STATE OF THE CLIMATE IN 2011

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STATE OF THE CLIMATE IN 2011

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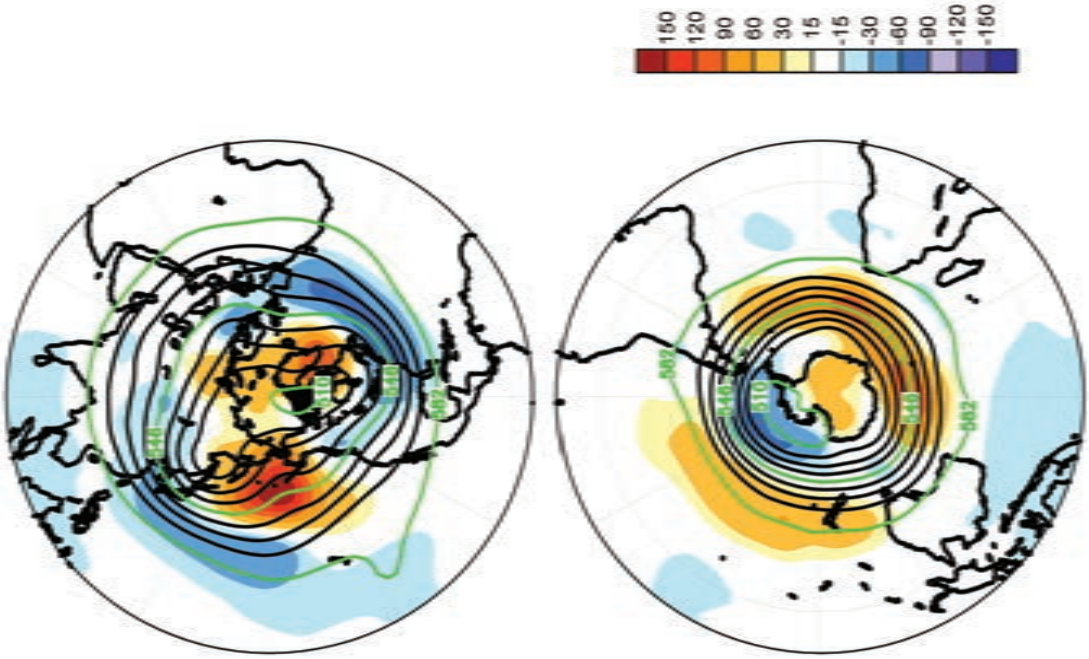

Fig. A1.2. Dec 2010–Feb 2011 (top) Northern Hemisphere and (bottom) Southern Hemisphere 500-hPa geopotential heights (9-dam contour interval) and anomalies (shading) determined from the 1981–2010 base period means. Data is from the CDAS/Reanalysis Project (Kalnay et al. 1996).

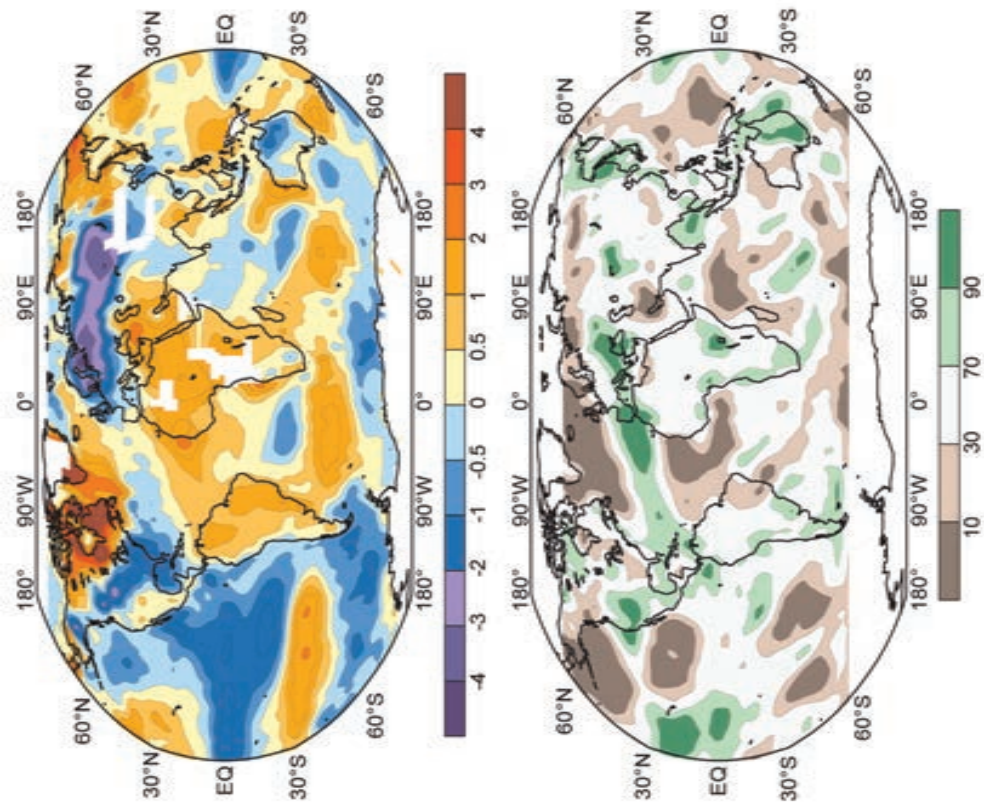

Fig. A1.1. Dec 2010–Feb 2011 (top) surface temperature anomalies (°C) and (bottom) precipitation percentiles based on a gamma distribution fit to the 1981–2010 base period. Temperature anomalies (1981–2010 base period) are based on station data over land and sea surface temperature data over water. Precipitation data were obtained from the CAMS-OPI dataset that is a combination of rain gauge observations and satellite-derived estimates (Janowiak and Xie 1999). Analysis was omitted in data-sparse regions (white areas).

