POLISH POLAR RESEARCH	13	3-4	183-214	1992

Jacek MACHOWSKI

Institute of International Law
Warsaw University
Krakowskie Przedmieście 1
00–068 Warszawa, POLAND

The Antarctic environmental legal regime

ABSTRACT: The article provides a general overview of environmental protection and conservation practice in the Antarctic Treaty area, with special reference to the stipulations of the 1991 Protocol on Environmental Protection and its Annexes.

K e y w o r d s: Antarctica, ecology, law and politics.

Introduction

On 4th October 1991 in Madrid the Parties of the Antarctic Treaty have adopted the Protocol on Environmental Protection[1], which as an integral part of the Treaty, designates Antarctica as a natural reserve devoted to peace and science. It establishes also a comprehensive, legally binding regime for ensuring that all activities undertaken in Antarctica are consistent with protection of the environment and its dependent and associated ecosystems. The adoption of the Protocol was a turning – point in the protracted struggle for the preservation and protection of the Antarctic environment carried on for the last three decades within the framework of the Antarctic Treaty System (ATS). Before presenting the genesis and contents of that international instrument, let us take a glance at the object of its protection and try to explain what makes it so extraordinary as requiring special legal regulations.

It is generally agreed, that Antarctica represents a unique in global scale ecosystem, based on a very fragile balance, the shaking and disruption of which, might have unpredictable consequences for our whole planet. No wonder, therefore, that Antarctica is defined to-day as „world's scientific zero – area". But, the unprecedented intensification of various human activities – in particular scientific, economic and tourist – created for the Antarctic environment, imminent threats, demanding adequate conservation measures and a comprehensive legal protection.

The Antarctic natural reserve designated by the Protocol follows the 60° South boundary established by the Antarctic Treaty and known as the Antarctic Treaty area, which covers the entire Antarctic continent with its ice shelves and considerable parts of the Southern Ocean with its islands[2]. The scientific investigations have proved that the pristine environment of the Antarctic needs to be maintained, not just for the protection of Antarctica *per se*, but for the protection of the entire planet, especially since it serves as a unique „control" environment for the entire globe. The discovery in 1978 of ozone layer depletion and its alarmingly rapid dissipation over Antarctica have dramatically stressed the importance of that environment for our planet. Antarctica and the Southern Ocean play important role in interactive physical, chemical and biological processes that regulate the total Earth System. The Antarctic ice sheet contains enough water to raise global sea level world wide up to 60 metres in case of green-house climate warming. Thus, any future pollution, contamination or other, even the the smallest man-made alterations in the Antarctic environment, might all too easily destroy its fragile natural balance.

Taking into account these circumstances, the authors of the Protocol have acknowledged in its Preamble „the unique opportunities Antarctica offers for scientific monitoring of and research on processes of global as well as regional importance". Thus, any considerations on the Antarctic environment must be done within its global context[3].

From the Antarctic Treaty to the Protocol on environmental protection

Environmental protection is today one of the central global issues affecting whole mankind. In the polar regions, particularly in Antarctica, it has special dimensions and peculiar challenges. Different was the situation in the days when the Antarctic Treaty was signed. In 1959, protection of the environment was in international relations an insignificant, and in Antarctica – at least in the eyes of the Treaty's authors – a non-existent problem. In result, the preservation and protection of the Antarctic environment – as distinct from conservation of living resources referred casually in Art. IX par. 1f – was not even mentioned in the 1959 Treaty. It touched upon that problem only indirectly and marginally in the articles dealing with the prohibition in Antarctica of military activities (Art. I par. 1), of nuclear explosions and the disposal there of radioactive waste material (Art. V par. 1).

That unfortunate omission was noticed by the Treaty parties just in time to rectify it. In the subsequent years, concern for the environment has been a dominant feature of the public attitude of the Antarctic Treaty Consultative Parties (ATCP), displayed both in the considerable number of the recommen-

dations on that subject passed by the Antarctic Treaty Consultative Meetings (ATCM) since its first session, and in their contents. As of 1992, a majority of some 200 recommendations adopted at the Consultative Meetings pertained the protection and preservation of the Antarctic environment and its ecosystem as a whole.

