

Development of the weather observations network at the Icelandic Meteorological Office

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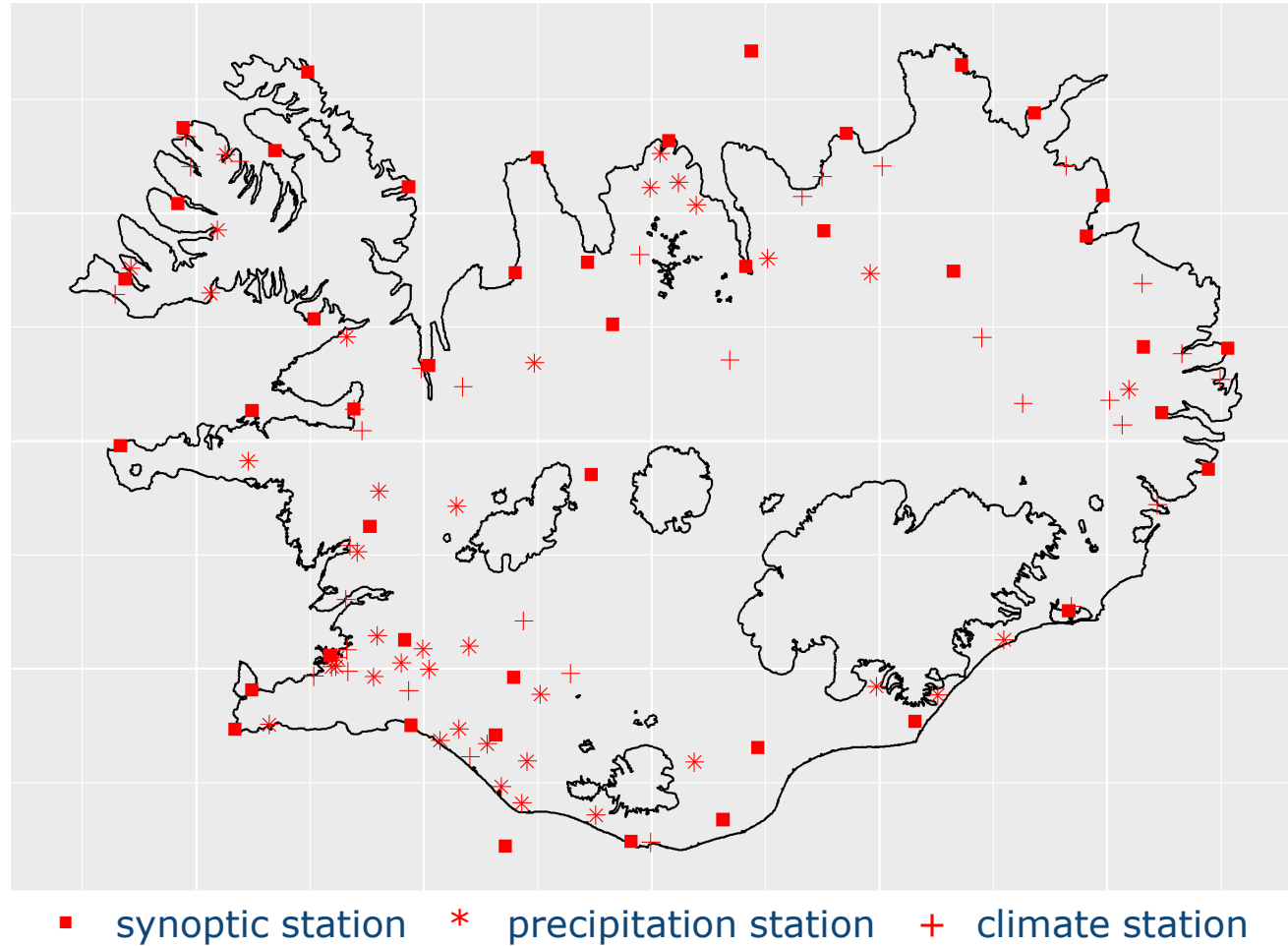
Vilhjálmur Þorvaldsson

