



**SIOS**

SVALBARD INTEGRATED ARCTIC  
EARTH OBSERVING SYSTEM

# **Technical documentation**

*SIOS Key Performance Indicators  
Specification*

## Versions

Version	Date	Comment	Responsible
0.2	2017-05-29	Revised version following discussions with KC	Inger Jennings
0.1	2017-05-18	Revised version following discussions during preparation of the ESFR proposal.	Øystein Godøy
0.0	2017-04-20	Initial draft based on a version prepared for the Norwegian Scientific Data Network project.	Øystein Godøy Torill Hamre

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## **1 Introduction**

### **1.1 Background**

Environmental and climate changes are currently observed at a global scale and in particular in the Arctic. In order to give better estimates of the future changes, the Arctic has to be monitored and analysed by a multi-disciplinary observation system which is suited to validate and gradually improve Earth System Models. The best chance to achieve significant results within a relatively short time frame is found in regions with a large natural climate gradient, and where processes sensitive to the expected changes are particularly important.

Svalbard and the surrounding ocean areas fulfil all these criteria: Svalbard is located in a region with a very large climate gradient, being alternately influenced by cold central Arctic or mild marine climate conditions at time scales of weeks to years. It is also located in the region with the strongest inflow and outflow processes between the Arctic and lower-latitude oceans. In addition, Svalbard is the region in the world that is best placed to facilitate study and quantify one of the remaining unknowns in the climate puzzle: the extra-terrestrial and especially solar influence on climate.

The vision for the Svalbard Integrated Arctic Earth Observing System (SIOS) is to be a regional observational system for long term acquisition and proliferation of fundamental knowledge on global environmental change (GEC) within an Earth System Science (ESS) perspective in and around Svalbard. SIOS will systematically develop and implement methods for how observational networks are to be construed and thus become a leader regarding observational systems in the Arctic and Polar regions. The SIOS Data Management System (SDMS) Data Portal is the entry point to SIOS datasets. It offers a web interface that contains information about datasets (metadata). These metadata are harvested on a regular basis from data centres contributing to SIOS. These data centres manage the data on behalf of the owners/providers of the data.

A major innovative element of SIOS is the Knowledge Centre (KC), which facilitates interaction between observation, modelling and process research, strategic processes, a service point to user communities and a platform for data handling and utilisation [3].

The first version of this document is based on a similar document developed for the SIOS project funded by the Research Council of Norway.

### **1.2 Scope**

The purpose of this document is to identify a number Key Performance Indicators that can be used as metrics for evaluation of the operation. This evaluation shall cover both the progress of SIOS and user uptake of its core services.

### 1.3 Audience

This document is developed for both an internal and external audience. The internal audience is the development team and the external audience is the Research Council of Norway, the contributing data centres and the data providers.

### 1.4 Applicable documents

[1] [Svalbard Integrated Arctic Earth Observing System – Preparatory Phase \(SIOS-PP\)](#). Accessed 2017-04-18

[2] [Memorandum of Understanding for the Operational Phase](#). Accessed 2017-04-18

[3] [SIOS Statutes for the Operational Phase](#). Accessed 2017-04-18

## 2 Key Performance Indicators definition

Key Performance Indicators (KPI) help define and measure progress towards achieving the goals and objectives of the system under development. KPIs are a tool supporting this process. In this context KPIs should measure the uptake and relevance of the system developed in the user community as well as the timeliness and quality of the services provided to the user community.

Key characteristics of the KPIs considered in this context are:

- relevant and consistent in relation to overall objectives and goals
- representative
- realistic
- specific
- measurable
- trend related (i.e. consistent over time)

In order to support this KPIs are divided in two main categories according to the system performance they are measuring:

- user relevance, uptake and impact
- quality of services

When properly developed these KPIs are reported on a monthly basis and graphical representations of time series are made available on the SIOS web page. No information related to a specific data centre, data provider or data consumer is made publicly available.

### 3 Key Performance Indicators for SIOS

#### 3.1 Background

The main objective of the selected KPIs is for the SIOS-KC to have a live tool to follow up the goals and strategies agreed upon by the General Assembly of the consortium. It is of vital importance that the KPIs can be shared with stakeholders, and supply them with useful information needed to assess whether the consortium is on track to achieve its goals. Some of the KPIs are designed to follow the progress on a frequent basis while others are suited for an annual review.

The KPIs have been selected with the strategic goals and objectives of the consortium in mind. The KPIs must evolve along with the consortium and will therefore be subject to change.

#### 3.2 User relevance, uptake and impact

##### 3.2.1 *Number of users of the web portal*

<b>Objective</b>	To measure the visibility of SIOS
<b>Measured through</b>	Analysis of web server log files. Log files are analysed using software (no Google integration) on a daily basis. The aggregated information (number of users per pages etc., not individual users) is stored indefinitely. Server logs are rotated on a weekly basis. Users of a higher order services are assumed to register and will be incorporated in a more complicated KPI in the future. This KPI includes both users of the data search interface and the rest of the site. The aggregated information is stored in monthly files.
<b>Reporting frequency</b>	Quarterly

##### 3.2.2 *Number of data repositories linked to the data portal*

<b>Objective</b>	Measure whether SIOS is attractive for data providers
<b>Measured through</b>	Information is extracted from the metadata harvesting system through which contributing data centres are linked to the SDMS.
<b>Reporting frequency</b>	Annual

##### 3.2.3 *Number of applications to RI access call*

<b>Objective</b>	To determine whether SIOS RI is attractive for researchers.
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<b>Measured through</b>	Counting the number of applications.
<b>Reporting frequency</b>	Annual