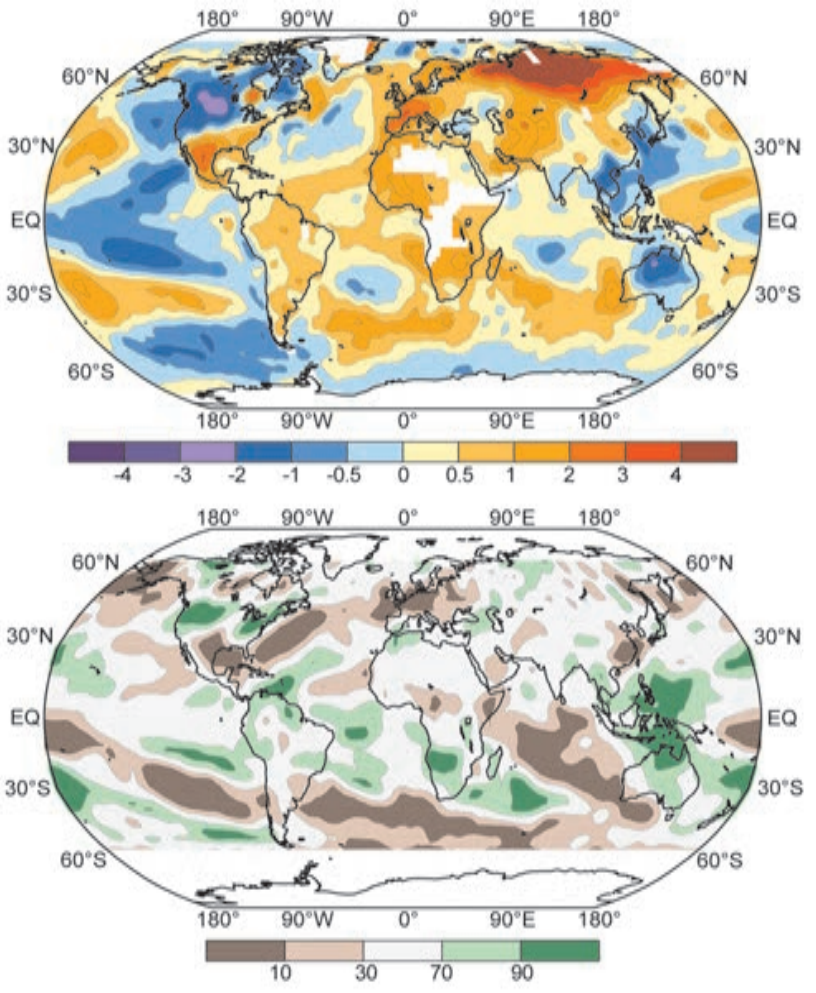

Fig. A1.3. Mar–May 2011 (top) surface temperature anomalies (°C) and (bottom) precipitation percentiles based on a gamma distribution fit to the 1981–2010 base period. Temperature anomalies (1981–2010 base period) are based on station data over land and sea surface temperature data over water. Precipitation data were obtained from the CAMS-OPI dataset that is a combination of rain gauge observations and satellite-derived estimates (Janowiak and Xie 1999). Analysis was omitted in data-sparse regions (white areas).

