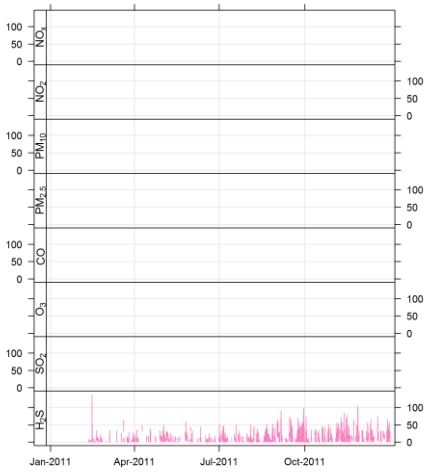
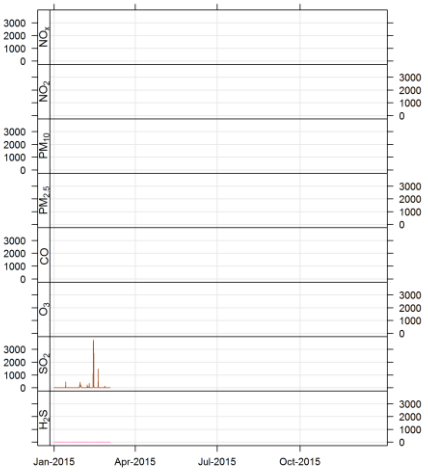


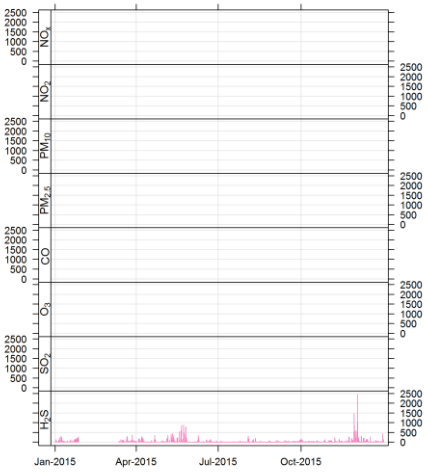
MývatnReykjahlíð



Naustafjara



Nesjavellir



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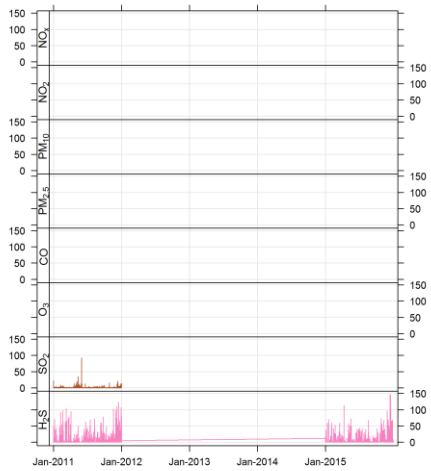

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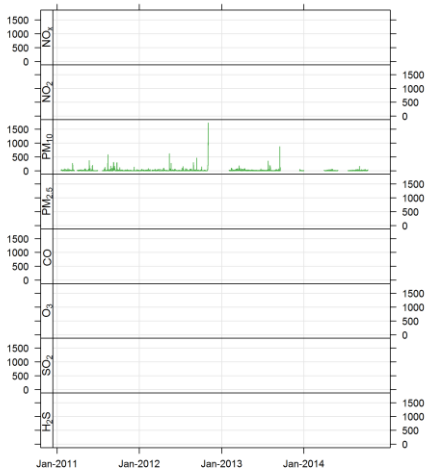
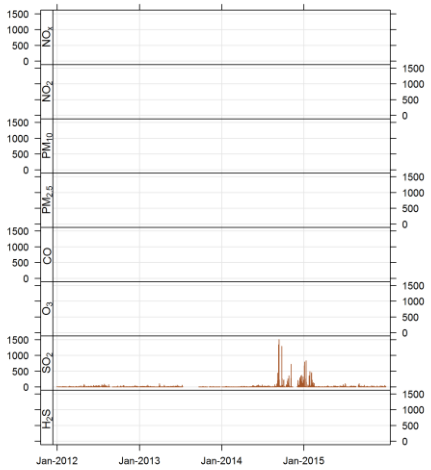


Reyðarfjörður_St1



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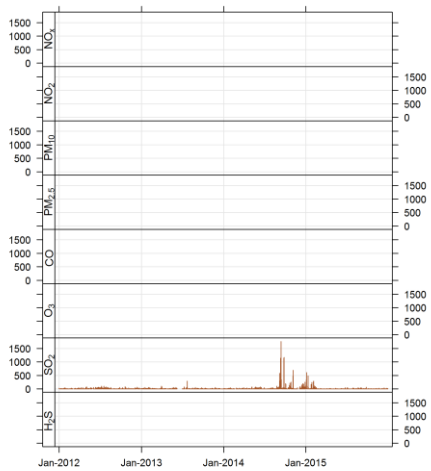

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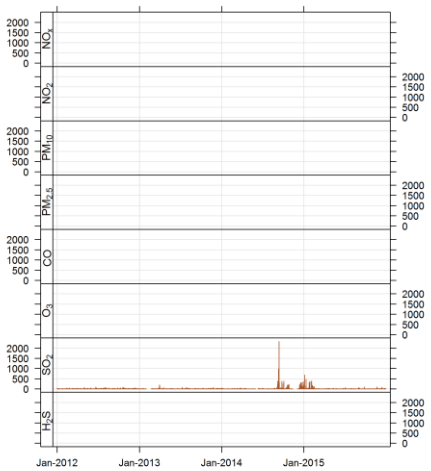

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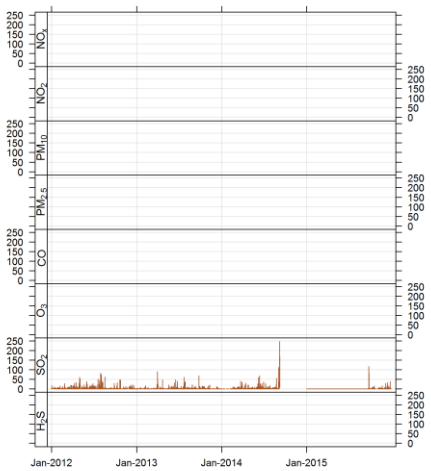
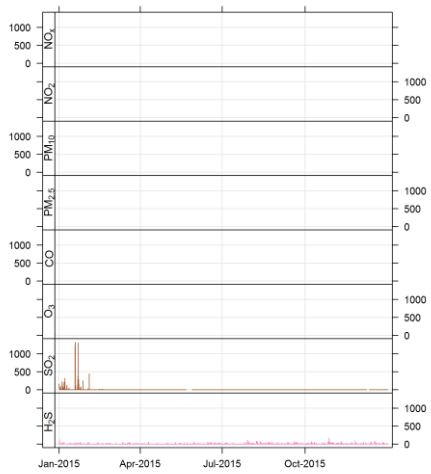
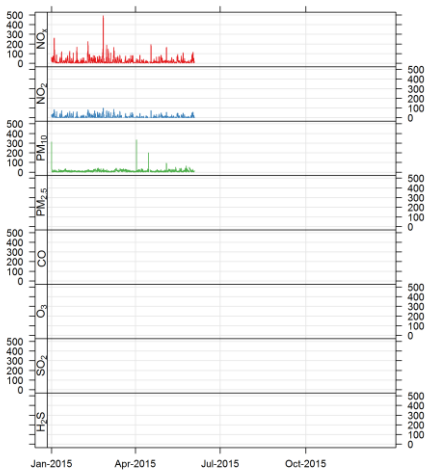


