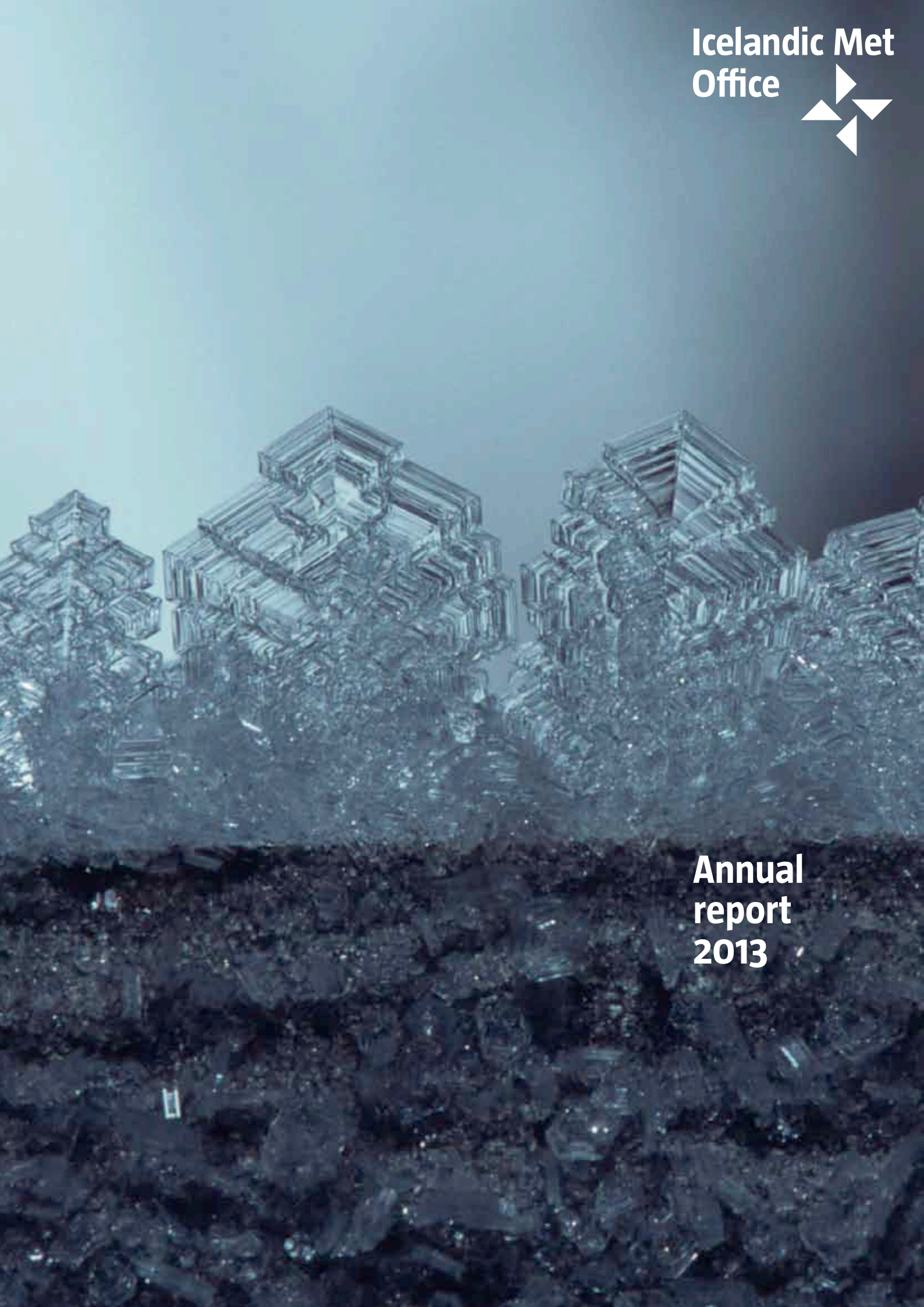
Icelandic Met Office



Annual report 2013

Bústaðavegur 7–9
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The Icelandic Meteorological Office, IMO, is responsible for real-time monitoring and forecasting of natural hazards to enhance public safety and to minimize damage to property. It is vital that the government understands the importance of this work and that it cannot be delayed. Risks from natural hazards are always present. At IMO, all forms of natural hazards are monitored. This winter, the weather in the western, northern and eastern parts of the country has been severe. There have been many avalanches, some near inhabited areas. During such periods, residents and IMO weather and avalanche monitoring staff are put under considerable strain.

