Sampling Site and Measurement Program Summary

Global Monitoring Division

NOAA Earth System Research Laboratory

Boulder, Colorado

Atmospheric Research Observatory - South Pole, Antarctica *Photo by: Patrick Cullis*

September, 2011

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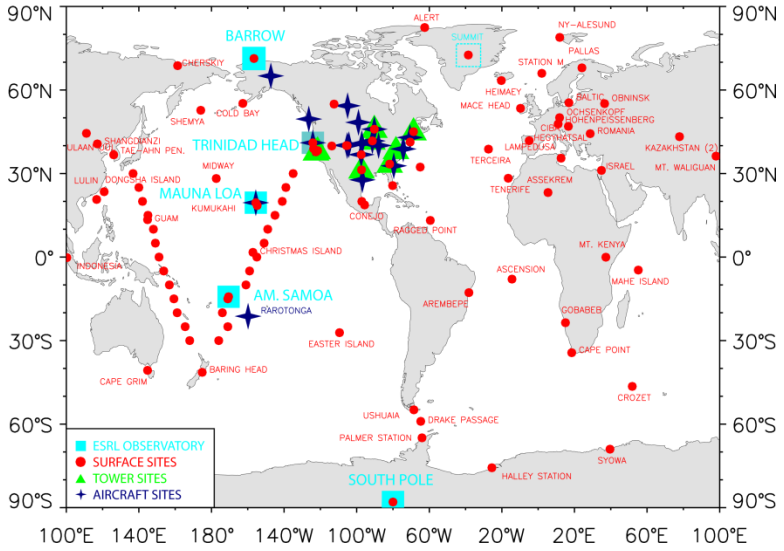
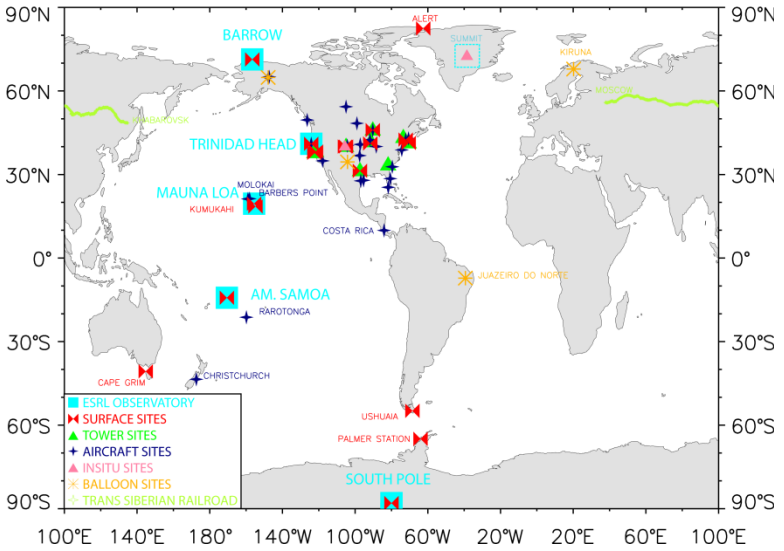
NOAA ESRL Global Monitoring Division Network Site Maps