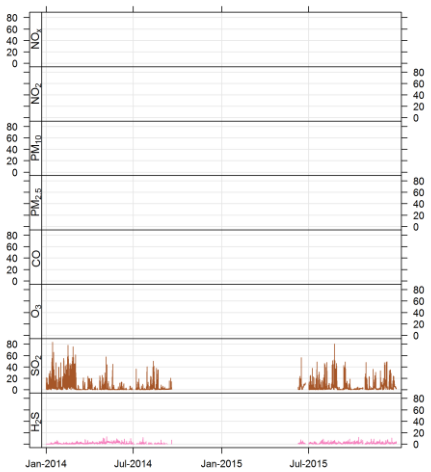
Reykjahlíð

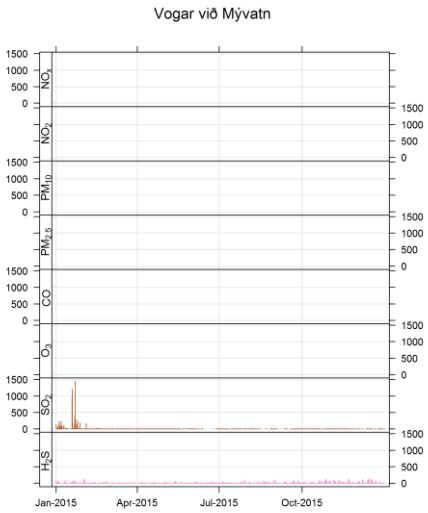


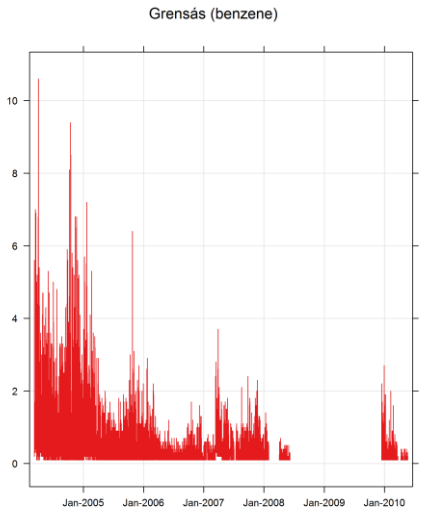
RVKFæranleg-Sleppa



Stekkjarás




Vogar við Mývatn
NO
NO2
PM10
PM2.5
CO
O3
SO2
H2S
Jan-2015
Apr-2015
Jul-2015
Oct-2015


Grensás (benzene)
Jan-2005
Jan-2006
Jan-2007
Jan-2008
Jan-2009
Jan-2010

Appendix B Assessment threshold metrics & zone classifications 2010-2015 by station and air quality management zone

Table A1 PM_{10} assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Akureyri	ZON-IS1002	PM10	Data Capture (%)	-	67	78	74	-	-	
Akureyri	ZON-IS1002	PM10	Mean	-	16	40	5	-	-	
Akureyri	ZON-IS1002	PM10	Min.	-	0	0	0	-	-	
Akureyri	ZON-IS1002	PM10	Max.	-	1029	548	85	-	-	
Akureyri	ZON-IS1002	PM10	Days >LV	-	2	72	0	-	-	
Akureyri	ZON-IS1002	PM10	Days >LAT	-	35	243	2	-	-	
Akureyri	ZON-IS1002	PM10	Days >UAT	-	8	186	0	-	-	
Akureyri	ZON-IS1002	PM10	Annual mean exceedance class	-	>UAT	>UAT	>UAT	-	-	>UAT
Akureyri	ZON-IS1002	PM10	Daily mean exceedance class	-	<LAT	>UAT	<LAT	-	-	LAT-UAT
Dalsmari	ZON-IS1001	PM10	Data capture (%)	-	-	-	-	59	99	
Dalsmari	ZON-IS1001	PM10	Mean	-	-	-	-	6	8	
Dalsmari	ZON-IS1001	PM10	Min.	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	PM10	Max.	-	-	-	-	108	300	
Dalsmari	ZON-IS1001	PM10	Days >LV	-	-	-	-	0	1	
Dalsmari	ZON-IS1001	PM10	Days >LAT	-	-	-	-	0	4	
Dalsmari	ZON-IS1001	PM10	Days >UAT	-	-	-	-	0	1	
Dalsmari	ZON-IS1001	PM10	Annual mean exceedance class	-	-	-	-	>UAT	>UAT	>UAT
Dalsmari	ZON-IS1001	PM10	Daily mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Digranesheiði	ZON-IS1001	PM10	Data capture (%)	-	94	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Mean	-	10	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Min.	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Max.	-	263	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Days >LV	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Days >LAT	-	15	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Days >UAT	-	9	-	-	-	-	
Digranesheiði	ZON-IS1001	PM10	Annual mean exceedance class	-	>UAT	-	-	-	-	>UAT
Digranesheiði	ZON-IS1001	PM10	Daily mean exceedance class	-	<LAT	-	-	-	-	<LAT
FHG	ZON-IS1001	PM10	Data capture (%)	-	23	97	78	63	-	
FHG	ZON-IS1001	PM10	Mean	-	10	9	13	10	-	
FHG	ZON-IS1001	PM10	Min.	-	0	0	0	0	-	
FHG	ZON-IS1001	PM10	Max.	-	212	329	576	154	-	
FHG	ZON-IS1001	PM10	Days >LV	-	1	2	2	0	-	
FHG	ZON-IS1001	PM10	Days >LAT	-	3	20	18	7	-	
FHG	ZON-IS1001	PM10	Days >UAT	-	2	6	5	1	-	
FHG	ZON-IS1001	PM10	Annual mean exceedance class	-	>UAT	>UAT	>UAT	>UAT	-	>UAT
FHG	ZON-IS1001	PM10	Daily mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT
Grensás	ZON-IS1001	PM10	Data capture (%)	-	95	98	100	96	94	
Grensás	ZON-IS1001	PM10	Mean	-	22	15	17	19	17	
Grensás	ZON-IS1001	PM10	Min.	-	0	0	0	0	0	
Grensás	ZON-IS1001	PM10	Max.	-	2004	684	808	1747	925	
Grensás	ZON-IS1001	PM10	Days >LV	-	17	8	8	9	16	
Grensás	ZON-IS1001	PM10	Days >LAT	-	65	43	55	61	46	

