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Cooperation in Marine Scientific Research in the East Asian Seas

Arkady V. Alekseev

My task here is to describe the cooperation in the area of marine scientific studies being carried out in the East Asian seas. Of course, it is impossible to present here a comprehensive overview of these multidisciplinary studies. That is why I will offer my own point of view on this problem. My opinions do not, of course, claim to be absolute or comprehensive. Trying to formulate this point coherently, I considered a number of issues.

First, when this conference was planned, the agenda was supposed to include the issues of regional economic development, comparative prospects of the Yellow Sea and the Sea of Japan and their margins, the Tumen River Project, exploration and exploitation of marine resources, and the institutionalization of regional cooperation. As Changchun II is a natural continuation of the series of meetings on regional seas and Changchun I (July 1990), it is reasonable to review the results of the previous meetings of the series, to sum up the conclusions worked out during these discussions, and to remember the prospects put forward.

Second, in constructing our common house—the house of cooperation—we should also remember the results obtained, not only the results of national projects but also those produced by international cooperative research and collaboration. We should also distinguish which interactions may be developed in the region and which results they might produce in the future.

Third, we do not live on an isolated continent—the world around has been changing, and the dynamics of these variations are growing continuously. This means that the political climate of the planet at large is not stable: we are going through a transitional period. The question is whether we can forecast at least the near future and the role that scientific cooperation will play in it.

Fourth, are there any examples of international cooperation in the region? Which positive results of such cooperation could be used in the region?

Fifth, what purposes in regional cooperation must be fulfilled first?

Sixth, if we are speaking of some sort of economic community in the region, what role will the region's scientists play in realization of this global purpose?

These are not the only questions we should address in considering cooperation in the area of marine sciences in the East Asian seas, but without answering them it is impossible to discuss the problem in principle. That is why I shall now try to address all of the issues I have cited.

First: Let us review the results of the previous meetings of the series and Changchun I. In the past two or three decades the world has focused on the dynamics of East Asia's economic development. This topic was discussed and studied by people of diverse specialties (politicians, economists, businessmen, and more). Different explanations were given for the phenomenon and various models were worked out in this respect. But in the current situation we are interested in the fact proper: the "ad hoc fact," as it is called. All the previous efforts were attempts to analyze the reasons for the dynamic development of East Asia. Among the main results of these conferences we should stress that most analyses have been carried on outside of governmental activity. Thus we were given an opportunity to discuss the phenomenon independently without political interference. It mostly corresponds to the scientific approach, as it was the analysis of natural phenomena not divided into pieces by political borders. This approach provides the most objective analysis of the strategy in the region. It is very difficult to do, but nature knows no political borders. When you study the origin of the Pacific marginal seas in order to forecast their resources (say, geological ones), you will analyze the region's geological structure and forget about exclusive economic zones.

Although the main topic of Changchun I concerned marginal seas and its participants represented mainly the countries of the Japan Sea Rim, most reports presented at the conference dwelt on the continent and the activity of countries on the continent. Marine investigations were "ad hoc" for the Working Group on the Sea of Japan. On the one hand this is due to the lack of sufficient knowledge of the marine region; on the other, it is due to the difficulties created by the exclusive economic zones. Thus, the realization of the programs based on numerical modeling and further forecasting has been complicated. This can be seen in the forecasts for fisheries and in estimations of the regional ecology. Exactly these difficulties were stressed by Changchun I, which noted the need for additional investigation and continuation of dialogue.

Serious attention should be paid to the Changchun I resolution on the setup of a regional Association of Northeastern Asian Nations (ANEAN). Thus, if one were to include Changchun I in a historical source catalog its key words would be: dynamics, analysis in the frames of nongovernmental activity, continuation of studies and dialogue, the need for regional organization.

Second: Which results have been obtained at present, which interactions have been formed, and which are still being formed? The 1980s introduced major qualitative changes in the relations of the Pacific Rim countries, particularly through bilateral relations between countries. This fact influenced the development of marine sciences on the basis of bilateral cooperation. Today

we can confidently report on the existence of stable and continuously developing bilateral relations between the scientific institutions of the Soviet Far East and the People's Republic of China in acoustics, oceanology, geology, and geophysics. Today this cooperation is characterized by regularly held conferences to compare the scientific results obtained in both countries, joint research cruises to obtain primary materials, and exchange of visits to get to know each other better and discuss scientific issues privately with one's colleagues. Nowadays the program is under discussion. It will account for the results of bilateral contacts between individual institutions and the regional interests of both states at large. In both countries, this program is discussed at the governmental level by the Committee on Science and Technology.