The Antarctic Treaty, while lacking specific environmental stipulations explicitly points to preservation and conservation of living resources in Antarctica (Art. IX par. 1f), as one of the measures coming within the scope of Treaty's principles and objectives on which the recommendations are made by the ATCP. In the first instance, the conservation measures adopted under the ATS have been of preventive nature, being designed before any serious damage can be inflicted upon the vulnearble Antarctic environment. Acordingly, the fundamental principles of the gradually developing legal regime for the conservation of the Antarctic nature were broadly outlined in a number of the ATCMs recommendations, adopted following the frequent suggestions by the Scientific Committee on Antarctic Research (SCAR)[4].

First, the Consultative Parties concentrated on drafting measures for the conservation of animals and plants indigenous to Antarctica. These efforts, which started already at the first meeting, at the initiative of SCAR, culminated in 1964 in the adoption of the „Agreed Measures for the Conservation of Antarctic Fauna and Flora"[5].

But the key element of the Antarctic conservation regime is the highly developed comprehensive system of protected areas and sites, with precise conservation rules, formulated by specific ATCMs recommendations[6].

Another environmental measure instituted by the ATCPs were specific recommendations relating to the use of radio-isotopes, oil contamination, waste disposal, the prohibition on the disposal of nuclear waste, environmental impact assessment procedures, environmental monitoring, prevention, control and response to marine pollution *etc*[7].

Two instruments are of special importance for the preservation and protection of the environment, namely the Code of Conduct for Antarctic Expeditions and Station Activites[8], adopted in 1975, after consultations with SCAR and the Statement of Accepted Practices and the Relevant Provisions of the Antarctic Treaty, Including Guidance of Visitors to the Antarctic[9], adopted in 1979.

Although at present, most of the international legal rules governing the protection and preservation of the Antarctic environment are derived primarily from the ATS itself, a number of universal, regional and bilateral agreements, dealing primarily with preservation of wildlife apply to Antarctica as well[10].

A turning–point in the emergence of the Antarctic environmental legal regime was marked in the transition from the means of facultative recommendations to the legally binding international agreements[11]. The numerous recommendations on environmental issues passed by the Consultative

Meetings turned out to be an invaluable point of departure and source of information in the drafting of such agreements. In result, at present, the legal framework of the Antarctic environmental law includes alongside with the relevant Antarctic Treaty provisions and the extensive body of ATCMs recommendations, the Convention of 1972 for the Conservation of Antarctic Seals[12], the Convention of 1980 on the Conservation of Antarctic Marine Living Resources and the mentioned Protocol of 1991 on Environmental Protection[13]. Environmental conservation played also a major role in the drafting of the Convention of 1988 on the Regulation of Antarctic Mineral Resource Activities[14] and provoked the adoption of the said Protocol.

The Protocol on environmental protection

The protection of the environment was often contrasted with other activities in Antarctica, in particular such as scientific research[15], economic exploitation[16] or tourism[17]. But the strongest objections have raised plans for the exploitation of Antarctic mineral resources. The six year long negotiations on the Antarctic Minerals Convention were accompanied with unprecedented manifestations of protests and pressure on the contracting parties. These objections originated from two circles: non-governmental environmentalist movements[18] and the developing countries. While the former objected mainly in the field, the latter acted through diplomatic channels, primarily in the UN forum. Though their concerted actions did not prevent the adoption of the Antarctic Mineral Convention, they influenced strongly its final text. Under the growing external pressure the positions of individual negotiating parties changed substantially, subject their changing policies and interests[19].