31st Nordic Meteorological Meeting

Reyjavík, 18-20 June 2018

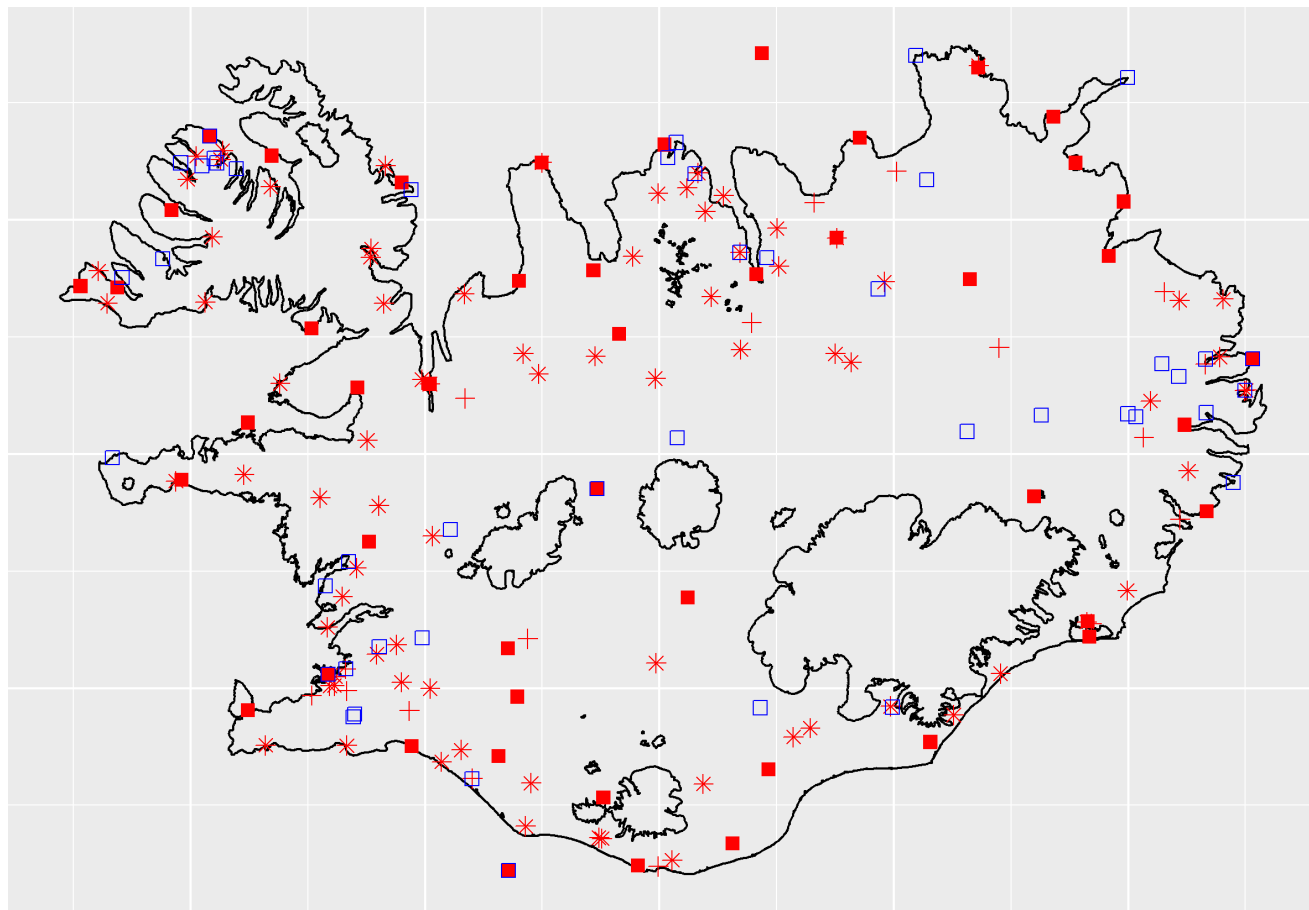
Weather observation network before 1990

- 44 Manned synoptic stations
- 39 Manned precipitation stations
- 33 Manned climatological stations
- No automatic weather stations



