Data for a novel infrared imager for studies of hydroxyl and oxygen emissions in the mesopause above northern Scandinavia

SND-ID: 2023-196. **Version**: 1. **DOI**: https://doi.org/10.5878/cn8x-d486

Download data

Fig2.xlsx *(11.56 KB)*

Fig3.xlsx *(11.31 KB)*

Fig4.xlsx *(18.77 KB)*

Fig5.xlsx *(9.39 KB)*

Fig6.nc *(12.03 MB)*

Fig7.xlsx *(11.45 KB)*

OH_imager_video_160223.avi *(8.82 MB)*

Associated documentation

OH_imager_Data_description.docx *(22.75 KB)*

Download all files

2023-196-1.zip *(~20.93 MB)*

Citation

Dalin, P. (2024) Data for a novel infrared imager for studies of hydroxyl and oxygen emissions in the mesopause above northern Scandinavia (Version 1) [Data set]. Swedish Institute of Space Physics. Available at: https://doi.org/10.5878/cn8x-d486

Creator/Principal investigator(s)

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Research principal

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Principal's reference number

216

Description

Data contain hydroxyl and molecular oxygen emission measurements as well as complementary measurements presented in the paper “A novel infrared imager for studies of hydroxyl and oxygen nightglow emissions in the mesopause above northern Scandinavia” submitted to Atmospheric Measurement Techniques in 2023. The data were obtained with a new infrared imaging system (OH imager) for studies of nightglow emissions coming from hydroxyl (OH) and molecular oxygen (O2) layers in the mesopause region (80–100 km) over Kiruna (Sweden).

File Fig2.xlsx contains data on 6 April 2023 shown in Figure 2 of the paper. The first column lists the time [UT, hours]. Raw intensities [digital numbers] of the atmospheric background, OH P1(2) and

P1(4) lines are listed in the second, third and fourth column, respectively.

File Fig3.xlsx contains data on the night 6/7 April 2023 shown in Figure 3 of the paper. The first column lists the time [UT, days]. The second column lists the dark-current noise [digital number].

File Fig4.xlsx contains OH(3-1) rotational temperature measurements made on the night 2/3 February 2023 shown in Figure 4 of the paper. The date and time (UT) are shown from the first to sixth column. The OH (3-1) rotational temperature [K] above Esrange is presented in the seventh column.

File Fig5.xlsx contains OH(3-1) rotational temperature measurements shown in Figure 5 of the paper. The first column contains Day of Year 2023. The OH (3-1) temperature [K] above Kiruna and its standard deviation [K] are listed in the second and third column, respectively.

File Fig6.nc is a NETCDF4 format file (https://www.unidata.ucar.edu/software/netcdf/). It contains maps around Kiruna of airglow emission intensities and temperature obtained by the OH imager on 16 February 2023. Intensities of the OH (3-1) P1(2) and P1(4) lines are given in the Rayleigh. Intensity of the O2 IR A-band at 1268.7 nm is given in a relative unit. The OH (3-1) rotational temperature at around 87 km altitude is in Kelvin. A detailed description of all the parameters is given in the metadata to Fig6.nc. The file can be read in Matlab, Python or other scientific software.

File Fig7.xlsx contains OH(3-1) rotational temperature measurements shown in Figure 7 of the paper. The first column contains Day of Year 2023. Daily mean OH (3-1) temperature above Kiruna and its standard deviation are listed in the second and third column, respectively.

File OH_imager_video_160223.avi contains a video sequence of the intensities and temperature maps on 16 February 2023 shown in Fig.6 of the present paper. The video demonstrates a motion of atmospheric gravity waves of various scales, preferentially moving from the south-west to the north-east.

Data contains personal data

No

Language

English

Time period(s) investigated

2023-01-13 – 2023-04-16

Variables

4

Data format / data structure

Numeric

Geospatial

Data collection 1

- Mode of collection: Measurements and tests
- Description of the mode of collection: Registering of nightglow infrared emissions coming from

hydroxyl (OH) and molecular oxygen (O2) layers in the mesopause (80–100 km)
- Time period(s) for data collection: 2022-11-29 – 2023-04-16
- Instrument: OH imager (Technical instrument(s)) - An infrared imaging system (OH imager) is dedicated for studies of nightglow emissions coming from hydroxyl (OH) and molecular oxygen (O2) layers in the mesopause region (80–100 km) over Kiruna (Sweden). The OH imager was put into operation in November 2022 at the Swedish Institute of Space Physics (IRF) in Kiruna. The OH imager records selected emission lines in the OH (3-1) band near 1500 nm to obtain intensity and temperature maps at around 87 km altitude. Also, the OH imager registers infrared emissions coming from O2 IR A-band airglow at 1268.7 nm in order to obtain O2 intensity maps at a slightly higher altitude at around 94 km.
- Temporal resolution: 2.75 minute
- Spatial resolution: 300 metres

Geographic spread

Geographic location: Sweden, Norrbotten Province, Finland, Norway

Responsible department/unit

Swedish Institute of Space Physics

Funding

- Funding agency: Swedish Research Council
- Funding agency's reference number: 2021-00360
- Project name on the application: Kiruna Atmosfärs- och Geofysiska Observatorium (KAGO)

Research area

Meteorology and atmospheric sciences (Standard för svensk indelning av forskningsämnen 2011)

Geoscientific information (INSPIRE topic categories)

Keywords

Atmospheric physics, Atmosphere, Atmospheric physics, Atmospheric conditions, Mesopause

Polygon (Lon/Lat)

17.146715, 66.538424

24.704048, 66.538424

24.704048, 69.122464

17.146715, 69.122464

17.146715, 66.538424

Accessibility level

Access to data through SND
Data are freely accessible

Use of data

Things to consider when using data shared through SND

Versions

Version 1. 2024-02-07

Contact for questions about the data

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Download metadata

DataCite
DDI 2.5
DDI 3.3
DCAT-AP-SE 2.0
JSON-LD
PDF
Citation (CSL)
File overview (CSV)

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