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	PM10	Days >UAT	-	31	15	22	25	29	
Grensás	ZON-IS1001	PM10	Annual mean exceedance class	-	>UAT	>UAT	>UAT	>UAT	>UAT	>UAT
Grensás	ZON-IS1001	PM10	Daily mean exceedance class	-	LAT-UAT	LAT-UAT	LAT-UAT	LAT-UAT	LAT-UAT	LAT-UAT
Gröf	ZON-IS0002	PM10	Data capture (%)	-	-	-	-	88	99	
Gröf	ZON-IS0002	PM10	Mean	-	-	-	-	7	6	
Gröf	ZON-IS0002	PM10	Min.	-	-	-	-	0	0	
Gröf	ZON-IS0002	PM10	Max.	-	-	-	-	157	94	
Gröf	ZON-IS0002	PM10	Days >LV	-	-	-	-	0	0	
Gröf	ZON-IS0002	PM10	Days >LAT	-	-	-	-	4	0	
Gröf	ZON-IS0002	PM10	Days >UAT	-	-	-	-	1	0	
Gröf	ZON-IS0002	PM10	Annual mean exceedance class	-	-	-	-	>UAT	>UAT	>UAT
Gröf	ZON-IS0002	PM10	Daily mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Húsdýragarður	ZON-IS1001	PM10	Data capture (%)	-	-	-	-	-	86	
Húsdýragarður	ZON-IS1001	PM10	Mean	-	-	-	-	-	10	
Húsdýragarður	ZON-IS1001	PM10	Min.	-	-	-	-	-	0	
Húsdýragarður	ZON-IS1001	PM10	Max.	-	-	-	-	-	499	
Húsdýragarður	ZON-IS1001	PM10	Days >LV	-	-	-	-	-	2	
Húsdýragarður	ZON-IS1001	PM10	Days >LAT	-	-	-	-	-	6	
Húsdýragarður	ZON-IS1001	PM10	Days >UAT	-	-	-	-	-	4	
Húsdýragarður	ZON-IS1001	PM10	Annual mean exceedance class	-	-	-	-	-	>UAT	>UAT
Húsdýragarður	ZON-IS1001	PM10	Daily mean exceedance class	-	-	-	-	-	<LAT	<LAT
Hvaleyrarholt	ZON-IS1001	PM10	Data capture (%)	-	99	96	89	99	100	
Hvaleyrarholt	ZON-IS1001	PM10	Mean	-	9	4	7	8	8	
Hvaleyrarholt	ZON-IS1001	PM10	Min.	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	PM10	Max.	-	164	164	126	274	412	
Hvaleyrarholt	ZON-IS1001	PM10	Days >LV	-	1	1	0	0	3	
Hvaleyrarholt	ZON-IS1001	PM10	Days >LAT	-	11	3	0	7	6	
Hvaleyrarholt	ZON-IS1001	PM10	Days >UAT	-	4	1	0	3	4	
Hvaleyrarholt	ZON-IS1001	PM10	Annual mean exceedance class	-	>UAT	>UAT	>UAT	>UAT	>UAT	>UAT
Hvaleyrarholt	ZON-IS1001	PM10	Daily mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT
Kirkjubæjarklaustur	ZON-IS0004	PM10	Data capture (%)	-	42	36	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Mean	-	24	15	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Min.	-	0	0	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Max.	-	1391	2101	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Days >LV	-	14	11	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Days >LAT	-	26	17	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Days >UAT	-	23	14	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM10	Annual mean exceedance class	-	>UAT	>UAT	-	-	-	>UAT
Kirkjubæjarklaustur	ZON-IS0004	PM10	Daily mean exceedance class	-	<LAT	<LAT	-	-	-	<LAT
Kríuvarða	ZON-IS0002	PM10	Data capture (%)	70	92	-	80	99	100	
Kríuvarða	ZON-IS0002	PM10	Mean	7	7	-	6	6	6	
Kríuvarða	ZON-IS0002	PM10	Min.	0	0	-	0	1	0	
Kríuvarða	ZON-IS0002	PM10	Max.	624	166	-	63	154	147	
Kríuvarða	ZON-IS0002	PM10	Days >LV	3	2	-	0	0	0	
Kríuvarða	ZON-IS0002	PM10	Days >LAT	5	5	-	2	1	1	
Kríuvarða	ZON-IS0002	PM10	Days >UAT	3	3	-	0	0	0	

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Kríuvarða	ZON-IS0002	PM10	Annual mean exceedance class	>UAT	>UAT	-	>UAT	>UAT	>UAT	>UAT
Kríuvarða	ZON-IS0002	PM10	Daily mean exceedance class	<LAT	<LAT	-	<LAT	<LAT	<LAT	<LAT
Raufarfell	ZON-IS0004	PM10	Data capture (%)	-	76	73	64	37	-	
Raufarfell	ZON-IS0004	PM10	Mean	-	17	19	16	11	-	
Raufarfell	ZON-IS0004	PM10	Min.	-	0	0	0	0	-	
Raufarfell	ZON-IS0004	PM10	Max.	-	581	1730	877	166	-	
Raufarfell	ZON-IS0004	PM10	Days >LV	-	18	10	9	0	-	
Raufarfell	ZON-IS0004	PM10	Days >LAT	-	35	34	32	4	-	
Raufarfell	ZON-IS0004	PM10	Days >UAT	-	23	20	18	1	-	
Raufarfell	ZON-IS0004	PM10	Annual mean exceedance class	-	>UAT	>UAT	>UAT	>UAT	-	>UAT
Raufarfell	ZON-IS0004	PM10	Daily mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT

Table A2 $PM_{2.5}$ assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Dalsmari	ZON-IS1001	PM2.5	Data capture (%)	-	-	-	-	59	99	
Dalsmari	ZON-IS1001	PM2.5	Mean	-	-	-	-	9	5	
Dalsmari	ZON-IS1001	PM2.5	Min.	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	PM2.5	Max.	-	-	-	-	89	117	
Dalsmari	ZON-IS1001	PM2.5	Annual mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Digranesheiði	ZON-IS1001	PM2.5	Data capture (%)	-	86	-	-	-	-	
Digranesheiði	ZON-IS1001	PM2.5	Mean	-	6	-	-	-	-	
Digranesheiði	ZON-IS1001	PM2.5	Min.	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	PM2.5	Max.	-	196	-	-	-	-	
Digranesheiði	ZON-IS1001	PM2.5	Annual mean exceedance class	-	<LAT	-	-	-	-	<LAT
FHG	ZON-IS1001	PM2.5	Data capture (%)	-	37	100	92	71	-	
FHG	ZON-IS1001	PM2.5	Mean	-	10	5	6	7	-	
FHG	ZON-IS1001	PM2.5	Min.	-	0	0	0	0	-	
FHG	ZON-IS1001	PM2.5	Max.	-	485	1636	458	132	-	
FHG	ZON-IS1001	PM2.5	Annual mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT
Grensás	ZON-IS1001	PM2.5	Data capture (%)	-	91	98	95	93	95	
Grensás	ZON-IS1001	PM2.5	Mean	-	11	12	14	13	11	
Grensás	ZON-IS1001	PM2.5	Min.	-	0	0	0	0	0	
Grensás	ZON-IS1001	PM2.5	Max.	-	607	1759	1145	1745	648	
Grensás	ZON-IS1001	PM2.5	Annual mean exceedance class	-	<LAT	<LAT	LAT-UAT	LAT-UAT	<LAT	LAT-UAT
Gröf	ZON-IS0002	PM2.5	Data capture (%)	-	-	-	-	84	99	
Gröf	ZON-IS0002	PM2.5	Mean	-	-	-	-	5	4	
Gröf	ZON-IS0002	PM2.5	Min.	-	-	-	-	0	0	
Gröf	ZON-IS0002	PM2.5	Max.	-	-	-	-	81	69	
Gröf	ZON-IS0002	PM2.5	Annual mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Húsdýragarður	ZON-IS1001	PM2.5	Data capture (%)	-	-	-	-	-	100	
Húsdýragarður	ZON-IS1001	PM2.5	Mean	-	-	-	-	-	7	
Húsdýragarður	ZON-IS1001	PM2.5	Min.	-	-	-	-	-	0	
Húsdýragarður	ZON-IS1001	PM2.5	Max.	-	-	-	-	-	510	
Húsdýragarður	ZON-IS1001	PM2.5	Annual mean exceedance class	-	-	-	-	-	<LAT	<LAT

