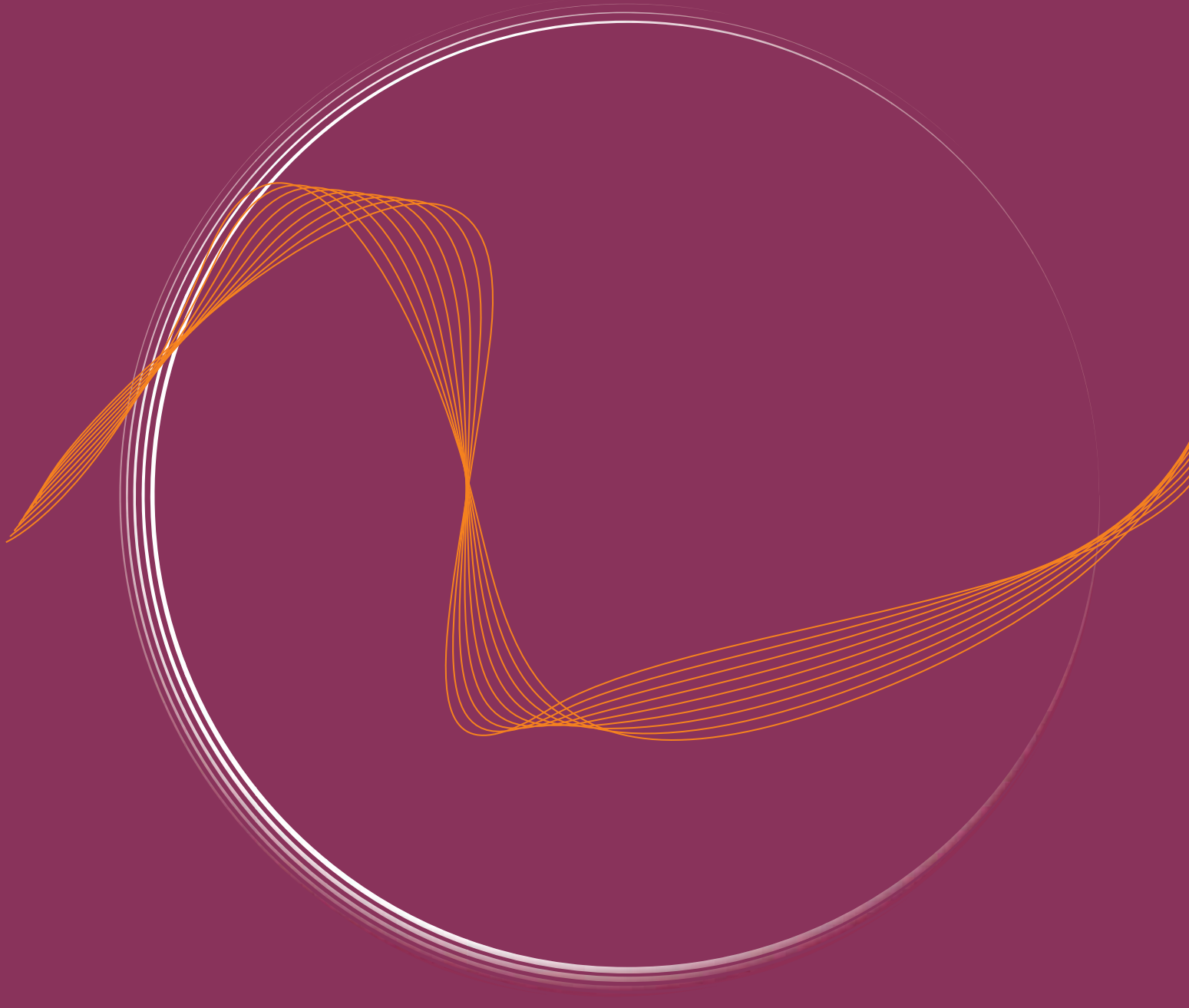
TERRESTRIAL OBSERVATIONS OF OUR PLANET



BIENNIAL REPORT 2008/09

WMO UNESCO UNEP ICSU FAO GTOS

TERRESTRIAL OBSERVATIONS OF OUR PLANET

[GTOS 73]

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GTOS PROGRAMME STRUCTURE

GTOS is a global system for observations, modelling and analysis of terrestrial ecosystems to support sustainable development. Its mission is to facilitate access to reliable information on terrestrial ecosystems so that researchers and policy-makers can detect and manage global and regional environmental change.

* Networks e.g.: Glaciers (GTN-G), Hydrology (GTN-H), Mountains (GTN-M), Permafrost (GTN-P), River Discharge (GTN-R).

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Contribution to the GTOS Programme
The GTOS Secretariat would like to thank the many individuals who have assisted in the GTOS Programme, including: Renato Cumani, Catherine Gaury, Trina Hershkovitz, Zubair Qamar, Ilaria Rosati, Reuben Sessa, Gabriele Zanolli, Stefano Bravi.

