

Global Monitoring Division

Collaborations/Stakeholders



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GLOBAL MONITORING DIVISION COLLABORATIONS

2013- Present

JOINT INSTITUTES:

- **Cooperative Institute for Research in Environmental Sciences (CIRES):** NOAA Cooperative Institute at the University of Colorado. Extensive joint research and atmospheric monitoring projects are conducted at the Boulder facilities.
- **Cooperative Institute for Arctic Research (CIFAR):** NOAA Cooperative Institute at the University of Alaska. Cooperative research in Arctic atmospheric science at the Barrow and Boulder facilities.
- **Cooperative Institute for Mesoscale Meteorological Studies (CIMMS):** NOAA Cooperative Institute at the University of Oklahoma. GMD provides large amounts of high quality data for modelers.
- **Cooperative Institute for Research in the Atmosphere (CIRA):** NOAA Cooperative Institute at the Colorado State University. Joint research projects are conducted at the Boulder facility.
- **Joint Institute for Marine and Atmospheric Research (JIMAR):** NOAA Cooperative Institute at the University of Hawaii. Studies of long range transport of mercury flowing from Asia to Hawaii.
- **National Oceanic and Atmospheric Administration Cooperative Science Center for Earth System Sciences and Remote Sensing Technologies (NOAA-CESSRST):** Under the CESSRST umbrella, GMD collaborates with the National Environmental Satellite, Data and Information Service (**NESDIS**), Center for Satellite Applications and Research (STAR), and Office of Satellite and Product Operations (OSPO) to provide satellite validations.

NOAA DIVISION and LABORATORY COLLABORATIONS:

- **AOML (Atlantic Oceanographic and Meteorological Lab) and PMEL:** GMD conducts cooperative carbon cycle and halocarbon measurements in the marine environment along with the study of sulfur particulates in the global atmosphere with these labs.

- **ARL:** The GMD Radiation Project utilizes some ARL field sites and is developing a plan for future collaboration in surface energy budget monitoring activities with ARL. GMD collaborates with ARL on stratospheric ozone, Pacific Basin mercury measurements, atmospheric chemical modeling, and air quality research.
- **NESDIS NCEI Big Earth Data Initiative (BEDI):** GMD is in the process of archiving its climate data and metadata from funding by the government-wide BEDI project at the NOAA National Center for Environmental Information.
- **CSD (Chemical Sciences Division):** GMD cooperates with CSD in providing halocarbon data for their modeling and laboratory studies of greenhouse gases and ozone depleting substances (ODS). We have worked with them on joint aircraft missions including HIPPO, ATTREX, POSIDON, and Atom.
- **GFDL (Geophysical Fluid Dynamics Lab):** GMD cooperates in conducting Global Carbon Cycle modeling and Global Climate Model results compared to observed radiation.
- **National Geodetic Survey:** Continuously Operating Reference Station (NGS-CORS) –GPS reference station at MLO.
- **NESDIS (National Environmental Satellite, Data, & Information Service):** GMD hosts and supports a polar satellite data downlink antenna for NESDIS at the Barrow Observatory. Dobson ozone network at MLO, Alaska and continental U.S. (7 sites total) provides data for NESDIS satellite validation program (JPSS).
- **NESDIS Climate Reference Network (CRN)** sites are hosted at GMD SURFRAD sites at Bondville, IL; Goodwin Creek MS; Fort Peck, MT; Sioux Falls, SD; and at the Barrow and Mauna Loa Observatories.
- **NESDIS:** GMD supports satellite validation program (GOES-R series), and a mobile SURFRAD for GOES-R Cal/Val activities. The GMD Radiation group is currently developing new products on land surface characteristics (Surface albedo, NDVI) for satellite validation for NESDIS (GOES-R series, MODIS, VIIRS).
- **NWS Pacific Region - MLO** participates in the Cooperative Observer program collecting rainfall at MLO and Kulani Mauka sites, and records daily max and min temperatures.
- **Pacific Tsunami Warning Center:** MLO is host to a tsunami seismometer.
- **PMEL (Pacific Marine Environment Lab):** GMD conducts joint aerosol chemical composition measurements and analyses with PMEL. GMD has assisted PMEL with the development of shortwave radiometer tilt corrections for deployment on buoys and saildrones.

- **PSD (Physical Sciences Division):** The GMD Carbon Cycle and Greenhouse Gases Group collaborates with PSD on data assimilation and with the PSD Arctic Program on IASOA activities and data analysis.
- **Ships of Opportunity Program:** GMD obtains carbon cycle flask air samples on the Atlantic and Pacific Ocean transects.

