Zeppelin NT Flies for European Climate Research – Facts and Figures

EU project PEGASOS:

PEGASOS (**P**an-**E**uropean-**G**as-**A**ero**SO**l-Climate Interaction **S**tudy) is receiving € 7 million in funding from the European Commission under its 7th Framework Programme for Research. Twenty-six partners from a total of fourteen European countries and Israel are involved. Within the project, researchers are investigating the influence of atmospheric chemistry on climate change. The objective is to create a basis for laws and measures dealing with the climate and air quality of the next fifty years.

Zeppelin campaigns within PEGASOS:

PEGASOS involves three Zeppelin campaigns, each lasting several weeks. Jülich researchers are coordinating the Zeppelin NT's largest scientific mission to date. Scientists from Switzerland, Estonia, Finland and the USA are involved in the measurement flights, while teams of researchers from the Netherlands, Italy, France, Sweden and Finland will man the ground stations.

Flight dates (as scheduled):

- Test campaign – measuring instrument checks: November 2011
- Western route towards Cabauw (Netherlands): May/June 2012
- Southern route towards Bologna (Italy): June/July 2012

Forschungszentrum Jülich GmbH
in the Helmholtz Association
52425 Jülich, Germany

Corporate Communications
Tel: +49 2461 61-4661
Fax: +49 2461 61-4666

info@fz-juelich.de
www.fz-iuelich.de

- Northern route towards Hyytiälä (Finland): April - June 2013

Previous campaigns:

- 2006–2007: First use of the Zeppelin NT as a flight platform for climate research. Modification of the Zeppelin to include the top platform (see measuring instruments), which allows the self-cleaning ability of the atmosphere to be investigated. Measurements in the vicinity of Lake Constance.
- 2008–2009: Regional photochemistry and air quality analysed above areas of land used for different purposes in flights over the Rhine valley and Lake Constance (participation in the DFG Priority Programme COPS: Convective and Orographically-Induced Precipitation Study).

The Federal Ministry of Education and Research is providing a total of € 2.4 million for the missions.

Zeppelin NT:

- Flying speed: 0–115 km/h
- Altitude: 20–3000 m
- Maximum flight duration: 24 h
- Unique flight characteristics of the Zeppelin: it can float slowly, hover in the air, ascend and descend vertically, fly for up to 24 hours, and carry heavy measuring equipment.
- Distribution of trace gases in the planetary boundary layer of the atmosphere (up to an altitude of about 2000 metres) can be measured with high resolution.

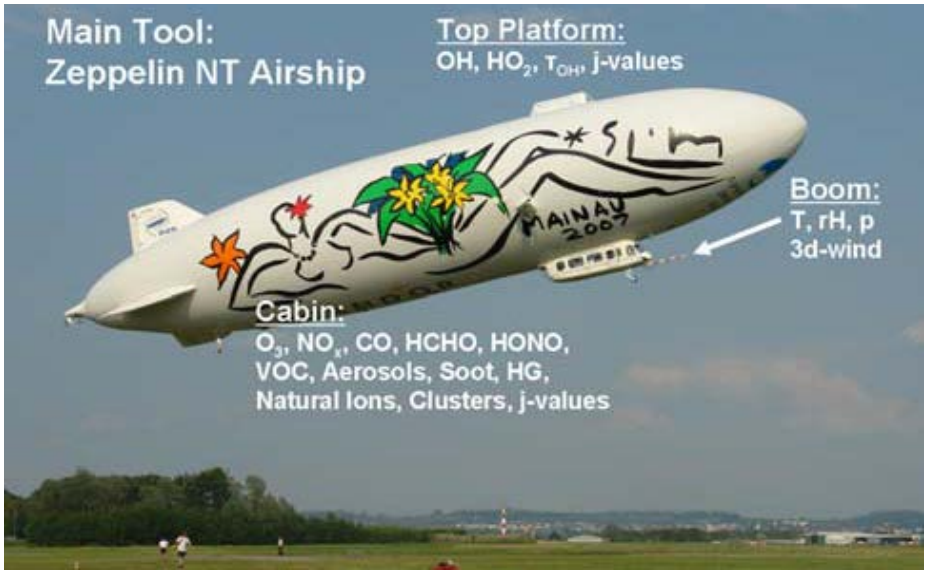
Equipped with measuring instruments:

A platform has been mounted on the Zeppelin with a dead weight of around 130 kg, which carries measuring instruments weighing around 350 kg. In addition, up to 500 kg of instruments are located in the gondola.
There are three different cabin layouts – one for each slightly different atmospheric chemistry issue being investigated. Depending on the meteorological and chemical situation in the air layers flown through, layouts will be changed during the campaign.