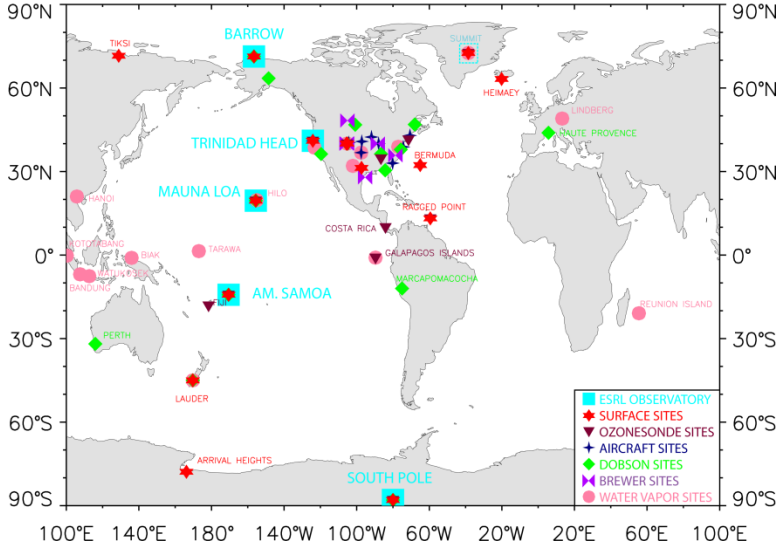
NOAA ESRL Carbon Cycle Greenhouse Gases



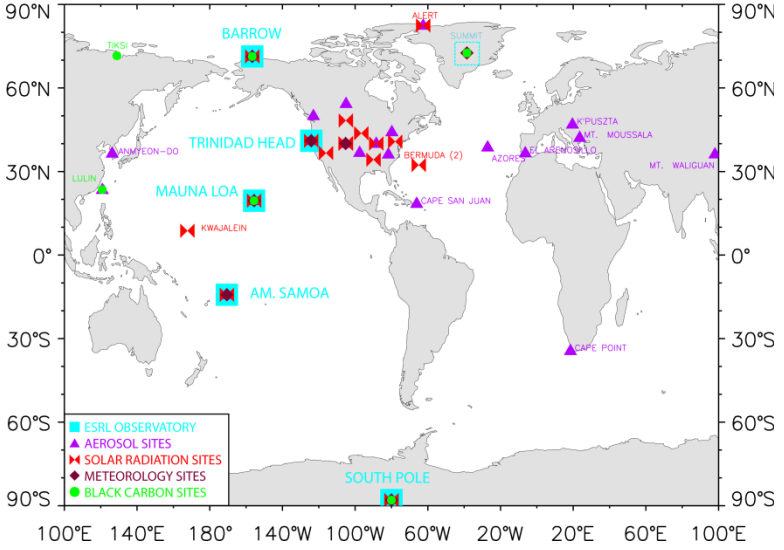
NOAA ESRL Halocarbons and Atmospheric Trace Species



NOAA ESRL Ozone and Water Vapor



NOAA ESRL Aerosols, Solar Radiation, Meteorology and Black Carbon



Sampling Sites and Measurement Programs

September, 2011

Global Monitoring Division, ESRL, Boulder, Colorado

Measurement	United States and Territories	International
Aerosols	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
Absorption, scattering, particle number, and chemical composition at most sites.	Barrow, Alaska Bondville, Illinois Boone, North Carolina Cape San Juan, Puerto Rico Lamont, Oklahoma Mauna Loa, Hawaii *Point Reyes, California (Closed)* Steamboat Springs, Colorado Trinidad Head, California Tutuila, American Samoa	Alert, Canada Anmyeon-do, Korea Azores, Portugal Black Forest, Germany (Campaign) Cape Point, South Africa East Trout Lake, Canada Egbert, Canada El Arenosillo, Spain Gosan, South Korea (Campaign) K'puszta, Hungary Kashidhoo, Maldives (Campaign) Lulin, Taiwan Moussala, Bulgaria Mt. Waliguan, China Niamey, Niger (Campaign) Sable Island, Canada (Campaign) Shouxian, China (Campaign) South Pole, Antarctica Summit, Greenland (black carbon) Whistler, Canada
Aerosol Lidar	**Daily Profiles**	**Daily Profiles**
Aerosol light scattering verses altitude.	Boulder, Colorado (stratosphere) Mauna Loa, Hawaii (stratosphere) Trinidad Head, California (troposphere) Tutuila, American Samoa (stratosphere)	South Pole, Antarctica (troposphere) Summit, Greenland (stratosphere & troposphere)
Carbon Cycle Gases	**Surface, Continuous**	**Surface, Continuous**
(Species listed)	Barrow, Alaska (CO_2, CH_4, CO) Mauna Loa, Hawaii (CO_2, CH_4, CO) Tutuila, American Samoa (CO_2) South Pole, Antarctica (CO_2)	
Carbon Cycle Gases	**Tall Tower, Continuous**	**Tall Tower, Continuous**
(Species listed)	Argyle, Maine (CO_2, CO) Beech Island, South Carolina (CO_2, CO) Erie, Colorado (CO_2, CO), Marthas Vineyard, Massachusetts (CO_2) Moody, Texas (CO_2, CO) Park Falls, Wisconsin (CO_2, CH_4, CO) Shenandoah, Virgina (CO_2, CO) Walnut Grove, Califoirnia (CO_2, CH_4, CO) West Branch, Iowa (CO_2, CO)	
Carbon Cycle Gases	**Airborne, Light Aircraft (Bi-weekly)**	**Airborne, Light Aircraft (Bi-weekly)**
(Flask Samples) Species Measured In Carbon Cycle Flasks: CO_2, CH_4, CO, H_2, SF_6, ^{13}C in CO_2, 18O in CO_2, N_2O, ^{13}C in CH_4, CH_3D	Beaver Crossing, Nebraska *Bondville, Illinois (on funding hold)* *Bradgate, Iowa (on funding hold)* Briggsdale, Colorado Cape May, New Jersey Charleston, South Carolina Dahlen, North Dakota *Fairchild, Wisconsin (on funding hold)* *Harvard Forest, Massachusetts (closed)* Homer, Illinois Isles of Shoals, New Hampshire Kodiak USCG, Alaska *Oahu, Hawaii (on funding hold)* *Oglesby, Illinois (on funding hold)* Park Falls, Wisconsin Poker Flat, Alaska Ponca City, Oklahoma *Rowley, Iowa (closed)* Sinton, Texas Trinidad Head, California West Branch, Iowa West Lafayette, Indiana (INFLUX campaign)	East Trout Lake, Saskatchewan, Canada Estevan Point, British Columbia, Canada Raratonga, Cook Islands