NOAA OAR PROGRAM COLLABORATIONS:

- **Climate Program Office:** GMD conducts climate, stratospheric ozone, air quality research and monitoring of radiatively important trace gases on a global scale with funding from this office. GMD is also active in the SEARCH program.
- **Arctic Research Program:** GMD participates in a methane sampling program in the Russian Arctic at a site in Cherskiy and in the operation of the Tiksi Arctic Observatory funded in part by NOAA through the Arctic Research Program Office. The International Arctic Systems for Observing the Atmosphere (IASOA) coordinates the activities of individual Observatories (including GMD Barrow and Summit) to provide a networked, observations-based view of the Arctic.
- **National Weather Service (NWS):** GMD has total-column ozone and/or solar radiation instrumentation and cooperative operations at seven NWS stations across the U.S.
- **NWS:** The GMD Radiation group provides UV Index measurements for validation of the UV Index forecast from the Climate Prediction Center (CPC). The NWS also hosts the SOLRAD sites at Albuquerque, NM; Bismarck, ND; Hanford, CA; Seattle, WA; Salt Lake City, UT, and Sterling, VA.
- **Unmanned Aerial Systems Program Office:** In 2015, GMD local Alaska personnel provided logistic support for USCGC Healy-NOAA PUMA mission.

OTHER FEDERAL AGENCIES:

- **ARM Department of Energy Mobile Facility** has deployed with GMD cooperation and staff at Point Reyes, CA; Niamey, Niger; Heselback, Germany; Shouxin, China; Azores Islands; Nainital, India; Cape Cod; MA, Manacapuru, Amazonas; Ascension Island, South Atlantic; Steamboat Springs, CO; Gan Island, Maldives; McMurdo and Ross Ice Shelf, Antarctica; Oliktok Point, Alaska; Cerro Chajnantor, Chile; and Macquarie Island, Southern Ocean.
- **Battelle-Northwest Laboratories:** ESRL samples for Persistent Organic pollutants (POPS) in the Arctic at the Barrow Observatory.

- **Civil Air Patrol:** Mauna Loa Observatory hosts a **USAF**-supported emergency radio rebroadcast facility covering the State of Hawaii.
- **Department of Energy (DOE):** GMD hosts the **Atmospheric Radiation Measurement (ARM)** North Slope of Alaska site at the Barrow facility. GMD scientists operate the surface and airborne aerosol monitoring programs at the DOE/ARM Southern Great Plains site in Oklahoma and the surface aerosol monitoring program at the ARM Mobile Facility.
- **Department of Energy (DOE):** GMD serves as the instrument mentors for **ARM's** Multi-Filter Rotating Shadowband Radiometer (MFRSR) instrument program, their shipborne radiation packages (ShipRad) and also provides technical support to the ARM facility on matters related to broadband radiation and radiometry for ground and airborne measurement programs. ARM provides funding for GMD to further the development of ultraviolet spectrometers.
- **Department of Interior (Parks Service):** Mauna Loa Observatory maintains two helicopter landing sites used by the Parks Service for patrols, rescues and facility repairs.
- **DOE Atmospheric Science Research Program (ASR):** GMD scientists serve on the team of site scientists for the Oliktok Point, AK facility to provide guidance on measurement and data product methods and to perform program relevant science.
- **DOE Environmental Energy Technologies Division:** GMD cooperates with DOE to operate atmospheric measurements from Tall Towers in Walnut Grove and San Francisco (Sutro Tower), CA.
- **DOE** funds GMD to evaluate models with *in situ* hygroscopicity aerosol measurements.
- **Environmental Protection Agency (EPA):** The EPA studies long-range transport of mercury in the atmosphere in a joint project with GMD at Mauna Loa Observatory through the NOAA Air Resources Laboratory.
- **EPA Mandates:** GMD provides long-term measurements of ozone, and ozone precursors at the surface and in the troposphere in support of monitoring emissions for oil and gas extraction activities.
- **EPA's annual Report on the Environment:** GMD provides updates on the distributions and trends of greenhouse gases and ozone depleting substances (ODS) that are used in reports and some of its Climate Indicators.
- **Federal Aviation Administration (FAA):** Mauna Loa Observatory is host to an FAA GPS system for controlling aircraft in the Pacific Basin.