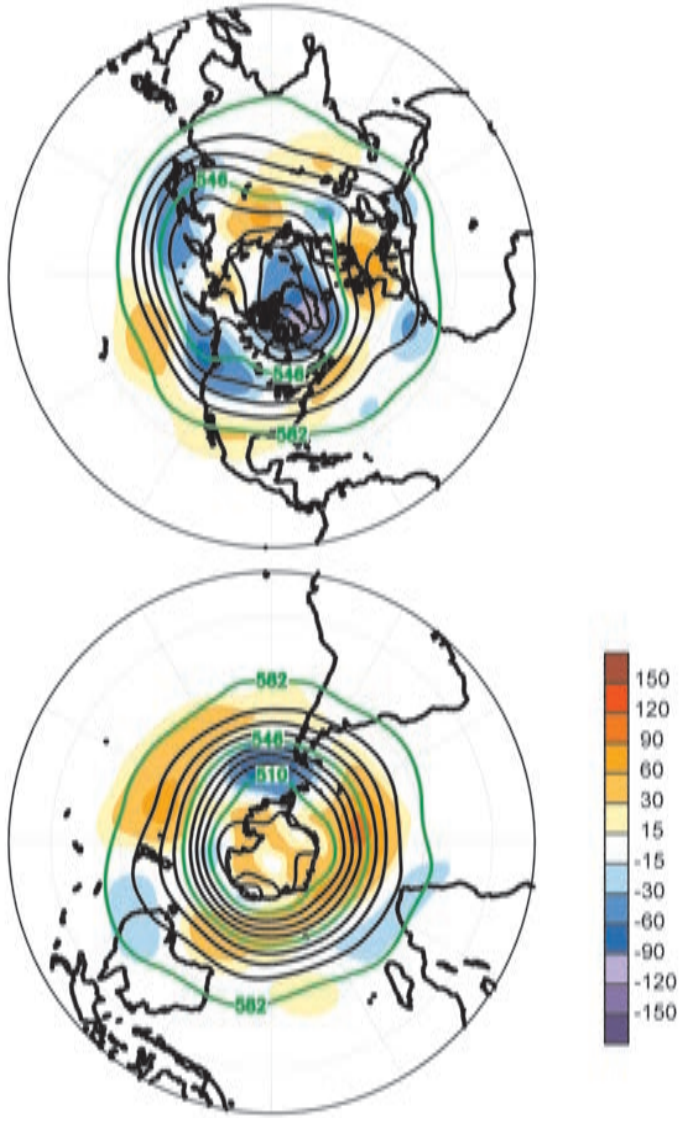

Fig. A1.4. Mar–May 2011 (top) Northern Hemisphere and (bottom) Southern Hemisphere 500-hPa geopotential heights (9-dam contour interval) and anomalies (shading) determined from the 1981–2010 base period means. Data is from the CDAS/Reanalysis Project (Kalnay et al. 1996).

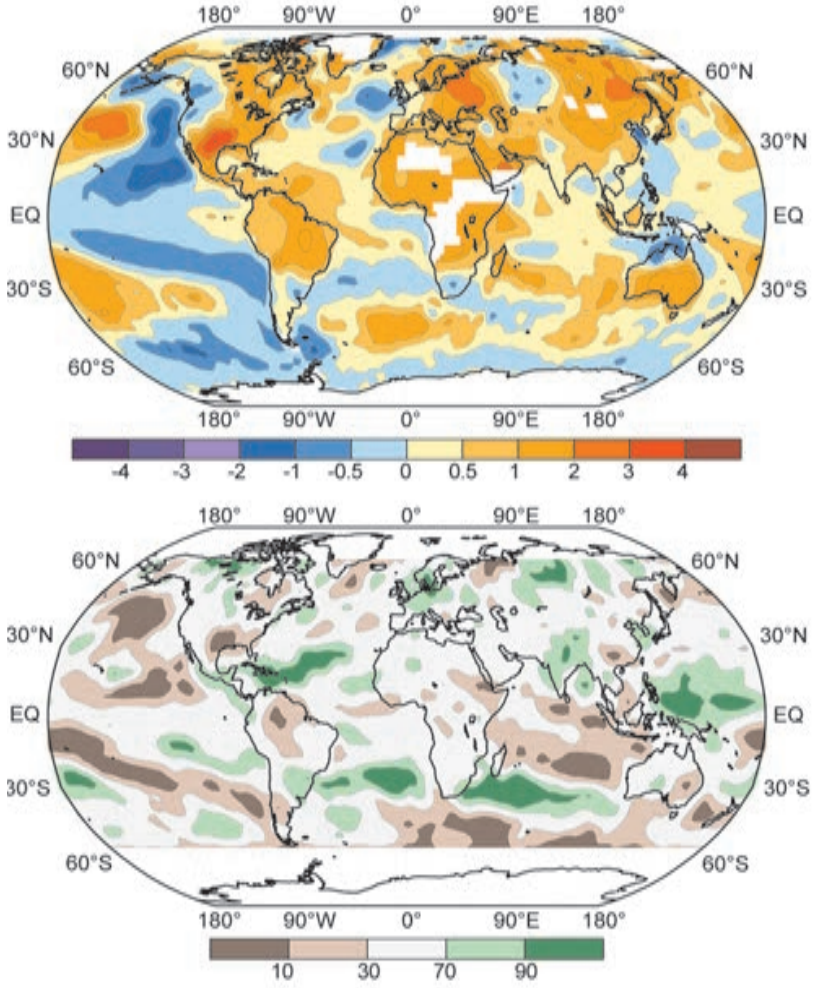

Fig. A1.5. Jun–Aug 2011 (top) surface temperature anomalies (°C) and (bottom) precipitation percentiles based on a gamma distribution fit to the 1981–2010 base period. Temperature anomalies (1981–2010 base period) are based on station data over land and sea surface temperature data over water. Precipitation data were obtained from the CAMS-OPI dataset that is a combination of rain gauge observations and satellite-derived estimates (Janowiak and Xie 1999). Analysis was omitted in data-sparse regions (white areas).

