EARTH SCIENTISTS AND THE LAW OF THE SEA

by

V. E. McKelvey

Although agreement has been reached on most of the issues being considered by the United Nations Third Conference on the Law of the Sea (which completed the first part of its Eighth Session on April 27, 1979), those remaining have proved to be difficult ones. Three of the most intractable are of interest to and have involved earth scientists: exploration of seabed resources, delimitation of the Continental Shelf, and the terms governing the conduct of scientific research.

Conference Background

The law of the sea has been a topic of international concern for centuries, but the events leading more or less directly to the Third Law of the Sea (LOS) Conference began in 1945, when U.S. President Truman issued a declaration claiming sovereign rights for the United States over the mineral resources of its Continental Shelf. This action followed the completion of the first oil well offshore Louisiana in 1938, and the rapidly growing recognition that the technology for offshore oil production was nearly in hand.

Several other countries with interests in control over offshore resources - at first fisheries rather than oil - soon claimed sovereignty over territorial seas up to 200 miles wide, leading to international concern over the seaward extent of national sovereignty and sovereign rights, and their implications for navigation, freedom of the seas, and resource exploitation.

As a result of this concern, the United Nations convened the First Law of the Sea Conference in 1958, with representatives of the governments of 86 States in attendance. After a mere nine weeks of negotiations, the Conference concluded the 1958 Geneva Conventions on the Territorial Sea and Contiguous Zone, the High Seas, Fishing and Conservation of the Living Resources of the High Seas, and the Continental Shelf, along with nine resolutions, and an Optional Protocol of Signature concerning the Compulsory Settlement of Disputes.

The principal elements in these agreements of interest to earth scientists were

- provisions in the High Seas Convention against pollution
- provisions in the Continental Shelf Convention giving Coastal States sovereign rights over the Continental Shelf for the purpose of exploring it and exploiting the mineral

The opening meeting of the eighth session of the LOS Conference in Geneva, March 19, 1979 (Photo courtesy UN).

- and other non-living resources of the seabed and subsoil,
- requiring that the consent of the Coastal State be obtained to undertake any research concerning the Continental Shelf,
- defining the Continental Shelf as "the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas" and "the seabed and subsoil of similar submarine areas adjacent to the coasts of islands."

The Conference was apparently satisfied with its work on the Shelf Convention, but because it had been unable to agree on what should be the breadth of the Territorial Sea and related issues, it passed, in one of its last actions, a resolution requesting the UN General Assembly to study the advisability of convening a second conference for further consideration of still unsettled questions. The Second Law of the Sea Conference (1962) focussed primarily on the Territorial Sea but failed to reach agreement.

Clearly, in setting limits to a State's jurisdiction over the resources of the Continental Shelf based on exploitability, the participants in the First LOS Conference did not anticipate that the resources of the deep ocean floor would become recoverable. In 1959, however, John Mero published the first of a series of papers, followed in 1965 by a book, on Mineral Resources of the Sea, calling attention to the potential value of subsea mineral resources and in particular, the potential exploitability of the manganese oxide nodules, because of their content of nickel, copper, and cobalt.

At a meeting of the U.N. Economic and Social Council in 1966, U.S. Ambassador James Roosevelt spoke of the resource potential of the deep ocean floor, and in the same year U.S. President Johnson referred to deep sea resources as "the legacy of all human beings". This concept was elaborated by Ambassador Pardo of Malta in a speech given at the UN General Assembly in 1967, describing the potential resources beyond the limits of national jurisdiction as the common heritage of mankind, and calling for the establishment of an international regime under which the resources would be developed for the benefit of all mankind. A committee on the Seabeds and Ocean Floor Beyond the Limits of National Jurisdiction was then established and held the first of its many sessions in New York in June, 1968.

Although a few marine geologists were available "in the wings" during the First LOS Conference, they were never consulted and played little or no role in the Conference proceedings. By contrast, geologists and other earth scientists participated in the Seabeds Committee from the outset, primarily to help other governmental representatives acquire some understanding of the configuration of the ocean basins, known and potential subsea resources, and elements of existing national mineral resource exploration and exploitation systems that might have some relevance to an international regime applicable to seabed resources.

Purpose and Scope of Conference

Although the initial focus of the Seabeds Committee was on the breadth of the Territorial Sea, the limits of national jurisdiction, and seabed resources of the international area, over the course of its five-year life its scope enlarged to include all aspects of the law of the sea. That became the scope of the Third LOS Conference as well.