- **Interdisciplinary Research in Earth Sciences program:** NASA contributes to GMD missions with funding support.
- **Lawrence Berkeley National Laboratory:** Tall Tower sites at Walnut Grove and San Francisco (Sutro Tower), CA.
- **NASA AERONET:** GMD is host to the sunphotometer project's primary calibration site at Mauna Loa Observatory and hosts additional AERONET measurement sites.
- **NASA Clouds and Earth's Radiant Energy System Evaluation:** GMD operates surface radiation sites at Kwajalein and Bermuda, initiated with NASA funding.
- **NASA HIAPER Pole to Pole Observations (HIPPO):** GMD was a key participant in the HIPPO program and participated in the **Carbon in Arctic Reservoirs Vulnerability Experiment (CARVE)** campaigns, as well as NASA's **Atmospheric Carbon and Transport (ACT-America)** project and the **Arctic-Boreal Vulnerability experiment (ABOVE)** and in the **Atmospheric Tomography (ATom)** campaigns.
- **NASA Southern Hemisphere Additional Ozonesonde (SHADOZ):** GMD operates three international ozonesonde stations in the network in the Pacific.
- **NASA Stratospheric Aerosol and Gas Experiment (SAGE III):** GMD provides overpass-coordinated, balloon-borne, vertical profile measurements of ozone and water vapor in the upper troposphere/lower stratosphere (UTLS) over Boulder and Lauder for validation of measurements by the spectrometer aboard the International Space Station.
- **NASA** supports the continuity of GMD's long-term measurement records of upper atmospheric water vapor measurements by balloon-borne frost point hygrometers at Boulder, Hilo and Lauder.
- **NASA** Wallops Island Flight Center, VA is host to and operates a GMD Dobson spectrophotometer.
- **NASA:** GMD provides airborne trace gas instrumentation and data analysis for NASA airborne campaigns on aircraft, balloon, and unmanned aircraft for missions.
- **NASA:** GMD provides ozone sonde and Dobson total ozone column and profile data for NASA satellite validation GMD participates in various NASA organized validation/research campaigns (MAPEX, ATTREX, POSIDON, ATom, POSIDON, ATTREX, GloPac, SEAC4RS, SEACIONS, TC4, ARCTAS, CALTEX).

- **NASA's OCO-2:** GMD participates in Science Teams in the areas of validation and flux inversion. Calibrated *in situ* data are a crucial component. Near-real time releases (four times per year) of GMD's CO₂ data assimilation system (CarbonTracker-NRT) support the evaluation of OCO-2 retrievals.
- **National Aeronautics and Space Administration (NASA):** GMD is host to, and provides manpower for a NASA Advanced Global Atmospheric Gas Experiment (AGAGE) site at the American Samoa Observatory.
- **National Center for Atmospheric Research (NCAR) High Altitude Observatory:** Mauna Loa Observatory hosts the facilities supported by the National Science Foundation.
- **National Institute of Standards and Technology (NIST):** Cooperative activities in the development and maintenance of long-term absolute UV calibration, trace gas standards and reference materials.
- **National Science Foundation (NSF):** GMD is host to a wide range of NSF-sponsored university research projects (in excess of 30) across the GMD observatories.
- **National Science Foundation (NSF):** GMD operates the NSF-owned Atmospheric Research Observatory (ARO) at the South Pole, and the NSF Summit, Greenland atmospheric research facility. GMD collects air samples in the Drake Passage aboard the L.M Gould operated by NSF. Air samples are collected at the NSF Palmer Station, Antarctica.
- **NCAR Gulfstream-5:** GMD participated in five intensive campaigns utilizing the aircraft to survey trace gas distributions in the UTLS from high northern to high southern latitudes in different seasons (HIPPO 1-5).
- **NCAR, NASA and GMD** participate in extensive trace gas comparisons to maintain comparability and consistency of measurements.
- **Network for the Detection of Atmospheric Composition Change (NDACC):** GMD conducts NDACC measurements at Mauna Loa, HI; South Pole, Antarctica; Boulder, CO; Wallops Island, VA; Cape Matatula, American Samoa; Observatoire Haute Provence, France; Lauder, New Zealand; and Summit, Greenland.
- **The Northeast Regional Center of the National Institute for Global Environmental Change (NIGEC)** provides funding to both GMD and Harvard University to monitor important trace gases at the Harvard Forest tower site, Massachusetts.

- **The United States Coast Guard (USCG):** The USCG in Kodiak, AK carries a suite of GMD greenhouse gas and ozone instruments, free of charge, on board its C-130 aircraft during Arctic Domain Awareness reconnaissance flights.
- **U.S Fish and Wildlife Service:** Collection of air samples at Midway Island.
- **United States Air Force (USAF):** The USAF ships helium, free of charge, to GMD balloon sites from a depot in Texas to any airbase in the world that is near an ESRL balloon site.
- **United States Air Force** samples air flasks for GMD on Ascension Island in the mid- Atlantic Ocean.
- **United States Air Force:** The Barrow Observatory operates a radioactive aerosol sampling facility for the USAF.
- **United States Air Force:** The BRW Observatory cooperates with the USAF Long Range Radar Site in Barrow, including snow removal and road maintenance.
- **United States Army:** GMD operates a solar radiation facility with the on Kwajalein Island, Pacific Ocean.
- **United States Army:** Mauna Loa Observatory is host to a command and control radio system used by the U.S. Army for the Pacific Army live fire base on the Island of Hawaii.
- **United States Department of Agriculture (USDA):** GMD hosts the USDA solar radiation baseline calibration site at Mauna Loa, HI and operates precipitation gauges at the Barrow Observatory for the USDA. The USDA also hosts the Goodwin Creek SURFRAD site near Batesville, MS.
- **United States Department of Agriculture:** GMD operates the Central UV Calibration Facility in direct support of the USDA UV program.
- **United States Geological Survey (USGS):** The USGS Arctic Magnetic Observatory is located adjacent to the GMD Barrow Observatory and is operated by GMD staff. Also, the USGS EROS Data Center hosts the SURFRAD site at Sioux Falls, SD.
- **United States Navy (USN):** Mauna Loa Observatory is host to a Navy camera system for the control and monitoring of bombing in the Pohakuloa live fire range.
- **United States Geological Survey (USGS) Alaska Science Center:** GMD collaborates with the science center and the **Russian National Academy of Sciences** in a study of Arctic climate variability.

