



# EnviroGRIDS

**BUILDING CAPACITY FOR A BLACK SEA CATCHMENT  
OBSERVATION AND ASSESSMENT SYSTEM  
SUPPORTING SUSTAINABLE DEVELOPMENT**

**GROUP ON EARTH  
OBSERVATIONS**

**Interview with José Achache  
GEO Secretariat Director**

# Group on Earth Observations

**José Achache**, the GEO Secretariat Director, sets out the vision behind the organisation and its work to complete GEOSS, the interoperable framework to consolidate observational systems on a global basis

## Could you outline the motivating factors behind the establishment of the GEO in 2005?

People became gradually aware that the earth is a system of systems, that everything is coupled to other things, making it difficult to isolate the sub-systems of Earth, such as volcanoes, the oceans and the atmosphere. In the past there were enormous duplications in the build up of observing systems and there was a tendency to duplicate satellites, driven by industrial competition. At the same time there were huge gaps in the observations systems and people became aware of the need for more coordinated projects. There was also the recognition that earth observation was needed to support science, but also to be used as a tool to inform public decision making. The governments realised that they needed to be informed on the environment, and not just by models, but by the observations that the models require to make significant forecasts. The keywords of GEOSS are observations and coordination.

## How does the GEO framework assist policy makers and NGOs alike in the pursuit of sustainable development; do you believe it to be a realistic, or an idealistic goal?

It is not idealistic; it is extremely realistic, and badly needed. There is no way out, as you can see from the current discussions on climate variability and climate change. The transparency of information and how it is processed is critical. We will have to deal with water management in a similar way; it will require observations to be made and the information to

be processed to inform the public, governments and private organisations for decision making. I see increasing pressure on governments to make decisions that are well informed: aside from only social or economic influences, they will also have to factor in the environment.

## Can you outline the basic premise behind GEOSS? Given that the system is yet to be completed, is it already yielding encouraging results?

The basic premise behind GEOSS is interoperability. You cannot develop a system that is centralised; instead, it is critical to recognise ownership, both of observation systems, of models, and of forecasting responsibilities. You have to design a system that works properly with all the components recognising ownership of each of these components, and the only way to do this is by developing interoperability mechanisms. The second premise is data and information access; you can call it transparency – we need to make sure that the data is accessible, both technically and legally. The third point is quality assurance, because if all data has to be made available its quality has to be checked to avoid corrupting the decision making process.

GEOSS is already yielding encouraging results. In terms of access, there has been a revolution in data distribution lately in a number of strongholds of restricted data policy; we have unlocked a number of major data sets. This is now generating a flow of changes.

**In such a complex world, how difficult is it to provide a coordination role to the many members of the GEO framework, currently totalling 80 Governments, the EC, and an additional 58 participating organisations?**

It is extremely difficult to coordinate so many partners. You really have to convince these groups that they are not losing their responsibilities, that the outcome of individual contributions to GEOSS is greater than the sum of their parts, and that they will reap the benefits accordingly. Many communities are involved in GEO, and happy to be so, but there is a delicate tension at play. They are willing to contribute to GEOSS but they want recognition for their role.

There has been some hesitation from organisations that have an obvious leadership in one particular area, but it is gradually evaporating. Generally, governments do not have that specificity or ownership so they are more willing to engage in a collaborative effort like GEOSS. International collaboration has been extremely positive. The role of GEO is particularly well recognised by these communities which need better coordination and better access to observation systems, on a global scale. Such is the case for ecosystems and biodiversity studies; as well as climate. You must realise that there is no such thing as a climate community; climate studies encompass a very wide range of disciplines. It is a cooperative effort between oceanographers, vegetation biologists, atmospheric chemists and physicists, historians, phenologists, cryosphere experts, etc. .