Broadly, the purpose of the Conference is to clarify international law applying to the sea where it is uncertain, and to develop new law where it is necessary to achieve internationally agreed objectives. Some of these objectives were spelled out in a "Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil thereof, beyond the Limits of National Jurisdiction", passed by the UN General Assembly in December, 1970 as Resolution No. 2747 (XXV) which declares, among other things, that:

- "...The development and use of the area (i.e. the area beyond national jurisdiction) shall be undertaken in such a manner as to foster the healthy development of the world economy and balanced growth of international trade, and to minimize any adverse economic effects caused by the fluctuation of prices of raw materials resulting from such activities..."
- "All activities regarding the exploration and exploitation of the resources of the area (i.e. the area beyond national jurisdiction) shall be governed by the international regime to be established"...
- "The areas shall be open to use exclusively for peaceful purposes by all States..."
- "The exploration of the area and the exploitation of its resources shall be carried out for the benefit of mankind as a whole...taking into particular consideration the interests and needs of the developing countries"...
- "...States shall promote international co-operation in scientific research exclusively for peaceful purposes..."
- "...States shall take appropriate measures for and shall co-operate in the adoption and implementation of international rules, standards, and procedures for..." prevention of pollution, interference with the ecological balance of the marine environment, and prevention of damage to the floor and fauna of the marine environment.
- "Nothing herein shall affect: a) the legal status of the waters superjacent to the area... b) the rights of coastal States with respect to measures to prevent, mitigate or eliminate grave and imminent danger to their coastline...from pollution..."

To draw attention to the LOS Conference, delegates sailed on board the tall ship *Barba Negra* (a former whaleship now dedicated to the preservation of marine mammals) on a one-hour voyage from mid-Manhattan (N.Y.) to the Seaport Museum, September 9, 1976. (Photo courtesy UN/M. Tzovaras).

Regimes Proposed for the Oceans

Negotiations have thus far led to seven proposed regimes for the ocean domain, the main elements of which are:

- 1) a 12-mile Territorial Sea over which the coastal State has sovereignty, with the right of innocent passage for ships of other nations, and a 12-mile Contiguous Zone in which the coastal State has certain rights related to the enforcement of its laws and regulations in the Territorial Sea;

Map of an hypothetical area showing the limits of the 12-mile Territorial Sea (T), the 12-mile Contiguous Zone (C), the Exclusive Economic Zone (EEZ) extending 200 nautical miles (200 nm) beyond the base line from which the Territorial Sea is measured, the base of the Continental Slope (S), the 2500-meter isobath, a line (60 nm) 60 nautical miles from the base of the slope, the line (1%) along which the thickness of sedimentary rocks of the continental margin is 1 % of the distance from the base of the slope, a line (350 nm) 350 nautical miles from the territorial sea base line, and a line (100 nm) 100 nautical miles seaward of the 2500-m isobath. The outer boundary of the Continental Shelf (CS) regime where it extends beyond the EEZ and as it would be determined under the provisions of Article 76 of the ICNT (Rev. I) is shown by the hachured line.

- 2) an archipelagic regime in which archipelago States are permitted to treat waters within the archipelago as internal waters under certain conditions;
- 3) an Exclusive Economic Zone (EEZ) extending up to 200 nautical miles from the base lines from which the Territorial Sea is measured, within which the coastal State has sovereign rights over living and non-living resources and from which consent must be obtained for the conduct of marine scientific research;
- 4) a Continental Shelf regime in which the coastal State would exercise sovereign rights over sedentary species and non-living resources and might also be able to require its consent for the conduct of resource-related research;
- 5) a regime of habitable islands for which the Territorial Sea, the Contiguous Zone, the Exclusive Economic Zone, and the Continental Shelf are determined in accordance with the provisions for other land territory;
- 6) the High Seas beyond the 200 mile EEZ where the activities of nationals, while required to conform to certain internationally agreed rules, are under the control of their flag States; and
- 7) the Area, in which exploration and exploitation of non-living resources are to be under the control of an International Seabed Authority under conditions to be specified in the treaty.

The negotiating text calls for resources to be developed under the so-called parallel system in which an operator seeking an exploration and exploitation contract must define two mine sites of equal value, one of which will be reserved by the Authority for development by the Enterprise (the operating arm of the Authority) or by developing countries. Although the specifics are not yet agreed to, production of manganese nodules is to be limited to some fraction of the growth of world nickel consumption, payments are to be made to the Authority from revenues derived from the mining of manganese nodules, and technology is to be transferred from the contractors to the Authority under fair and reasonable commercial terms and conditions.