In result, the Antarctic Minerals Convention became very much the product of a compromise between the need to preserve Antarctica's unique environment and the desire to exploit the possible resources of the continent. In the end the Consultative Parties made considerable concessions on the environmental issue in the final text. They did not satisfy, however, the environmentalists, aware that any extractive mineral activity will threaten the delicate Antarctic environment. The opening for signature in 1988 of the Antarctic Mineral Convention provoked a new wave of violent protests and opened the last stage of the long struggle for their final goal: the total prohibition of the exploitation of Antarctic mineral resources. The environmentalist gathered sufficient momentum that even some governments which had previously supported the Convention began to indicate reservations about its viability.

The State opposition was led by Australia which indicated in April 1989 that it would not ratify the Mineral Convention. France soon adopted a similar position to Australia and the two countries declared that they would lead a campaign for the abandonment of the Convention. That move was opposed by some Consultative Parties, especially the United Kingdom and the United

States. But Australia and France did not confine themselves to simply proposing the abandonment of the Convention, but started a campaign for the elaboration of an alternative legal regime within the ATS, which would provide for the total prohibition of mineral activities and a comprehensive system of the protection of the Antarctic environment and its dependent and associated ecosystems.

The effect of the joint Australian-French action was to split the hard-won – after six years efforts – consensus among the Consultative Parties. A group of countries led by the United Kingdom and the United States maintained that the environmentalists' goals could be achieved without necessarily prohibiting the mining, which could be permitted only under stringent environmental conditions set out in the Convention. By mid-1989, however, several states, including New Zealand (the promoter of the Minerals Convention), Italy, Belgium and Poland had officially declared their support for a total ban on mining in Antarctica, with many states indicating their sympathy for the motion.

At the XV ATCM held in Paris in October 1989, France and Australia, supported by Belgium and Italy, proposed that Antarctica be declared a „Nature Reserve – Land of Science" and, with that object in mind submitted two papers[20], containing among other the possible components of a convention on the comprehensive protection of the Antarctic environment. Wide-ranging debate at that Meeting on the item entitled "Comprehensive measures for the protection of the Antarctic environment and dependent and associated ecosystems", which focussed on six working papers submitted respectively by France and Australia, Chile, New Zealand, United States and Sweden[21], revealed that a broad consensus had emerged in favour of embodying such measures in a new international legal instrument. The discussion covered all aspects of environmental protection in Antarctica and encompassed a range of considerations on how to prevent, reduce and mitigate adverse impacts on Antarctic terrestrial, marine and atmospheric environments. These ranged from specific regulation of waste disposal and marine pollution control, to improving the protected system and integrating prior assessment of potential adverse environmental impacts into the planning stages of Antarctic activities. The value of Antarctica for science was also strongly emphasized. But, the crucial controversial issue remained the ban of mining and the „moratorium" on mineral resource activities in Antarctica, instituted by the Fourth Special ATCM. After adoption of Draft Principles of Comprehensive Measures, the Consultative Parties recommended to convene in 1990 a Special ATCM „to explore and discuss all proposals relating to the comprehensive protection of the Antarctic environment and its dependent and associated ecosystems"[22].

The XI[th] Special ATCM held in November 1990 in Viña del Mar, Chile was partly a response to the well-founded concerns of the environmentalists that the mining activities might jeopardize the Antarctic environment, but also

an expression of their long-standing nostalgia for a comprehensive and legally binding Antarctic ecological regime. The Consultative Parties came to Chile deeply divided on the antagonistic character of the exploitation of mineral resources and the environmental protective measures in Antarctica, and attempted to find a compromise formula between a short-term moratorium on mining and an unconditional ban. The Chile meeting did adopt a draft Protocol on Environmental Protection, but was unable to reach consensus on the mining issue[23].

The break through came at the next session of the Meeting[24], held in Madrid in April, June and October 1991. The change in the position of the United Kingdom, the principal supporter of the Antarctic Mineral Convention, and leading opponent of the complete ban on mining, and its support lend to moratorium on mineral exploitation[25] was a major setback for the mining lobby. Thanks to a mediation by the delegation of Norway, the Madrid meeting reached a compromise and committed itself to a 50-year moratorium on mining in Antarctica incorporated into a Protocol to the Antarctic Treaty.

