



THE HISTORY

IAGOS combines the expertise of two successful European research projects, MOZAIC and CARIBIC. The complementary methodology developed in these projects is continued in IAGOS in order to fully exploit the advantages of both approaches.

IAGOS-CORE	IAGOS-CARIBIC
120 kg	1600 kg
<ul style="list-style-type: none"> • Quasi-continuous • Many aircraft with ca. 500 flights/ac/yr • Quasi global coverage 	<ul style="list-style-type: none"> • More and more complex instruments • Larger flexibility • Certification easier

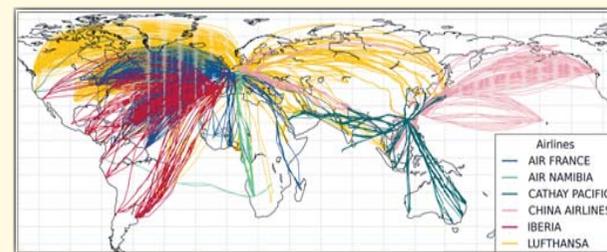
IAGOS-CORE delivers continuous data on trace gases, aerosol and cloud particles from a growing fleet of aircraft operated globally.

IAGOS-CARIBIC observes approximately 100 trace gases and aerosol parameters for a deeper understanding of atmospheric chemistry and physics from one aircraft.

THE FLEET

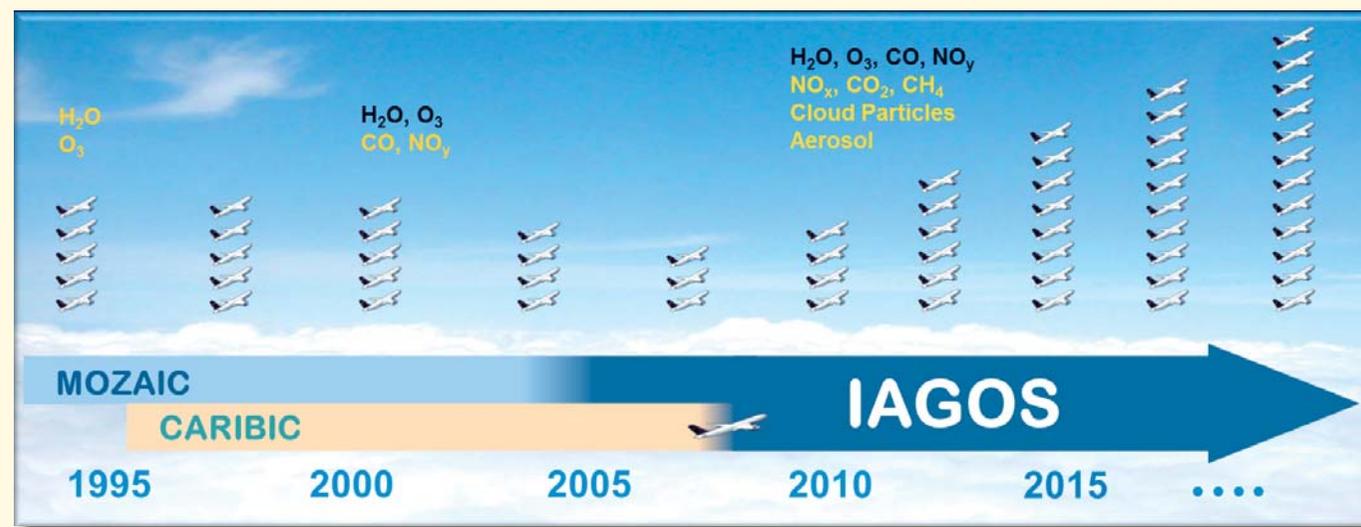
By September 2017, nine aircraft are flying for IAGOS - one with IAGOS-CARIBIC and eight with IAGOS-CORE.

Since July 2011 more than 13000 long-haul flights have been achieved, including vertical profiles over many cities.



IAGOS flight routes since July 2011

The long-term plan is to increase the number of aircraft to 20 in order to further enhance the geographical coverage. New instruments will be developed in response to future scientific and societal challenges.



<http://www.iagos.fr/mozaic>

<http://www.caribic-atmospheric.com>



THE SUPPORT

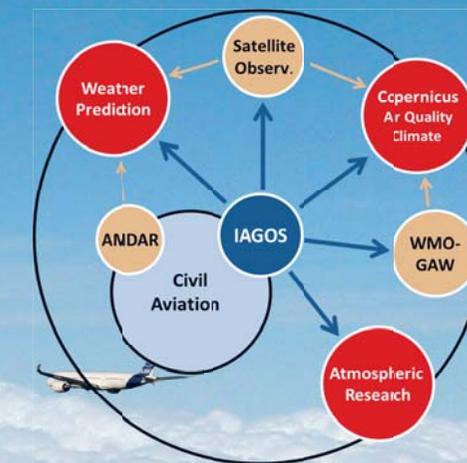
The construction phase of the Research Infrastructure is funded by Germany, France and the United Kingdom.

The preparatory phase of IAGOS was co-funded by the European Commission, in addition to national funding from Germany, France and the United Kingdom.

The IAGOS data base is cosponsored by CNES as part of the French data centre AERIS.