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Hvaleyrarholt	ZON-IS1001	PM2.5	Data capture (%)	-	96	100	99	99	99	
Hvaleyrarholt	ZON-IS1001	PM2.5	Mean	-	4	8	4	5	4	
Hvaleyrarholt	ZON-IS1001	PM2.5	Min.	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	PM2.5	Max.	-	190	232	89	134	87	
Hvaleyrarholt	ZON-IS1001	PM2.5	Annual mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT
Kirkjubæjarklaustur	ZON-IS0004	PM2.5	Data capture (%)	-	28	36	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM2.5	Mean	-	4	6	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM2.5	Min.	-	0	0	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM2.5	Max.	-	46	148	-	-	-	
Kirkjubæjarklaustur	ZON-IS0004	PM2.5	Annual mean exceedance class	-	<LAT	<LAT	-	-	-	<LAT
Kríuvarða	ZON-IS0002	PM2.5	Data capture (%)	50	78	-	72	99	100	
Kríuvarða	ZON-IS0002	PM2.5	Mean	5	4	-	4	5	4	
Kríuvarða	ZON-IS0002	PM2.5	Min.	0	0	-	0	0	0	
Kríuvarða	ZON-IS0002	PM2.5	Max.	251	126	-	65	192	129	
Kríuvarða	ZON-IS0002	PM2.5	Annual mean exceedance class	<LAT	<LAT	-	<LAT	<LAT	<LAT	<LAT

Table A3 Ozone long-term objective metrics 2010-2015 by station and air quality management zone

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	O3	Data capture (%)	-	86	-	-	-	-	
Grensás	ZON-IS1001	O3	Mean	-	62	-	-	-	-	
Grensás	ZON-IS1001	O3	Min.	-	0	-	-	-	-	
Grensás	ZON-IS1001	O3	Max.	-	130	-	-	-	-	
Grensás	ZON-IS1001	O3	Maximum daily eight-hour mean >120 µg/m³	-	1	-	-	-	-	
Grensás	ZON-IS1001	O3	AOT40	-	2967	-	-	-	-	
Grensás	ZON-IS1001	O3	Days > 120 µg/m³ exceedance class	-	>UAT	-	-	-	-	>LTO
Grensás	ZON-IS1001	O3	AOT40 exceedance class	-	<LAT	-	-	-	-	<LTO

Table A4 SO_2 assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Gröf	ZON-IS0002	SO2	Data capture (%)	-	-	-	-	84	86	
Gröf	ZON-IS0002	SO2	Mean	-	-	-	-	15	4	
Gröf	ZON-IS0002	SO2	Min.	-	-	-	-	0	0	
Gröf	ZON-IS0002	SO2	Max.	-	-	-	-	1326	425	
Gröf	ZON-IS0002	SO2	Hours > LV	-	-	-	-	50	1	
Gröf	ZON-IS0002	SO2	Days > LV	-	-	-	-	11	1	
Gröf	ZON-IS0002	SO2	Days > LAT	-	-	-	-	21	1	
Gröf	ZON-IS0002	SO2	Days > UAT	-	-	-	-	15	1	
Gröf	ZON-IS0002	SO2	Daily exceedance class	-	-	-	-	>UAT	<LAT	>UAT
Kríuvarða	ZON-IS0002	SO2	Data capture (%)	68	92		67	79	94	
Kríuvarða	ZON-IS0002	SO2	Mean	4	10		8	18	13	
Kríuvarða	ZON-IS0002	SO2	Min.	0	0		0	0	0	
Kríuvarða	ZON-IS0002	SO2	Max.	184	267		208	1300	270	

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Kríuvarða	ZON-IS0002	SO2	Hours > LV	0	0		0	42	0	
Kríuvarða	ZON-IS0002	SO2	Days > LV	0	1		0	7	1	
Kríuvarða	ZON-IS0002	SO2	Days > LAT	1	22		11	26	28	
Kríuvarða	ZON-IS0002	SO2	Days > UAT	0	9		4	17	10	
Kríuvarða	ZON-IS0002	SO2	Daily exceedance class	<LAT	>UAT	-	>UAT	>UAT	>UAT	>UAT
Stekkjarás	ZON-IS0002	SO2	Data capture (%)	-	-	-	-	58	49	
Stekkjarás	ZON-IS0002	SO2	Mean	-	-	-	-	5	5	
Stekkjarás	ZON-IS0002	SO2	Min.	-	-	-	-	0	0	
Stekkjarás	ZON-IS0002	SO2	Max.	-	-	-	-	83	80	
Stekkjarás	ZON-IS0002	SO2	Hours > LV	-	-	-	-	0	0	
Stekkjarás	ZON-IS0002	SO2	Days > LV	-	-	-	-	0	0	
Stekkjarás	ZON-IS0002	SO2	Days > LAT	-	-	-	-	0	0	
Stekkjarás	ZON-IS0002	SO2	Days > UAT	-	-	-	-	0	0	
Stekkjarás	ZON-IS0002	SO2	Daily exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Stekkjarás	ZON-IS0002	SO2	Hourly exceedance class	-	-	-	-	>UAT	>UAT	>UAT
Reyðarfjörður_St1	ZON-IS0003	SO2	Data capture (%)	-	-	83	78	94	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Mean	-	-	3	2	11	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Min.	-	-	0	0	0	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Max.	-	-	94	107	1509	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Hours > LV	-	-	0	0	26	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Days > LV	-	-	0	0	7	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Days > LAT	-	-	0	0	18	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Days > UAT	-	-	0	0	14	-	
Reyðarfjörður_St1	ZON-IS0003	SO2	Daily exceedance class	-	-	<LAT	<LAT	>UAT	-	LAT-UAT
Reyðarfjörður_St2	ZON-IS0003	SO2	Data capture (%)	-	-	83	88	93	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Mean	-	-	5	3	11	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Min.	-	-	0	0	0	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Max.	-	-	106	296	1764	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Hours > LV	-	-	0	0	30	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Days > LV	-	-	0	0	8	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Days > LAT	-	-	0	0	15	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Days > UAT	-	-	0	0	12	-	
Reyðarfjörður_St2	ZON-IS0003	SO2	Daily exceedance class	-	-	<LAT	<LAT	>UAT	-	LAT-UAT
Reyðarfjörður_St3	ZON-IS0003	SO2	Data capture (%)	-	-	85	89	88	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Mean	-	-	4	3	10	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Min.	-	-	0	0	0	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Max.	-	-	92	198	2334	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Hours > LV	-	-	0	0	17	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Days > LV	-	-	0	0	7	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Days > LAT	-	-	0	0	18	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Days > UAT	-	-	0	0	12	-	
Reyðarfjörður_St3	ZON-IS0003	SO2	Daily exceedance class	-	-	<LAT	<LAT	>UAT	-	LAT-UAT
Reyðarfjörður_St4	ZON-IS0003	SO2	Data capture (%)	-	-	92	92	65	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Mean	-	-	2	1	2	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Min.	-	-	0	0	0	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Max.	-	-	82	89	248	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Hours > LV	-	-	0	0	0	-	

