

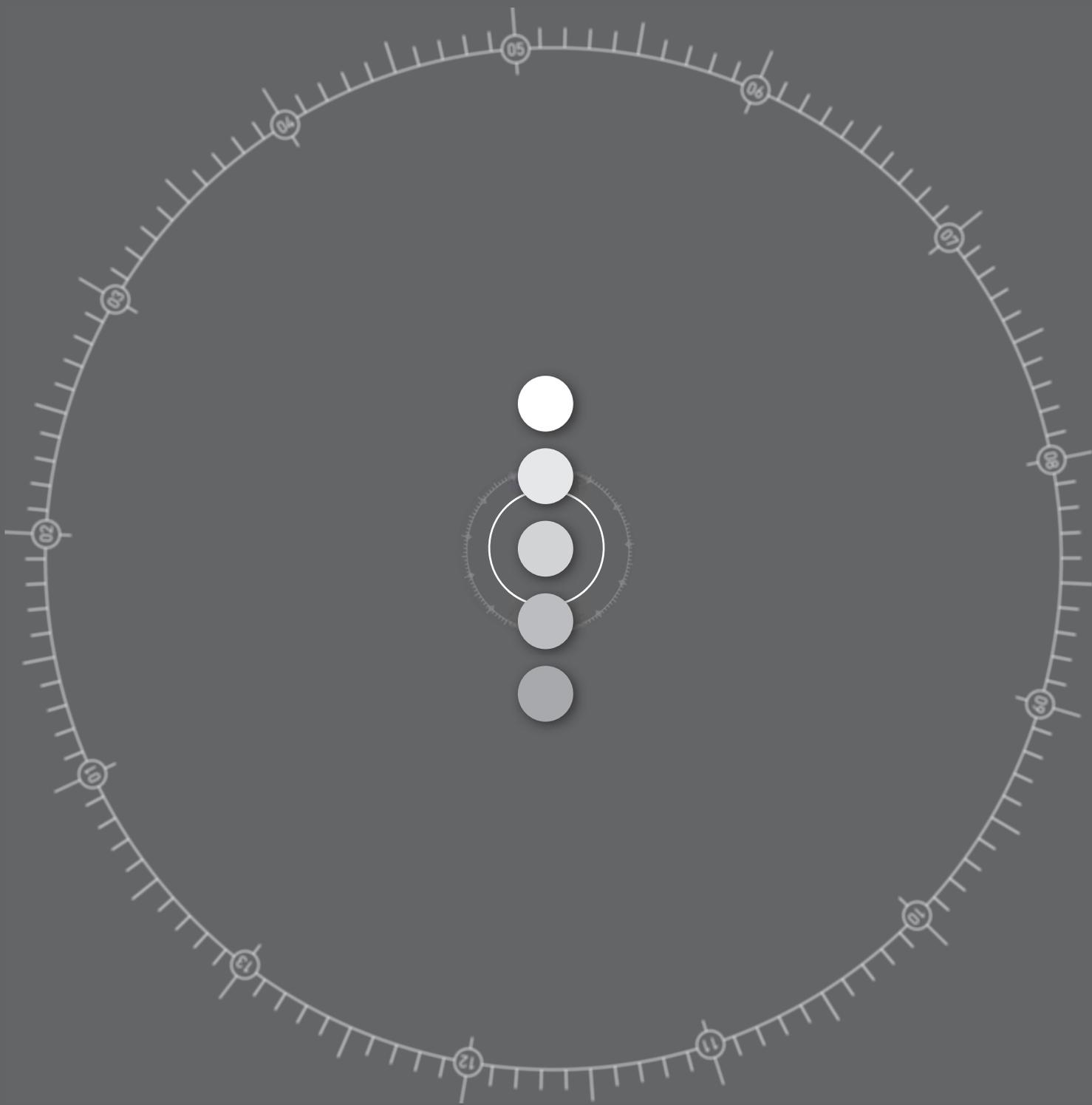
# ACRONYMS

Unfortunately in Earth Observations you cannot avoid them so a summary list of those used in this document are provided below.

