

Session 4

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As an introduction, I would like to stress the urgency to have a Global Carbon Monitoring System.

In fact, it is widely understood that international political action is needed to avoid reaching a potential “climate tipping point” around 2050.

But the Kyoto protocol expires in 2012 and the Copenhagen summit failed to achieve a new agreement.

There are of course several reasons for this failure, but one of the key factor to obtain an international agreement was missing, namely a transparent, independent and non-biased verification tool in order to monitor the carbone emissions. I would summarise that by saying that objective evidence is required for policymaking.

To quote the Secretary of the United Nations Framework Convention on Climate Change (the UNFCCC) in Cancun: a Global Carbon Observing System is needed for delivering information to “*guide political discussions of the need to take difficult decisions on agreement among countries*”.

In this respect, a space infrastructure has the strong advantage to be global and transparent, as there cannot be a suspicion that a country modify the information for its own interests, as could have been the case for ground-based measurements.

According to the “GEO Carbon Strategy” expressed by the GEO, the Group on Earth Observation put in place by the 2002 World Summit on Sustainable Development and by the G8, an Integrated Global Carbon Observing System is needed by 2015.

They also stated that the next generation of greenhouse gases satellite measurements need to provide high accuracy

measurements with high spatial resolution (1-2km) in order to minimize cloud contamination.

And that a 1-3 day repeat frequency is needed to get good monthly mean greenhouse gases fields.

However, today, none of current or planned satellite missions achieve these specifications.

That is why the GEO stated that the highest short term priority is to continue space-based CO₂ and CH₄ measurements with improved passive sensors, ideally in a satellite constellation.

In fact, the feasibility of greenhouse gases measurement from space has been already demonstrated by the SCIAMACHY instrument on-board the ENVISAT satellite from ESA.

We therefore propose to base the concept for a carbon-monitoring constellation (which we call Carbonsat) on the experience gained from SCIAMACHY.

The time constraint, the urgency calls also for the use of state-of-art "off the shelf" technologies as far as possible.

That is the reason why a team led by the University of Bremen launched airborne campaigns to demonstrate how this approach is able to monitor and to verify transparently point source emissions.

The concept is now further elaborated in the ESA CarbonSat study, which is part of the Earth Explorer programme.

Clearly, the advantage of a satellite constellation is to be able to deliver global daily CO₂ and CH₄ measurements with a spatial resolution of less than 2km and adequate accuracy. With 5 Satellites, we can cover 2500 km on ground in one orbit, leading to a global coverage every day.

It will provide urgently needed information:

- First, it will improve our understanding of the CO₂ and CH₄ man-made and natural sources, and CO₂ sinks, for better attribution and prediction of climate change.

- Second, it will provide reliable and timely global monitoring and reporting of the surface emissions of greenhouse gases from strong local sources such as power plants and urban areas, and will yield the contribution of man-made emissions of CO₂ and CH₄ to be monitored, assessed and attributed.

This in order to support transparent, objective and independent verification of the reporting to UNFCCC (United Nations Framework Convention on Climate Change).

This will support post Kyoto treaty negotiations, by the ability to verify treaty obligations.

To implement such a system is a political responsibility of the European Union, as a forerunner of worldwide climate change initiatives, with programmes such as the ECCP, the European Climate Change Programme.

It will indeed serve several political needs, such as the long-term life preservation on Earth, the political stability to avoid the problems and burdens due to potential migration which could be caused by climate change.

It will also provide early strategic information for the EU to guide the development of global economy and environment policy and legislation, by having inside understanding in advance about the greenhouse gases emissions, having thus a significant advantage in the international negotiations.

This can also bring an economic advantage for European industries by enabling fair competition for European manufacturers in the export market, as currently European industries are subject to heavy emission control which adds in extra costs while some of their competitors do not incur

these costs, in the countries which do not implement any control on emissions.

As a conclusion, I would summarise by saying that a satellite constellation is a global, non-intrusive, independent, transparent and operational answer, to be able to monitor CO₂ and CH₄ man-made and natural emissions as well as CO₂ sinks. It is the adequate tool to help on reaching an international agreement and its consequent enforcement. It will also provide the strategic information at the earliest possible time for the EU to guide and influence the development of global economy, and national, European and international environment policy and legislation.

Note:

GEO is a voluntary partnership of governments and international organizations. It provides a framework within which these partners can develop new projects and coordinate their strategies and investments. As of October 2010, GEO's Members include 85 Governments and the European Commission. In addition, 61 intergovernmental, international, and regional organizations with a mandate in Earth observation or related issues have been recognized as Participating Organizations