- **United States Geological Survey (USGS):** Mauna Loa Observatory is host to a seismometer and tilt and strain well to monitor local lava flows and earthquakes.

STATE and MUNICIPAL AGENCIES:

- **California Air Resources Board (CARB):** Sponsors tropospheric ozone sampling at Trinidad Head with ozonesondes for air quality program.
- **California Air Resources Board:** Greenhouse gas emissions.
- **Colorado Department of Public Health and Environment, Air Pollution Control Division:** GMD provides background values for a number of trace gases of interest to the division.
- **Denver Water Board, Colorado:** Local solar radiation environment.
- **Fort Peck Tribes** host the SURFRAD site on the Fort Peck Reservation in northeastern Montana.
- **Hawaii County Police, Hawaii:** Mauna Loa Observatory hosts a radio rebroadcast facility for the police and Hawaii Civil Defense radios covering all of the Island of Hawaii.
- **Hawaii State Department of Health (DOH), Honolulu:** Mercury samples collected at Mauna Loa Observatory are analyzed by the DOH.
- **Humboldt State University:** Maintains ozone-measuring instruments at Trinidad Head.
- **Illinois State Water Survey, Urbana:** This agency hosts the GMD Bondville aerosol monitoring site that has been monitoring the climate forcing properties of aerosols at that location since 1994. The Illinois State Water Survey also hosts the Bondville SURFRAD site.
- **Metro Wastewater Reclamation District, Colorado:** Local solar radiation environment.
- **Pennsylvania State University,** Department of Meteorology hosts the Penn State GMD SURFRAD site.
- **Texas Agricultural Experiment Station:** Tall Tower site in Texas.
- **University of Alabama in Huntsville:** Launch ozonesonde balloon for the GMD ozone program.
- **University of Alaska at Fairbanks:** Operates NOAA's Dobson instrument.

- **University of Colorado INSTAAR:** The Mountain Research Station operates a NEUBrew Brewer spectrophotometer, a visible MFRSR, a Yankee UVB-1, a Yankee UVA-1, an Eppley pyranometer, and a LiCOR pyranometer for GMD.
- **University of Colorado:** Hosts the surface ozone measurements at the Mountain Research Center and collects air samples at the Niwot Ridge Research Station.
- **University of Miami,** Department of Atmospheric Sciences & Rosenstiel School of Marine and Atmospheric Science acquires long-term surface ozone observations at Barbados.
- **University of Washington-Bothell, Washington:** Mountain Bachelor Observatory conducts carbon, aerosols and ozone monitoring with focus on background air sampling and seasonal impacts of the biomass burning.
- **University of Wisconsin:** The Department of Mechanical Engineering at the hosts the Madison SOLRAD site for GMD.
- **Utah Department of Air Quality:** Wintertime ozone research in Utah.
- **Wyoming Department of Air Quality:** Wintertime ozone research in Wyoming.

COLLABORATING NATIONAL and INTERNATIONAL NETWORKS

(see acronym list at the end of the booklet)

- AGAGE
- BIPM
- BSRN
- GAW (WMO)
- GCOS
- GOOS
- GRUAN
- GUAN
- ICOS
- NDACC
- SHADOZ
- IASOA

NON-GOVERNMENT, NON-UNIVERSITY PARTNERSHIPS

- 2B Technology, Boulder, CO: Surface and aircraft ozone measurement.
- Allen Scientific Glass, Boulder, CO: Air sampling flasks.
- Atmospheric Environment Research (AER), Cambridge, MA: Airborne halocarbon data and modeling support.
- ATSC, Norman, OK: Activities at the Kwajalein BSRN site.
- Bermuda Institute of Ocean Sciences: Flask-air sampling and surface ozone.
- Biospherical Instruments, Inc., San Diego, CA: Solar radiation instruments calibration.
- Brechtel Manufacturing Inc., Hayward, CA: Commercialization of GMD CLAP aerosol light absorption instrument.
- DuPont Company, NJ: Halocarbon emission estimates.
- EKO Instruments, Tokyo: Instrument design and testing.
- ENSI, CO: Ozonesondes.
- Eppley Laboratory, RI: Instrument design, modification, and testing.
- Fort Peck Indian Tribes: Fort Peck SURFRAD site operations.
- Friends of Midway: Air sampling at Midway Island.
- High Precision Devices, Boulder, CO: Air sampling equipment.
- Illinois State Water Survey, Bondville, IL: Field site operations.
- M&D Consulting, Germany: Provides halocarbon emission data.