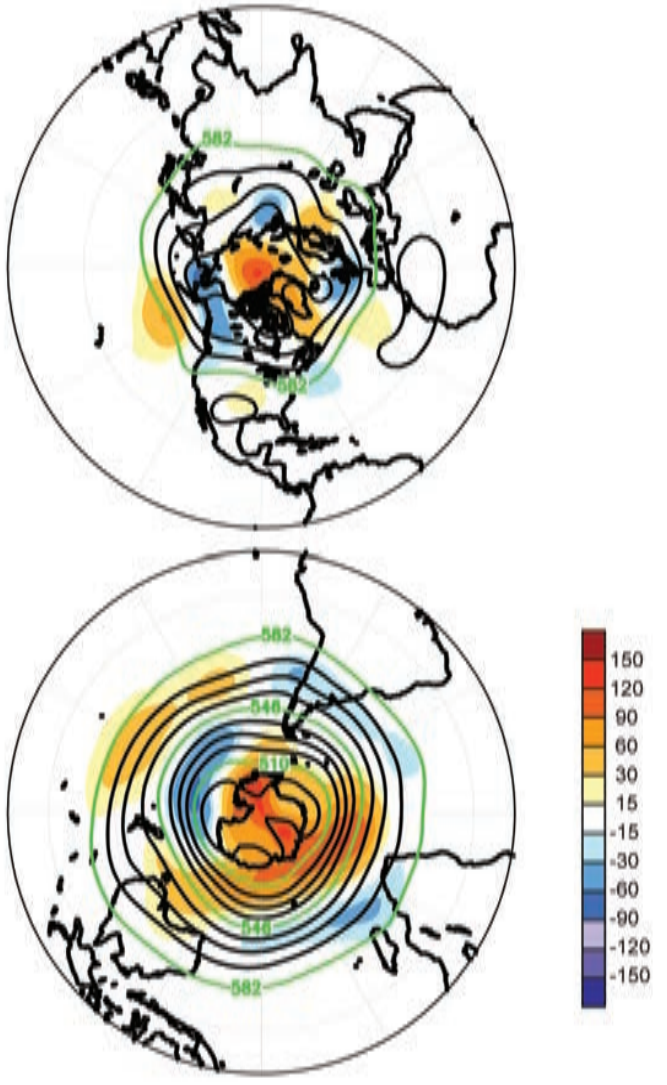

Fig. A1.6. Jun–Aug 2011 (top) Northern Hemisphere and (bottom) Southern Hemisphere 500-hPa geopotential heights (9-dam contour interval) and anomalies (shading) determined from the 1981–2010 base period means. Data is from the CDAS/Reanalysis Project (Kalnay et al. 1996).

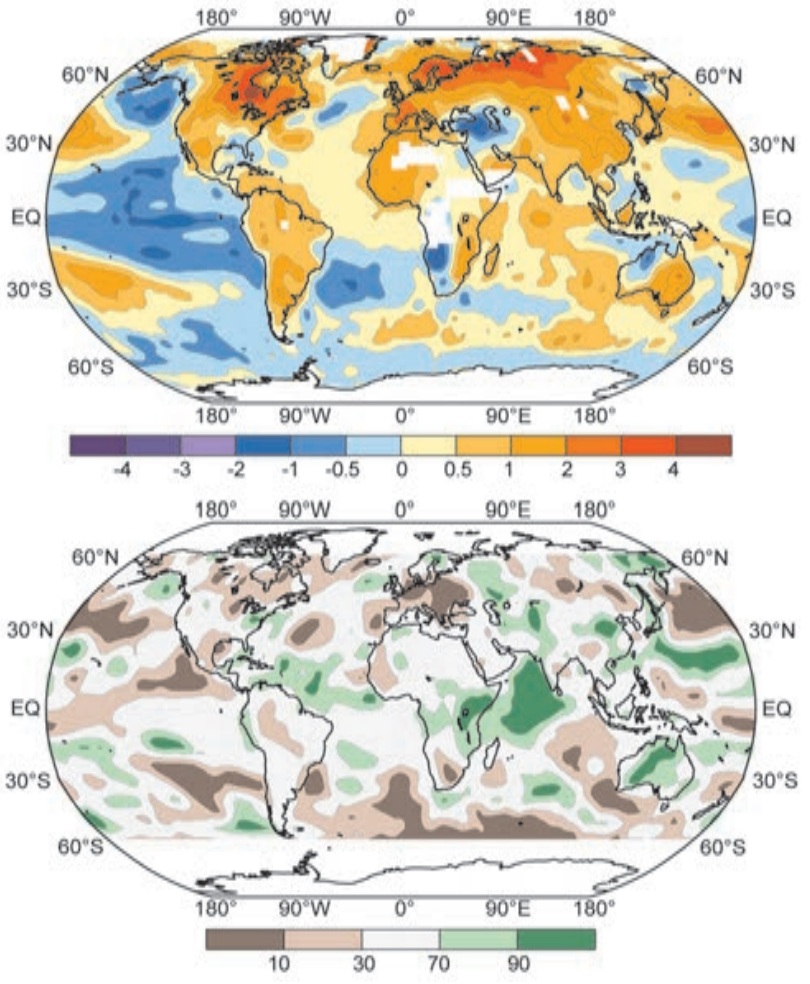

Fig. A1.7. Sep–Nov 2011 (top) surface temperature anomalies (°C) and (bottom) precipitation percentiles based on a gamma distribution fit to the 1981–2010 base period. Temperature anomalies (1981–2010 base period) are based on station data over land and sea surface temperature data over water. Precipitation data were obtained from the CAMS-OPI dataset that is a combination of rain gauge observations and satellite-derived estimates (Janowiak and Xie 1999). Analysis was omitted in data-sparse regions (white areas).