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Reyðarfjörður_St4	ZON-IS0003	SO2	Days > LV	-	-	0	0	0	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Days > LAT	-	-	0	0	2	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Days > UAT	-	-	0	0	2	-	
Reyðarfjörður_St4	ZON-IS0003	SO2	Daily exceedance class	-	-	<LAT	<LAT	<LAT	-	<LAT
Hellisheiði	ZON-IS0004	SO2	Data capture (%)	-	100	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Mean	-	2	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Min.	-	0	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Max.	-	98	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Hours > LV	-	0	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Days > LV	-	0	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Days > LAT	-	0	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Days > UAT	-	0	-	-	-	-	
Hellisheiði	ZON-IS0004	SO2	Daily exceedance class	-	<LAT	-	-	-	-	<LAT
Hveragerði	ZON-IS0004	SO2	Mean	-	1	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Min.	-	0	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Max.	-	85	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Hours > LV	-	0	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Days > LV	-	0	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Days > LAT	-	0	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Days > UAT	-	0	-	-	-	-	
Hveragerði	ZON-IS0004	SO2	Daily exceedance class	-	<LAT	-	-	-	-	<LAT
Dalsmari	ZON-IS1001	SO2	Data capture (%)	-	-	-	-	48	98	
Dalsmari	ZON-IS1001	SO2	Mean	-	-	-	-	20	3	
Dalsmari	ZON-IS1001	SO2	Min.	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	SO2	Max.	-	-	-	-	1560	285	
Dalsmari	ZON-IS1001	SO2	Hours > LV	-	-	-	-	45	0	
Dalsmari	ZON-IS1001	SO2	Days > LV	-	-	-	-	6	1	
Dalsmari	ZON-IS1001	SO2	Days > LAT	-	-	-	-	14	2	
Dalsmari	ZON-IS1001	SO2	Days > UAT	-	-	-	-	10	1	
Dalsmari	ZON-IS1001	SO2	Daily exceedance class	-	-	-	-	>UAT	<LAT	LAT-UAT
Digranesheiði	ZON-IS1001	SO2	Data capture (%)	-	95	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Mean	-	1	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Min.	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Max.	-	60	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Hours > LV	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Days > LV	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Days > LAT	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Days > UAT	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	SO2	Daily exceedance class	-	<LAT	-	-	-	-	<LAT
Grensás	ZON-IS1001	SO2	Data capture (%)	-	94	97	98	98	89	
Grensás	ZON-IS1001	SO2	Mean	-	1	3	1	14	4	
Grensás	ZON-IS1001	SO2	Min.	-	0	0	0	0	0	
Grensás	ZON-IS1001	SO2	Max.	-	42	138	23	823	655	
Grensás	ZON-IS1001	SO2	Hours > LV	-	0	0	0	77	6	
Grensás	ZON-IS1001	SO2	Days > LV	-	0	0	0	10	1	
Grensás	ZON-IS1001	SO2	Days > LAT	-	0	0	0	21	2	
Grensás	ZON-IS1001	SO2	Days > UAT	-	0	0	0	17	2	

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	SO2	Daily exceedance class	-	<LAT	<LAT	<LAT	>UAT	<LAT	<LAT
Hvaleyrarholt	ZON-IS1001	SO2	Data capture (%)	-	95	89	83	96	84	
Hvaleyrarholt	ZON-IS1001	SO2	Mean	-	2	2	1	9	2	
Hvaleyrarholt	ZON-IS1001	SO2	Min.	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	SO2	Max.	-	85	59	56	1432	326	
Hvaleyrarholt	ZON-IS1001	SO2	Hours > LV	-	0	0	0	34	0	
Hvaleyrarholt	ZON-IS1001	SO2	Days > LV	-	0	0	0	4	1	
Hvaleyrarholt	ZON-IS1001	SO2	Days > LAT	-	0	0	0	14	2	
Hvaleyrarholt	ZON-IS1001	SO2	Days > UAT	-	0	0	0	9	1	
Hvaleyrarholt	ZON-IS1001	SO2	Daily exceedance class	-	<LAT	<LAT	<LAT	>UAT	<LAT	<LAT
Norðlingaholt	ZON-IS1001	SO2	Data capture (%)	-	99	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Mean	-	1	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Min.	-	0	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Max.	-	92	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Hours > LV	-	0	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Days > LV	-	0	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Days > LAT	-	0	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Days > UAT	-	0	-	-	-	-	
Norðlingaholt	ZON-IS1001	SO2	Daily exceedance class	-	<LAT	-	-	-	-	<LAT
Kelduhverfi	ZON-IS1002	SO2	Data capture (%)	-	-	-	-	7	57	
Kelduhverfi	ZON-IS1002	SO2	Mean	-	-	-	-	129	4	
Kelduhverfi	ZON-IS1002	SO2	Min.	-	-	-	-	0	0	
Kelduhverfi	ZON-IS1002	SO2	Max.	-	-	-	-	3785	1088	
Kelduhverfi	ZON-IS1002	SO2	Hours > LV	-	-	-	-	38	9	
Kelduhverfi	ZON-IS1002	SO2	Days > LV	-	-	-	-	6	1	
Kelduhverfi	ZON-IS1002	SO2	Days > LAT	-	-	-	-	15	6	
Kelduhverfi	ZON-IS1002	SO2	Days > UAT	-	-	-	-	12	2	
Kelduhverfi	ZON-IS1002	SO2	Daily exceedance class	-	-	-	-	>UAT	LAT-UAT	>UAT
Naustafjara	ZON-IS1002	SO2	Data capture (%)	-	-	-	-	-	17	
Naustafjara	ZON-IS1002	SO2	Mean	-	-	-	-	-	49	
Naustafjara	ZON-IS1002	SO2	Min.	-	-	-	-	-	0	
Naustafjara	ZON-IS1002	SO2	Max.	-	-	-	-	-	3733	
Naustafjara	ZON-IS1002	SO2	Hours > LV	-	-	-	-	-	32	
Naustafjara	ZON-IS1002	SO2	Days > LV	-	-	-	-	-	5	
Naustafjara	ZON-IS1002	SO2	Days > LAT	-	-	-	-	-	7	
Naustafjara	ZON-IS1002	SO2	Days > UAT	-	-	-	-	-	5	
Naustafjara	ZON-IS1002	SO2	Daily exceedance class	-	-	-	-	-	>UAT	>UAT
Reykjahlíð	ZON-IS1002	SO2	Data capture (%)	-	-	-	-	-	96	
Reykjahlíð	ZON-IS1002	SO2	Mean	-	-	-	-	-	3	
Reykjahlíð	ZON-IS1002	SO2	Min.	-	-	-	-	-	0	
Reykjahlíð	ZON-IS1002	SO2	Max.	-	-	-	-	-	1328	
Reykjahlíð	ZON-IS1002	SO2	Hours > LV	-	-	-	-	-	13	
Reykjahlíð	ZON-IS1002	SO2	Days > LV	-	-	-	-	-	1	
Reykjahlíð	ZON-IS1002	SO2	Days > LAT	-	-	-	-	-	4	
Reykjahlíð	ZON-IS1002	SO2	Days > UAT	-	-	-	-	-	3	
Reykjahlíð	ZON-IS1002	SO2	Daily exceedance class	-	-	-	-	-	LAT-UAT	LAT-UAT

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
VogarviðMývatn	ZON-IS1002	SO2	Data capture (%)	-	-	-	-	-	66	
VogarviðMývatn	ZON-IS1002	SO2	Mean	-	-	-	-	-	3	
VogarviðMývatn	ZON-IS1002	SO2	Min.	-	-	-	-	-	0	
VogarviðMývatn	ZON-IS1002	SO2	Max.	-	-	-	-	-	1443	
VogarviðMývatn	ZON-IS1002	SO2	Hours > LV	-	-	-	-	-	10	
VogarviðMývatn	ZON-IS1002	SO2	Days > LV	-	-	-	-	-	2	
VogarviðMývatn	ZON-IS1002	SO2	Days > LAT	-	-	-	-	-	4	
VogarviðMývatn	ZON-IS1002	SO2	Days > UAT	-	-	-	-	-	3	
VogarviðMývatn	ZON-IS1002	SO2	Daily exceedance class	-	-	-	-	-	LAT-UAT	LAT-UAT