IAGOS would not exist without the strong support of the Airlines contributing to operation of the infrastructure by providing their technical expertise during installation and deployment of the equipment and by waving the additional fuel costs incurred by carrying the IAGOS-CORE installation.

CLIMATE / AIR QUALITY RESEARCH BY PASSENGER AIRCRAFT



In-service Aircraft for a Global Observing System

Association Internationale Sans But Lucratif

IAGOS is a European Research Infrastructure for global observations of atmospheric composition from commercial aircraft.

IAGOS combines the expertise of scientific institutions with the infrastructure of civil aviation to provide essential data on climate change and air quality.



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THE VALUE

IAGOS delivers a time and spatially resolved multi-component dataset on Essential Climate Variables and Air Pollutants.

- Distribution and long-term changes in the troposphere and lower stratosphere
- Regular vertical profiles over major cities

Group	Measured Compounds	
	IAGOS-CORE	IAGOS-CARIBIC
Greenhouse Gases	carbon dioxide, methane, water vapour	carbon dioxide, methane, nitrous oxide, water vapour, halocarbons, sulfur hexafluoride
Reactive Gases	ozone, carbon monoxide, nitrogen oxides	ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, formaldehyde, volatile organic compounds,
Aerosol	number density, size distribution	number density, size distribution, chemical composition
Cloud Particles	number density	cloud ice /water

Red: Essential Climate Variables defined by GCOS¹

IAGOS has an open data policy. Use of the data is free for non-commercial users. For operational users, data are provided in near real-time through the WMO Information System (WIS)².

The IAGOS Data Base is used by researchers world-wide for:

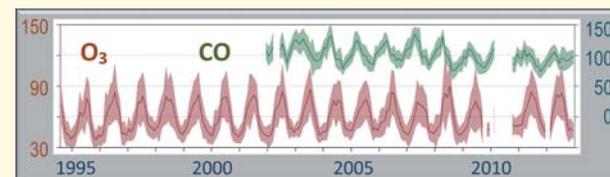
- Process studies
- Trend analysis
- Validation of climate and air quality models
- Validation of space borne data retrievals

1 <http://www.wmo.int/pages/prog/gcos>

2 <http://www.wmo.int/pages/themes/wis>

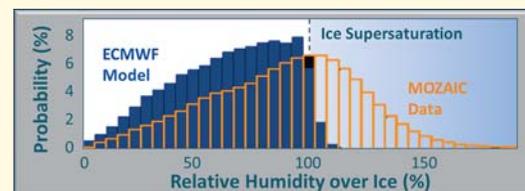
THE FINDINGS

IAGOS provides essential information on long-term changes around the tropopause (10-13 km). Over Europe, CO concentrations decreased significantly, while ozone was relatively constant during the past two decades (Petetin et al., ACP, 2016).

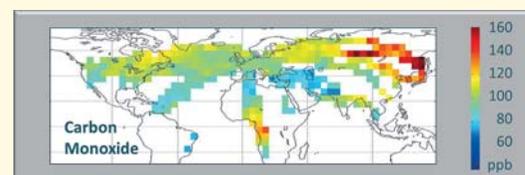


Examples of unexpected findings are:

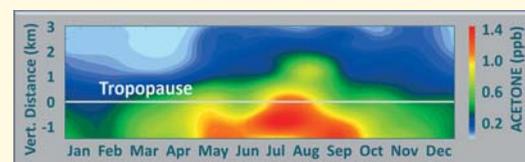
- The large abundance of ice supersaturation in the upper troposphere, an unpredicted feature with implications for weather prediction (Gierens et al., JGR, 2000)



- Extreme CO concentrations in the upper troposphere due to biomass burning with implications for global air quality (Nédélec et al., GRL, 2005)



- High concentrations of short-lived organic compounds at the tropopause with implications for the cleaning capacity of the atmosphere (Sprung & Zahn, JGR, 2010).



THE TECHNICAL APPROACH

IAGOS-CORE



Fully automatic instruments are permanently installed on AIRBUS A330 and A340 aircraft operated by different airlines. The instruments are designed according to aeronautic standards and are approved by the European Aviation Safety Agency. Data are collected on each flight between take-off and landing (~500 flights per aircraft and year).

IAGOS-CARIBIC



Each month, a cargo container with 19 instruments for measurements of atmospheric trace gases and aerosol is loaded on an AIRBUS A340 of Lufthansa, which is fitted with special provisions for sampling of gases and aerosol. After four flights, the container is brought back to the laboratory for calibration of the instruments and analysis of the samples collected during flight.

THE ORGANISATION

IAGOS is organised as an International not-for-profit Association with its seat in Brussels. For statutes and structure see: <http://www.iagos.org>

Founding Members of IAGOS-AISBL

	Forschungszentrum Jülich GmbH, Jülich, Germany
	Centre National de la Recherche Scientifique, Paris, France
	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V., München, Germany
	Météo France, Toulouse, France
	The University of Manchester, Manchester, United Kingdom
	Deutsches Zentrum für Luft- und Raumfahrt e.V., Köln, Germany
	Leibniz-Institut für Troposphärenforschung e.V., Leipzig, Germany
	Karlsruher Institut für Technologie, Karlsruhe, Germany

Editorial Note: The information presented refers to September 2017. For actual information visit our website.

Cover design: A. Volz-Thomas