<b>AERONET</b> AErosol RObotic NETwork	<b>ESA</b> European Space Agency
<b>ALOS</b> Advanced Land Observing Satellite	<b>ETN-R</b> European Terrestrial Network for River Discharge
<b>AQUASTAT</b> Global information system for water and agriculture (FAO)+	<b>EUMETSAT</b> European Organisation for the Exploitation of Meteorological Satellites
<b>ARM/SGP</b> Atmospheric Radiation Measurement/ Southern Great Plains [Site]	<b>FAO</b> Food and Agricultural Organization of United Nations
<b>ATSR</b> Along Track Scanning Radiometer	<b>FAPAR</b> Fraction of Absorbed Photosynthetically Active Radiation
<b>AVHRR</b> Advanced Very High Resolution Radiometer	<b>FCDR</b> fundamental climate data record
<b>BSRN</b> Baseline Surface Radiation Network	<b>FIRMS</b> Fire Information for Resource Management System
<b>CALM</b> Circumpolar Active Layer Monitoring	<b>FLUXNET</b> a global network of micrometeorological tower sites
<b>CDIAC</b> Carbon Dioxide Information and Analysis Center	<b>FRA</b> Global Forest Resources Assessment of FAO
<b>CEOS</b> Committee on Earth Observing Satellites	<b>FRP</b> Fire Radiated Power
<b>CERES</b> Clouds and Earth's Radiant Energy System mission	<b>GARS</b> Geological Application of Remote Sensing
<b>CGMS</b> Coordination Group for Meteorological Satellites	<b>GCOS</b> Global Climate Observing System
<b>COP</b> Conference of the Parties	<b>GEMS</b> Global Environment Monitoring System
<b>CORINE</b> COOrdination of INformation on Environment	<b>GEO</b> Group on Earth Observations
<b>DEWA</b> Division of Early Warning and Assessment (UNEP)	<b>GEOS</b> Global Earth Observing System of Systems
<b>EASE-Grid</b> Equal-Area Scalable Earth Grid	<b>GFMC</b> Global Fire Monitoring Center
<b>ECV</b> Essential Climate Variables	<b>GFSC</b> Goddard Space Flight Center
<b>EFAS</b> European Flood Alert System	<b>GGMS</b> Global Groundwater Monitoring System
<b>EO</b> Earth observations	<b>GIS</b> Geographic Information System
<b>EOSD</b> Earth Observation for Sustainable Development	<b>GLCN</b> Global Land Cover Network
	<b>GLIMS</b> Global Land Ice Measurements from Space