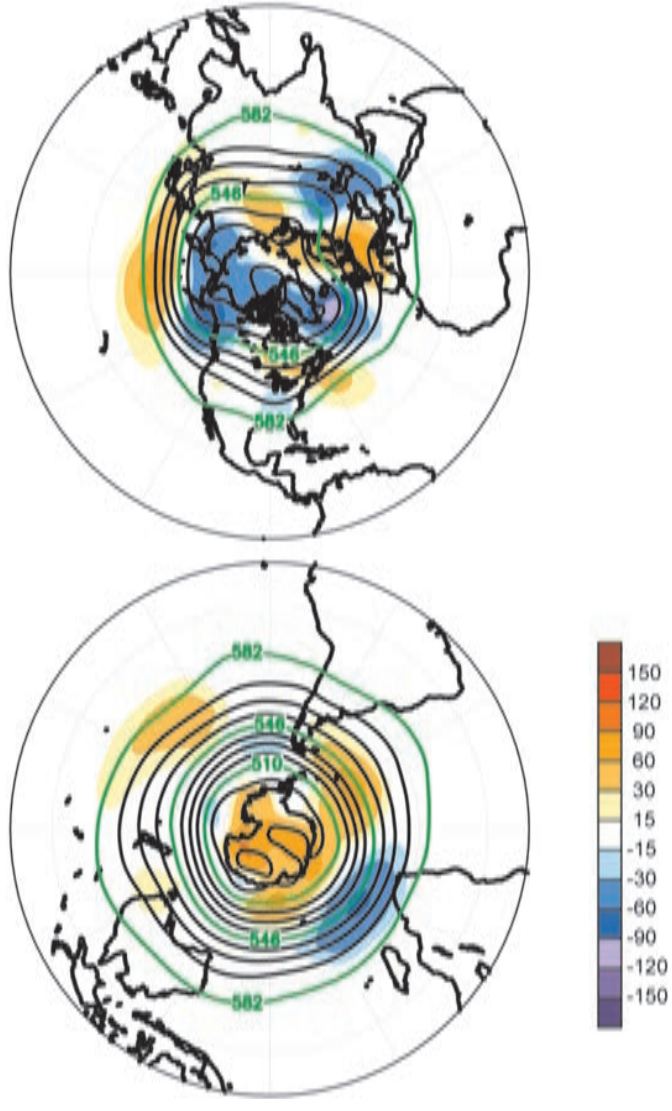

Fig. A1.8. Sep–Nov 2011 (top) Northern Hemisphere and (bottom) Southern Hemisphere 500-hPa geopotential heights (9-dam contour interval) and anomalies (shading) determined from the 1981–2010 base period means. Data is from the CDAS/Reanalysis Project (Kalnay et al. 1996).

APPENDIX 2: RELEVANT DATASETS AND SOURCES

General Variable or Phenomenon	Specific Dataset or Variable	Source	Section
Aerosols	AERONET data (NASA)	http://aeronet.gsfc.nasa.gov/	2g2
	Aerosol products	http://www.gmes-atmosphere.eu/data/	2g2
Air-sea fluxes	Woods Hole Oceano-graphic Institute (WHOI) OAFlux Project	http://oaflux.whoi.edu	3d
Albedo	MODIS	http://ladsweb.nascom.nasa.gov/	2h2,5f
Biomass Burning	Biomass Burning	http://www.globalfiredata.org/	2h4
Clouds, Cloudiness	HIRS	No known public portal	2d4
	ISCCP D2	http://isccp.giss.nasa.gov	2d4
	MISR	http://eosweb.larc.nasa.gov/PRODOCS/misr/level3 /overview.html	2d4
	MODIS Cloud Mask	http://ladsweb.nascom.nasa.gov/	2d4,5b
	PATMOS-x	http://www.ncdc.noaa.gov/cdr/operationalcdrs.html	2d4
	SOBS	http://www.atmos.washington.edu/~ignatius/CloudMap	2d4
Evaporation	JRA-25	http://jra.kishou.go.jp	6d
FAPAR	FAPAR	http://fapar.jrc.ec.europa.eu/	2h3
Geopotential Height	ERA-Interim	http://www.ecmwf.int/research/era	6b
Glacier Mass or Volume	Glacier Mass Balance	http://www.geo.uzh.ch/microsite/wgms/mbb/sum10.html	5e
	GRACE	http://www.csr.utexas.edu/grace/	2c3
Humidity, [Near] Surface	20th Century Reanalysis	http://www.esrl.noaa.gov/psd/data/20thC_Rean/	2d1
	Dai	by email to adai@ucar.edu	2d1
	ERA-Interim	http://www.ecmwf.int/research/era	2d1
	HadCRUH	http://www.metoffice.gov.uk/hadobs/hadcruh	2d1
	JRA-25 Atmospheric Reanalysis	http://jra.kishou.go.jp/JRA-25/index_en.html	2d1
	MERRA	http://gmao.gsfc.nasa.gov/merra/	2d1
	NCEP CFSR	http://cfs.ncep.noaa.gov	2d1
	NOCS 2.0	http://www.noc.soton.ac.uk/noc_flux/noc2.php	2d1
Isotherm depth	NCEP Global Ocean Data Assimilation System	http://www.cpc.ncep.noaa.gov/products/GODAS	4h
Lake Ice	NOAA IMS, 4m Daily	http://nsidc.org/data/g02156.html	5h
Lake Levels	Altimetric Lake level Products, USDA	http://www.pecad.fas.usda.gov/cropexplorer /global_reservoir/index.cfm	2d8
	ESA	http://tethys.eaprs.cse.dmu.ac.uk/RiverLake/shared/main	2d8
	LEGOS	http://www.legos.obs-mip.fr/soa/hydrologie/hydroweb/	2d8
Lake Temperature	ARCLAKE	http://hdl.handle.net/10283/88, http://www.geos.ed.ac.uk /arclake/	2b4
	IWBP	http://largelakes.jpl.nasa.gov	2b4