GTOS
PROGRAMME ACTIVITIES

LETTER FROM THE NEW CHAIR

by Riccardo Valentini

The United Nations Climate Change Conference in Copenhagen is fast approaching and we are facing a new challenge toward stabilization of GHG emissions in the atmosphere. We all must take responsibility to achieve this objective, and I sincerely believe that high quality systematic Earth observations are a key tool in understanding the biogeophysical processes leading to global change and to help governments take appropriate policies and measures, contributing to sustainable development.

In the past several years the scientific community has played a vital role by continuous and consistent monitoring of GHG fluxes and other environmental variables. More than fifty years have passed since the first measurements of CO2 concentration in the atmosphere were performed at Mauna Loa Observatory in Hawaii, thanks to the pioneering work of Dr. Charles David Keeling. The Keeling Curve showed for the first time the significant increase of CO2 in the atmosphere. This is one of the most evident examples of the importance and practical usefulness of continuous systematic observations of the biosphere.

Long-term monitoring of our environment is essential to:

i. show trends and their changes of natural and anthropic processes,
ii. discover "surprises" and unknown behaviours of our planet systems,
iii. identify early warning and preparedness of the civil society on emerging critical environmental issues, and
iv. verify the effectiveness of societal responses to global change pressures.

Much work has already been done, however continued efforts in systematic observation of the Earth should be maintained.

During the coming years, systematic observations are essential to improve the understanding of the relationship between the carbon cycle and climate systems, assess the mitigation potential of terrestrial ecosystems and propose adaptation options. Only through systematic observations is it possible to verify the adequacy of the commitments of emission reduction, and to monitor and foresee any possible risks that could be induced by global change.

GTOS should play a leading role in supporting the maintenance and the development of a global observation system, in collaboration with other monitoring programmes such as GCOS, GOOS, and GEO. I am sure that this is possible, but we need to conceive a new effective GTOS strategy for at least the next ten years. Thus, it is a great responsibility and a great challenge to lead this process during the next three years.

The next GTOS strategy should address the concrete integration of space-based and ground observations with renewed emphasis. Remote sensing and *in situ* communities have developed an outstanding wealth of information and data sets in the last 20 years but for several reasons they have remained separated too long. Now there is an urgent need to develop products and models able to combine these two components.

Definition of environmental baselines to be used as a reference for the future observations should be part of the next strategy. GTOS should thus identify a sustainability threshold for ecosystem services based mainly on the projection of historical data.

Observations are essential to address the growing concern over the ever-increasing human modification of the global environment and the consequent implications for human wellbeing

In order to be more effective and gain more visibility , GTOS should be more focused toward the delivery of concrete specific products- to be identified uniquely as GTOS products - such as a global database on terrestrial information, data analysis, data assimilation prototypes, publications and position papers on international peer reviewed journals.
To this end, GTOS should concentrate on a few specific focus areas:

i. climate change,
ii. terrestrial carbon stocks and fluxes,
iii. land degradation, and
iv. loss of biodiversity.

Under these categories, the following cross-cutting topics should be considered: coastal areas, mountains, snow and ice cover, and urban areas.

However, none of the above issues can be realized without securing continuous financial support for the GTOS programme. An important foundation for future strategy will be the adoption of a funding model based on extra-budgetary resources, as GTOS has already demonstrated in these past three years. Furthermore, minimum funding to ensure efficient functioning of the GTOS Secretariat should be guaranteed.

In closing, I would like to thank my predecessor Berrien Moore, for his work as GTOS chair in the period 2004-2009, and the numerous collaborators who contributed to the important progress made by GTOS during the past five years.

I feel very honoured to have been assigned this challenging opportunity and I can only say that I will do my best for the next three years. I am convinced that with everyone's support we can raise the GTOS profile and expand its active role.

RELATED LINKS:
GTOS: www.fao.org/gtos

BIENNIAL REVIEW FROM THE PROGRAMME DIRECTOR

by John S. Latham

GLOBAL ENGAGEMENT

The 2008–2009 biennium has seen a major elevation in the profile of GTOS within the International community. There has been a significant increase in the engagement with and reporting to the International community by the GTOS Panels. The relevancy and need for an improvement in the quality and quantity of observations has never been greater, in the lead up to the negotiation of a new climate agreement in Copenhagen. The increase in number and intensity of natural disasters, as well as the rise in reporting on the evidence and effects of climate change on local, regional and global systems, are cause for concern, motivating policy-makers to intensify national and international efforts to understand, prevent and adapt to climate change. Clearly, climate change is a real threat to development and puts additional pressure on already limited resources. To respond to these requirements GTOS is fully engaged in advocating for the improvement of the global quality and coverage of systematic Earth observations, both ground and space based, in the terrestrial domain.

