Abstract. Man's exploitation of the World Ocean continues to increase both productively, i.e., utilization of fisheries and natural resources, and counterproductively, i.e., increased pollutant loading. This paper presents a scientific rationale for a global ecological monitoring programme which will address open as well as coastal waters.

1. Introduction

One of the characteristic features of the present is ever growing concern for the fate of the World Ocean. Solution of the most urgent problems confronting mankind is in the study and overall exploration of the World Ocean. The oceans are being more and more involved in man's economic activity: increased catches of sea products, intensified use of natural resources of the shelf, etc. At the same time, the global development of energetics, industry and agriculture leads to increasing fluxes of numerous pollutants, including those of non-natural origin, to the marine environment.

The problems of the pollution and vital activity of the World Ocean attract special attention of scientific community all over the world. Numerous international organizations are involved in finding the solution to these problems.

However, the current co-ordinated international programmes of marine environment monitoring are devoted to the assessment of pollution in marine ecosystems. They primarily cover the coastal waters of the World Ocean and do not extend to its open areas. Soviet scientists have put forward the idea of organizing an integrated global ocean monitoring system aimed at a better understanding of global oceanic processes, evaluating and forecasting the quality of life in the World Ocean and detecting adverse ecological consequences of ocean pollution.

The proposal to organize such a system was considered at the First International Symposium on Integrated Global Ocean Monitoring (IGOM) arranged on the initiative of the USSR (USSR State Committee for Hydrometeorology and Control of Natural Environment) and held in Tallin (USSR) in October 1983.

Recommendations of the symposium confirmed the need to organize the integrated
global monitoring system and included the proposal that a special programme be devised within the framework of GESAMP. Following these recommendations, the XIV session of GESAMP (March 1984) established an *ad hoc* working group (WG-24). The group was requested to prepare the Integrated Global Ocean Monitoring Programme (IGOM-MONOC Programme). One of the authors of the present paper is chairman of this working group.

We would like to note that the paper presents the scientific rational for the ecological global ocean monitoring programme based on the concepts and scientific developments put forward by the authors, as well as on the results of long-term ecological studies carried out by specialists from the Natural Environment and Climate Monitoring Laboratory of impact and background regions of the World Ocean, that have lead to the formulation of theoretical and methodological aspects of the programme.

In our paper, preference is given to the scientific problems and studies that we consider most promising. To describe the ecological consequences of ocean pollution, a certain schematization is needed to cover the great bulk of data available.

So, the following issues are suggested for discussion:

1. Scientific basis for the Integrated Global Ocean Monitoring Programme (IGOM Programme) including the description of the problems of anthropogenic ecology of the ocean.
2. Main objectives of the IGOM Programme.
4. Basic elements of ecological global ocean monitoring.
5. Selection of activity regions, and methodological recommendations.
6. Expected results.

Up to now, pollutants of all kinds have been discharged into the World Ocean, since it is believed that its huge volume (1.379 x 10^6 km^3) and self-purification processes will decrease the adverse effects of pollutants due to their dilution with seawater.

Analyses of current information show that thousands, tens of thousands and millions of tons of toxic metals and oil, and thousands of tons of chlorinated hydrocarbons, PCBs in particular, enter the World Ocean every year. At present, more and more new pollutants, such as chlorophenols, dibenzofurans and some PAHs, are found in the ocean.

It has been estimated that the anthropogenic component of the fluxes of some pollutants (lead, mercury, oil, arsenic, and carbon dioxide) is comparable with the natural fluxes of these elements to the World Ocean, or even exceeds them.

Recently, an idea has been put forward that atmospheric transport and deposition of chemical compounds on the surface of the aquatic environment are among the most important sources of marine pollution.

Thousands and tens of thousands of tons of lead, mercury, cadmium, PCBs, arsenic and other compounds fall out annually from the atmosphere on to the surface of the World Ocean. The contribution of atmospheric transport to the pollution of