Forschungszentrum Jülich GmbH
in the Helmholtz Association
52425 Jülich, Germany

Corporate Communications
Tel: +49 2461 61-4661
Fax: +49 2461 61-4666

info@fz-juelich.de
www.fz-iuelich.de



What substances are being measured?

- Hydroxyl radicals (OH radicals): “detergent of the atmosphere”, which triggers the degradation of most pollutants.
- Aerosols: formation, composition, impact on climate and air quality as well as the recycling of OH radicals.
- The most important photochemically active trace substances that play a role in forming and degrading the OH radical and in aerosol chemistry (NO_x, ozone, volatile organic compounds, CO).

Where are the substances measured?

The Zeppelin NT takes measurements in the planetary boundary layer of the atmosphere (up to an altitude of about 2000 metres): the planetary boundary layer is a chemically reactive region, where the fate of most of the pollutants emitted on the Earth’s surface is decided. Information about this region is necessary to understand atmospheric processes in detail and to verify model concepts.

What makes the campaign unique?

- Extensive measuring equipment makes it possible to measure all processes associated with the OH detergent; there is no need to supplement them with model assumptions. This means that assumptions made in the past regarding the self-cleaning ability of the atmosphere can be verified in detail.
- Data on aerosols will be recorded at different altitudes in the planetary boundary layer for the first time. These include dimensions and distribution, as well as chemical and physical properties.
- The vertical distribution of chemical species that contribute to the formation of aerosols will also be determined for the first time.
- The campaign provides data on atmospheric chemistry from a variety of climate regions in Europe. As all measurements are taken

Forschungszentrum Jülich GmbH
in the Helmholtz Association
52425 Jülich, Germany

Corporate Communications
Tel: +49 2461 61-4661
Fax: +49 2461 61-4666

info@fz-juelich.de
www.fz-iuelich.de

using the same equipment, the results can be compared directly with each other.

- Integrating these campaigns in the EU project PEGASOS allows the measurements taken in the planetary boundary layer (largely unexplored in the past) to be correlated with data recorded concurrently at ground stations manned by project partners.

Further information:

Information on Jülich climate research with the Zeppelin NT:
http://www.fz-juelich.de/portal/EN/Research/EnergyEnvironment/ClimateResearch/zeppelin/_node.html

Information on PEGASOS:
http://pegasos.iceht.forth.gr/

Blog on the Zeppelin campaign:
http://eu-pegasos.blogspot.de/

Information on Zeppelin NT
http://www.zeppelinwerft.de/startseite.html

Information on Jülich's Institute of Energy and Climate Research, Troposphere (IEK-8)
http://www.fz-juelich.de/iek/iek-8/EN/Home/home_node.html

Information on Forschungszentrum Jülich:
http://www.fz-juelich.de/portal/EN/Home/home_node.html

Information on the 7th Framework Programme:
http://cordis.europa.eu/fp7/home_en.html

Information on the European Commission, Research and Innovation: Environment:
http://ec.europa.eu/research/environment/index_en.cfm?

Contacts:

Prof. Dr. Andreas Wahner
Institute of Energy and Climate Research – Troposphere (IEK-8)
Tel: +49 2461 61-5932
Email: a.wahner@fz-juelich.de

Dr. Astrid Kiendler-Scharr
Institute of Energy and Climate Research – Troposphere (IEK-8)
Tel: +49 2461 61-4185
Email: a.kiendler-scharr@fz-juelich.de

Dr. Thomas Mentel
Institute of Energy and Climate Research – Troposphere (IEK-8)

Forschungszentrum Jülich GmbH
in the Helmholtz Association
52425 Jülich, Germany

Corporate Communications
Tel: +49 2461 61-4661
Fax: +49 2461 61-4666

info@fz-juelich.de
www.fz-iuelich.de

Tel: +49 2461 61-6921
Email: t.mentel@fz-juelich.de

Press contacts:

Erhard Zeiss, Dr. Barbara Schunk
Tel: +49 2461 61-1841 or -8031
Email: e.zeiss@fz-juelich.de, b.schunk@fz-juelich.de

Forschungszentrum Jülich…

... pursues cutting-edge interdisciplinary research addressing pressing issues facing society today while at the same time developing key technologies for tomorrow. Activities focus on the fields of information technology and brain research as well as on energy and the environment. The cooperation of researchers at Jülich is characterized by unique expertise and infrastructure in physics, materials science, nanotechnology, and supercomputing. With some 5,500 employees, Jülich – a member of the Helmholtz Association – is one of Europe's large research centres.

Forschungszentrum Jülich GmbH
in the Helmholtz Association
52425 Jülich, Germany

Corporate Communications
Tel: +49 2461 61-4661
Fax: +49 2461 61-4666

info@fz-juelich.de
www.fz-iuelich.de