GMD Sampling Sites and Measurement Programs

Measurement	United States and Territories	International
Carbon Cycle Gases	**Ship Sampling, Carbon Cycle Flasks**	**Ship Sampling, Carbon Cycle Flasks**
(Flask Samples) Species Measured In Carbon Cycle Flasks: CO_2, CH_4, CO, H_2, SF_6, ^{13}C in CO_2, 18O in CO_2, N_2O, ^{13}C in CH_4, CH_3D		Antarctic Ocean, Chinese Ship (annual) Drake Passage Transect (every 6 weeks) Eastern Pacific Transect (monthly) North Atlantic, Norway (Ship M), weekly Western Pacific Transect (monthly)
Carbon Cycle Gases	**Surface, Weekly Flasks**	**Surface, Weekly Flasks**
Species Measured In Carbon Cycle Flasks: CO_2, CH_4, CO, H_2, SF_6, ^{13}C in CO_2, 18O in CO_2, N_2O, ^{13}C in CH_4, CH_3D plus Volatile Organic Compounds: ethane, n-hexane, propane, propene methyl-chloride, ethene, i-pentane, n-pentane i-butane, n-butane in a subset of flasks.	Argyle, Maine Barrow, Alaska Beech Island, South Carolina Cape Kumukahi, Hawaii Cold Bay, Alaska Erie, Colorado Key Biscayne, Florida Lamont, Oklahoma Mauna Loa, Hawaii Martha's Vinyard, Massachusetts Midway Island, Pacific Moody, Texas (daily flasks) Mt. Wilson Observatory, California Niwot Ridge, Colorado (daily flasks) Park Falls, Wisconsin (daily and weekly) Point Arena, California Shemya Island, Alaska Sutro, California Trinidad Head, California Tutuila, American Samoa Walnut Grove, California Wendover, Utah West Branch, Iowa	Alert, Canada *Amsterdam Island, France (closed)* Arembepe, Brazil Ascension Island, United Kingdon Assekrem, Algeria Baltic Sea, Poland Baring Head, New Zealand *Bird Island, United Kingdom (closed)* Black Sea, Romania Bukit Kototabang, Indonesia Cape Grim, Australia *Cape Meares, Oregon (closed)* Cape Point, South Africa Christmas Island, Kiribati Cofre de Perote, Mexico Conejo, Mexico Crozet Island, Indian Ocean Dongsha Island, Taiwan *Dwejra Point, Gozo (closed)* Easter Island, Chile Gobabeb, Namibia *Grifton, North Carolina (closed)* Guam, Marianas Islands Halley Station, Antarctica Hegyhatsal, Hungary Heimaey, Iceland Hohenpeissenberg, Germany *Kaashidhoo, Maldives (closed)* Lac La Biche, Canada Lampedusa, Italy Lulin, Taiwan Mace Head, Ireland Mahe Island, Seychelles Maxaranguape, Brazil *McMurdo Station, Antarctica (closed)* *Mould Bay, Canada (closed)* Mount Kenya, Kenya Mt. Waliguan, China Ny-Alesund, Svalbard Obninsk, Russia *Ocean Station C, United States (closed)* *Ocean Station M, Norway (closed)* Ochsenkopf, Germany *Olympic Pennisula, Washington (closed)* Palmer Station, Antarctica *Plateau Assy, Kazakhstan (closed)* Ragged Point, Barbados Sammaltunturi, Finland *Sary Takum, Kazakhstan (closed)* Sede Boker, Israel Shangdianzi, China *South China Sea, China (closed)* South Pole, Antarctica *St. Croix, Virgin Islands (closed)* *St. David's Head, Bermuda (closed)* Summit, Greenland Syowa, Antarctica (Japan) Tae-ahn Peninsula, South Korea Tenerife, Canary Islands Terceira, Azores Tierra Del Fuego, Argentina Tudor Hill, Bermuda Ulaan Uul, Mongolia Valladolid, Spain