Weather observations network 2000

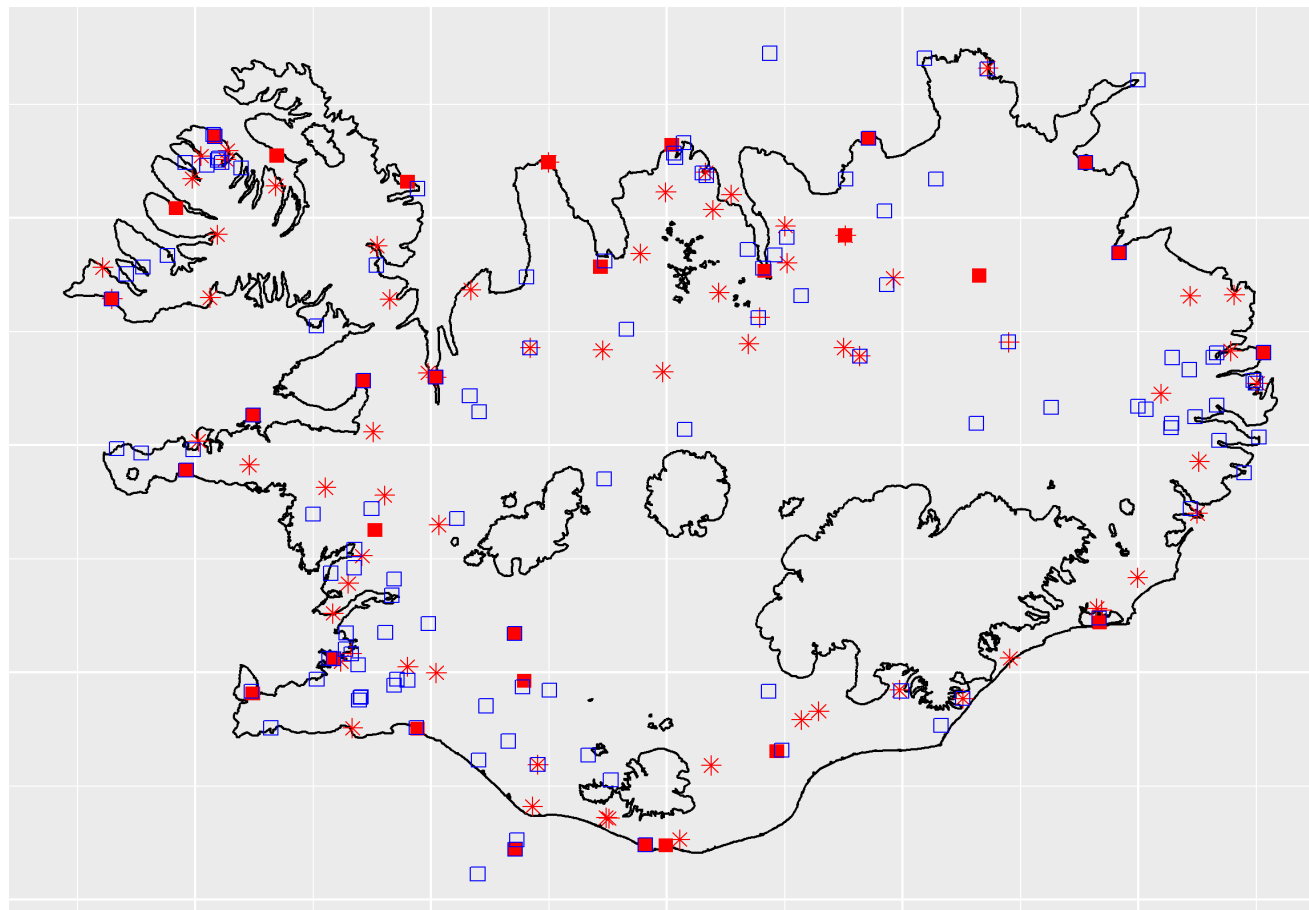
- **46 Manned synoptic stations**
- **59 Manned precipitation stations**
- **22 Manned climatological stations**
- **45 Automatic weather stations (AWS)**
- 19 air pressure sensor
- 25 precipitation sensor



