EGU26-18608, updated on 12 Nov 2026
https://doi.org/10.5194/egusphere-egu26-18608
EGU General Assembly 2026
© Author(s) 2026. This work is distributed under
the Creative Commons Attribution 4.0 License.

Strengthening EU-US Cooperation towards a Sustainable Global Atmospheric Research Infrastructure: Key achievements from CARGO-ACT

Sabine Philippin[1], Elisabeth Andrews[2,3], Giri Prakash[4], Tuukka Petäjä[5,6], James Mather[7], Markus Fiebig[8], Honey Alas[9], Alfred Wiedensohler[9], Doina Nicolae[10], Anca Nemuc[10], Martial Haeffelin[11], Lucia Mona[12], Rosa Maria Petracca Altieri[12], Martine De Mazière[13], Olga Mayol-Bracero[14], Jasper Lewis[15], Nga Lee (Sally) Ng[16], Mikhail Paramonov[5], and Ewan O'Connor[17]

[1]Laboratoire de Météorologie Physique, Centre National de Recherche Scientifique, Université Clermont Auvergne, Aubière, France(s.philippin@opgc.fr)
[2]University of Colorado, CIRES, USA (betsy.andrews@noaa.gov)
[3]NOAA, Global Monitoring Laboratory, USA (betsy.andrews@noaa.gov)
[4]Oak Ridge National Laboratory, USA (palanisamyg@ornl.gov)
[5]ACTRIS ERIC, Helsinki, Finland (tuukka.petaja@helsinki.fi, mikhail.paramonov@actris.eu)
[6]University of Helsinki, Finland (tuukka.petaja@helsinki.fi)
[7]Pacific Northwest National Laboratory, USA (Jim.Mather@pnnl.gov)
[8]Norwegian Institute for Air Research, Norway (mf@nilu.no)
[9]Leibniz Institute for Tropospheric Research (alas@tropos.de, ali@tropos.de)
[10]National Institute for Research and Development in Optoelectronics INOE 2000, Romania (nnicol@inoe.ro, anca@inoe.ro)
[11]Institut Pierre Simon Laplace, CNRS, Ecole polytechnique, Paris, France (martial.haeffelin@ipsl.fr)
[12]Consiglio Nazionale delle Ricerche, Italy (lucia.mona@cnr.it, rosamaria.petraccaaltieri@cnr.it)
[13]Royal Belgian Institute for Space Aeronomy, Belgium (martine.demaziere@aeronomie.be)
[14]Brookhaven National Laboratory, USA (omayolbra@bnl.gov)
[15]University of Maryland Baltimore County, USA (jrlewis@umbc.edu)
[16]Georgia Institute of Technology, USA (ng@chbe.gatech.edu)
[17]Finnish Meteorological Institute, Finland (ewan.oconnor@fmi.fi)

Harmonized observations of aerosols, clouds and trace gases with global coverage are essential for advancing weather prediction, climate science and air quality research. They support model development and simulation and enable the calibration and validation of current and future satellite missions. While major ground-based research infrastructures (RIs) and observational networks have been developed in Europe and the United States (US) with long-term perspectives [1], their global integration remains fragmented. This is primarily due to differences in governance and access mechanisms, and to a lesser extent to operational practices and data policies. The Horizon Europe project CARGO-ACT [2] addresses these challenges by developing a roadmap for sustainable global cooperation among key atmospheric RIs, with the long-term vision of building a sustainable and coherent international framework.

As proof of concept, CARGO-ACT evaluated the consistency and compatibility of data, operations,

governance and access mechanisms for aerosol in-situ and remote sensing networks in the US (DOE/ARM, NASA/MPLNET, NOAA/GML, ASCENT) [3] and Europe (ACTRIS [4]). By bringing together network leaders and leading experts, the project promotes convergence towards interoperability and FAIR principles between ACTRIS and its US counterparts through a common data management framework and aligned data policies. Scientific robustness and comparability are addressed through the development of harmonised operating procedures, calibration strategies, and data quality methodologies, providing a solid basis for mutual trust, reproducibility and long-term sustainability of global observations.

As a concrete demonstration of data interoperability, the US Department of Energy's Atmospheric Radiation Measurement (ARM) program enabled bi-directional metadata exchange by harvesting and indexing metadata from CARGO-ACT participants (such as ACTRIS) within the ARM data portal, and by providing ARM metadata APIs to support discovery and reuse of relevant ARM datasets by the ACTRIS data portal. Another outcome of the project is the ongoing revision of the WMO/GAW report on in-situ measurements [5], led by CARGO-ACT participants. In tandem with the technical aspects, CARGO-ACT proposes strategies for coordinating governance and aligning global objectives through structured stakeholder engagement and mechanisms to support cooperation across diverse scientific priorities. The project delivers strategic recommendations for sustainable international access to global atmospheric RIs, advocating policy alignment, legal and organisational flexibility, sustainable financial and operational models, and effective coordination platforms. The CARGO-ACT approach is applicable across multiple measurement variables and observational networks.

Overall, CARGO-ACT demonstrates that sustainable global cooperation in atmospheric research is not only technically feasible but strategically essential. In the context of global environmental challenges that extend beyond national and continental boundaries, strengthened international cooperation is a prerequisite for ensuring resilient, interoperable and globally coherent observing systems capable of supporting science, policy, and society in the long run.

[1] https://doi.org/10.1175/AMSMONOGRAPHS-D-15-0045.1

[2] CARGO-ACT: https://www.cargo-act.eu/

[3] DOE/ARM: https://www.arm.gov/), NASA/MPLNET: https://mplnet.gsfc.nasa.gov/), NOAA/GML:), ASCENT: https://ascent.research.gatech.edu/)

[4] ACTRIS: https://www.actris.eu/

[5] WMO/GAW (2016), Report 227, https://www.wmo-gaw-sag-aerosol.org/files/FINAL_GAW_227.pdf