**How is GEO data involved in unforeseen events such as the recent Haiti earthquake?**

On the information site we developed for Haiti - in a matter of days if not hours, we managed to bring together all the data providers, convincing them that even where they had restricted data policies, for the specific purpose, of this event they should make their data available. Japan was extremely helpful, and all the required data could be provided on the site, and used by scientists to compute in real time, stress redistribution maps. These are very accurate indicators of where the stress is reaccumulating after the fault has slipped, and therefore where future earthquakes are most likely to take place. This is very helpful in the early phase of recovery, to protect from aftershocks, and also very helpful in the reconstruction phase, to make sure you are not going to rebuild in the most dangerous places.

Alongside geophysicists, there were many disciplines involved in this effort, extending to involvement with the rebuilding of the country, redeveloping the agriculture and to forecasting weather events that could aggravate the situation. Everyone was willing to cooperate.

As I say, this was established in a matter of days, which is a good indication of how efficiently the GEO system now works.

**Is it fair to say that the improved, integrated climate monitoring systems made available under the GEOSS framework will assist developing countries in particular to develop action plans to mitigate against these potentially hazardous consequences, for example by making changes in their land use and water management strategies?**

It is probably true that a lot of countries which will be hardest hit by climate change will be developing countries, but because they are poor, and specifically resource-poor, not because the climatic consequences will be larger in these countries. Therefore the need to devise the best mitigation and adaptation strategies in these regions is essential. Rich countries can rely on technology, building dams and resisting nature; poorer countries will have to adapt and learn to use nature as an ally, rather than to combat or change it. Water management is a good example, wherein the natural flux of water can be used to recharge the water tables, leading to a balanced use of water resources. Nature provides solutions that can otherwise be extremely costly. However, with 9 billion people on this planet (as projected for 2050), we will no longer be able to build the necessary infrastructure to cope, so maintaining ecosystem services and rebalancing natural processes will be the natural, and most efficient option.

**What amongst the recent achievements enabled by GEO and GEOSS would you highlight for special attention? Perhaps you could elaborate on the GEO Forest Carbon Tracking portal, and the way in which it will help us to monitor global warming?**

Key moments have centred around the release of multi-spectral imagery from satellites. This data provides a critical resource for agriculture management, forecasting, forest monitoring, land use planning, glacier monitoring, climate change detection, etc. It started with CBERS (China-Brazil Earth Resources Satellite) which was released for all GEO users free of charge by China and Brazil. And later on the Americans decided to release the LANDSAT archive spanning 40 years of observations. When it became public, the number of images distributed in a month was 10 times larger than what they used to distribute in a whole year. We have also produced a global digital elevation model, thanks to Japan and the U.S, which represents the first time a global numerical model of topography has been publically available. The Forest Carbon Tracking portal is another very interesting development from GEO; we are evaluating the characteristics that forest carbon estimates from satellites would provide. This tool will be available to governments to help them protecting or combating deforestation, should they wish to do so.

**In light of a recent tide of scepticism, do you believe there is a danger that the global will for action on climate change is wavering?**

Well, the IPCC has been blamed for something that GEO is criticising – the lack of transparency. They had restricted access to the data on which



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## ANALYSIS

they had based their evaluation; however, now they have agreed to make it available. My concern with recent events is that in the end, governments might doubt the reliability of all scientific evidence. If decision makers lose confidence in the ability of scientists to provide good advice, then the Earth Science community could be hurt, altogether

Regarding public opinion, I don't think it is well informed; and it often fluctuates. But that being said, there is a real issue of credibility to address.

### **Is enough being done by different governments to react to the impact of climate change?**

Honestly, I don't know. I'm not entirely convinced by the outputs of the climate models for the next century. I think it's beyond our knowledge to be able to predict climate change over this timescale, so whether we've reached a threshold and we're about to get to a tipping point, is beyond our knowledge.