GEO/GEOSS

The Group on Earth Observations (GEO) has become the focal point and guidance for all institutions, initiatives and individuals involved in environmental observations, and its Global Earth Observation System of Systems (GEOSS) should ensure the needed political support. What is now required are the financial resources to develop a coordinated infrastructure for collecting and distributing the observations needed by the broad user community. GTOS and its Panels have actively supported the process and have contributed to the development of the nine societal benefit areas (SBAs) and the ten-year implementation plan. GTOS remains committed to the process as an active participating agency implementing a number of critical tasks of the GEO 2009-11 workplan. GTOS is currently engaged in 16 tasks/subtasks and leads 4 of these, addressing four SBAs: Disasters, Climate, Ecosystems and Biodiversity. With 4 tasks/subtasks, the climate SBA has the largest number of tasks addressed by GTOS.

GTOS DELIVERING AS ONE

GTOS panels have succeeded in raising the profile through a set of integrated actions and a set of strategic documents developed across several areas. A few key examples include:

- The new REDD sourcebook of GOFC-GOLD, is a baseline reference for countries seeking strategic advice on how best to approach methodologies for carbon stock assessment.
- The Global Fire Information Management System (GFIMS) of University of Maryland, under the financial support of NASA, is an operational email alert system of daily active fire that will be fully ported to the Food and Agricultural Organization of the United Nations (FAO) for distribution to the global community of users.
- TCO continues to provide support to the terrestrial carbon assessment with a focus on Africa. TCO further supported the development of capacities through three milestone workshops on carbon fluxes estimation, approaches to biomass assessment and fire monitoring by remote sensing, convened in South Africa, Congo and UK, respectively. TCO is also directly involved in the writing and editing of the GEO carbon strategy.
- TOPC is supporting the development of the adequacy reports and the preparation of the Implementation Plan for the Global Observing

System for Climate (GCOS) for UNFCCC. The GTOS Secretariat has also been active in support of the convention, in particular for issues related to terrestrial Essential Climate Variables (ECVs).

- The GTOS Coastal initiative is now seeing the realization of its Implementation Plan. A new global mangrove atlas in partnership with the International Society for Mangrove Ecosystems (ISME) and the International Tropical Timber Organization (ITTO) has been developed by FAO. A new initiave supported by FAO and UNEP is assisting C-GTOS to build up a profile of the dynamics of coastal deltaic ecosystems through the mapping of changes in land cover in the world's main deltas.

INTERNATIONAL CONVENTIONS

GTOS was conceived at the time of UNCED and Agenda 21 in support of the international environmental conventions. A primary GTOS objective is to support climate-related international priorities and initiatives. GTOS has continued to raise the profile and importance of terrestrial observations and panels have re-energized their efforts to increase delivery at this critical time. It is not coincidental that during the biennium the greatest increase in all observation, as identified in the GCOS Implementation Plan, has occurred in the terrestrial domain. Most of the terrestrial actions (56%) were associated with a moderate to good delivery rating. Not withstanding this, it is evident that *in situ* observations are still underrepresented and that significant and sustained actions by governments are needed to increase the number of long-term and high-quality standardized *in situ* measurements, covering the main representative land cover and ecosystem types. The significant progress made by GTOS in improving the terrestrial observing systems for climate was recognised by UNFCCC/SBSTA at its 30th session which also saw the endorsement of the approval of the UN/ISO framework for the development of standards for variables in the terrestrial domain that affect climate.

Through the promotion of harmonized collection, analysis and exchange of relevant information related to land degradation, its contribution to the UN-REDD initiatives, and its involvement in wetlands and biodiversity issues, GTOS continues its contribution also to the other main environmental conventions, such as UNCCD, CBD and Ramsar.

MAINTAINING THE LEADERSHIP

Maintaining GTOS at the forefront of terrestrial observation requires that the programme is dynamic and responsive to new challenges. In this regard the forthcoming Steering Committee of GTOS will deliberate the new strategy for GTOS. Focus is proposed to be orientated towards:

- climate change
- terrestrial carbon stocks and fluxes
- land degradation
- loss of biodiversity.

The Key issue will be the integration of space and ground observations to support the assessment of global change impacts on terrestrial ecosystem services.

Equally important is the development of new Essential Climate Variables (ECVs), following new technological developments and stakeholder requirements. As the diversity of ECVs is expanding, increasing attention will be focused on reviewing the applicability of the ECVs as the basis for supporting climate services in the field of land degradation and biodiversity and in this regard strengthening links with UNFCCC, as well as broadened collaboration with UNCCD and CBD is being pursued.

Finally, I would like to thank the many individuals who have been involved in GTOS activities, especially the members of the panels, tireless dedication of the chair and the secretariat for their tremendous effort and long hours and hard work. Gratitude also goes to our many supporters and sponsors, for their financial contribution to GTOS.

I also take this opportunity to thank the outgoing GTOS Chair, Berrien Moore, for his efforts, and warmly welcome the new GTOS Chair, Riccardo Valentini, with whom I look forward to work in the coming years.

RELATED LINKS:

GTOS: www.fao.org/gtos | **GTOS and the Conventions:** www.fao.org/gtos/Conventions.html