

Statement by the WMO International Greenhouse Gas Monitoring Symposium (30 Jan – 1 Feb 2023, Geneva)

We, a broad group of 170 greenhouse gas monitoring stakeholders attending [the WMO International Greenhouse Gas Monitoring Symposium](#) held in Geneva January 30 to February 1, 2023, agree on the following points:

- Climate change is arguably the most important challenge facing humanity at this time, and in response, 196 nations adopted the 2015 Paris Agreement, which sets a goal of limiting the increase in global mean temperature via a reduction in net anthropogenic greenhouse gas emissions (referred to as “mitigation”).
- Achieving the goal of the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) requires all sectors of society to reduce their net emissions. Under the Paris Agreement, the Global Stocktake provides a mechanism to evaluate and enhance emission reduction targets every 5 years. However, delays of typically 1-2 years in current emissions reporting hampers the assessment of the effectiveness of mitigation action and limits the availability of timely input to policy decision making.
- Atmospheric greenhouse gas abundances are influenced by both anthropogenic emissions and natural processes, and the interactions between the two are complex and, in many cases, still poorly characterized. Assessing the efficacy of mitigation action to reduce GHG abundances thus requires quantifying and improving our understanding of emissions also from natural systems that are themselves under stress from climate change.
- Consequently, there is an urgent need to provide timely, temporally and geographically resolved data and information products on natural and anthropogenic fluxes and their contribution to greenhouse gas concentrations to a broad range of users for policy and decision-making purposes.
- Many groups from the public, private and academic sectors have recognized the importance of this need and have independently developed a variety of systems to observe greenhouse gases and related processes from various perspectives and for different Earth system domains; to integrate, analyze and interpret these observations, to model the processes involved and to quantify emissions. These systems have delivered valuable elements of the required information to a range of stakeholders.
- However, there is an urgent need to build on these efforts to develop a global, internationally coordinated GHG monitoring framework that will help us accurately quantify greenhouse gas sources and sinks at multiple scales needed for decision-making, support for the UNFCCC process, and serve the needs of other stakeholders from both public and private sectors.
- Our collective ambition is thus to leverage these disparate efforts and systems in a common framework that will enable delivery of timely, authoritative, quantitative, transparent observation-based data on greenhouse gas concentrations and their net fluxes at a high level of spatial and temporal granularity. This will help us both better quantify and manage the anthropogenic components of the atmospheric greenhouse gas budgets, and improve our understanding of the evolving natural sources and sinks, both of which together control GHG concentrations and their impact on global temperatures.
- A refocusing of existing monitoring efforts along with some enhancements towards providing support for the delivery of a science-based, user-driven, routine, sustained, actionable greenhouse gas-related services is needed. This includes elements such as coordinated acquisition and timely international exchange of observational data (both surface and space-based), validation of their accuracy through comparisons with internationally recognized standards, development of best practices for incorporating

observations into modeling and data assimilation systems, development of strategies and methodologies for model outputs intercomparisons and interpretation.

- In view of the policy implications of coordinated greenhouse gas monitoring, it is vital that the effort by all parties be inclusive and conducted in full transparency. This means that the activity must be open to participation from all nations, and that all input and output data must be made available to users on a free and unrestricted basis for verification and quality control purposes; methodologies and algorithms for flux estimation must be documented and should be published in the peer-reviewed literature; intercomparison of quality assessment of monitoring output should follow agreed best practices.
- WMO, because of its intergovernmental nature, its role in international coordination of research and operational activities in the field of weather, climate and water, its expertise in observing systems, modeling and data exchange systems design and implementation and related capacity development efforts, its convening power, and its role in informing the UNFCCC, is uniquely positioned to play a significant role in advancing the ambitions outlined above.
- Recognizing the urgency of actions required to mitigate and adapt to climate change, we therefore call on WMO, as the primary United Nations agency responsible for scientific and technical coordination of weather and climate-related activities, to take ownership of such a task via the following actions:
 - Convening a broad range of experts and stakeholders across United Nations agencies, international programs, national and subnational governments, academia and the private sector to develop consolidated requirements and deliverables for internationally coordinated, operational global greenhouse gas monitoring systems, with the aim of providing information needed to implement the Paris Agreement Global Stocktake, enable national, subnational, and private sector emissions mitigation and track the effectiveness of climate change mitigation policies and decisions;
 - Leading the development of an initial concept for an integrated framework for the operation of these systems, building on existing observing, modeling and data integration and assimilation capabilities;
 - Supporting existing and stimulating further development of both surface- and space-based observing systems for the relevant Earth system domains, atmosphere, ocean and land surface (both biosphere and cryosphere) and stimulating their further development;
 - Working with observational communities to establish standards for development, deployment, intercalibration, data acquisition, and data exchange for both in-situ and space-based measurements;
 - Exploring mechanisms for improving sustainability and geographic coverage of greenhouse gas and related observations, including capacity development where needed;
 - Exploring potential synergies with other treaty-based efforts that depend on similar Earth system observation, data exchange and modeling capabilities;
 - Establishing a review process to ensure the continual development of the systems, in response to new requirements, scientific challenges, and capabilities; recognizing that greenhouse gas fluxes in response to mitigation and climate change will present a changing global tapestry of emission patterns;
 - Keeping Parties to the UNFCCC, the greenhouse gas research community and other stakeholders informed and updated on this task.