PARTNERSHIPS AT GMD OBSERVATORIES:

The Global Monitoring Division Atmospheric Baseline Observatories are host to a wide variety of cooperative monitoring projects that benefit both NOAA and the cooperating entity. Some of these projects are operated free of charge, but many pay a fee to cover staff time, utilities, communications and road maintenance.

Some universities/agencies have projects at more than one baseline observatory and some have a number of different projects at one observatory. All of the cooperative projects in operation in 2017 are presented in following sections.

Barrow Atmospheric Baseline Observatory, Alaska

Department of Energy: Atmospheric Radiation Measurement (ARM) site.

Desert Research Institute: Mercury analyzer (until 2015).

Environment and Climate Change Canada: Persistent Organic Pollutants (POPs).

NOAA/NESDIS/NCDC: Climate Reference Network (CRN).
 NOAA/NESDIS: POES Satellite uplink and downlink facility.
 NOAA/OAR/PMEL: Aerosol filters.
 NSF EarthScope Plate Boundary Observatory.
 San Diego State University and NASA ABoVE: CH₄ Flux.
 Scripps Institution of Oceanography: CO₂, ¹³C, N₂O (flask), O₂/N₂.
 State University of New York, Albany, University of Delaware, and USDA NRCS: Thaw depth in permafrost.
 UNAVCO: SoumiNet GPS, precipitable water vapor.
 University of California, Davis: Black carbon.
 University of California, Irvine: Hydrocarbons.
 US Air Force: Detachment 460 radiation monitoring.
 USDA/Snow Survey: Precipitation gauge (until 2016).
 USGS: Geomagnetism.

Summit, Greenland: Prior to and following July 2017

Georgia Institute of Technology: Aerosol light absorption and scattering.

Mauna Loa Atmospheric Baseline Observatory, Hawaii

Academia Sinica Institute of Astronomy and Astrophysics (ASIAA) Array for Microwave Background Anisotropy (AMiBA).
 Atmospheric & Space Technology Research Associates (ASTRA) Traveling Ionospheric Disturbance Detector Built In Texas (TIDDBIT).
 Australian Nuclear Science and Technology Organization (ANSTO): Radon tracer monitoring.
 California Institute of Technology, California: Cosmic dust fluxes.
 Central Connecticut University: Clidar aerosol lidar project.
 Colorado State University, Fort Collins: Ultraviolet radiation project.
 CSIRO (Australia): ¹³C/¹²C and ¹⁸O/¹⁶O in CO₂.
 Environment and Climate Change Canada: Persistent Organic Pollutants (POPs).
 Environment and Climate Change Canada: Refractory black carbon, organic carbon, elemental carbon
 FAA/Stanford University: GPS test bed.
 Hawaii State Civil Defense Radio Amateur Civil Emergency Service (HSCD RACES and ARES).
 Hawaii Volcano Observatory: Volcano activity.
 HPA: Communications.
 John Hopkins University: Airglow studies.
 Kinki University, Japan: Solar radiation calibrations for satellites.
 Meteorological Research Institute, Japan: Spectral radiation calibrations.

Mount Washington Observatory: Ground Winds lidar.
 MSC Canada: Column O₃.
 NASA AMES Sunphotometer Calibrations.
 NASA Goddard Space Flight Center (GSFC): Pandora total ozone.
 NASA Goddard Space Flight Center: AERONET photometers.
 NASA Goddard Space Flight Center: Pyranometer.
 NASA Jet Propulsion Laboratory (JPL) Panoptic Astronomical Networked Observatories
 for a Public Transiting Exoplanets Survey (PANOPTES).
 NASA Jet Propulsion Laboratory: Stratospheric O₃ & temp profiles.
 National Ecological Observatory Network (NEON) CIMEL sunphotometer.
 National Solar Observatory (NSO) Global Oscillation Network Group (GONG).
 Naval Research Labs: Chloride oxide.
 Naval Research Labs: Stratospheric ozone profiles.
 Naval Research Labs: Water vapor.
 NCAR FTS: Solar spectra.
 NCAR: FTIR columns spectra of atmospheric gases.
 NDACC: Stratospheric Climate and Atmospheric Composition Change.
 NIES: CO₂, ¹³C, N₂O.
 NOAA Air Resources Lab: Carbon monoxide.
 NOAA Air Resources Lab: Hg⁰, Hg⁺², Hg^p.
 NOAA Air Resources Lab: Particulates.
 NOAA Air Resources Lab: Surface O₃, and SO₂.
 NOAA and NIWA: BrO.
 NOAA and NIWA: NO₂.
 NOAA and NIWA: UV.
 NOAA Earth System Research Lab (GSD): Meteorology.
 NOAA National Weather Service: Meteorology.
 NOAA National Weather Service: Rainfall at Kulani Mauka site.
 NOAA Pacific Tsunami Warning Center: Seismic activity.
 NOAA/NESDIS/NCDC: Climate Reference Network (CRN).
 Pacific Northwest National Laboratory (PNNL) Multi-Filter rotating shadowband
 radiometer.
 Pacific Northwest National Laboratory (PNNL): Solar calibrations.
 Pohakuloa Training Area Range Surveillance System: Video surveillance.
 Scripps Institution of Oceanography - Earth Networks Center for Climate Research:
 CO₂/CH₄/water vapor.
 Scripps Institution of Oceanography: Carbon cycle gases and oxygen.
 Scripps Institution of Oceanography: CO₂, ¹³C, N₂O (flask).
 Scripps Institution of Oceanography: O₂/N₂.
 Solar Light: Calibration of Microtops ozone meters.