Table A5 Winter SO_2 assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	Pollutants	Parameter	2010	2011	2012	2013	2014	Overall exceedance class
Dalsmari	ZON-IS1001	SO2	Data capture (%)					19.7	
Dalsmari	ZON-IS1001	SO2	Valid winter hours					4292	
Dalsmari	ZON-IS1001	SO2	Winter mean					98%	
Dalsmari	ZON-IS1001	SO2	Winter mean exceedance class					>UAT	>UAT
Digranesheiði	ZON-IS1001	SO2	Data capture (%)		1.2				
Digranesheiði	ZON-IS1001	SO2	Valid winter hours		2203				
Digranesheiði	ZON-IS1001	SO2	Winter mean		50%				
Digranesheiði	ZON-IS1001	SO2	Winter mean exceedance class		<LAT				<LAT
Grensás	ZON-IS1001	SO2	Data capture (%)		2.3	2.2	2.0	28.9	
Grensás	ZON-IS1001	SO2	Valid winter hours		3876	4243	4267	4156	
Grensás	ZON-IS1001	SO2	Winter mean		88%	96%	97%	94%	
Grensás	ZON-IS1001	SO2	Winter mean exceedance class		<LAT	<LAT	<LAT	>UAT	>UAT
Gröf	ZON-IS0002	SO2	Data capture (%)				6.4	24.2	
Gröf	ZON-IS0002	SO2	Valid winter hours				870	4174	
Gröf	ZON-IS0002	SO2	Winter mean				20%	95%	
Gröf	ZON-IS0002	SO2	Winter mean exceedance class				<LAT	>UAT	>UAT
Hellisheiði	ZON-IS0004	SO2	Data capture (%)		3.2				
Hellisheiði	ZON-IS0004	SO2	Valid winter hours		2209				
Hellisheiði	ZON-IS0004	SO2	Winter mean		50%				
Hellisheiði	ZON-IS0004	SO2	Winter mean exceedance class		<LAT				<LAT
Hvaleyrarholt	ZON-IS1001	SO2	Data capture (%)		2.0	1.1	1.6	18.7	
Hvaleyrarholt	ZON-IS1001	SO2	Valid winter hours		4167	3737	3840	3908	
Hvaleyrarholt	ZON-IS1001	SO2	Winter mean		95%	85%	87%	89%	
Hvaleyrarholt	ZON-IS1001	SO2	Winter mean exceedance class		<LAT	<LAT	<LAT	>UAT	>UAT
Hveragerði	ZON-IS0004	SO2	Data capture (%)		1.4				
Hveragerði	ZON-IS0004	SO2	Valid winter hours		2209				
Hveragerði	ZON-IS0004	SO2	Winter mean		50%				
Hveragerði	ZON-IS0004	SO2	Winter mean exceedance class		<LAT				<LAT
Kelduhverfi	ZON-IS1002	SO2	Data capture (%)					37.5	
Kelduhverfi	ZON-IS1002	SO2	Valid winter hours					2605	
Kelduhverfi	ZON-IS1002	SO2	Winter mean					59%	
Kelduhverfi	ZON-IS1002	SO2	Winter mean exceedance class					>UAT	>UAT

Station	Zone	Pollutants	Parameter	2010	2011	2012	2013	2014	Overall exceedance class
Kríuvarða	ZON-IS0002	SO2	Data capture (%)			6.4	5.7	32.1	
Kríuvarða	ZON-IS0002	SO2	Valid winter hours			1919	3146	4105	
Kríuvarða	ZON-IS0002	SO2	Winter mean			44%	72%	93%	
Kríuvarða	ZON-IS0002	SO2	Winter mean exceedance class			<LAT	<LAT	>UAT	>UAT
Naustafjara	ZON-IS1002	SO2	Data capture (%)					48.6	
Naustafjara	ZON-IS1002	SO2	Valid winter hours					1496	
Naustafjara	ZON-IS1002	SO2	Winter mean					34%	
Naustafjara	ZON-IS1002	SO2	Winter mean exceedance class					>UAT	>UAT
Norðlingaholt	ZON-IS1001	SO2	Data capture (%)		0.8				
Norðlingaholt	ZON-IS1001	SO2	Valid winter hours		2209				
Norðlingaholt	ZON-IS1001	SO2	Winter mean		50%				
Norðlingaholt	ZON-IS1001	SO2	Winter mean exceedance class		<LAT				<LAT
Reyðarfjörður_St1	ZON-IS0003	SO2	Data capture (%)		2.1	3.2	1.2	26.4	
Reyðarfjörður_St1	ZON-IS0003	SO2	Valid winter hours		1628	4070	4109	1731	
Reyðarfjörður_St1	ZON-IS0003	SO2	Winter mean		37%	93%	93%	39%	
Reyðarfjörður_St1	ZON-IS0003	SO2	Winter mean exceedance class		<LAT	<LAT	<LAT	>UAT	>UAT
Reyðarfjörður_St2	ZON-IS0003	SO2	Data capture (%)		3.9	4.1	3.0	17.8	
Reyðarfjörður_St2	ZON-IS0003	SO2	Valid winter hours		1466	4205	3976	2000	
Reyðarfjörður_St2	ZON-IS0003	SO2	Winter mean		33%	96%	90%	45%	
Reyðarfjörður_St2	ZON-IS0003	SO2	Winter mean exceedance class		<LAT	<LAT	<LAT	>UAT	>UAT
Reyðarfjörður_St3	ZON-IS0003	SO2	Data capture (%)		3.9	4.2	3.3	20.5	
Reyðarfjörður_St3	ZON-IS0003	SO2	Valid winter hours		3430	7508	6349	1743	
Reyðarfjörður_St3	ZON-IS0003	SO2	Winter mean		78%	171%	144%	40%	
Reyðarfjörður_St3	ZON-IS0003	SO2	Winter mean exceedance class		<LAT	<LAT	<LAT	>UAT	>UAT
Reyðarfjörður_St4	ZON-IS0003	SO2	Data capture (%)		1.1	1.4	1.2		
Reyðarfjörður_St4	ZON-IS0003	SO2	Valid winter hours		1862	3900	3867		
Reyðarfjörður_St4	ZON-IS0003	SO2	Winter mean		42%	89%	88%		
Reyðarfjörður_St4	ZON-IS0003	SO2	Winter mean exceedance class		<LAT	<LAT	<LAT		<LAT
Reykjahlíð	ZON-IS1002	SO2	Data capture (%)					8.6	
Reykjahlíð	ZON-IS1002	SO2	Valid winter hours					2132	
Reykjahlíð	ZON-IS1002	SO2	Winter mean					48%	
Reykjahlíð	ZON-IS1002	SO2	Winter mean exceedance class					LAT-UAT	LAT-UAT
Stekkjarás	ZON-IS0002	SO2	Data capture (%)				9.0		
Stekkjarás	ZON-IS0002	SO2	Valid winter hours				1903		
Stekkjarás	ZON-IS0002	SO2	Winter mean				43%		
Stekkjarás	ZON-IS0002	SO2	Winter mean exceedance class				LAT-UAT		LAT-UAT
VogarviðMývatn	ZON-IS1002	SO2	Data capture (%)					10.1	
VogarviðMývatn	ZON-IS1002	SO2	Valid winter hours					1747	
VogarviðMývatn	ZON-IS1002	SO2	Winter mean					40%	
VogarviðMývatn	ZON-IS1002	SO2	Winter mean exceedance class					LAT-UAT	LAT-UAT

Table A6 CO assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	co	Data capture (%)	-	3	-	-	99	99	