Contacts are being broadened and continue to develop between the Soviet Far East and Japan. These relations are conditioned by studies of the region's ecological problems with a focus on anthropogenic stress, atmospheric transport of matter, joint geophysical investigation of the Japan Sea floor, and joint publications on the Sea of Japan. To illustrate this bilateral cooperation I should mention the agreement between the Pacific Oceanological Institute and the group of scientists from Japan's Earthquake Research Institute on the geology and geophysics of the Sea of Japan. Under this agreement a number of works were carried out by the Soviet R/V *Professor Bogorov* and R/V *Tansey-maru* of Tokyo University to study the seismology of the Japan Sea floor. The results of continuous seismoprofiling enable the scientist to trace the geological history of seafloor structures.

It is interesting to recall the evolution of these contacts over the past decade. The first step was made by the scientists of the Soviet Far East and their colleagues from Kansai province; they started the exchange of visits and the organization of bilateral scientific conferences. This cooperation developed over time, grew stable and the contacts with Kansai province were transformed into the annual Kansai Economic Seminar. Nowadays these contacts are formed according to the categories of the participating institutions. Thus, in the Soviet Far East there are the institutions of the USSR Academy of Sciences, the Soviet Committee of Education, and the Soviet Ministry of Fishery. Scientific contacts are complemented by contacts of businessmen interested in the Sea of Japan as the source of many valuable resources.

As an example of the importance of the Sea of Japan in view of its geological resources, I offer as evidence the geological map constructed by the specialists of our institute—the result of these long-term geological studies. Phosphorites have been discovered at more than 50 stations within the Sea of Japan, mainly on submarine highs: East Korean, Krishtofovitch, Northern and Southern Yamato Plateaus, and the Oki Ridge. Some isolated samples were also found on the adjacent part of the Asian continental slope. On the submarine highs, phosphorites lie predominantly on slopes and less often on summits covered by Miocene-Pliocene marine deposits. We carried out comparative experiments with the indicated oceanic phosphorites and industrial triple su-

perphosphate. The former appeared to increase oat crops in green and dry mass by 88 to 90 percent and can be used for the production of extracted phosphate acid, ammophose, and fodder fluorine pure phosphates. This proves the Sea of Japan to be a great source of mineral resources for future generations of the countries in the Japan Sea Rim.

Today we witness the development of scientific contacts between the institutes of the Soviet Far East and Republic of Korea—the agreements are worked out, colleagues visit each other. The basis for such contacts has been laid by the results obtained in oceanology, numerical modeling, and so forth. Joint works are carried out in the geology of the Korean peninsula; the partners are the scientists of the former Soviet Union and the People's Democratic Republic of Korea. Interesting results also produced cooperative electromagnetic studies in Tsushima Strait carried out by scientists from Japan and the Republic of Korea.

Therefore, scientific cooperation in the region is very intensive, covers a broad spectrum of disciplines, and promotes bilateral dialogue. However, in the present situation we cannot be satisfied only with bilateral contacts. Natural processes and phenomena, as I have noted, have no political borders. National and bilateral projects can solve limited problems, but they cannot study a phenomenon comprehensively. To illustrate this, I offer as evidence the materials on the current around the Korea peninsula, which Professor Kuh Kim from the Department of Oceanography, Seoul National University, shared with me. The currents along the peninsula may transport water up to the Tsushima current's branches. Further, the Tsushima current proper is responsible for the transport of admixtures introduced into this area by the Sea of Japan water masses. At the present moment, not enough oceanological data are available on the northern part of this phenomenon. On the other hand, speaking of ecological control in the region, we should stress the urgent necessity of the most representative data for numerical modeling and forecasts of various situations to be developed in the area under study. This problem can be solved only in the frame of a comprehensive international project based on bilateral projects. The situation in the region demonstrates the feasibility of such an approach. Why do I insist on this suggestion? To answer this question, recall my third question.

Third: Here we consider changes in the region's political climate and the role of scientific contacts. Nowadays we are witnessing an active political dialogue. It is possible only because of the warming of the political climate on the planet at large. To some extent the European processes have affected the area of Southeast Asia. These are signs of the greater importance of the Pacific Ocean and the countries of the Pacific Rim for the twenty-first century. The recent Congress of the Pacific Science Association in Honolulu emphasized this tendency. This warming of the global political climate has seriously affected the state of cooperation in marine sciences. The scientists of the Republic of Korea have joined in and contributed to the positive changes in the region.