<b>GMES</b> Global Monitoring for Environment and Security	<b>IGOL</b> Integrated Global Observations for Land
<b>GOES</b> Geostationary Operational Environmental Satellite	<b>IGOS</b> Integrated Global Observing Strategy
<b>GOFC-GOLD</b> Global Observation of Forest and Land Cover Dynamics (GTOS)	<b>IGRAC</b> International Groundwater Resources Assessment Centre
<b>GOOS</b> Global Ocean Observing System	<b>IGWCO</b> Integrated Global Water Cycle Observations
<b>GPPC</b> Global Precipitation Climatology Centre	<b>ILTER</b> International Long Term Ecological Research
<b>GRACE</b> Gravity Recovery and Climate Experiment	<b>IMS</b> Interactive Multisensor Snow and Ice Mapping System
<b>GRAPHIC</b> Groundwater Resources Assessment under the Pressures of Humanity and Climate Change	<b>InSAR</b> Interferometric Synthetic Aperture Radar
<b>GRDC</b> Global Runoff Data Centre	<b>IPCC</b> International Panel on Climate Change
<b>GRID</b> Global Resource Information Database	<b>IPA</b> International Permafrost Association
<b>GTN-G</b> Global Terrestrial Network for Glaciers	<b>IPY</b> International Polar Year
<b>GTN-GW</b> Global Terrestrial Network on Groundwater	<b>ISO</b> International Organization for Standardization
<b>GTN-H</b> Global Terrestrial Network for Hydrology	<b>IWMI</b> International Water Management Institute
<b>GTN-L</b> Global Terrestrial Network for Lake level	<b>JAXA</b> Japan Aerospace Exploration Agency
<b>GTN-P</b> Global Terrestrial Network for Permafrost	<b>JRC</b> Joint Research Centre [of the EU]
<b>GTN-R</b> Global Terrestrial Network for River discharge	<b>LAI</b> Leaf Area Index
<b>GTOS</b> Global Terrestrial Observing System	<b>LCCS</b> Land Cover Classification System (FAO/UNEP)
<b>GTS</b> Global Telecommunications System	<b>LPV</b> Land Product Validation [Subgroup of CEOS-WGCV]
<b>HYDROLARE</b> International Data Centre on the Hydrology of Lakes and Reservoirs	<b>LSI</b> Land Surface Imaging [Constellation]
<b>HSDSD</b> Historical Soviet Daily Snow Depth Version 2	<b>MERIS</b> MEidium Resolution Imaging Spectrometer
<b>HTE</b> High-Temperature Events	<b>MISR</b> Multiangle Imaging Spectro-Radiometer
<b>IACS/IUGG</b> International Association for the Cryospheric Sciences of the International Union of Geodesy and Geophysics	<b>MODIS</b> Moderate Resolution Imaging Spectroradiometer
<b>IAEA</b> International Atomic Energy Agency	<b>MSG</b> METEOSAT Second Generation
<b>ICSU</b> International Council of Scientific Unions	<b>NASA</b> National Aeronautics and Space Administration
<b>IFPRI</b> International Food Policy Research Institute	<b>IWMI</b> International Water Management Institute

<b>NESDIS</b> National Environmental Satellite, Data, and Information	<b>TCO</b> Terrestrial Carbon Observation Panel of GTOS
<b>NDSI</b> Normalized Difference Snow Index	<b>TEMS</b> Terrestrial Ecosystem Monitoring Site
<b>NICOP</b> Ninth International Conference on Permafrost	<b>TMB</b> Technical Management Board
<b>NLCD</b> National Land Cover Dataset (USA)	<b>TOPC</b> Terrestrial Observation Panel for Climate
<b>NOAA</b> National Oceanic and Atmospheric Administration	<b>TRMM</b> Tropical Rainfall Measuring Mission
<b>NPOESS</b> U.S. National Polar Orbiting Environmental Satellite System	<b>TSP</b> Thermal State of Permafrost
<b>NPP</b> net primary production	<b>TU Delft</b> Delft University of Technology (The Netherlands)
<b>NPP / NPOESS</b> NPOESS Preparatory Program / National Polar-orbiting Operational Environmental Satellite System	<b>UN</b> United Nations
<b>NSIDC</b> National Snow and Ice Data Center	<b>UNEP</b> United Nations Environment Programme
<b>NWS/COOP</b> National Weather Service, Cooperative Observer Program	<b>UNISDR</b> United Nations International Strategy for Disaster Reduction
<b>PACE</b> Permafrost and Climate in Europe	<b>UNESCO</b> United Nations Educational, Cultural, Scientific and Cultural Organization
<b>PALSAR</b> Phased Array type L-band Synthetic Aperture Radar	<b>UNFCCC</b> United Nations Framework Convention on Climate Change
<b>PAR</b> photosynthetically active radiation	<b>USGS</b> United States Geological Survey
<b>POLDER</b> POLarization and Directionality of the Earth's	<b>VIIRS</b> Visible Infrared Imagery Radiometer Suite
<b>REDD</b> Reducing Emissions from Deforestation and Degradation	<b>VU Amsterdam</b> Vrije Universiteit Amsterdam, The Netherlands
<b>ROSHYDROMET</b> Federal Service of Russia for Hydrometeorology & Environmental Monitoring	<b>WCRP</b> World Climate Research Programme
<b>SBSTA</b> Subsidiary Body for Scientific and Technological Advice (UNFCCC)	<b>WF-ABBA</b> Wildfire Automated Biomass Burning Algorithm
<b>SeaWiFS</b> Sea-viewing Wide Field-of-view Sensor	<b>WGCV</b> Working Group on Calibration and Validation
<b>SEVIRI</b> Spinning Enhanced Visible and Infrared Imager	<b>WGMS</b> World Glacier Monitoring Service
<b>SHI</b> State Hydrological Institute (Russia)	<b>WHYMAP</b> World-wide Hydrogeological Mapping and Assessment Programme
<b>SMMR</b> Scanning Multichannel Microwave Radiometer	<b>WMO</b> World Meteorological Organization
<b>SSM/I</b> Special Sensor Microwave Imager	<b>WRMC</b> World Radiation Monitoring Centre
<b>SWE</b> snow water equivalent	<b>WWAP</b> World Water Assessment Programme (UN)
	<b>WWDR</b> World Water Development Report (UN)