Station	Zone	Pollutant	Parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	co	Mean	-	0	-	-	0	0	
Grensás	ZON-IS1001	co	Min.	-	0	-	-	0	0	
Grensás	ZON-IS1001	co	Max.	-	2	-	-	3	2	
Grensás	ZON-IS1001	co	8- hour mean	-	1	-	-	2	1	
Grensás	ZON-IS1001	co	8- hour exceedance class	-	<LAT	-	-	<LAT	<LAT	<LAT

Table A7 NO_2 assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	pollutant	parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Dalsmari	ZON-IS1001	NO2	Data capture (%)	-	-	-	-	57	95	
Dalsmari	ZON-IS1001	NO2	Mean	-	-	-	-	5	11	
Dalsmari	ZON-IS1001	NO2	Min.	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	NO2	Max.	-	-	-	-	62	127	
Dalsmari	ZON-IS1001	NO2	Hours > LV	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	NO2	Hours > LAT	-	-	-	-	0	18	
Dalsmari	ZON-IS1001	NO2	Hours > UAT	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	NO2	Annual Mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Dalsmari	ZON-IS1001	NO2	Hourly exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Digranesheiði	ZON-IS1001	NO2	Data capture (%)	-	98	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Mean	-	8	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Min.	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Max.	-	89	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Hours > LV	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Hourly > LAT	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Hourly > UAT	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	NO2	Annual Mean exceedance class	-	<LAT	-	-	-	-	<LAT
Digranesheiði	ZON-IS1001	NO2	Hourly exceedance class	-	<LAT	-	-	-	-	<LAT
FHG	ZON-IS1001	NO2	Data capture (%)	-	68	79	85	72	-	
FHG	ZON-IS1001	NO2	Mean	-	9	10	10	9	-	
FHG	ZON-IS1001	NO2	Min.	-	0	0	0	0	-	
FHG	ZON-IS1001	NO2	Max.	-	109	112	109	87	-	
FHG	ZON-IS1001	NO2	Hours > LV	-	0	0	0	0	-	
FHG	ZON-IS1001	NO2	Hourly > LAT	-	2	2	4	0	-	
FHG	ZON-IS1001	NO2	Hourly > UAT	-	0	0	0	0	-	
FHG	ZON-IS1001	NO2	Annual Mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT
FHG	ZON-IS1001	NO2	Hourly exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT
Grensás	ZON-IS1001	NO2	Data capture (%)	-	88	96	93	95	98	
Grensás	ZON-IS1001	NO2	Mean	-	19	19	27	25	21	
Grensás	ZON-IS1001	NO2	Min.	-	0	0	0	0	0	
Grensás	ZON-IS1001	NO2	Max.	-	131	127	223	243	208	
Grensás	ZON-IS1001	NO2	Hours > LV	-	0	0	2	4	1	
Grensás	ZON-IS1001	NO2	Hourly > LAT	-	14	16	272	302	64	
Grensás	ZON-IS1001	NO2	Hourly > UAT	-	0	0	56	63	6	
Grensás	ZON-IS1001	NO2	Annual Mean exceedance class	-	<LAT	<LAT	LAT-UAT	<LAT	<LAT	<LAT

Station	Zone	pollutant	parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	NO2	Hourly exceedance class	-	<LAT	<LAT	>UAT	>UAT	LAT-UAT	LAT-UAT
Húsdýragarður	ZON-IS1001	NO2	Data capture (%)	-	-	-	-	-	100	
Húsdýragarður	ZON-IS1001	NO2	Mean	-	-	-	-	-	10	
Húsdýragarður	ZON-IS1001	NO2	Min.	-	-	-	-	-	0	
Húsdýragarður	ZON-IS1001	NO2	Max.	-	-	-	-	-	104	
Húsdýragarður	ZON-IS1001	NO2	Hours > LV	-	-	-	-	-	0	
Húsdýragarður	ZON-IS1001	NO2	Hourly > LAT	-	-	-	-	-	1	
Húsdýragarður	ZON-IS1001	NO2	Hourly > UAT	-	-	-	-	-	0	
Húsdýragarður	ZON-IS1001	NO2	Annual Mean exceedance class	-	-	-	-	-	<LAT	<LAT
Húsdýragarður	ZON-IS1001	NO2	Hourly exceedance class	-	-	-	-	-	<LAT	<LAT
Hvaleyrarholt	ZON-IS1001	NO2	Data capture (%)	-	96	82	87	88	83	
Hvaleyrarholt	ZON-IS1001	NO2	Mean	-	4	4	5	6	6	
Hvaleyrarholt	ZON-IS1001	NO2	Min.	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	NO2	Max.	-	93	107	104	133	78	
Hvaleyrarholt	ZON-IS1001	NO2	Hours > LV	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	NO2	Hourly > LAT	-	0	1	1	4	0	
Hvaleyrarholt	ZON-IS1001	NO2	Hourly > UAT	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	NO2	Annual Mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT
Hvaleyrarholt	ZON-IS1001	NO2	Hourly exceedance class	-	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT
Akureyri	ZON-IS1002	NO2	Data capture (%)	-	72	65	71	30	-	
Akureyri	ZON-IS1002	NO2	Mean	-	13	8	9	7	-	
Akureyri	ZON-IS1002	NO2	Min.	-	0	0	0	0	-	
Akureyri	ZON-IS1002	NO2	Max.	-	187	163	107	42	-	
Akureyri	ZON-IS1002	NO2	Hours > LV	-	0	0	0	0	-	
Akureyri	ZON-IS1002	NO2	Hourly > LAT	-	47	10	1	0	-	
Akureyri	ZON-IS1002	NO2	Hourly > UAT	-	3	2	0	0	-	
Akureyri	ZON-IS1002	NO2	Annual Mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT
Akureyri	ZON-IS1002	NO2	Hourly exceedance class	-	LAT-UAT	<LAT	<LAT	<LAT	-	<LAT
Gröf	ZON-IS0002	NO2	Data capture (%)	-	-	-	-	70	82	
Gröf	ZON-IS0002	NO2	Mean	-	-	-	-	3	2	
Gröf	ZON-IS0002	NO2	Min.	-	-	-	-	0	0	
Gröf	ZON-IS0002	NO2	Max.	-	-	-	-	62	36	
Gröf	ZON-IS0002	NO2	Hours > LV	-	-	-	-	0	0	
Gröf	ZON-IS0002	NO2	Hourly > LAT	-	-	-	-	0	0	
Gröf	ZON-IS0002	NO2	Hourly > UAT	-	-	-	-	0	0	
Gröf	ZON-IS0002	NO2	Annual Mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Gröf	ZON-IS0002	NO2	Hourly exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Kríuvarða	ZON-IS0002	NO2	Data capture (%)	61	80	-	93	84	79	
Kríuvarða	ZON-IS0002	NO2	Mean	1	1	-	1	1	2	
Kríuvarða	ZON-IS0002	NO2	Min.	0	0	-	0	0	0	
Kríuvarða	ZON-IS0002	NO2	Max.	178	22	-	28	34	33	
Kríuvarða	ZON-IS0002	NO2	Hours > LV	0	0	-	0	0	0	
Kríuvarða	ZON-IS0002	NO2	Hourly > LAT	8	0	-	0	0	0	
Kríuvarða	ZON-IS0002	NO2	Hourly > UAT	2	0	-	0	0	0	

Station	Zone	pollutant	parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Kríuvarða	ZON-IS0002	NO2	Annual Mean exceedance class	<LAT	<LAT	-	<LAT	<LAT	<LAT	<LAT
Kríuvarða	ZON-IS0002	NO2	Hourly exceedance class	<LAT	<LAT	-	<LAT	<LAT	<LAT	<LAT

