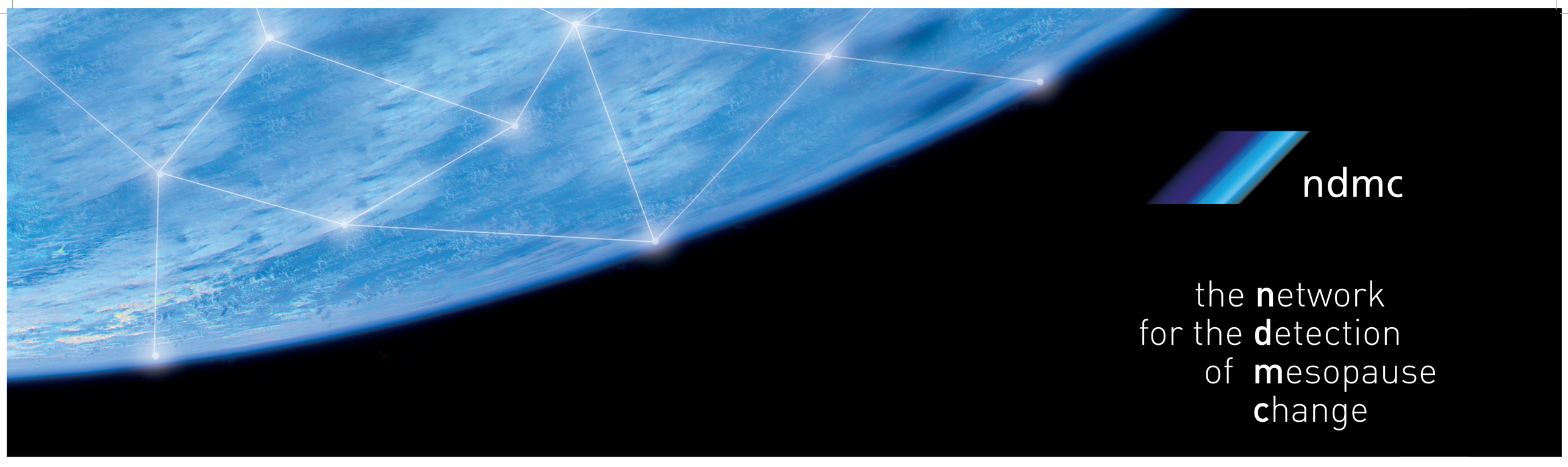


Mission Statement

The Network for the Detection of Mesopause Change (NDMC) is a global program with the mission to promote international cooperation among research groups investigating the mesopause region (80-100 km) with the goal of early identification of changing climate signals.

This program involves the coordinated study of atmospheric variability at all time scales, the exchange of existing know-how, and the coordinated development of improved observation, analysis techniques and modeling. The initial emphasis is on mesopause region airglow techniques utilizing the existing ground-based and satellite measurement capabilities.

Participation or association of researchers using other techniques in the same altitude region will be actively developed. NDMC is concerned with coupling processes and will interface with related activities throughout the atmosphere. It is affiliated with the Global Atmosphere Watch program of the World Meteorological Organization and with the Network for the Detection of Atmospheric Composition Change.

Airglow

In the mesopause region, a chemical reaction between atomic hydrogen and ozone creates vibrationally excited OH molecules. They give rise to optical emissions in the Meinel bands in the visible and near-infrared spectral range, which come from a narrow layer that peaks at a nominal altitude of 87 km. Another chain of reactions starting with the recombination of atomic oxygen leads to electronically excited oxygen molecules that produce different emission bands of molecular oxygen including the Atmospheric band from an altitude of about 95 km.

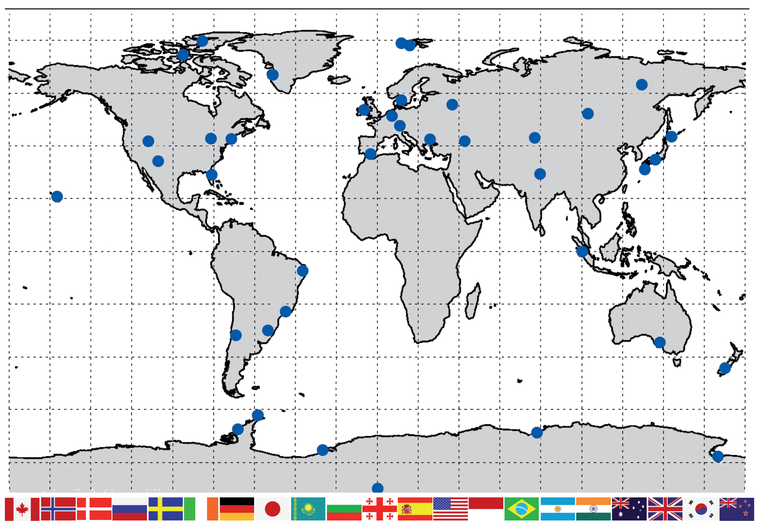
Atomic oxygen, the result of the dissociation of oxygen molecules by solar UV, itself contributes to mesopause region airglow with its green emission line, from an altitude slightly higher than the O2 bands. Complex chemistry between sodium of meteoritic origin and atomic oxygen leads to the yellow atomic sodium emission lines. The molecular emissions can be used to measure temperature from the relative intensities of the different lines contained in the emission bands. Atomic oxygen can be used to derive temperature from the Doppler broadening. Sodium and other metal emissions can be used by lidar techniques to determine vertical temperature profiles in the mesopause region.