■ synoptic station * precipitation station + climate station
□ AWS

Weather observations network 2010

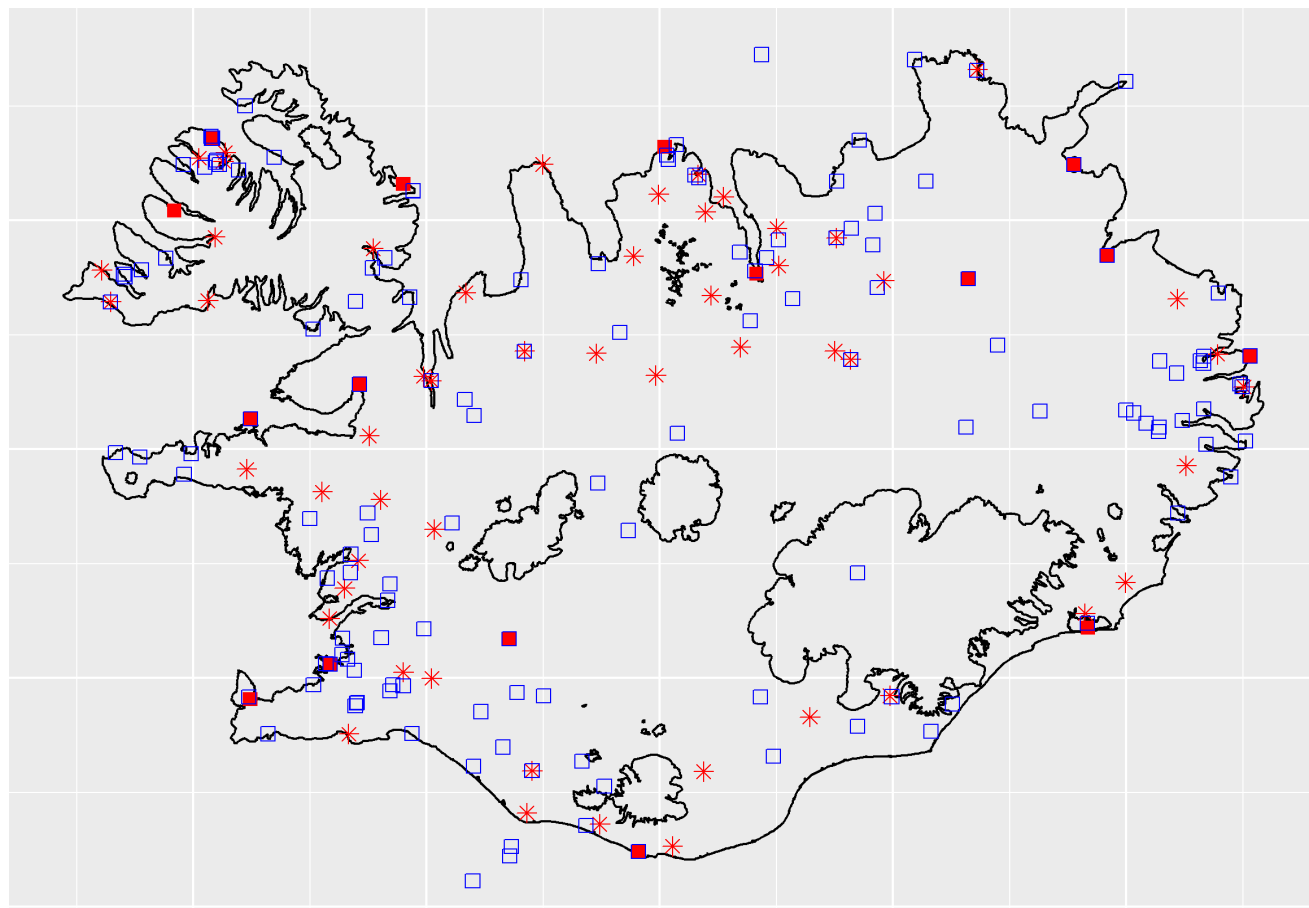
- **30 Manned synoptic stations**
- **53 Manned precipitation stations**
- **7 Manned climatological stations**
- **121 AWS**
- 41 air pressure sensor
- 48 precipitation sensor