When the new IMO was formed at the beginning of 2009, a vision was presented. Staff members agreed that maintaining the community's trust was important and also being a leading organisation in extensive monitoring of natural hazards, risk assessments and response plans in collaboration with other agencies. What have we achieved during the last five years?

The largest achievement was to be nominated as a State Volcano Observatory by the Icelandic and International Civil Aviation Authorities, with the objectives to monitor Icelandic volcanoes, Jan Mayen and volcanic activity in the oceanic area around Iceland. Experts in the field of volcanology have been employed to work on improving the infrastructure and services for volcano monitoring.

We have actively participated in international research projects in collaboration with the University of Iceland, the Icelandic Civil Protection Agency and several Icelandic companies. We have received considerable international funding for these projects. As part of these projects, we have improved our earthquake, strain and GPS monitoring systems in collaboration with Icelandic and international partners, despite considerable cuts being made to our budget. Hydrological monitoring has improved significantly and the standard of the monitoring is now comparable to the weather and earth hazard monitoring. Hydrological models are in development, and our intention is to run these models during times of hazardous events and even on a daily basis to further improve monitoring.

Avalanche monitoring has progressed. The emphasis is now on improving our services, especially to the Icelandic Road and Coastal Administration with regard to transport. The reason is that community structure has changed considerably in recent years and the need for better public services has increased. Also, avalanche forecasts are now a part of our services, mainly for the increasing number of tourists in mountainous areas. This service is developed as part of a research project that is partially funded with international grants.

To help us achieve our goals, we encouraged the Icelandic government to seek full membership in two European organisations which are significant to our work. One is the European Centre for Medium-Range Weather Forecasts, ECMWF, which runs a global weather model for long-term weather forecasts. These forecasts provide a base for further modelling and weather forecasts in the member states. Air quality and flooding models are also run at the centre and past climate changes have been reanalysed. The centre is considered one of the foremost institutes in their field. The other is the European Organisation for the Exploitation of Meteorological Satellites, EUMETSAT, which operates several satellites that monitor weather conditions and the natural environment. This organisation collaborates with all major satellite organizations in the world.

Iceland became a member state of ECMWF in 2011 and of EUMETSAT at the beginning of 2014. IMO is the official member on Iceland's behalf. Membership in these organisations reinforces and supports our work, especially with regard to natural hazard monitoring. Furthermore, the availability of the data is also important to other environmental research institutes in Iceland.

Another infrastructure project is EPOS, the European Plate Observation System, which aims at uniting geophysical systems in Europe into one virtual network. This will facilitate access to data for research and monitoring. A few issues of dispute have prevented the EFTA countries from participating in the project, but an effort is being made to find a solution.

This substantial development of infrastructure in collaboration with other Icelandic and international institutes has made IMO one of the most progressive centres in monitoring of natural hazards.

Árni Snorrason
Director General

Dyrfjöll. Photo: Oddur Sigurðsson

The Icelandic Meteorological Office (IMO) is a government institution under the auspices of the Ministry for the Environment and Natural Resources. IMO's headquarters are in Reykjavík but other offices are in Ísafjörður and at the international airport in Keflavík. IMO has 138 full time employees, 80% with a university degree, of which 20% are at the PhD level. About 60 employees work on research-related activities. The gender balance of the office is 64% male and 36% female. Additionally about 120 people contribute to measurements and sampling all around Iceland.