### **To what extent is the GEO involved in the preservation of biodiversity, an area of particular focus for the UN in 2010?**

Biodiversity is one of the nine areas in which we are working; we have built a network called GEO BON (Biodiversity Observation Network). We have an agreement with the UN CBD (Convention on Biological Diversity), to help them establish a 2010 baseline in biodiversity, relative to which changes in biodiversity 2015 and 2020 will be evaluated. The problem of understanding biodiversity loss is the lack of reference level. It is also worth remembering that species are constantly disappearing over geological ages, while others are being introduced; it's thanks to that very same evolution that we live on this Earth. In any case, we need to have a reliable baseline.

In addition, GEO is coordinating the biodiversity community to try and develop coordinated methodologies for biodiversity assessments.

### **Finally, a word about investment – do you believe there is sufficient funding to tackle the undeniably huge environmental issues we face as a global community?**

No, but it's not a major problem. If we hadn't been facing this global financial crisis, which has reduced the funds available to below what's needed, I think we'd be in good shape. We are spending a lot of money on Earth observation, but it's poorly coordinated and there is a lot of duplication at present. Improving efficiency, while difficult, would be an enormous benefit, and would provide much better value for money.

We need additional satellites, and more observing systems, but it's not radical change. We can gradually increase that capability. It's really a question of approach, with science coupled with better decision making, leading to a more intelligent management of the environment.

### **Is there scope for commercial enterprise to help in shifting the way we prioritise environmental objectives?**

Yes, and this is already happening. There is growing interest from information managing companies like Cisco and Google to invest in this sector, alongside growing demand from private companies such as reinsurance companies, big brewers like Coca Cola, and Saab Miller and many others with a large environmental impact, for reliable data that allows them to make the right decisions for future growth.

[www.earthobservations.org](http://www.earthobservations.org)





# Bridging the data gap to build sustainable development in the Black Sea catchment

The EnviroGRIDS project, coordinated by [Dr Anthony Lehmann](#), aims to generate a computing infrastructure that will lead to more sustainable and responsible management of the Black Sea and its entire catchment area

THE BLACK SEA is an inland sea between Europe and Asia and its catchment represents a very important water source for the region. It is essential for supporting trade, industry and sustaining life. However, in recent times it has been adversely affected by human activity, not least from developments on its tributary rivers. The onset of climate change suggests that trends are set to continue, and with this background in mind, a new study is seeking to harness technology to improve the management of this vital resource.

