



**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
of UNESCO**

STATEMENT

**of Professor Gunnar Kullenberg, Executive Secretary of
the Intergovernmental Oceanographic Commission of UNESCO
to the First Conference of Parties of the UNFCCC
(Berlin, March 28 - April 7, 1995)**

March 30, 1995

Mr. Chairman,

First of all, Mr. Chairman, I would like to express my very warm congratulations with the beginning of new phase of the UN FCCC life, which is started at the opening of this first session of the Conference of Parties, in particular I wish to note the efforts of the Government of Germany, the very productive finish of the negotiating process of INC, chaired by His Excellency Ambassador Raul Estrada-Oyuela and very hard and good work made by the staff of UN FCCC Secretariat headed by Mr. Michael Zammit Cutajar.

The practical tasks for IOC to carry out in context of UN FCCC requirements were identified through the decisions and recommendations adopted at UNCED in 1992 in Rio-de Janeiro. These provisions requested all competent international and intergovernmental bodies and organizations to cooperate to provide the best available scientific knowledge and possible assistance in implementation of the UNFCCC. In this connection, Chapter 17 of "The Agenda XXI" (para 17.101) noted "Recognizing the important role that oceans and all seas play in attenuating potential climate change, IOC and other relevant competent United Nations bodies, with the support of countries having the resources and expertise, should carry out analysis, assessments and systematic observation of the role of oceans as a carbon sink."

In this context IOC of UNESCO aiming at presenting in an integrated way new knowledge with regards to the Ocean in relation to Climate Change of the Earth, jointly with WMO and UNEP, arranged in summer of 1991 an International Meeting of Scientific and Technical Experts on Climate Change and Oceans,

hosted by the Government of Malta. One results of this Meeting was the identification of following important tasks:

1. We need to improve the reliability of our estimates of the amount of anthropogenic carbon dioxide being taken up by the oceans, and then we need to monitor this uptake on regular basis.

2. We need to determine the importance of coastal ecosystems in the global cycles of carbon and methane. In the case of methane the importance and variability of clathrate deposits in coastal sediments need to be determined.

3. We need to determine the retention times of greenhouse gases in the oceans.

4. We need to establish national, regional, and global programs for long-term systematic monitoring of selected greenhouse-gas parameters such as their emissions to the atmosphere, their concentrations in coastal and oceanic waters, and their deposition in marine sediments.

5. A global evaluation should be made of the calcium carbonate compensation depth (both past and present) and its variation with climatic conditions in order to determine the time-scales over which this portion of the carbon cycle interacts with atmospheric carbon dioxide.

6. We need to improve our recognition of non-linear, episodic changes in oceanic Greenhouse gases, rather than assuming gradual, linear changes.

These needs were used in the preparation the Action Paper: Approaches to the Global Ocean Observing System (GOOS) of IOC, WMO, UNEP and ICSU, approved by the XVII-th Session of the IOC Assembly in 1993.

The GOOS Climate module is the component of the Global Climate Observing System (GCOS) of WMO, IOC, UNEP and ICSU at which the main priorities are: seasonal to interannual predictability, early detection of climate change and attribution of its causes and reduction of uncertainties concerning climate change and its impact. With a number additional research Programs this is a main core of the International cooperation in systematic observations, as reflected in the provisions of Article 12 of the UNFCCC. All international research efforts in this context are coordinated in the framework of the World Climate Research Program, of WMO, ICSU and IOC.

Following its strategy to present the best available knowledge to help solve one of the most difficult tasks - that of change of the Earth's Climatic system, IOC, in October 1994 arranged in Malta the second Meeting of Scientific and Technical experts focusing on the interaction of World ocean with carbon dioxide in the atmosphere. The results are be summarised as follows:

- (1) quantifying the fate of CO₂ is difficult since the net uptake of anthropogenic CO₂ is a small proportion (2%) of the total CO₂ fluxes;
- (2) ocean models, isotopic carbon and atmospheric O₂ measurements indicate that the oceanic uptake of anthropogenic CO₂ is about 2 GtC per year (by isotopic 1.1-2.7 GtC and by models 1.0-2.5 GtC);
- (3) the "missing" anthropogenic CO₂ has likely been taken up equally by the oceanic and terrestrial biospheres;

- (4) model results indicate that most (65-85%) of the initial oceanic anthropogenic CO₂ uptake occurs in the main thermocline, the ventilation of which may be of the order of 20 years (decades);
- (5) thermocline ventilation (mixing) and not CO₂ gas exchange is the most important factor affecting the oceanic uptake of CO₂ and occurs on decadal and shorter time-scales;
- (6) the seasonal gains and losses of atmospheric CO₂ are large and the terrestrial biosphere is the main driving force;
- (7) until oceanwide measurements of carbon inventory changes are made, global ocean-atmosphere models will provide the best estimates of where anthropogenic CO₂ resides in the ocean;
- (8) the ocean is not in a steady state, and hence, interannual variations must be expected;

Furthermore:

- certain specific areas of the marine system need dedicated evaluations not done so far, e.g., marshes, mangroves, wetlands, shelves, estuaries, coral reefs;
- model studies suggest that over long time scales (100-1000 years) the oceans will efficiently recycle the CO₂, but less CO₂ will be returned than originally sequestered so the ocean will still serve as a sink for CO₂;
- sequestration of CO₂ in the ocean may be achieved on engineering principles, but the consequences are unknown; uptake experiment can be cost-effective, but it may not work;
- burial of CO₂ in ocean sediments can only be achieved through blanketing by sedimentation or active injection into the sediments; a delay of CO₂ release could be obtained by inorganic or organic carbon burial in the deep sea sediments;
- currently, neither models nor observations allow us to quantify uptakes of anthropogenic CO₂ in different zones of the ocean, e.g., in shelf sea areas or EEZs;
- long-term burial of CO₂ (e.g., in subduction zones) is possibly the only way to permanently solve the CO₂ build-up process.

One of the components of the Global Ocean Observing System, Mr. Chairman, is the Global Sea Level Observing System (GLOSS) - the IOC Program oriented towards obtaining standardized sea level data from a global network of over 200 operational stations with the support of 79 countries. Having in mind a sea-level rise assessment of possible damage for Small Island and Coastal Low Lying developing States (IPCC, 1990) IOC intends to increase its attention to this project. From our view it is very important not only to continue the systematic observation in this respect and to transfer the data base obtained to the interested developing States but also to transfer the methodology and experience of assessments and predictions of expected critical sea level rise.

IOC on basis of existing data produced an overview of sea-level monitoring in Small Island developing States in 1994.

I would like to note also, Mr. Chairman, that IOC cooperates actively with the CC:INFO project created and sponsored by the FCCC Secretariat.

Concluding my Intervention before COP-1 on behalf of IOC, Mr. Chairman, I want to say that our Commission has wishes and intends to establish close links and cooperation with the SABSTA and contribute of products of systematic observation of World Ocean interaction with greenhouse gases and to serve as one of the authoritative sources of information for this body in the interest of all Member States to support the implementation of the UN Framework Convention on Climate Change, and ensure proper involvement of the ocean science community in this very serious subject.

Thank you Mr. Chairman.