Although the results of the Madrid Meeting were declared as „a historical landmark in environmental protection" and praised as a major victory of the environmentalists, some experts and authors were sceptical on the practical value of the reached compromise, stating that" on the face of it the Madrid Protocol represents a major diplomatic coup for the Australian initiative and the environmental lobby generally. /.../ With respect to the ban on mining the strength of the Madrid Protocol lies in the fact that it is neither a compromise nor a moratorium. Once it becomes operational it could constitute an effective indefinite ban on mining because it gives each Consultative Party that is opposed to mining the power to veto any attempt to introduce mining on the continent at any time. Paradoxically this strength could also be a source of weakness. At the meeting of the ATS held in Madrid in June 1991 to finalise the draft Protocol, the United States rejected the veto-powers granted to States under Article 24 in respect of the ban on mining. It argued instead that the 50-year period should be considered a moratorium as such and that if at the expiry of the date, there is no unanimity on the lifting of the ban, any State party to the Protocol should be entitled to opt out of the agreement if so wished"[26].

As a result of the amazingly brief but hot deliberations, the XI[th] Special ATCM adopted the **Protocol on Environmental Protection to the Antarctic Treaty**[27] and four Annexes to the Protocol, which form an integral part thereof, namely: Annex I on Environmental Impact Assessment, Annex II on Conservation of Antarctic Fauna and Flora, Annex III on Waste Disposal and Waste Management and Annex IV on Preservation of Marine Pollution. The Protocol (Art. 9 par. 2) provides for the possibility of adopting additional Annexes. The XVI[th] ATCM availed itself of this opportunity and adopted Annex V on Area Protection and Management[28]. The Meeting further

discussed proposals for new Annexes on Tourism and on Liability. The drafting of the Protocol in general terms and the transfer of all detailed issues into the annexes, which are unlimited in number, made that international instrument open and flexible, and free to respond to future environmental needs and requirements.

The Protocol provided that it will be opened for signature in Madrid on 4.X.1991, and thereafter in Washington D.C. until 3.X.1992. The XVI[th] ATCM „stressed the absolute priority of the earliest possible ratification and entry into force of the Protocol" and „in the meantime, as far as possible and in accordance with their legal system, the provisions of the Protocol should be applied, as appropriate, by all Parties to the Treaty"[29].

The Protocol shall supplement the Antarctic Treaty (Art. 4 par. 1) and be consistent with other components of the ATS (Art. 5). The resignation by its authors of the usual method of drafting an independent convention and the choice instead of the form of a Protocol, brings that instrument closer to the Antarctic Treaty than any of the previous ATS components and rectifies the unfortunate omission committed in 1959. It also offers to the ATS new development procedures, avoiding the largely feared modifications or amendments of the Treaty itself.

The Protocol is composed of a Preamble, 27 articles, a Schedule on arbitration and the mentioned Annexes.

In Article 2 „the Parties commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science".

In the comprehensive Art. 3 on Environmental Principles, the Parties resolve that „activities in the Antarctic Treaty area shall be planned and conducted so as to limit adverse impacts on the Antarctic environment and dependent and associated ecosystems" and „so as to accord priority to scientific research and to preserve the value of Antarctica as an area for the conduct of such research, including research essential to understanding the global environment".

One of the central provisions is the brief Art. 7 on prohibition of mineral resource activities, other than scientific research.

The activities under the Protocol are regulated through a complex structure of institutions, a regimented application procedure, rules of dispute settlement and a set of environmental conditions. Together, they form a comprehensive and coherent **Antarctic environmental legal regime.**

The Protocol provides for two institutions to carry out its purposes: 1 – the Antarctic Treaty Consultative Meetings (Art. 10) and 2 – the Committee for Environmental Protection (Art. 11). The functions of the Committee (Art. 12) newly established by the Protocol shall be to provide advice and formulate

recommendations to the Parties in connection with the implementation of the Protocol and its Annexes.