GMD Sampling Sites and Measurement Programs

Measurement	United States and Territories	International
Halocarbon Network	**Surface, Weekly High Pressure Flasks**	**Surface, Weekly High Pressure Flasks**
Species Measured In Halocarbon Flasks CFC-11 & -12, HCFC-142b CH_2Br_2, N_2O, CS_2, $CHBr_3$ CFC-113, HCFC-22, C_6H_6 HCFC-141b, CS_2 HFC-134a, HFC-152a, CH_3Br, CH_3Cl, CH_3I, SF_6, CH_3CCl_3, CCl_4, CH_2Cl_2, $CHCl_3$, C_2Cl_4, C_2HCl, Halon 1211,-1301,-2402.	Barrow, Alaska Cape Kumukahi, Hawaii Erie, Colorado Harvard Forest, Massachusetts Marthas Vineyard, Massachusetts Mauna Loa, Hawaii Moody, Texas (tall tower in CCGG flasks) Niwot Ridge, Colorado (in CCGG flasks) Niwot Ridge, Colorado (steel flasks) Park Falls, Wisconsin (in CCGG flasks) Park Falls, Wisconsin (steel flasks) Trinidad Head, California Tutuila, American Samoa Sutro, California Walnut Grove, California West Branch, Iowa	Alert, Canada (weekly) Cape Grim, Australia (weekly) Palmer, Antarctica (bi-weekly) South Pole, Antarctica (bi-weekly) Summit, Greenland (bi-weekly) Trans-Siberian Railway, Russia (periodic) Ushuaia, Argentina (weekly)
Halocarbon Species	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
N_2O, SF_6, CFC-11, CFC-12 CFC-113, halon-1211, $CHCl_3$, CH_3CCl_3, CCl_4, (all but Summit: HCFC-22, HCFC-142b, COS, CH_3Cl (Summit: CO, H_2, CH_4)	Barrow, Alaska Mauna Loa, Hawaii Niwot Ridge, Colorado Tutuila, American Samoa	South Pole, Antarctica Summit, Greenland
Halocarbon Species	**Surface, Tower Flasks**	**Surface, Tower Flasks**
Measured In Carbon Cycle Flasks CFC-11 & -12, HCFC-142b, CFC-113, HCFC-22, HCFC-141b, HFC-134a, HFC-152a, CH_3Br, CH_3Cl, CH_3I, CH_3CCl_3, CCl_4, CH_2Cl_2, $CHCl_3$, C_2Cl_4, halon 1211,-1301,-2402, CH_2Br_2, C_6H_6, COS, $CHBr_3$, CS_2.	Argyle, Maine Beech Island, South Carolina Erie, Colorado Marthas Vineyard, Massachusetts Moody, Texas (tall tower in CCGG flasks) Mt. Wilson Observatory, California Park Falls, Wisconsin Sutro, California West Branch, Iowa Walnut Grove, California West Lafayette, Indiana (INFLUX campaign)	East Trout Lake, Saskatchewan, Canada
Halocarbon Species	**Airborne, Light Aircraft, Bi-weekly**	**Airborne, Light Aircraft, Bi-weekly**
Measured In Carbon Cycle Flasks CFC-11 & -12, HCFC-142b, CFC-113, HCFC-22, HCFC-141b, HFC-134a, HFC-152a, CH_3Br, CH_3Cl, CH_3I, CH_3CCl_3, CCl_4, CH_2Cl_2, $CHCl_3$, C_2Cl_4, halon 1211,-1301,-2402, CH_2Br_2, C_6H_6, COS, $CHBr_3$, CS_2.	Beaver Crossing, Nebraska Bondville, Illinois (on funding hold) Bradgate, Iowa (on funding hold) Briggsdale, Colorado Cape May, New Jersey Charleston, South Carolina Dahlen, North Dakota Fairchild, Wisconsin (on funding hold) Harvard Forest, Massachusetts (funds hold) Homer, Illinois Kodiak USCG, Alaska Molokai, Hawaii (on funding hold) Park Falls, Wisconsin Poker Flat, Alaska Rowley, Iowa (on funding hold) Sinton, Texas Southern Great Plains, Oklahoma Trinidad Head, California Worchester, Massachusetts	East Trout Lake, Saskatchewan, Canada Estevan Point, British Columbia, Canada Raratonga, Cook Islands
Halocarbon Missions	**Airborne, Large Balloons and Aircraft**	**Airborne, Large Balloons and Aircraft**
Balloon Measurements: CH_4, H_2, CO, N_20, SF_6, CH_3CCl_3, CCl_4, halon-1211, $CHCl_3$, CFC-11,-12,-113. **Aircraft:** Above list plus PAN, HFC-134a, COS, CS_2 HCFC-22,-141b,-142b CH_3Br, CH_3I.	Barbers Point, Hawaii (aircraft, periodic) Edwards, California (aircraft, periodic) Fairbanks, AK (aircraft/balloons, periodic) Ft. Sumner, New Mexico (balloon, periodic) Houston, Texas (aircraft, periodic) Key West, Florida (aircraft, periodic) Kennedy Space Center, Florida, (aircraft, periodic)	Christchurch, NZ (aircraft, periodic) COBRA (aircraft, Canada and U.S.) HIPPO (NSF aircraft, Global) Kiruna, Sweden (balloon, periodic) San Jose, Costa Rica (aircraft)