Table A8 NO_x assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	pollutant	parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Akureyri	ZON-IS1002	NOx	Data capture (%)	-	72	65	71	30	-	
Akureyri	ZON-IS1002	NOx	Mean	-	17	10	21	18	-	
Akureyri	ZON-IS1002	NOx	Min.	-	0	0	0	0	-	
Akureyri	ZON-IS1002	NOx	Max.	-	262	228	583	129	-	
Akureyri	ZON-IS1002	NOx	Hours > LV	-	-	-	-	-	-	
Akureyri	ZON-IS1002	NOx	Hourly > LAT	-	-	-	-	-	-	
Akureyri	ZON-IS1002	NOx	Hourly > UAT	-	-	-	-	-	-	
Akureyri	ZON-IS1002	NOx	Annual Mean exceedance class	-	<LAT	<LAT	LAT-UAT	<LAT	-	<LAT
Dalsmari	ZON-IS1001	NOx	Data capture (%)	-	-	-	-	57	95	
Dalsmari	ZON-IS1001	NOx	Mean	-	-	-	-	8	15	
Dalsmari	ZON-IS1001	NOx	Min.	-	-	-	-	0	0	
Dalsmari	ZON-IS1001	NOx	Max.	-	-	-	-	214	469	
Dalsmari	ZON-IS1001	NOx	Hours > LV	-	-	-	-	-	-	
Dalsmari	ZON-IS1001	NOx	Hourly > LAT	-	-	-	-	-	-	
Dalsmari	ZON-IS1001	NOx	Hourly > UAT	-	-	-	-	-	-	
Dalsmari	ZON-IS1001	NOx	Annual Mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Digranesheiði	ZON-IS1001	NOx	Data capture (%)	-	97	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Mean	-	10	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Min.	-	0	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Max.	-	218	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Hours > LV	-	-	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Hourly > LAT	-	-	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Hourly > UAT	-	-	-	-	-	-	
Digranesheiði	ZON-IS1001	NOx	Annual Mean exceedance class	-	<LAT	-	-	-	-	<LAT
FHG	ZON-IS1001	NOx	Data capture (%)	-	65	77	86	73	-	
FHG	ZON-IS1001	NOx	Mean	-	11	13	12	15	-	
FHG	ZON-IS1001	NOx	Min.	-	0	0	0	0	-	
FHG	ZON-IS1001	NOx	Max.	-	267	363	546	387	-	
FHG	ZON-IS1001	NOx	Hours > LV	-	-	-	-	-	-	
FHG	ZON-IS1001	NOx	Hourly > LAT	-	-	-	-	-	-	
FHG	ZON-IS1001	NOx	Hourly > UAT	-	-	-	-	-	-	
FHG	ZON-IS1001	NOx	Annual Mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	-	<LAT
Grensás	ZON-IS1001	NOx	Data capture (%)	-	88	96	85	96	97	
Grensás	ZON-IS1001	NOx	Mean	-	42	46	64	59	46	
Grensás	ZON-IS1001	NOx	Min.	-	0	0	0	0	0	
Grensás	ZON-IS1001	NOx	Max.	-	630	689	1358	1402	951	
Grensás	ZON-IS1001	NOx	Hours > LV	-	-	-	-	-	-	
Grensás	ZON-IS1001	NOx	Hourly > LAT	-	-	-	-	-	-	

Station	Zone	pollutant	parameter	2010	2011	2012	2013	2014	2015	Overall exceedance class
Grensás	ZON-IS1001	NOx	Hourly > UAT	-	-	-	-	-	-	
Grensás	ZON-IS1001	NOx	Annual Mean exceedance class	-	>UAT	>UAT	>UAT	>UAT	>UAT	>UAT
Gröf	ZON-IS0002	NOx	Data capture (%)	-	-	-	-	68	84	
Gröf	ZON-IS0002	NOx	Mean	-	-	-	-	3	3	
Gröf	ZON-IS0002	NOx	Min.	-	-	-	-	0	0	
Gröf	ZON-IS0002	NOx	Max.	-	-	-	-	71	46	
Gröf	ZON-IS0002	NOx	Hours > LV	-	-	-	-	-	-	
Gröf	ZON-IS0002	NOx	Hourly > LAT	-	-	-	-	-	-	
Gröf	ZON-IS0002	NOx	Hourly > UAT	-	-	-	-	-	-	
Gröf	ZON-IS0002	NOx	Annual Mean exceedance class	-	-	-	-	<LAT	<LAT	<LAT
Húsdýragarður	ZON-IS1001	NOx	Data capture (%)	-	-	-	-	-	100	
Húsdýragarður	ZON-IS1001	NOx	Mean	-	-	-	-	-	15	
Húsdýragarður	ZON-IS1001	NOx	Min.	-	-	-	-	-	1	
Húsdýragarður	ZON-IS1001	NOx	Max.	-	-	-	-	-	413	
Húsdýragarður	ZON-IS1001	NOx	Hours > LV	-	-	-	-	-	-	
Húsdýragarður	ZON-IS1001	NOx	Hourly > LAT	-	-	-	-	-	-	
Húsdýragarður	ZON-IS1001	NOx	Hourly > UAT	-	-	-	-	-	-	
Húsdýragarður	ZON-IS1001	NOx	Annual Mean exceedance class	-	-	-	-	-	<LAT	<LAT
Hvaleyrarholt	ZON-IS1001	NOx	Data capture (%)	-	87	92	86	85	83	
Hvaleyrarholt	ZON-IS1001	NOx	Mean	-	6	5	7	8	7	
Hvaleyrarholt	ZON-IS1001	NOx	Min.	-	0	0	0	0	0	
Hvaleyrarholt	ZON-IS1001	NOx	Max.	-	202	146	194	147	128	
Hvaleyrarholt	ZON-IS1001	NOx	Hours > LV	-	-	-	-	-	-	
Hvaleyrarholt	ZON-IS1001	NOx	Hourly > LAT	-	-	-	-	-	-	
Hvaleyrarholt	ZON-IS1001	NOx	Hourly > UAT	-	-	-	-	-	-	
Hvaleyrarholt	ZON-IS1001	NOx	Annual Mean exceedance class	-	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT
Kríuvarða	ZON-IS0002	NOx	Data capture (%)	64	84	-	90	86	79	
Kríuvarða	ZON-IS0002	NOx	Mean	2	1	-	1	1	2	
Kríuvarða	ZON-IS0002	NOx	Min.	0	0	-	0	0	0	
Kríuvarða	ZON-IS0002	NOx	Max.	192	28	-	38	47	42	
Kríuvarða	ZON-IS0002	NOx	Hours > LV	-	-	-	-	-	-	
Kríuvarða	ZON-IS0002	NOx	Hourly > LAT	-	-	-	-	-	-	
Kríuvarða	ZON-IS0002	NOx	Hourly > UAT	-	-	-	-	-	-	
Kríuvarða	ZON-IS0002	NOx	Annual Mean exceedance class	<LAT	<LAT	-	<LAT	<LAT	<LAT	<LAT

Table A9 Benzene assessment threshold metrics 2010-2015 by station and air quality management zone

Station	Zone	pollutant	parameter	2004	2005	2006	2007	2008	2009	2010	Overall exceedance class
Grensás	ZON-IS1001	Benzene	Data capture (%)	58	59	51	52	14	4	46	
Grensás	ZON-IS1001	Benzene	Mean	0.9	0.5	0.2	0.3	0.2	0.4	0.2	
Grensás	ZON-IS1001	Benzene	Min.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Grensás	ZON-IS1001	Benzene	Max.	13.9	7.2	2.9	172.1	1.4	2.7	2.0	
Grensás	ZON-IS1001	Benzene	Annual Mean exceedance class	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT

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