In the near future, I hope, we shall be speaking about the role of Taiwan's scientific potential in regional cooperation, which distinguishes its readiness to join in these endeavors. This warming of the global political climate is most important, for the progress of marine investigations depends on the availability of research vessels and their work in the exclusive economic zones of various states entails calling at different ports. Some positive changes have occurred in this area too—one can mention the calls of research vessels from Japan and the People's Republic of China at Vladivostok. Although there are a lot of problems, their solution depends on the political climate in the region.

Fourth: Are there any examples of international cooperative projects in the region? The question should be answered yes. The WESTPAC Project is one of them. Under the aegis of the International Oceanographic Committee, the WESTPAC Project promotes monitoring, state forecasting, efficient use of natural resources, and the control and protection of the ocean/atmosphere/continent system, including living and nonliving resources.

The WESTPAC Project covers four important aspects: ocean dynamics and climate; ocean sciences in relation to nonliving resources; marine pollution research and monitoring; and ocean sciences in relation to living resources. Thus WESTPAC includes work in oceanic hydrophysics, geology and geophysics, chemistry, and biology. It is realized through national projects of the Asian-Pacific region with participation of all countries of the Pacific Rim WESTPAC. There is no need for a detailed description of the WESTPAC Project here. The only thing I would like to stress is its great organizational and planning experience. WESTPAC demonstrates that the integration of national projects may produce positive results.

Another example is the WOCE Project—the World Ocean Circulation Experiment—the great project determining oceanographic strategy over about two decades. The project is the most important component of the Global Climate Investigations Project, its third aspect: long-term climatic changes covering a period of several decades. World ocean circulations are known to have a great influence on these climatic changes. The WOCE Project also demonstrates the positive interaction of national and international programs.

After many years of discussion and four years of intergovernmental talks, the North Pacific Marine Sciences Organization (PICES) was set up. This event took place in Ottawa in December 1990. The draft agreement was signed by Canada, China, Japan, the United States, and the USSR. This organization will promote international cooperation in the studies of the North Pacific (especially north of 30° N) with an emphasis on the ocean environment, its interaction with the continent and atmosphere, its importance for the formation of global weather and climatic changes, flora, fauna, and ecosystems, the exploitation of oceanic resources, and human influence on all the enumerated factors.

I have dwelt upon only three examples of large-scale international projects that include the majority of the region. In the Asian-Pacific region there are

other international projects, however, nongovernmental as well. Some projects are set up by the countries to be fulfilled by individual scientists—for example, the drift bottle experiment in the Japan Sea, the Yellow Sea, and the East China Sea. Thus we must emphasize the great regional experience in the organization and execution of large-scale international projects, and this experience should be used to address the issues we are discussing now.

Fifth: What should we choose as the general objective of the new regional program without duplicating other existing programs? It seems to me that it should be determined by the purposes of economic activity—that is, the formation of an economic community aimed at the comprehensive development of the region at large. This means that the marine investigations project should realize two principal purposes: resources and ecology. All other purposes covered by the project should be subordinated to these two. Thus, the situation in the region nowadays is quite favorable for such an international program, which then can serve as a basis for other regional activities. This situation is conditioned by well-developed bilateral contacts and the experience in carrying out international scientific projects—important and noble purposes that should be realized for the future welfare of the Pacific Rim nations.

And sixth: What should the scientists of the region do to form this regional economic community? This question must be answered by keeping in mind that marine investigations, like nature itself, have no political borders. Natural phenomena of the ocean and its marginal seas affect the processes taking place on a continent. As it is not a linear process, human activity on a continent can affect the ocean as well. That is why this new program must account for the interests of all countries. Many difficulties will arise in this respect. But as the regional community decides to construct a single economic entity, these difficulties will be coped with. The scientists can also work out measures for resolving these problems—perhaps a single regional system of ecological monitoring. In this case we should take into account the fact that different marginal seas suffer different anthropogenic influence. I think it is reasonable to study the possibility of a single regional center for data exchange that will promote the unity of nations and the formation of a unified regional structure.

Finally, I wish to stress again that cooperation in marine scientific studies in the East Asian seas may become the basis for mutual understanding. The existing and newly developing bilateral contacts may then become the basis for a large-scale regional program, which in turn will serve as one of the bases of the regional economic community.