Modes of Variability	Arctic Oscillation (AO)	http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/ao.shtml	2f3
	Climate Prediction Center: AAO, AO, NAO, PNA	http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml	3b, 6a
	Oceanic Nino Index	http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml	4a,4b
	Southern Annular Mode Index	http://www.antarctica.ac.uk/met/gjma/sam.html	6a, 6b,6d, 6f,SB6.1
	Southern Oscillation Index	http://www.cpc.ncep.noaa.gov/data/indices/	6b,6d,6f
Ocean Carbon	AOML Monthly Flux Anomalies	http://cwcgom.aoml.noaa.gov/erddap/griddap/aomlcarbonfluxes.graph	3j1
	Hawaii Ocean Time-series (HOT)	http://hahana.soest.hawaii.edu/hot/hot_jgofs.html	3j3
	Surface Ocean CO_2 Atlas (SOCAT) Data Access System	http://www.socat.info	3j1
	The U.S. CO_2/Repeat Hydrography Program	http://ushydro.ucsd.edu	3j2
	Trends in Atmospheric Carbon Dioxide: Mauna Loa, Hawaii	http://www.esrl.noaa.gov/gmd/ccgg/trends/	3j3
Ocean Circulation	Atlantic Meridional Overturning Circulation	http://www.noc.soton.ac.uk/rapidmoc/	3h
Ocean Color	Level 3 MODIS Aqua Ocean Color Data	http://oceancolor.gsfc.nasa.gov/	SB5.3
	Level 3 SeaWiFS Ocean Color Data	http://oceancolor.gsfc.nasa.gov/	SB5.3
Ocean Salinity	Global Ocean Heat and Salt Content	http://www.nodc.noaa.gov/OC5/3M_HEAT_CONTENT/	3f
	World Ocean Atlas 2009	http://www.nodc.noaa.gov/OC5/WOA09/pr_woa09.html	3f
	World Ocean Database 2009	http://www.nodc.noaa.gov/OC5/WOD09/pr_wod09.html	3f
Ocean Temperature	World Ocean Database 2009	http://www.nodc.noaa.gov/OC5/WOD09/pr_wod09.html	3c
Outgoing Longwave Radiation	CERES FLASHFlux Project	http://flashflux.larc.nasa.gov	3d
	NOAA-interpolated OLR	http://www.esrl.noaa.gov/psd/data/gridded/data.interp_OLR.html	4f2
Permafrost	Active Layer Thickness	http://www.udel.edu/Geography/calm/data/north.html	5g
	GTN-P, Alaskan Repository	http://www.permafrostwatch.org	2c1
	GTN-P, Norwegian Repository	http://www.ngu.no/kart/permafrost	2c1
	Permafrost Temperature	http://permafrost.gi.alaska.edu/sites_map	5g
	Permafrost Data	http://nsidc.org/data/g02190.html	2c1

Phytoplankton, Ocean Color	MERIS 3rd Data Reprocessing	http://earth.eo.esa.int/pcs/envisat/meris/documentation /meris_3rd_reproc/MERIS_3rd_Reprocessing_Changes.pdf	3j4
	Ocean Color Documents: MODIS-Aqua Reprocessing 2010.0	http://oceancolor.gsfc.nasa.gov/WIKI/OCReproc20100MA.html	3j4
Precipitation	CMAP	http://www.esrl.noaa.gov/psd/data/gridded /data.ncep.reanalysis.html	2d3
	GHCN	http://www.ncdc.noaa.gov/temp-and-precip /ghcn-gridded-products.php	2d3
	Global Precipitation Climatology Project (GPCP)	http://precip.gsfc.nasa.gov	2d3,4h
	GPCC	http://www.gpcc.dwd.de/	2d3
	SSM/I, TMI, and AMSR-E Data	http://www.remss.com	2d3
	TRMM 3A12	http://disc.sci.gsfc.nasa.gov/precipitation/documentation /TRMM_README/TRMM_3A12_readme.shtml	4f2
	TRMM 3B43 Rainfall	http://disc.sci.gsfc.nasa.gov/precipitation/documentation /TRMM_README/TRMM_3B43_readme.shtml	4f1, 4f2
Precipitation (net)	JRA-25 Atmospheric Reanalysis	http://jra.kishou.go.jp/JRA-25/index_en.html	6d
Pressure, Sea Level or Near-Surface	ACCESS	http://www.bom.gov.au/nwp/access/NWPData.shtml	6f
	AMRC (Antarctic Meteorological Research Center) AWS	http://amrc.ssec.wisc.edu/data/	6c,SB6.1
	ERA-Interim	http://www.ecmwf.int/research/era	6a,6b,6c
	HadSLP2r	http://www.metoffice.gov.uk/hadobs	2e1
	JRA-25 Atmospheric Reanalysis	http://jra.kishou.go.jp/JRA-25/index_en.html	6d
	READER	http://www.antarctica.ac.uk/met/READER/	6c
River Discharge	Arctic-RIMS1 River Discharge	http://rims.unh.edu	2d5
	Dartmouth Flood Observatory	http://floodobservatory.colorado.edu	2d5
	River Discharge	http://waterdata.usgs.gov/nwis - USGS2	2d5
Sea Ice Concentration	Nimbus-7 SMMR and DMSP SSM/I	http://nsidc.org/data/nsidc-0051.html	5b, SB5.2
	Nimbus-7 SMMR and DMSP SSM/I (Bootstrap)	http://nsidc.org/data/docs/daac/nsidc0079_bootstrap_seaice .gd.html	6f
Sea Ice Duration	Near-Real-Time DMSP SSM/I-SSMIS Daily Polar Gridded	http://nsidc.org/data/nsidc-0081.html	6f
Sea Ice Extent	Nimbus-7 SMMR and DMSP SSM/I (Bootstrap)	http://nsidc.org/data/docs/daac /nsidc0079_bootstrap_seaice.gd.html	6f
	NOAA IMS, 4km Daily	http://nsidc.org/data/g02156.html	5i
Sea Ice Index	Sea Ice Concentration from DMSP SSM/I-SSMIS Passive Microwave Data	http://nsidc.org/data/seaice_index/archives/index.html	5i