Limb view of the Earth's atmosphere. The airglow in the 80 - 100 km altitude region is seen as a bright narrow layer. (Source: NASA)

Objectives

The overall question: is the climate of mesopause region (80-100km) changing? If so, how and why?

- Identify and quantify climate changes by monitoring key parameters such as temperatures in the mesopause region, airglow brightness for the early characterization of climate signals; Identify and quantify variability at different time scales such as seasonal variations and solar cycle effects.
- Detection of solar activity effects at all time scales ("Space Weather")
- Answering other scientific questions related to atmospheric dynamics at different time scales including the description and the causes of the variability of periodic and quasi-periodic processes:
  - acoustic and gravity waves,
  - tides and planetary waves, and
  - seasonal and interannual variations.
  - Also, episodic events caused by external forcing shall be monitored.
- Validation of satellite instruments and its use for intercomparison of ground-based instruments
- Cooperation in the development of instrumentation



Geographical distribution of NDMC measurement sites. Presently, NDMC includes 47 sites addressing airglow observation. (Status: April 2009)

NDMC network operations have officially started in 2007.
NDMC management is funded by the Bavarian State Ministry of the Environment and Public Health.

http://wdc.dlr.de/ndmc

wdc The NDMC web sites are hosted by the ICSU/WMO World Data Center for Remote Sensing of the Atmosphere (WDC-RSAT), which serves as a communication and data management platform for NDMC. WDC-RSAT is a service of the DLR-German Remote Sensing Data Center.

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No.	Code	Lat.	Long.	Location	Country
1	EUR	79.98°N	85.56°W	Eureka	Canada
2	NAS	78.92°N	11.93°E	Ny-Ålesund	Svalbard
3	KH1	78.15°N	16.04°E	Kjell Henriksen Observatory	Svalbard
4	KH2	78.15°N	16.04°E	Kjell Henriksen Observatory	Svalbard
5	RE1	74.68°N	94.90°W	Resolute Bay	Canada
6	RE2	74.68°N	94.90°W	Resolute Bay	Canada
7	SSF	67.00°N	51.00°W	Sondrestromfjord	Greenland
8	MAI	63.04°N	129.51°E	Maimaga	Russia
9	STO	57.39°N	11.92°E	Stockholm/Onsala	Sweden
10	ZVE	55.70°N	36.80°E	Zvenigorod	Russia
11	MAY	53.38°N	6.60°W	Maynooth	Ireland
12	IRK	52.00°N	103.00°E	Irkutsk	Russia
13	WUP	51.25°N	7.15°E	Wuppertal	Germany
14	OPN	48.08°N	11.27°E	Oberpfaffenhofen	Germany
15	HPB	47.80°N	11.01°E	Hohenpeissenberg	Germany
16	UFS	47.42°N	10.98°E	Schneefernerhaus / Zugspitze	Germany
17	RIK	43.50°N	143.80°E	Rikubetsu	Japan
18	ALM	43.05°N	76.97°E	Almaty	Kazakhstan
19	DL1	42.87°N	81.38°W	Delaware Observatory	Canada
20	DL2	42.87°N	81.38°W	Delaware Observatory	Canada
21	MIH	42.62°N	71.49°W	Millstone Hill	USA
22	SZB	42.43°N	25.62°E	Stara Zagora	Bulgaria
23	BLO	41.90°N	111.40°W	Bear Lake Observatory	USA
24	ABA	41.75°N	42.82°E	Abastumani	Georgia
25	GRA	37.06°N	3.38°W	Granada	Spain
26	SHI	34.80°N	136.10°E	Shigaraki	Japan
27	SOC	34.06°N	106.92°W	Socorro	USA
28	SAT	31.02°N	130.68°E	Sata	Japan
29	NAI	29.40°N	79.50°E	Nainital	India
30	DTB	29.00°N	81.04°W	Daytona Beach	USA
31	MA1	20.71°N	156.26°W	Maui	Hawaii
32	MA2	20.71°N	156.26°W	Maui	Hawaii
33	KOT	0.20°S	100.32°E	Kototabang	Indonesia
34	CAR	7.38°S	36.53°W	Cariri	Brazil
35	CAP	22.70°S	45.00°W	Cachoeira Paulista	Brazil
36	SMA	29.70°S	53.70°W	Santa Maria	Brazil
37	LEO	31.80°S	69.29°W	El Leoncito	Argentina
38	ADE	34.40°S	138.30°E	Adelaide	Australia
39	MJO	43.99°S	170.47°E	Mount John	New Zealand
40	KGI	62.00°S	58.00°W	King George Island	Antarctica
41	KSJ	62.22°S	58.79°W	King Sejong	Antarctica
42	ROT	67.57°S	68.13°W	Rothera Station	Antarctica
43	DAV	68.58°S	77.97°E	Davis Station	Antarctica
44	HAL	75.52°S	26.72°W	Halley Station	Antarctica
45	ARH	77.85°S	166.65°E	Arrival Heights	Antarctica
46	SP1	90.00°S	0.00°E	Amundsen-Scott South Pole Station	Antarctica
47	SP2	90.00°S	0.00°E	Amundsen-Scott South Pole Station	Antarctica

Status: April 2009