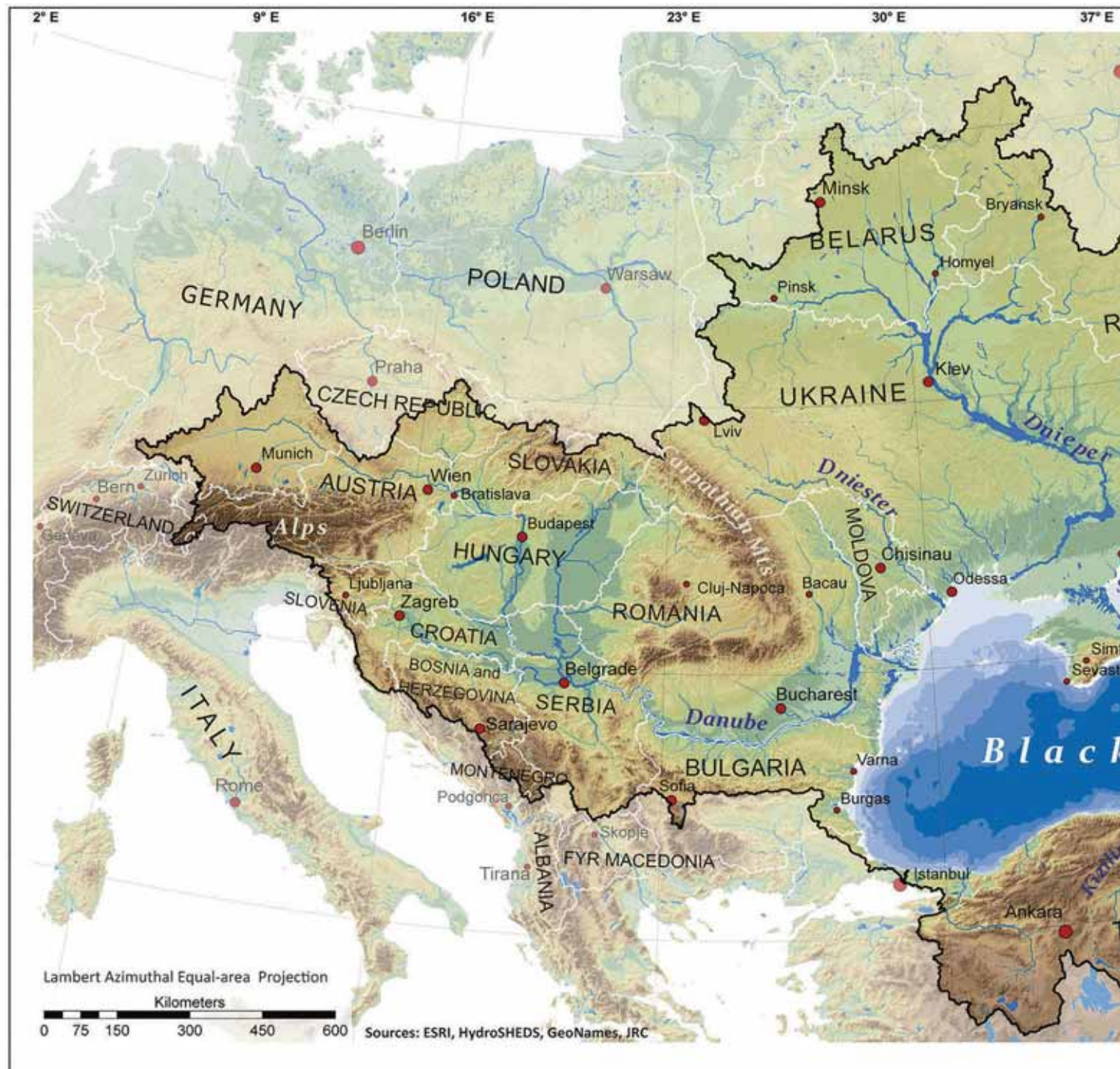
The water catchment area of the Black Sea stands at 2.2 million km<sup>2</sup>; covering 23 countries, it is inhabited by more than 160 million people. The EnviroGRIDS Black Sea catchment project was launched in April 2009, with the task of providing a grid computing infrastructure to allow previously private or inaccessible data to be accessed and processed through easy-to-use web services and tools. The system aims to assist governments and communities to track and respond to environmental trends in one of the world's most famous and economically important inland water bodies.

The Black Sea catchment is internationally renowned as an area of ecologically unsustainable development and poor resource management, which has led to acute environmental, social and economic problems. EnviroGRIDS tackles these issues by utilising emerging information

technologies and encouraging cooperation between scientists to improve their observational capabilities, thereby allowing decision makers to be better informed when introducing new legislation. The European Community has expressed a desire to tackle the crucial problems of water quality and quantity, by adopting the Water Framework Directive, promoting water management based on watersheds rather than administrative or political boundaries. Ahmet Kideys of the Black Sea Commission, a partner of the EnviroGRIDS project, explains the significance of this action: "The Water Framework Directive establishes a legal framework to protect and restore clean water across Europe and ensure its long-term, sustainable use," he remarks. "Similarly, the newly adopted Land Based Sources and Activities Protocol to the Bucharest Convention covers not only inland surface waters, but also groundwater and coastal waters." It is hoped that this approach will lead to a unified solution that will benefit all inhabitants of the Black Sea catchment, and ensure the most sustainable and ecologically friendly future possible, rather than simply meeting the demands of the most vocal countries.