The Protocol provides for application procedures, including: 1 – individual and collective inspection system (Art. 14), 2 – emergency response action (Art. 15), 3 – rules and procedures relating to liability for damage (Art. 16) and 4 – annual reports by Parties (Art. 17).

Special procedure for dispute settlement is provided in the Protocol (Art. 18–20) itself, while the attached Schedule to the Protocol, in its 13 articles, establishes the Arbitral Tribunal and is setting up its procedure. With reference to Art. 18, the XIth Special ATCM agreed that an inquiry procedure should be elaborated to facilitate resolution of disputes concerning the interpretation of Article 3 (on environmental principles) with respect to activites undertaken or proposed to be undertaken in the Antarctic Treaty area. The Meeting noted also that, with regard to the competence of the Arbitral Tribunal under Articles 19 and 20 of the Protocol to make an award upon any matter, it was understood that the Tribunal would not make determinations as to damages until a binding legal regime had entered into force through an Annex or Annexes on liability.

The apparent shelving of the Minerals Convention in favour of the Madrid Protocol will seem to suggest a setback for the mining lobby and an ascendancy of the environmentalist party within the ATS framework.

A solemn Declaration on the 30th Anniversary of the Entry into Force of the Antarctic Treaty, adopted at the XVIth ATCM, calls upon the ATCP to take the necessary steps to achieve the earliest possible entry into force of the Protocol and ensure that as fast as possible and, consistent with their legal and constitutional processes, the provisions of the Protocol and its Annexes are applied to their activities in Antarctica.

Environmental impact assessment

Impact assessment is considered to be the acid test of the Treaty powers protection of the Antarctic environment. No wonder, therefore, that it was chosen as subject of Annex I to the Protocol, which in Article 8 commits the Parties to ensure that the assessment procedures set out in that Annex are applied in the planning processes leading to decisions about activities undertaken in the Antarctic Treaty area pursuant to scientific research programmes, tourism and all other governmental and non-governmental activities for which advance notice is required under the Treaty's Art. VII par. 5, including associated logistic support.

There are no binding rules under the Antarctic Treaty requiring cooperative environmental impact assessment or analyses in advance of major construction

projects. Such procedure was recommended in 1973 by SCAR, which suggested „a comprehensive statement of anticipated short-term and long-term effects on the environment and its intimately associated macro- and micro-biota, together with their primary, secondary and tertiary consequences (and) a delimination of all probable and unavoidable adverse environmental effects, with suggestions for means of minimizing them"[30]. That proposal required further circulation of assessments to SCAR and governments for comments on their adequacy. It was, however, rejected by ATCM and replaced by a limited language recommendation[31], containing the Code of Conduct for Antarctic Expeditions and Station Activities, which provided that „in the planning of major operations in the Antarctic Treaty Area an evaluation of the environmental impact of the proposed activity should be carried out by the Antarctic operating organizations concerned". This evaluation may be circulated for information through SCAR channels to all states engaged in Antarctic activities.

In 1985 SCAR again recommended a mandatory environmental assessment procedure[32] to the XIII[th] ATCM, but this, likewise, did not achieve consensus. Instead, more limited recommendations[33] were adopted by the ATCMs to ensure that no act or activity having an inherent tendency to modify the environment over wide areas be undertaken unless appropriate steps have been taken to foresee the probable modifications and to exercise appropriate controls with respect to the harmful environmental effects such uses may have[34]. Also in planning future activities the question of environmental effects and the possible impact of such activities on the relevant ecosystems ought to be duly considered[35].

In view of some experts the ATS „currently provides no guidance on how the values of, for example, scientific research, shore-based mineral development, fishery potential and the conservation of widlife and aesthetic qualities are to be weighed against one another in circumstances where there is perceived competition between them... There needs, therefore, to be machinery for reasoned judgment between alternative uses of the environment"[36].