Stanford University, California: GPS-derived column water vapor.
 State University of New York, Stonybrook: Carbon monoxide and its isotopes.
 University Nevada-Reno: Mercury studies.
 University of California, Davis - Delta group: Long transport of aerosols.
 University of California, Davis: Aerosol chemistry.
 University of Colorado: MultiAXis Differential Optical Absorption Spectroscopy (CU-MAX DOAS).
 University of Hawaii Institute for Astronomy (IFA) Asteroid Terrestrial-impact Last Alert System (ATLAS).
 University of Hawaii Institute for Astronomy (IFA): MLONet and VYSOS telescope.
 University of Hawaii - Institute for Astronomy: Variable Young Star Survey.
 University of Hawaii: Extraterrestrial particles.
 University of Hawaii: Precipitation study.
 University of Hawaii, Honolulu: Sulphate chemistry.
 University of Hawaii, Manoa: Corrosion and fungal spore projects.
 University of Michigan: Atmospheric lidar measurements.
 University of New Hampshire/NIWA: Stratospheric ozone.
 University of Rochester: ^{14}C flask sampling.
 US Navy Pacific Missile Range Facility: Video surveillance, communications.
 US Postal Inspector: Radio repeaters.
 USGS: Mercury sampling.
 USGS: Seismometer and strain meters.
 World Radiation Center: Filter radiometer/PMOD.

Trinidad Head, California: Both Before and After 2017

Scripps Institute of Oceanography, La Jolla, CA: Flask samples, surface ozone, and data sharing.

American Samoa Atmospheric Baseline Observatory, Cape Matatula

Environment and Climate Change Canada: Persistent Organic Pollutants (POPs).
 Johns Hopkins University: Ionospheric imaging.
 NASA/AGAGE: CFC-11, CFC-12, CFC-113, CCl_4 , CH_3CCl_3 , CH_4 , N_2O , CHCl_3 .
 NASA/Goddard Space Flight Center: AERONET photometers.
 Scripps Institution of Oceanography: CO_2 , ^{13}C , N_2O (flask).
 Scripps Institution of Oceanography: O_2/N_2 .
 University of California, Irvine: Hydrocarbons.

South Pole Atmospheric Baseline Observatory, Antarctica

CSIRO (Australia): CO₂, CH₄, CO, H₂, N₂O, ¹³C/¹²C and ¹⁸O/¹⁶O in CO₂.

Environment and Climate Change Canada: Brewer spectrophotometer.

NASA/Goddard Space Flight Center: AERONET photometers.

NASA/Goddard Space Flight Center: MPLNET cloud profiling.

National Institute of Polar Research (Japan) - NIPR All Sky Camera
(discontinued in 2017).

Scripps Institution of Oceanography: CO₂, ¹³C, N₂O (flask).

Scripps Institution of Oceanography: Firn air sampling.

Scripps Institution of Oceanography: O₂/N₂.

Scripps Institution of Oceanography: Oxygen isotopes.

OTHER INTERNATIONAL PARTNERSHIPS

GMD has a variety of Partnerships, Cooperative Agreements and Memoranda of Understanding with agencies in other countries to conduct Measurements and Research Separate from the Observatory Programs.

Alfred Wegener Institute, Bremerhaven, Germany: Cooperation in the operation of the WCRP BSRN data archive and various polar aerosol optical depth studies.

Algerian Meteorological Service, Tamanrasset, Algeria: Operates SURFRAD site; collects carbon cycle flask-air samples.

Arctic Research Center, Department of Environmental Science, Denmark: Surface ozone measurements in the Arctic.

Australian CSIRO: Collection of flask-air samples at Cape Grim, Tasmania and comparison of GHG measurements.

Brazilian Meteorological Service: Measurements at Bahia GAW.

British Antarctic Survey: Collection of air samples at Halley Bay, Antarctica.

Brazilian Meteorological Service: Measurements at Bahia GAW.

Bureau International des Poids et Mesures (BIPM), France.

Bureau of Meteorology, Cape Grim (Smithton), Australia: Collects flask samples for trace gases under supervision of GMD.