This spirit of cooperation is one of the driving forces behind this project, as it aims to create a unified vision for the greater good of the ecology of the Black Sea catchment and all those who rely on it for their livelihood. EnviroGRIDS is





The boundaries and names shown and the designations used on this map do not imply official endorsements or acceptance by the United Nations

coordinated by the University of Geneva and UNEP, in cooperation with 26 national and international partners, including the Institute for Water Education of the UN Educational, Scientific and Cultural Organisation, the European Nuclear Research Center (CERN), the Black Sea Commission, and the International Commission for the Protection of the Danube River headed by Philip Weller. "The ICPDR already has a very good and organised data collection for the Danube River catchment. EnviroGRIDS should provide additional support to modernise this system and to extend some of its components

eastwards" explains Weller. The Global Earth Observation Systems of Systems (GEOSS) will expose the data obtained by the EnviroGRIDS project in its quest to build a data-driven view of the Earth. Thanks to its grid-enabled Spatial Data Infrastructure, EnviroGRIDS will produce models and scenarios to analyse the human impacts on the environment in the past, present and future. In addition, the EnviroGRIDS seeks to build the capacities in the Black Sea region to use new international standards in the gathering, storage, distribution and analysis of the significant environmental data, thereby enabling the team

to utilise past data to calculate future trends, reducing the vulnerability of the region.

One of the great aims of the EnviroGRIDS project is to produce an early warning system which will enable the political decision makers and the general public to have advanced knowledge of possible risks to human health, biodiversity, agriculture and energy supply caused by climate, demographic and land use changes with a 50 year time period. Such a system will not only facilitate a short term warning about impending disasters but, it is hoped, it will also lead to a





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change in the way that this important body of water is viewed. Subsequently, by making informed changes to the way that the water and the catchment area is exploited, future disasters may be prevented. The ground work of EnviroGRIDS will help to form the basis of an educational programme that will inform the local population of their impact on the water system and how they can make small changes to their water usage to benefit the ecology of the Black Sea. In order to safeguard their lifestyles, it is imperative that inhabitants are properly informed of the importance of this resource.

Compounding the impact of localised human activity, the Black Sea is also affected by climate change, which will have a significant and profound effect on the daily lives of the human population. The Intergovernmental Panel on Climate Change (IPCC) predicts important changes in the coming decades that will not only modify climate patterns, such as temperature and rain fall, but will also lead to a considerable change in freshwater resources. It is predicted that there will be a significant impact on the quality and quantity of the available water supply available, and some freshwater sources in particular are likely to be affected by an increased risk of water-borne diseases, irrigation problems and reduced drinking water quality. The IPCC has forecasted possible socio-economic instability around the world due to the scarcity of this invaluable resource.

This level of preparation and foresight can only serve to provide a positive future for the Black Sea catchment area. It is contributing essential data to a relatively data-poor region, and assisting in the production of accurate climate, demographic and land use forecasts, using the most powerful computer network in the world. The exceptional commitment demonstrated by the EnviroGRIDS project is an example for all similar projects worldwide and acts as a template for change in the Black Sea catchment areas, while providing essential



THE ENVIROGRIDS COORDINATION TEAM  
IN THEIR UNEP OFFICE OF GENEVA.  
image: C Brun

data to ensure the continued prosperity of the region. According to project coordinator Anthony Lehmann, EnviroGRIDS could provide a platform for future, global projects: "We aim, together with the BSC and ICPDR commissions, to build a sustainable observation system for the Black Sea catchment that will survive the project itself," he observes. "The EnviroGRIDS approach could certainly be replicated in specific parts of the world or even globally".

The Black Sea catchment is internationally renowned as an area of ecologically unsustainable development and poor resource management, which has led to acute environmental, social and economic problems



ISTANBUL, HOSTING CITY OF THE BLACK SEA COMMISSION ON THE PROTECTION OF THE BLACK SEA AGAINST POLLUTION. Image: N Ray



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