The main purpose of IMO is to contribute towards increased security and efficiency in society by:

- Monitoring, analysing, interpreting, informing, giving advice and counsel, providing warnings and forecasts and where possible, predicting natural processes and natural hazards
- Issuing public, marine and aviation alerts about impending natural hazards, such as extreme weather, volcanic ash, avalanches, sea-ice and flooding
- Conducting research on the physics of air, land and sea, specifically in the fields of meteorology, hydrology, glaciology, climatology, seismology and volcanology
- Maintaining high quality service and efficiency in providing information in the interest of economy, of security affairs, of sustainable usage of natural resources and with regard to other needs of the public
- Ensuring the accumulation and preservation of data and knowledge regarding the long-term development of natural processes such as climate, glacier changes, crustal movements and other environmental matters that fall under IMO's responsibility, including trans-boundary air pollution
- Undertaking of risk assessments for natural hazards at the request of the government
- Deciding on evacuation plans for snow avalanches and landslides

Monitoring

IMO's nationwide monitoring systems consist of over 115 automatic weather stations and almost 90 manned, a network of about 145 water level gauges in rivers and lakes, a seismic network of about 65 stations with automatic real-time data acquisition and earthquake locations, a continuous GNSS network of about 70 stations, four borehole strainmeter stations, two fixed position weather radars and two mobile ones which are intended to monitor volcanic plumes. IMO operates over 15 automatic snow depth sensors and conducts manned monitoring of snow-pack conditions, glacial margins and rivers; two stations are devoted to environmental monitoring. Many of these monitoring systems are operated in collaboration with other institutes and supporting parties.

Warning and forecasting

The operation of an effective early warning system based on forecasting is one of IMO's major tasks. IMO has a long-term advisory role with the

Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police, and issues warning and forecast about impending natural hazards to the public and stakeholders.

The institute is designated weather service provider for the international aviation in the Icelandic aviation territory and operates according to the standards and regulations of the International Civil Aviation Organization (ICAO). The institute is as well a State Volcano Observatory designated by the Icelandic Civil Aviation Authority on behalf of ICAO. IMO co-operates with national and international institutes regarding warning and alerts, e.g. the Icelandic Coast Guard, the Institute of Earth Sciences, London Volcanic Ash Advisory Centre (London VAAC), etc.

Research and development

The research focus of IMO is on earthquake- and volcanic processes, ice-volcano interaction, hydrological systems, glaciers and glacial outburst floods, avalanches and landslides, climate change and weather and atmospheric processes.

The research is to a large extent based on the extensive long term time-series from IMO, which have become increasingly important with ongoing environmental changes. These include time series of weather-related factors, such as temperature, precipitation, wind, air pressure, solar radiation and cloud cover, as well as time-series on hydrology, glaciology, earthquakes, floods, sea-ice condition, crustal deformation, avalanches, sediment load in rivers and air pollution. In addition, new fields of research and technology are constantly being pursued and developed, e.g. with remote sensing, with the main objective to enhance the capability of IMO to issue warnings and forecasts.

These data provide a benchmark for assessing ongoing changes in the Arctic, valuable information on natural resources in Iceland such as water and wind resources, as well as being fundamental in risk assessment studies carried out at IMO.

In order to broaden the research already carried out at IMO the institute is involved in many multi-participant research projects, funded by national, Nordic and European research funds. In addition to geo-hazards, most of the research projects are directed towards the topics above.

IMO is Iceland's delegate in extensive international cooperation fundamental in global monitoring such as the World Meteorological Organization (WMO), European Centre for Medium-Range Weather Forecasts (ECMWF) and EUMETSAT; from which extensive data streams enter IMO and are utilized for forecasts and research purposes.

Dissemination

The main dissemination of IMO is in the form of forecasts and warnings; through radio, TV, direct dialog with stakeholders and through IMO's web-site (vedur.is). Additionally, the web provides comprehensive real-time data on the weather, earthquakes and deformation, as well as river discharge and water levels. Notices on avalanches and sea-ice are shown; short articles and news are presented. Furthermore, web and data portals can be accessed through the web, which is available in both Icelandic and English. IMO uses the social networking website Facebook for communication and feed-back. A new web-application (App) provides access to forecasts and warnings for smartphones and other mobile devices.