# THE GLOBAL TERRESTRIAL OBSERVING SYSTEM

The Global Terrestrial Observing System (GTOS) was established in January 1996 by its five co-sponsoring organizations in response to international calls for a deeper understanding of global change in the Earth System.

The central mission of GTOS is to provide policy-makers, resource managers and researchers with access to the data they need to detect, quantify, locate, understand and warn of change (especially reduction) in the capacity of terrestrial ecosystems to support sustainable development. Since its establishment, GTOS has been working to improve the quality, the coverage and accessibility of terrestrial ecosystem data.

GTOS promotes: integration of biophysical and socio-economic georeferenced data; interaction between monitoring networks, research programmes and policy-makers; data exchange and application; quality assurance and harmonization of measurement methods; and collaboration to develop regional and global datasets.

This report reviews the terrestrial Essential Climate Variables (ECVs), which are endorsed by the United Nations Framework Convention on Climate Change (UNFCCC) and the Group on Earth Observations (GEO). Details are provided on why these observations are needed to understand the causes of climate change, analyse the potential impacts, evaluate the adaptation options and enable characterization of extreme events such as floods, droughts and heat waves. It highlights some of the activities being undertaken, the need for the standardization of methods and harmonization of data and the major observational gaps and funding requirements needed to allow countries and international agencies to monitor, implement and report on issues related to climate change.

## GTOS PARTNERS



**Food and Agriculture Organization of the United Nations (FAO)**  
[www.fao.org](http://www.fao.org)



**International Council for Science (ICSU)**  
[www.icsu.org](http://www.icsu.org)



**United Nations Environment Programme (UNEP)**  
[www.unep.org](http://www.unep.org)



**United Nations Educational, Scientific and Cultural Organization (UNESCO)**  
[www.unesco.org](http://www.unesco.org)



**World Meteorological Organization (WMO)**  
[www.wmo.ch](http://www.wmo.ch)

## GTOS DONOR



**Cooperazione Italiana**  
[www.cooperazioneallosviluppo.esteri.it](http://www.cooperazioneallosviluppo.esteri.it)



### GTOS Secretariat

c/o Environment, Climate Change and Bioenergy Division (NRC)  
Food and Agriculture Organization of the United Nations  
Viale delle Terme di Caracalla 00153 Rome, Italy

E-mail: [GTOS@fao.org](mailto:GTOS@fao.org) | Tel: (+39) 06 57056804 | Fax: (+39) 06 57053369 | [www.fao.org/gtos](http://www.fao.org/gtos)