GMD Sampling Sites and Measurement Programs

Measurement	United States and Territories	International
Halocarbon Species	**Unmanned Aircraft Systems (UAS)**	**Unmanned Aircraft Systems (UAS)**
CH_4, H_2, CO, N_20, SF_6, $CHCl_3$, CFC-11,-12,, RH halon-1211, O_3, H_2O, T	Alaska Mission California Mission Gray Butte, California (Altair, test phase) Western U.S.(Altair, wildfires, periodic)	GloPac (aircraft, Arctic & Pacific) ATTREX (aircraft, Pacific and Indian Oceans)
Ozone	**Surface, In Situ, Continuous**	**Surface, In Situ, Continuous**
	Barrow, Alaska BAO, Erie, Colorado Mauna Loa, Hawaii Moody, Texas (WKT Tower) Niwot Ridge, Colorado Trinidad Head, California Tutuila, American Samoa	Arrival Heights, Antarctica Lauder, New Zealand Ragged Point, Barbados South Pole, Antarctica Summit, Greenland Tudor Hill, Bermuda Westman Island, Iceland
Ozone	**Total Column Ozone**	**Total Column Ozone**
	Barrow, Alaska (Dobson) Bismarck, North Dakota (Dobson) Bondville, Illionos (Brewer) *** Boulder, Colorado (Dobson)** Caribou, Maine (Dobson) Fairbanks, Alaska (Dobson)** Fort Peck, Montana (Brewer)*** Hanford, California (Dobson) Houston, Texas (Brewer) Mauna Loa, Hawaii (Dobson)** Nashville, Tennessee (Dobson) Niwot Ridge (Brewer)*** Raleigh, North Carolina (Brewer)*** Table Mountain, Colorado (Brewer)*** Tallahassee, Florida (Dobson) Tutuila, American Samoa (Dobson) Wallops Island, Virginia (Dobson)	Lauder, New Zealand** (Dobson) Maracompoche, Peru (Dobson) OHP, France** (Dobson) Perth, Australia** (Dobson) South Pole, Antarctica (Dobson) ** Also conduct Umkehr profiles that give ozone concentrations in 8 successive layers within the sounding twice per day. ***Also conduct Umkehr profile measurements that yield ozone concentrations in 10 successive layers at sunrise and sunset
Ozone Profiles	**Balloonborne Ozonesondes, Weekly**	**Balloonborne Ozonesondes, Weekly**
	Boulder, Colorado Hunstville, Alabama Mauna Loa, Hawaii Narragansett, Rhode Island Trinidad Head, California Tutuila, American Samoa	Galapagos Islands, Ecuador Ragged Point, Barbados San Jose, Costa Rica South Pole, Antarctica Summit, Greenland Suva, Fiji
Ozone Profiles	**Light Aircraft, Weekly Profiles**	**Light Aircraft, Weekly Profiles**
	Beaver Crossing, Nebraska Worcester, Massachusetts Briggsdale, Colorado Cape May, New Jersey Homer, Illinois Lamont, Oklahoma Rowley, Iowa Summerville, South Carolina Trinidad Head, California	
Water Vapor Profiles	**Balloonborne Water Vapor Profiles**	**Balloonborne Water Vapor Profiles**
	Beltsville, Maryland (Campaign) Boulder, Colorado Hilo, Hawaii Lamont, Oklahoma (Campaign) Midland, Texas (Campaign) Table Mountain, California (Campaign)	Bandung, Indonesia (Campaign) Biak, Indonesia (Campaign) Galapagos Island, Ecuador (Campaign) Hanoi, Vietnam (Campaign) Kototabang, Indonesia (Campaign) La Reunion Island, Indian Ocean (Campaign) Lauder, New Zealand Lindberg, Germany (Campaign) Summit, Greenland (Campaign) Tarawa, Kiribati (Campaign) Watukosek, Indonesia (Campaign)
Surface Radiation Budget	**SURFRAD Continuous Measurements**	**SURFRAD Continuous Measurements**
Downwelling short wave and long wave radiation, albedo, aerosol optical depth, direct beam and diffuse radiation. UV and UVB radiation, photosynthetically active radiation, and T, RH, WS, WD, P.	Bondville, Illinois Desert Rock, Nevada Fort Peck, Montana Goodwin Creek, Mississippi Penn State, Pennsylvania Sioux Falls, South Dakota Table Mountain, Colorado	
Radiation Key:	**(BSRN = Baseline Surface Radiation Network; GAW = Global Atmosphere Watch; SURFRAD = US National Surface Radiation Network)**	