Bureau of Meteorology, Perth, Australia: Operates a Dobson spectrophotometer under supervision of GMD.

Centre des Faibles Radioactivités/TAAF, France: Collection of discrete air samples at Crozet Island.

Global Carbon Project: Contributions of atmospheric data and interpretations.

- Centre National de la Recherche Scientifique, France: Operates a Dobson spectrophotometer under supervision of ESRL and University of Reims.
- Centro de Investigacion de la Baja Atmosfera, Univ. of Valladolid, Spain: Collection of discrete air samples.
- China Meteorological Administration, Chinese Academy of Meteorological Sciences (CAMS): Cooperative aerosol measurements and flask-air sampling at Mt. Waliguan GAW station.
- Copernicus, the European Union's Earth Observation Programme: GMD is involved in the development of observation infrastructure.
- Czech Hydrometeorological Institute: Collaboration on calibrations of Dobson instruments through WMO/GAW.
- Deutscher Wetterdienst, Germany: Calibrations of Dobson spectrophotometers through WMO/GAW and collection of discrete air samples at Hohenpeissenberg.
- Deutscher Wetterdienst, Lindenberg, Germany: GRUAN Lead Center cooperates with GMD's certified GRUAN site at Boulder.
- Direccion Meteorologica de Chile: Collection of discrete air samples on Easter Island.
- Ente per le Nuove tecnologie, l'Energia e l'Ambiente, Italy: Collection of air samples at Lampedusa.
- Environment and Climate Change Canada: SEARCH aerosol filters at MLO and joint research operations at Alert, Egbert, Whistler, East Trout Lake and Eureka.
- Environment and Climate change Canada: The World Ozone and Ultraviolet Radiation Data Centre (WOUDC).
- Finnish Meteorological Institute, Finland: Cooperative flask-air sampling at Pallas, Finland GAW station.
- German Aerospace Center (DLR), Oberpfaffenhofen, Germany.
- Gobabeb Training and Research Center, Namibia: Discrete air sampling.
- Hungarian Meteorological Service: Collection of air samples and comparison of measurements at Hegyhatsal.
- Icelandic Meteorological Office: Collection of air samples at Storhofdi, Vestmannaeyjar.
- Indonesian Bureau of Meteorology and Geophysics: Measurements at Sumatra GAW station.
- Instituto Nacional de Pesquisas Espaciais (INPE), Brazil: Dobson spectrophotometer calibrations with assistance from GMD; joint WMO/GAW operations.
- Instituto Nacional de Meteorologia e Geofisica, Portugal: Collection of discrete air samples at Terceira Island, Azores.
- Izaña Observatory/Meteorological State Agency of Spain: Collection of air samples.

Japan Meteorological Agency: Collaboration on calibrations of Dobson Instruments through WMO/GAW.

Karlsruhe Institute of Technology, Karlsruhe, Germany: Collaboration in performing comparisons between satellite-based, balloon-borne, and ground-based measurements of stratospheric water vapor for the 2nd SPARC Water Vapor Assessment.

Korea Centre for Atmospheric Environment Research: Air sampling at Yae-ahn Peninsula, Korea.

Korea Meteorological Administration, Korea Global Atmosphere Watch Center, Korea: Collection of discrete air samples at Anmyeon-do.

Leibniz Institute for Tropospheric Research, Leipzig, Germany: Collaborative aerosol measurements at Barrow, joint workshop participation to improve aerosol instruments and measurement methodologies.

Max Planck Institute for Chemie, Mainz, Germany.

Mongolian Hydrometeorological Research Institute: Collect flask-air samples at Ulaan Uul, Mongolia.

National Academy of Sciences, Russia: Cooperation on BSRN site.

National Central University, Taiwan: Collection of air samples at Dongsha Island and Lulin GAW station.

National Institute of Polar Research, Japan: Studies of polar aerosol optical properties.

National Institute of Water & Atmospheric Research, New Zealand: Operates a Dobson spectrophotometer under supervision of GMD, a surface ozone instrument in Lauder, New Zealand and Arrival Heights, Antarctica, and launches water vapor sondes at Lauder supplied by GMD.

National University of Ireland, Galway, Ireland: Collection of air samples at Mace Head.

Paul Scherrer Institute, Villigen, Switzerland: Aerosol research.

Roshydromet, Russia: SEARCH and establishment of climate monitoring station in Northern Siberia.

Servicio Meteorologico Nacional, Argentina: Collect cooperative air samples at Ushuaia for measurements of GHGs.

Seychelles Bureau of Standards: Collection of discrete air samples on Mahe Island.

Sistema Internacional de Monitoreo Ambiental, Mexico: Collection of air samples at high altitude climate observatory.

South African Weather Service: Calibrations of Dobson spectrophotometers through WMO/GAW and aerosol measurements and collection of flask-air samples at Cape Point GAW station.

Stockholm University, Meteorological Institute, Sweden: Cooperative flask-air sampling at the GAW Zeppelin Observatory.