*3.2.4 Number of proposals by the consortium to funding agencies*

<b>Objective</b>	To measure the SIOS cooperation and commitment
<b>Measured through</b>	Counting the number of project proposal coordinated through SIOS.
<b>Reporting frequency</b>	Annual

*3.2.5 Number of contributors to the SIOS Annual Science Report*

<b>Objective</b>	To measure the commitment to SIOS
<b>Measured through</b>	Counting the numbers of scientists contributing to the SIOS Annual Report.
<b>Reporting frequency</b>	Annual

*3.2.6 Number of citations of the SIOS Annual Science Report*

<b>Objective</b>	To measure the relevance of the report to the wider community
<b>Measured through</b>	Tracking citations using DOI for the report.
<b>Reporting frequency</b>	Annual

*3.2.7 Number of peer reviewed publications using SIOS data / facilities*

<b>Objective</b>	To measure the relevance of SIOS to the wider scientific community
<b>Measured through</b>	Counting publications. This requires all users of SIOS infrastructure to report publications to SIOS. A more reliable method for tracking publications must be developed.
<b>Reporting frequency</b>	Annual

*3.2.8 Number of joint peer reviewed publications using SIOS*

*data/facilities*

<b>Objective</b>	To measure the success of international cooperation
<b>Measured through</b>	Tracking publications and counting them. This requires all users of SIOS infrastructure to report publications to SIOS. A more reliable method for tracking publications must be developed.
<b>Reporting frequency</b>	Annual

*3.2.9 Number of early career scientists gaining access to RI via the SIOS access programme*

<b>Objective</b>	To measure SIOS' contribution to promotion of the next generation of scientists
<b>Measured through</b>	Tracking early career scientist involvement through the application forms. We define early career scientist as someone less than 5 years from the completion of PhD (or PhD, MSc or BSc student).
<b>Reporting frequency</b>	Annual

*3.2.10 Number of institutions in SIOS in relation to number of institutions active in Svalbard*

<b>Objective</b>	To measure whether it is attractive to become a SIOS member
<b>Measured through</b>	The relative frequency of institutions active in Svalbard that are members of SIOS. This requires cooperation with Svalbard Science Forum for provision of aggregated information about the number of active institutions.
<b>Reporting frequency</b>	Annual

*3.2.11 Amount of cash and in-kind contributions from members as a proportion of host contribution*

<b>Objective</b>	To measure the evolution of partner involvement to SIOS
<b>Measured through</b>	The annual budget indicating partners financial contributions.
<b>Reporting frequency</b>	Annual

### 3.3 Quality of services

#### 3.3.1 Success rate for applications RI access

<b>Objective</b>	To measure of the quality of applications to the SIOS RI Access Programme
<b>Measured through</b>	The relative frequency of successful RI applications and the relative frequency of applications eligible (in the sense that they are scientifically qualified) for access. The latter measure is to identify whether availability of RI is good enough or actions are required.
<b>Reporting frequency</b>	Annual

#### 3.3.2 Success rate for project proposals coordinated through SIOS

<b>Objective</b>	To measure the quality of SIOS coordination and cooperation
<b>Measured through</b>	The relative frequency of successful project proposals coordinated through SIOS.
<b>Reporting frequency</b>	Annual

#### 3.3.3 Number of scientific themes

<b>Objective</b>	To measure the evolution of the SIOS science programme
<b>Measured through</b>	Counting the scientific themes in the SIOS Annual Science Report.
<b>Reporting frequency</b>	Annual

#### 3.3.4 Number of core datasets

<b>Objective</b>	To measure the growth of SIOS core data
<b>Measured through</b>	Core data sets will be determined by SOAG and flagged on the data portal. The number of flags can then be counted annually.
<b>Reporting frequency</b>	Annual

### 3.3.5 Level of user satisfaction of Access Programme

<b>Objective</b>	To measure the quality of the service provided by SIOS to users of the Access Programme
<b>Measured through</b>	There will be a compulsory feedback form for all successful applicants to the programme.
<b>Reporting frequency</b>	Annually

### 3.3.6 Completion rate of annual work programme

<b>Objective</b>	To measure the performance of SIOS
<b>Measured through</b>	Review of the work plan at the end of each year. This requires careful consideration of the work programme to ensure it is deliverable in the year specified.
<b>Reporting frequency</b>	Annual

### 3.3.7 Availability of end points

<b>Objective</b>	To measure the availability of SDMS
<b>Measured through</b>	<p>Several times a day the availability and proper operation of end points for metadata (e.g. OAI-PMH) and data (OGC WMS, OPeNDAP, ...) is checked and registered.</p> <ul style="list-style-type: none"> <li>Ⓢ Availability is defined as responding to requests.</li> <li>Ⓢ Proper operation is defined as providing expected information.</li> </ul> <p>This information is reported on a monthly basis. The availability is reported as a percentage measure.</p> <p>The target for SIOS is 95% availability in office hours (08:00-17:00 CET).</p>
<b>Reporting frequency</b>	Quarterly

### 3.3.8 Temporal frequency of dead links

<b>Objective</b>	To measure the quality of the web portal
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<b>Measured through</b>	All available metadata and editorial material is checked on a daily basis for broken links (internally or externally). The numbers of valid and broken links are aggregated on a monthly basis.
<b>Reporting frequency</b>	Quarterly

### 3.3.9 Availability of central data access point

<b>Objective</b>	To measure the quality of the data search facility
<b>Measured through</b>	The availability of the central access point of the service is reported in a similar manner as for 9.
<b>Reporting frequency</b>	Quarterly