Unresolved issues

By the end of April of this year, the conferees agreed to revise the Informal Composite Negotiating Text (ICNT), issued at the close of the Sixth Session, incorporating changes intended to help the Conference reach a consensus. The ICNT (Rev. I) is, as its title indicates, a negotiating text or a basis for further negotiations, and theoretically any part of it

is subject to modifications even though there is now general agreement on much of it. Most difficult are the following issues:

- 1) conditions of exploration and exploitation of resources in the area;
- 2) financial arrangements applying to the Authority, the Enterprise and contractors who will produce resources from the area in parallel with the Enterprise;
- 3) the composition of the Council of the Authority and its voting procedures;
- 4) the delimitation of the Continental Shelf and the requirements for sharing revenues from the production of resources from the Continental Shelf beyond the 200-mile EEZ;
- 5) the delimitation of boundaries between opposite and adjacent States; and
- 6) the terms governing the conduct of marine scientific research.

Earth scientists have provided information relating to a number of these and other issues, but their principal involvement has been with problems relating to the nature, extent, distribution, and conditions of exploration of seabed resources in general and of manganese nodules in particular; the delimitation of the Continental Shelf; and the terms governing the conduct of scientific research.

The general conditions of exploration and exploitation under consideration have been outlined above. What remains are political issues such as the requirements for technology transfer, the terms governing limitation of seabed production, the selection of applicants for contracts in competitive situations, the kind of regime that will prevail if agreement is not reached at a review conference planned to be held 20 years after the treaty enters into force, and the financial terms of contracts.

The principal interest groups involved in the negotiations on these issues are the developing countries (called the G-77, carried on from the time when the group of developing countries numbered 77, who want to see revenues maximized and also to ensure that the Enterprise is able to exploit the resources in parallel with contractors); the land based producers (who want to protect their markets for minerals likely to be produced also from the seabed); and the industrialized countries (who want terms and conditions that will encourage the development of seabed resources).

Areas in the northeastern equatorial Pacific in which manganese nodules contain more than 1.8% nickel plus copper. The numbers represent the average % of nickel plus copper of samples in 1-degree squares where analyses are available at five or more stations. The rectangles outline the Deep Sea Ventures "claim" (DSV) and the sites (A, B, and C) investigated under the Deep Ocean Mining Environmental Studies program sponsored by the U.S. National Oceanic and Atmospheric Administration. The area between the Clarion and Clipperton fracture zones is about 2.5 million km² in size, and about half of it is assumed to contain nodules in concentrations greater than 5 kg/m² and averaging 11.9 kg/m². Assuming that 20 % of the nodules in this area of 1.25 million km² would be recoverable, its potentially recoverable resources are about 2.1 billion dry metric tons of nodules averaging about 25 % Mn, 1.3 % Ni, 1 % Cu, 0.22 % Co, and 0.05 % Mo--enough to support about 28 mining operations each producing an average of 75 million metric tons of nodules over their lifetimes (V.E. McKelvey, Nancy A. Wright, and Robert W. Rowland, U.S. Geological Survey Open File Report 78-814, 1978).

The ICNT defined the Continental Shelf as "...the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin...", a definition generally considered unsatisfactory without a practical definition of the continental margin*. In 1976, geologists of the Irish delegation proposed two alternative means of establishing the boundary of the Continental Shelf: one - a line connecting fixed points of latitude and longitude where the thickness of sedimentary rocks becomes less than one percent of the distance to the base of the continental slope; the other - a line connecting fixed points of latitude and longitude not more than 60 nautical miles from the base of the slope (the second being essentially the formula proposed earlier by Professor Hollis H. Hedberg). A key part of the Irish proposal is that there be a review of a State's

proposed boundary by a Boundary Review Commission, and that once its boundary was accepted it would become fixed for all time.

Nevertheless, many geologists and geophysicists have been concerned that the Irish formula would lead to continuing uncertainties due to the difficulty of establishing, in some places, a non-controversial position for the base of the slope, and of determining sediment thickness, particularly in areas where basalt might be intercalated with sediment. During the Seventh Session, the Soviet Union sought to limit national jurisdiction over the Continental Shelf to not more than 300 nautical miles from the baseline from which the breadth of the territorial sea would be determined, and negotiations during the Eighth Session considered, as an alternative, a mileage limit measured from the 2500-meter isobath.

On the last day of the session, Ambassador Aguilar of Venezuela, Chairman of the negotiating group charged with the problem, proposed a compromise formula in which the boundary would be determined by the Irish formula, but could not extend more than 350 nautical miles from the territorial sea base line or, alternatively, more than 100 nautical miles from the 2500-meter isobath. Although several countries expressed reservations or opposition, it was generally agreed that the compromise was a sufficient improvement over the ICNT to justify inclusion in the revised version.