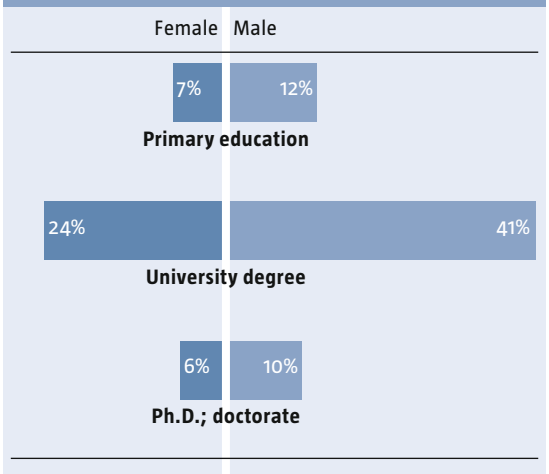
Annually, scientific reports are published by IMO as well as notices, documents and promotional material relating to the institution. In addition, IMO's employees publish a number of papers in peer-reviewed academic journals or as book chapters, and participate in oral dissemination at various levels for stakeholders, academics and the collaborators.

Natural hazards group leaders. Eiríkur Gíslason, Matthew J. Roberts, Sara Barsotti, Kristín Jónsdóttir, Harpa Grímsdóttir and Björn Sævar Einarsson. Photo: Snorri Zóphóníasson.

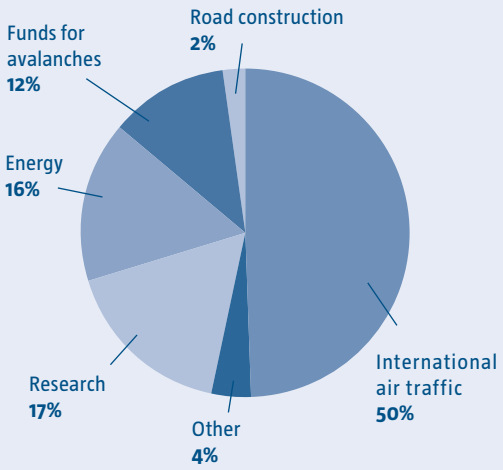
Statement of accounts for the year 2013

Income	2013	2012
Grants and donations	811.069.889	615.525.339
Public service	322.712.878	306.570.407
Other income	61.465.854	56.940.483
	1.195.248.621	979.036.229
Fees		
Wages and related expences	1.166.624.658	1.065.834.610
Office and management fees	74.483.129	74.174.794
Conference, travel and training expenses	86.221.201	64.149.119
Contracted service	131.913.414	112.393.744
Operation of equipment	64.352.602	39.824.806
Other operational expenses	126.977.887	119.544.517
Housing expenses	116.458.659	107.563.753
Vehicle expenses	15.539.739	9.744.244
Transference between Institutions	12.888.091	18.481.691
	1.795.459.380	1.611.711.278
Depreciation and purchase of assets	116.603.120	39.557.644
	1.912.062.500	1.651.268.922
(Deficit) Surplus for financial income	(716.813.879)	(672.232.693)
Financial income	(25.482.569)	21.994.370
(Deficit) Surplus for state contributions	(742.296.448)	(650.238.323)
State contribution	720.300.000	774.300.000
(Deficit) Surplus of the year	(21.996.448)	124.061.677
Principal amount at the beginning of the year	68.543.868	–55.517.809
Operating results for the year	–21.996.448	124.061.677
Principal amount at the end of the year	46.547.420	68.543.868

Education in percentage of the total number of staff



Division of income



IMO in figures

Over 600 stations in operation

IMO has 5 offices, including the hearquarters in Reykjavik

138 staff and 118 additional surveillants

Employment cost is 61% of total cost

64% of staff are male

41% of administrators are female

37% of IMO income are grants

56% of non-governmental income is due to international projects

Staff publications

Peer reviewed articles

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