GMD Sampling Sites and Measurement Programs

Measurement	United States and Territories	International
Surface Radiation Budget	**BSRN Continuous Measurements**	**BSRN Continuous Measurements**
Downwelling short wave and long wave radiation, albedo, aerosol optical depth, direct beam and diffuse radiation and UV radiation, and T, RH, WS, WD, P.	Alert, Canada Barrow, Alaska Boulder, Colorado Erie, Colorado Mauna Loa, Hawaii Trinidad Head, California Tutuila, American Samoa	Kwajalein, Marshall Islands* Prospect Hill, Bermuda* South Pole, Antarctica* * GMD Operated Alert, Canada Alice Springs, Australia Cabauw, Netherlands Cambourne, United Kingdom Carpentras, France Cocos Island, Australia *DeAar, South Africa (Closed)* Dome Concordia, Antarctica (with ISAC, Italy) Eureka, Canada Florianoplis, Brazil Fukuoka, Japan Ilorin, Nigeria Ishigakijima, Japan Izana, Spain Lerwick, United Kingdom Lindenberg, Germany Mt. Waliguan, China (GAW) Neumayer, Antarctica Ny Alesund, Svalbard Palaiseauu, France Payerne, Switzerland Regina, Canada Sede Boker, Israel Sumatrak, Indonesia (GAW) Summit, Greenland Syowa, Antarctica Tamanrasset, Algeria Tateno, Japan Tiksi, Russia Toravere, Estonia Xianghe, China
Surface UV Radiation	**UV Continuous**	**UV Continuous**
	Bondville, Illinois Boulder, Colorado Fort Peck, Montana Houston, Texas Mauna Loa, Hawaii Niwot Ridge, Colorado Raleigh, North Carolina Table Mountain, Colorado	McMurdo, Antarctica South Pole, Antarctica Palmer, Antarctica
Radiation Key:	**(BSRN = Baseline Surface Radiation Network; GAW = Global Atmosphere Watch; SURFRAD = US National Surface Radiation Network)**	
Meteorology	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
Wind Propeller Anemometer	Barrow, Alaska (10 m) Boulder, Colorado (10 m) Mauna Loa, Hawaii (10 and 38 m) Trinidad Head, California (10 m) Tutuila. American Samoa (19 m)	Alert, Canada (SEARH Project) South Pole, Antarctica (2, 10, and 30 m) Summit, Greenland (12 m)
Meteorology	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
Barometric Pressure Pressure transducer	Barrow, Alaska Boulder, Colorado Mauna Loa, Hawaii Trinidad Head, California Tutuila. American Samoa	Alert, Canada (SEARH Project) South Pole, Antarctica Summit, Greenland
Meteorology	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
Ambeint Temperature Aspirated platinum resistance probes	Barrow, Alaska (3 and 16 m) Boulder, Colorado (2 and 10 m) Mauna Loa, Hawaii (2, 9, and 37 m) Trinidad Head, California (2 and10 m) Tutuila. American Samoa (2 and 19 m)	Alert, Canada (SEARH Project) South Pole, Antarctica (2, 10, and 30 m) Summit, Greenland (2 and 8 m)
Meteorology	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
Dewpoint **Temperature** Hygrothermometers and relative humidty probes	Barrow, Alaska (3 m) Boulder, Colorado (2 m) Mauna Loa, Hawaii (2 m) Trinidad Head, California (2 m) Tutuila. American Samoa (2 m)	Alert, Canada (SEARH Project) South Pole, Antarctica (2 m) Summit, Greenland (2 m)
Meteorology	**Surface, Continuous Measurements**	**Surface, Continuous Measurements**
Precipitation Tipping bucket	Boulder, Colorado Mauna Loa, Hawaii Tutuila. American Samoa	