Sea Level	Arctic Sea Level	http://www.whoi.edu/science/PO/arcticsealevel/data.html	5j
	Ssalto/Duacs Multimission Altimeter Products	http://www.aviso.oceanobs.com/en/data /product-information/duacs/index.html	3g
	University of Hawaii Sea Level Center	http://uhslc.soest.hawaii.edu/	3i
Sea Surface Salinity	Aquarius	http://aquarius.nasa.gov	SB3.1
	World Ocean Atlas 2009	http://www.nodc.noaa.gov/OC5/WOA09/pr_woa09.html	3e
Sea Surface Temperature	Climate Prediction Center's Monthly Ocean Briefing	http://www.cpc.ncep.noaa.gov/products/GODAS	3b
	ERSST-v3b	http://www.esrl.noaa.gov/psd/data/gridded/data.noaa.ersst.html	4b1,4d,4g
	HadSST2	http://www.metoffice.gov.uk/hadobs/hadsst2	2b1
	NOAA Optimum Interpolation SST (OISST) v2	http://www.esrl.noaa.gov/psd/data/gridded /data.ncep.oisst.v2.html	4f2,4h, 5j2,6f
Snow Cover	Snow Cover Extent and Duration	http://climate.rutgers.edu/snowcover/	2c2,5d
	SSM/I	http://www.nsidc.org	6e
Snow Depth	Canadian Meteorological Centre Daily Gridded	http://nsidc.org/data/docs/daac/nsidc0447_CMC_snow_depth/index.html	5d
Snow Water Equivalent	ERA-interim Atmospheric Reanalysis	http://www.ecmwf.int/research/era	5d
	GlobSnow N. Hemisphere Snow Water Equivalent	http://www.globsnow.info/	5d
Soil Moisture	GRACE	http://www.esa-soimoisture-cci.org/	2d6
Solar Transmission	Mauna Loa Solar Transmission	http://www.esrl.noaa.gov/gmd/grad/mloapt.html	SB2.3
Stratospheric Ozone	Calipso (Polar Stratospheric Clouds)	http://eosweb.larc.nasa.gov/PRODOCS/calipso /table_calipso.html	6g
	GOME/SCIAMACHY/ GOME2 Total Ozone Datasets, GSG Merged Data	http://www.iup.uni-bremen.de/gome/wfdoas	2g3, 6g
	KNMI OMI	http://ozoneaq.gsfc.nasa.gov	6g
	Multi Sensor Reanalysis (MSR) of Total Ozone	http://www.temis.nl/protocols/O3global.html	2g3
	NASA Aura Microwave Limb Sounder	http://aura.gsfc.nasa.gov/instruments/mls.html	6g
	OMI Total Ozone ($OMTO_3$)	http://mirador.gsfc.nasa.gov/cgi-bin/mirador /presentNavigation.pl?tree=project&project=OMI	2g3
	Ozonesonde	http://www.esrl.noaa.gov/gmd/dv/spo_oz/	6g
	WOUDC Ground-based Ozone	ftp://ftp.tor.ec.gc.ca/Projects-Campaigns/ ZonalMeans/	2g3

Stratospheric Water Vapor	Boulder Water Vapor Balloon Data	ftp://ftp.cmdl.noaa.gov/ozwv/water_vapor/Boulder_New/	2f4
	HALOE Data	http://haloe.gats-inc.com/home/index.php	2f4
	MLS Data	http://disc.sci.gsfc.nasa.gov/Aura/data-holdings/MLS/index.shtml	2f4
Surface Current	Long Term Time Series of Surface Currents	http://www.aoml.noaa.gov/phod/altimetry/cvar	3g
	Long Term Time Series of Surface Currents: Agulhas Current	http://www.aoml.noaa.gov/phod/altimetry/cvar/agu/index.php	3g2
	Long Term Time Series of Surface Currents: Brazil-Malvina Region	http://www.aoml.noaa.gov/phod/altimetry/cvar/mal/BM_ts.php	3g3
	Ocean Surface Current Analysis - Real time (OSCAR)	http://www.oscar.noaa.gov/	3g
	PO.DAAC Physical Oceanography Distributed Active Archive Center	http://podaac.jpl.nasa.gov/	3g
	Ssalto/Duacs Multimission Altimeter Products	http://www.aviso.oceanobs.com/en/data/product-information/duacs/index.html	3i
	The Global Drifter Program, Satellite-tracked Surface Drifting Buoys	http://www.aoml.noaa.gov/phod/dac/gdp.html	3g
	Tropical Atmosphere Ocean Project	http://www.pmel.noaa.gov/tao/	3g
Temperature, [Near] Surface	AMRC (Antarctic Meteorological Research Center) AWS	http://amrc.ssec.wisc.edu/data/	6c,SB6.1
	Berkeley Land Temperature	http://berkeleyearth.org/analysis/	2b1
	CRUTEM3	http://www.metoffice.gov.uk/hadobs/crutem3	2b1, 5b
	CRUTEM4	http://www.metoffice.gov.uk/hadobs/crutem4	2b1
	ERA-Interim	http://www.ecmwf.int/research/era	6a,6b,6c
	HadCRUT3 Global Temperature	http://www.metoffice.gov.uk/hadobs/hadcrut3	2b1
	JMA Global Temperature	http://ds.data.jma.go.jp/tcc/tcc/products/gwp/temp/map/download.html	2b1
	JRA-25 Atmospheric Reanalysis	http://jra.kishou.go.jp/JRA-25/index_en.html	2b1
	MERRA	http://gmao.gsfc.nasa.gov/merra/	2b1, 6g
	NASA/GISS Global Temperature	http://data.giss.nasa.gov/gistemp/	2b1
	NCEP/NCAR Reanalysis	http://www.esrl.noaa.gov/psd/data/gridded/data.ncep.reanalysis.html	5b
	NCEP-CFSR	http://cfs.ncep.noaa.gov	2b1
	NOAA/NCDC Global Temperature	http://www.ncdc.noaa.gov/cmb-faq/anomalies.html	2b1
	READER	http://www.antarctica.ac.uk/met/READER/	6c, SB6.1