The principal interest groups in the Shelf question are the "Margineers" (coastal States with wide margins), many of which believe that any boundary short of the outer edge of the margin, however defined, is a compromise with rights already obtained under the 1958 Continental Shelf Convention; the Arab group, which has proposed that coastal State jurisdiction not extend beyond the EEZ; the Landlocked and Geographically Disadvantaged Group, who wish to see maximum benefits accrue to the international community; and the Eastern European Socialist States, which seem anxious to have the boundary unequivocally defined.

H. Shirley Amerasinghe (Sri Lanka), President of the Third United Nations Conference on the Law of the Sea, makes a statement at the opening of its fourth session, New York, March 1976. At left is Secretary-General Kurt Waldheim, at right - David Hall, Secretary of the Conference (Photo courtesy UN/Y. Nagata).

*The term "Continental Shelf" as used in international law is a term of art applying to whatever part of the continental margin that falls under national jurisdiction.

very likely, final agreement on the boundary of the Shelf will come as part of a package involving compromises on other issues, such as revenue sharing from Shelf production beyond the EEZ and control over scientific research. The ICNT proposes that payments be made through the Authority to States Parties to the present Convention, on the basis of equitable sharing criteria, taking into account the interests and needs of the developing countries, particularly the least developed and the landlocked among them" as a charge for production beyond 200 miles from the Territorial Sea baseline. It also provides that a developing country which is a net importer of a mineral resource produced from its Continental Shelf be exempt from such payments. These provisions are still being negotiated and in some form may be part of an eventual compromise package.

Although several issues related to the conduct of scientific research remain open, one of the most complex is the provision in the ICNT requiring coastal State consent for the conduct of scientific research on its Continental Shelf and providing that consent may be withheld if the project "is of direct significance for the exploration and exploitation of natural resources, whether living or non-living." The U.S. has expressed strong dissatisfaction with this provision and has indicated that its acceptance of a Continental Shelf package would require accommodation of its interest in freedom for scientific research.

Effects of LOS Conference

The LOS Conference has been the longest specialized conference in UN history, having been in session for 57 weeks over the last six years. It is still too early to tell what eventual effect it may have on earth scientists, for its outcome is uncertain. If a treaty is reached that encourages marine scientific research and development of subsea resources, earth scientists will be involved in a broadening spectrum of activities, and the subsea frontier will become of

increasing significance as land resources are depleted. If a highly restricted treaty is agreed to, or if no agreement is reached at all, subsea resource development may proceed more slowly or uncertainly, at least in the near term, with coordinate consequences to the activities of earth scientists in the ocean domain.

The work of the Seabeds Committee and the LOS Conference to date has already had a variety of far reaching effects on earth science. One has been the direct involvement of earth scientists in the Seabeds Committee and the Conference - at least 40 countries, including more than 20 developing countries, have had earth scientists and mining engineers on their delegations at one time or another, and many more have drawn on their nationals for preparatory support.

In addition, the Seabeds Committee and the LOS Conference have been the direct stimulus for the compilation of maps and data on the configuration of the ocean floor and on known and potential seabed resources. Most of these compilations have been prepared by the U.S.A. and the UN Secretariat, but in April 1979 the Soviet Union gave to Conference members copies of its new world map at a scale of 1:10 000 000, showing the relief of the ocean basins by shaded isobaths.

Of greatest significance has been the stimulus that the LOS issues have given to national and international support for marine scientific research, mainly through the programs developed under the International Decade of Ocean Exploration, formally proposed by the Intergovernmental Oceanographic Commission and recognized by the General Assembly's December 1969 Resolution 2560 (XXIV). These and related programs have involved international cooperation and, along with other projects, have contributed a wealth of new information on the marine environment and its resources.

The Glomar Explorer, now under lease to the Ocean Minerals consortium for use in testing manganese nodule mining systems. The U.S. National Science Foundation is considering a plan to convert the Explorer into a drill ship for use in an internationally supported program of deep exploratory drilling on the continental margins, the results of which are to be made available to the scientific community at large. (Photo courtesy Global Marine Development Inc.)

ABOUT THE AUTHOR: Vincent E. McKelvey, Research Geologist with the U.S. Geological Survey in Reston, Virginia, is Senior Scientific Advisor to the U.S. Law of the Sea Delegation. Dr. McKelvey served as the ninth Director of the U.S. Geological Survey between 1971 and 1978, and is currently a member of the IUGS Ad Hoc Committee for the Revision of the Constitution.