UK Met Office: Collection of discrete air samples on Ascension Island.

University of Guam/Marine Laboratory: Collection of discrete air samples.

University of Kiel, Institute für Meereskunde, Kiel, Germany: Halocarbon measurements.

University of Edinburgh, Scotland: CO₂ and CH₄ studies using models and measurements.

Weizmann Institute of Science and Arava Institute for Environmental Studies, Israel: Cooperative air sampling in Negev Desert.

WMO World Climate Research Program - GEWEX: ESRL provides international management of the WCRP Baseline Surface Radiation Network.

World Climate Research Program, Geneva: BSRN and GEWEX activities.

World Meteorological Organization, Switzerland: BSRN, GAW, and GCOS activities.

World Radiation Center, Switzerland: Radiometer calibration and characterization studies.

OTHER RESEARCH COLLABORATIONS, DATA EXCHANGES, STUDENT INTERNSHIPS, and JOINT PUBLICATIONS

- Bay Area Environmental Research Institute
- Baylor University
- Belgian Institute for Space Aeronomy
- Brookhaven National Laboratory
- California Institute of Technology
- California State University, Humboldt
- Centre National de la Recherche Scientifique
- Centre National d'Etudes Spatiales
- China Meteorological Administration
- Colorado State University
- University of Denver
- Department of Energy Pacific Northwest Laboratory
- Department of Interior Mineral Management Service
- Desert Research Institute
- DLR Institute of Atmospheric Physics
- DOE Argonne National Laboratory
- DOE Los Alamos National Laboratory

- Droplet Measurement Technologies
- Duke University
- Ecotech Pty Ltd.
- Eidgenössische Technische Hochschule
- Environment and Climate Change Canada
- Environmental Protection Agency
- European Centre for Medium-Range Weather Forecasting
- European Commission
- European Space Agency
- Federal Aviation Administration
- Florida State University
- Forschungszentrum Jülich
- Fort Hayes State University
- French Meteorological Service
- Georgia Institute of Technology
- German Aerospace Institute
- German Weather Service
- Harvard University (Harvard Forest and SEAS)
- Hokkaido University
- Howard University
- Ibaraki University
- Institut Pierre Simon Laplace
- Japan Meteorological Agency
- Johns Hopkins University
- Karlsruhe Institute of Technology
- Keio University
- Laboratoire d'Aérodynamique, Toulouse
- Laboratoire des Sciences du Climat et de l'Environnement
- Laboratory for Atmospheric and Space Physics
- Lamar University
- Lawrence Livermore National Laboratory
- Los Angeles World Airports
- Max-Planck-Institut Hamburg
- Max Planck Institute for Biogeochemistry, Jena
- McGill University
- Met Office, U.K.
- Met Service of Slovenia

- National Aeronautics and Space Administration (NASA):
 - Armstrong Flight Research Center (AFRC), Palmdale & Edwards Air Force Base, CA
 - Columbia Scientific Balloon Facility (CSBF), Ft. Sumner, NM
 - Goddard Space Flight Center (GSFC), Greenbelt, MD
 - Headquarters, DC
 - Johnson Space Center (JSC), Houston, TX
- National Center for Atmospheric Research
- National Institute of Standards and Technology
- National Institute of Water and Atmospheric Research
- National Science Foundation
- Netherlands Environmental Assessment Agency
- Nordic Envicon Oy
- North Carolina State University
- Norwegian Institute for Air Research
- Oregon State University
- Pacific Northwest National Laboratory
- Pennsylvania State University
- Physical Sciences Inc.
- Plymouth State College
- Portland State University
- Rice University
- Royal Dutch Meteorological Institute
- Scripps Institution of Oceanography
- Stanford University
- Technical University of Munich
- Tennessee Valley Authority
- Texas A&M University
- Texas Tech University
- Thermo Fisher Scientific
- United States Coast Guard
- University of California Berkeley
- Universidad Nacional de Autonoma Mexico
- Universite de Pierre et Marie Curie
- University of Bremen
- University of Bristol, UK (Mace Head and Barbados)
- University of California Davis
- University of California Irvine
- University of California Los Angeles
- University of California Santa Cruz

- University of Cambridge
- University of Central Florida
- University of Colorado Boulder
- University of East Anglia
- University of Edinburgh
- University of Galway (Mace Head, Ireland)
- University of Helsinki
- University of Houston
- University of Iowa
- University of Jerusalem
- University of Leeds
- University of Leicester
- University of Manchester
- University of Maryland
- University of Massachusetts
- University of Miami
- University of New Hampshire
- University of Reading
- University of Stockholm
- University of Texas
- University of Toronto
- University of Virginia
- University of Washington
- University of Wisconsin
- Valparaiso University
- Volpe National Transportation Systems Center
- Washington State University
- Weismann Institute
- Western Michigan University
- Woods Hole Oceanographic Institution