Temperature, Upper Atmosphere	20th Century Reanalysis	http://www.esrl.noaa.gov/psd/data/20thC_Rean/	2b2
	ERA-Interim	http://www.ecmwf.int/research/era	2b2,2b3, 6b
	HadAT2	http://www.metoffice.gov.uk/hadobs	2b2,2b3
	JRA-25 Atmospheric Reanalysis	http://jra.kishou.go.jp/JRA-25/index_en.html	2b2
	MERRA	http://gmao.gsfc.nasa.gov/merra/	2b2,2b3
	NCEP/DOE Reanalysis 2	http://www.esrl.noaa.gov/psd/data/gridded/data.ncep .reanalysis2.html	6g
	RAOBCORE, RICH	http://imgw.univie.ac.at/en/products	2b2,2b3
	RATPAC	http://www.ncdc.noaa.gov/oa/climate/ratpac	2b2,2b3
	RSS	http://www.remss.com	2b2,2b3
	UAH MSU	http://vortex.nsstc.uah.edu/public/msu/	2b2,2b3
TOA Earth Radiation Budget	CERES EBAF Ed2.6r 1Deg	http://ceres.larc.nasa.gov/sitemap_ceres.php	2f
Total Column Ozone	TOMS and OMI Sensors	http://ozoneaq.gsfc.nasa.gov/	5c,6g
Total Column Water Vapor and Humidity, Upper Air	COSMIC Land and Ocean Total Column Water Vapor	http://cosmic-io.cosmic.ucar.edu/cdaac/index.html	2d2
	GPS Ground-Based Total Column Water Vapor	http://dss.ucar.edu/datasets/ds721.1/	2d2
	NCEP/NCAR Reanalysis	http://www.esrl.noaa.gov/psd/data/gridded /data.ncep.reanalysis.html	4d4
	SSM/I -AMSR-E Ocean Total Column Water Vapor	http://www.remss.com	2d2
	TCWV Radiosonde	Junhong Wang, Earth Observing Laboratory, NCAR, Boulder, CO.	2d2
Trace Gases	Atmospheric Green-house Gas Index (AGGI)	http://www.esrl.noaa.gov/gmd/aggi/	2g1
	Carbon Dioxide	http://www.esrl.noaa.gov/gmd/dv/iadv/	2g1,SB5.1
	Carbon Monoxide	http://www.esrl.noaa.gov/gmd/dv/iadv/	2g1
	JPL MLS (HCl,ClO)	http://mls.jpl.nasa.gov/index.php	6g
	Methane	http://www.esrl.noaa.gov/gmd/dv/iadv/	2g1,SB5.1
	Nitrous Oxide	http://www.esrl.noaa.gov/gmd/hats/combined/N2O.html	2g1
	ODGI	http://www.esrl.noaa.gov/gmd/odgi/	2g1
	Perfluorocarbons	http://agage.eas.gatech.edu/	2g1
	Sulphur Hexafluoride	http://www.esrl.noaa.gov/gmd/hats/combined/SF6.html	2g1
	SCIAMACHY (OClO, NO_2)	http://www.sciamachy.org/	6g
Tropical Cyclone Data	International Best Track Archive for Climate Stewardship (IBTrACS)	http://www.ncdc.noaa.gov/oa/ibtracs/	4d
	JTWC Best-track Dataset (2011 preliminary)	http://www.usno.navy.mil/NOOC/nmfc-ph/RSS/jtwc /best_tracks/	4d4

Ultraviolet Radiation	UV Index	http://www.temis.nl/uvradiation/SCIA/stations_uv.html	5c
Wind, [Near] Surface	20th Century Reanalysis	http://www.esrl.noaa.gov/psd/data/20thC_Rean/	2e2
	AMRC (Antarctic Meteorological Research Center) AWS	http://amrc.ssec.wisc.edu/data/	6c,SB6.1
	ERA-Interim	http://www.ecmwf.int/research/era	2e2
	ISD-Lite wind data	http://www.ncdc.noaa.gov/oa/climate.isd.index.php?name=isdlite	2e2
	JRA-25 Atmospheric Reanalysis	http://jra.kishou.go.jp/JRA-25/index_en.html	2e2,4h,6b
	MERRA	http://gmao.gsfc.nasa.gov/merra/	2e2
	READER	http://www.antarctica.ac.uk/met/READER	6c
	Satellite Radiometer Winds (SSM/I, AMSR-E, WindSat, SSMIS)	http://www.remss.com	2e2
Wind, Upper Atmosphere	ERA-Interim	http://www.ecmwf.int/research/era	6b
	NCEP/DOE Reanalysis 2	http://www.esrl.noaa.gov/psd/data/gridded/data.ncep.reanalysis2.html	4d3

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