■ synoptic station * precipitation station + climate station
□ AWS

Weather observations network 2018

- **16 Manned synoptic stations**
- **53 Manned precipitation stations**
- **No climatological stations**
- **141 AWS**
- 45 pressure sensors
- 52 precipitation sensors



- synoptic station
- * precipitation station
- + climatological station
- AWS

Development last 30 years

	1990	2000	2010	2018
Synoptic weather station	44	46	30	16
Precipitation station	39	59	53	53
Climatological station	33	22	7	0
Human observations	116	127	90	69
AWS	0	45	121	141



Instrumentation at manned weather stations - Measurement site at IMO



Reykjavík, 1994



Reykjavík

- Stevenson screens (modified)
- Rain gauge with Nipher wind shield
- Cup anemometer and wind vane
- Measurement sticks for snow depth
- Dry and wet bulb thermometer
- Minimum and maximum thermometer

Instrumentation at manned weather stations



Rain gauge with
Niper wind shield



Campbell-Stokes
sunshine recorder



Akureyri, 1997

Barograph, Mercury barometer, Mechanical wind recorder,
Wind direction screen

Instrumentation at automatic weather stations

➤ Meteorological parameters

- Temperature
- relative humidity
- atmospheric pressure
- wind direction and speed
- amount of precipitation
- cloud height and cover
- visibility
- sunshine duration
- direct and diffuse solar radiation
- UV radiation