Cooperative Programs co-located at Baseline Observatories

Measurement Program	Home Institution	American Samoa
CO_2, ^{13}C, N_2O	Scripps Institution of Oceanography	
O_2/N_2	Scripps Institution of Oceanography	
CFC-11, CFC-12,	NASA/AGAGE	http://agage.eas.gatech.edu/
CFC-113, CCl_4, CH_3CCl_3	NASA/AGAGE	http://agage.eas.gatech.edu/
CH_4, N_2O, $CHCl_3$,	NASA/AGAGE	http://agage.eas.gatech.edu/
Hydrocarbons	University of California, Irvine	
O_2/N_2	Princeton University	
Aerosol Chemisty	University of Miami	
Measurement Program	**Home Institution**	**Barrow, Alaska**
Precip gauge	USDA/ Snow Survey	
Hydrocarbons	University of California, Irvine	
O_2/N_2	Scripps Institution of Oceanography	
CO_2 Flux	San Diego State University	
Thaw Depth	State University of NY	
POES Satellite uplink	NOAA/NESDIS	
POES Satellite downlink	NOAA/NESDIS	
Persistent Organic Pollutants	Environment Canada	http://www.msc-smc.ec.gc.ca/gaps/
SoumiNet GPS	UNAVCO	http://www.suominet.ucar.edu/support/
Climate Reference Network (CRN)	NOAA/NESDIS	
Geomagnetics	USGS	http://geomag.usgs.gov/observatories/barrow/
CO_2, ^{13}C, N_2O	Scripps Institution of Oceanography	
DMS	Woods Hole/University of Alaska, Fairbanks	
DOE/ARM	Department of Energy	http://www.arm.gov/sites/nsa.stm
Measurement Program	**Home Institution**	**South Pole**
CO_2, ^{13}C, N_2O	Scripps Institution of Oceanography	
O_2/N_2	Scripps Institution of Oceanography	
$^{13}C/^{12}C$ and $^{18}O/^{16}O$ in CO_2	CSIRO	http://www.csiro.au/
CO_2, CH_4, CO, H_2, N_2O	CSIRO	http://www.csiro.au/
H_2O_2 & TFA	University of Arizona/DRI	
Oxygen Isotopes	Scripps Institution of Oceanography	
MPLNET Cloud Profiling	NASA/Goddard Space Flight Center	http://mplnet.gsfc.nasa.gov/
AERONET Photometers	NASA/Goddard Space Flight Center	http://aeronet.gsfc.nasa.gov/
Measurement Program	**Home Institution**	**Trinidad Head, California**
ABC Sampling	University of Wisconson, Madison	
MPLNET Cloud Profiling	NASA/Goddard Space Flight Center	http://aeronet.gsfc.nasa.gov/
AERONET Photometers	NASA/Goddard Space Flight Center	http://mplnet.gsfc.nasa.gov/
Measurement Program	**Home Institution**	**Mauna Loa, Hawaii**
CO_2, ^{13}C, N_2O	Scripps Institution of Oceanography	
O_2/N_2	Scripps Institution of Oceanography	
UV	Colorado State University	
$^{13}C/^{12}C$ and $^{18}O/^{16}O$ in CO_2	CSIRO	http://www.csiro.au/
Radon	ANSTO	http://www.ansto.gov.au/
Climate Reference Network (CRN)	NOAA/NESDIS	
Persistent Organic Pollutants	Environment Canada	http://www.msc-smc.ec.gc.ca/gaps/
Sulfate, Nitrate Aerosols	University of Hawaii	
Hg^0, Hg^{+2}, Hg^p	EPA	
Particulate 2.5-10um	EPA	
GPS Derived Water Vapor	UNAVCO	http://www.suominet.ucar.edu/support/
Seismometer,	USGS	
GPS Testbed	FAA/Stanford University	
AERONET Photometers	NASA/Goddard Space Flight Center	http://aeronet.gsfc.nasa.gov/
Corrosion Project	University of Hawaii, Manoa	
Organic & Elemental Carbon	University of Hawaii, Manoa	
Variable Young Star Survey	University of Hawaii-Institute for Astronomy	
Filter Radiometer/PMOD	World Radiation Center	
Mineral Dust & Radionuclides	New Mexico State University	
Black Carbon	University of Hawaii, Manoa	
Aerosol Chemistry	University of California, Davis	
Halides, Black Carbon,	EPA/NERL	http://www.epa.gov/nerl/
Surface O_3, and SO_2	EPA/NERL	http://www.epa.gov/nerl/
CO Isotopes	State University New York	
Volcano Activity	Hawaii Volcano Observatory	http://hvo.wr.usgs.gov/maunaloa/
Video Surveillance	PMRF	
UV	NOAA and NIWA	
Stratospheric O_3 & Temp Profiles	JPL	
Aerosol Profile	JPL	
NO_2	NOAA and NIWA	http://www.niwa.co.nz/
BrO	NOAA and NIWA	http://www.niwa.co.nz/
Column O_3	MSC Canada	
Solar Spectra	University of Denver	