Challenges - Changes in environment



Húsavík, 2005

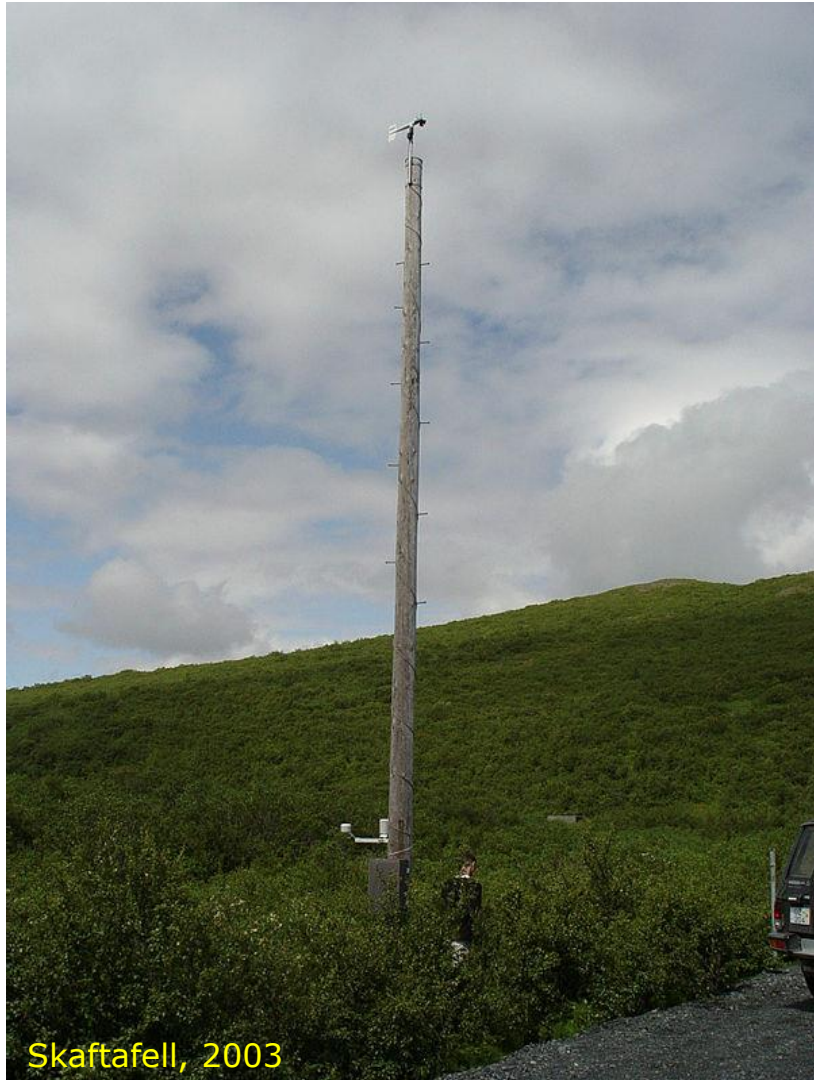


Húsavík, 2016



Húsavík, 2013

Changes in Environment

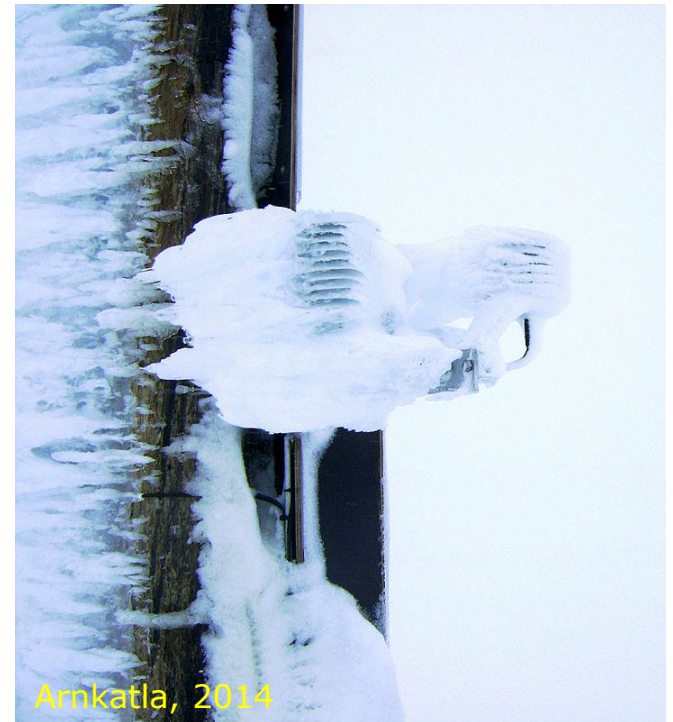


Challenges - Icing

Skálafell, 2007



Gagnheiði, 2015



Arnkátla, 2014

Other weather observation instruments

➤ Remote sensing

- seven Ceilometers (Vaisala CL31, CL51)
- two fixed C-Band Radars: Keflavík, Teigsbjarg; two mobile X-Band Radars
- one fixed Lidar: Keflavík, one mobile in a trailer



➤ Radiosonde launching stations

- two fixed: Keflavík, Egilsstaðir, one mobile radiosonde station



Summary and Outlook

- **Weather observation network changed a lot during last 30 years**
- **Human observations replaced by electronical sensors and instruments**
- **Ceilometer and radar network will expand**
- **Data quality and data traceability must be secured**