GMD Sampling Sites Summary

State and Territory (34)	Country and Ocean Summary (70)	Country and Ocean Summary (70)
Key: (1), (2) ... denote the separate sites or sample locations in a state/territory/country/ocean basin.		
Alabama (1) Alaska (9) American Samoa (2) California (8) Colorado (7) Florida (3) Georgia (1) Hawaii (6) Illinois (4) Iowa (2) Maine (2) Maryland (1) Massachusetts (1) Midway Island (1) Mississippi (1) Montana (2) Nebraska (2) Nevada (1) New Hampshire (2) New Jersey (1) New Mexico (2) North Carolina (1) North Dakota (3) Oklahoma (3) Pennsylvania (1) Rhode Island (1) South Carolina (2) South Dakota (2) Tennessee (2) Texas (4) Utah (2) Virginia (3) Washington (1) Wisconsin (2)	Algeria (2) Antarctic Circumpolar (Chinese) (24) Antarctica (7) Argentina (3) Ascension Island (1) Australia (5) Azores (1) Barbados (3) Bermuda (3) Brazil (2) Canada (7) Canary Islands (1) Chile (1) China (5) Cook Islands (1) Costa Rica (2) Crozet Island, Indian Ocean (1) Drake Passage Ships (6) Eastern Pacific Ships (15) Ecuador (Galapagos Islands) (2) Estonia (1) Fiji (1) Finland (2) France (4) Germany (2) Greenland (1) Guam (2) Hungary (1) Iceland (1) Indian Ocean Aircraft (1) Indonesia (5) Ireland (2) Israel (2) Italy (1) Japan (3) Kazakhstan (2) ***(continued, column right, top)***	***(continuation of column to the left)*** Kenya (1) Kiribati (2) Korea (South) (2) La Reunion Island, Indian Ocean (1) Maldives (1) Marshall Islands (1) Mexico (2) Midway Island (1) Mongolia (2) Namibia (1) Netherlands (1) New Zealand (3) Niger (1) Nigeria (1) Norway (1) Pacific Ocean Aircraft (2) Peru (1) Poland (1) Puerto Rico (2) Romania (1) Russia (5) Saipan (1) Saudi Arabia (1) Seychelles (1) Ship M, North Atlantic (1) South Africa (1) Spain (2) Svalbard (1) Sweden (1) Switzerland (1) Taiwan (1) United Kingdom (2) Vietnam (1) Western Pacific Ships (13)

SITE TOTALS

Number of U.S. states operating in = 34
Total Number of all U.S. state locations = 90

Number of foreign countries operating in = 70
Total Number of all foreign locations = 184

TOTAL NUMBER OF ALL GLOBAL SITES (U.S. + Foreign) IN OPERATION = 274

Advisory Panel Participation - **September, 2011**

Global Monitoring Division, ESRL, Boulder, Colorado

Personnel	Role	Panel
James Butler	Management group Management group Management group Management group Chair	WMO Commission for Atmospheric Sciences GCOS/WCRP Atmospheric Observation Panel for Climate GEO-Carbon Steering Committee GEO Carbon Community of Practice WMO/GAW Scientific Advisory Group - Greenhouse Gases
Brad Hall	Member	WMO/GAW Scientific Advisory Group - Greenhouse Gases
John Ogren	Chair Member	WMO/GAW Scientific Advisory Group - Aerosols Advisory Panel, European Supersites for Atmospheric Aerosol Research
Numerous	Member	WMO/IAEA (International Atomic Energy Agency) Meeting of Experts on Carbon Dioxide, Other Greenhouse Gases, and Related Tracer Measurement Techniques
Numerous	Member	WMO/IAEA (International Atomic Energy Agency) Meeting of Experts on Carbon Dioxide, Other Greenhouse Gases, and Related Tracer Measurement Techniques
Numerous	Member	WMO/IAEA (International Atomic Energy Agency) Meeting of Experts on Carbon Dioxide, Other Greenhouse Gases, and Related Tracer Measurement Techniques
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Ells Dutton	Chair	WMO/GAW Baseline Surface Radiation Network (BSRN)
Brian Vasel	United States country contact	WMO/GAW
Brad Hall	Member	Commerce Standards Committee