According to SCAR proposals, identification and evaluation of alternative options and possible measures to mitigate the predicted harmful impacts, are the key issues of an adequate environmental impact assessment which in Antarctica ought to be a continuing process. The non-governmental Antarctic and Southern Ocean Coalition (ASOC) considers, that environmental impact assessment in Antarctica, perhaps more than in any other region of the world, depends upon continual exchange of information between scientific investigators, logistics and engineering expert, and policy makers[37].

The inadeaquacies of the framework set up by ATCM recommendations for the environmental impact assessment and in particular of the Code of Conduct, were revealed dramatically *in situ* during the construction of the

French airfield at Dumont d'Urville on Pointe Geologie[38], the Dry Valley Drilling Project[39] and the Ross Ice Shelf Project[40]. Moreover, the recommendations, including the Agreed Measures and Code of Conduct, are not applicable to Non-Consultative Parties[41].

In this situation, the Consultative Parties took necessary steps towards the establishment of a comprehensive system of environmental impact assessment as part of full environmental regulation, including a system of enforcement. With that aim on mind, in 1983 during the minerals negotiation session held in Bonn, ASOC proposed the establishement within the ATS of an Antarctic Environmental Protection Agency[42].

As we have seen, in the last three decades both the ATCMs and SCAR have passed a considerable number of recomendations and guidelines relating to the environmental impact assessment. These are, however, voluntary codes of conduct, leaving the interpretation, implementation and enforcement exclusively to each individual country. Thus, the guiding idea of the authors of the 1991 Protocol on Environmental Protection was to set up a legally binding comprehensive system of environmental assessment.

According to the assessment procedures set out in Art. 8 of the Protocol and reiterated in its Annex I, the activities referred therein ought to be identified as having: a – less than a minor or transitory impact, b – a minor or transitory impact, or c – more than a minor or transitory impact. The assessment procedures set out in Annex I shall apply to „any change in an activity whether the change arises from an increase or decrease in the intensity of an existing activity, from the addition of an activity, the decommissioning of a facility or otherwise... Where activities are planned jointly by more than one Party, the Parties involved shall nominate one of their number to coordinate the implementation of the environmental impact assessment set out in Annex I." (Art. 8 par. 3 and 4 of the Protocol).

The general principles on the environmental impact assessment formulated in the Protocol, have been substantiated in eight articles of Annex I, which contains detailed evaluation procedures set up for each step, beginning with preliminary stage (Art. 1), initial environmental evaluation (Art. 2) up to the comprehensive environmental evaluation (Art. 3 and 4). Special attention was paid in Annex I to the monitoring of key environmental indicatiors, to assess and verify the impact of any activity (Art. 5), as well as the circulation and publication of information on environmental evaluations (Art. 6). Annex I does not apply in cases of emergency relating to the safety of human life or of ships, aircraft or equipment of high value, or the protection of the environment, which require an activity to be undertaken without completion of the procedures set out in this Annex (Art. 7).

The stipulations of Annex I bear distinct traces of the earlier presented recommendations, which served the authors of its articles as inspiration, source of information and departure point.

Conservation of Antarctic fauna and flora

The size of Antarctica, its remoteness, the lack of national jurisdiction and nature of the benefit which could be promoted, places the wilderness values of the natural reserve designated by the 1991 Protocol on Environmental Protection in a class of its own. Its another valuable asset is the status of animal populations. Despite its climatic hardships, Antarctica has the largest populations of wildlife left in the world, tens of millions of marine mammals and birds that are free to migrate, feed and breed, living for centuries in their natural state. It is feared, however that in few decades Antarctica might remain the only and least great wildlife sanctuary on our planet.

The fauna and flora of Antarctica present a remarkable contrast between the sea and the land. The sea is generally extremely rich, while on land plants strive to maintain a toe-hold, while animals struggle for survival. The barren parts of the Antarctic continent are barely more hospitable to life than the Moon or Mars and are extremely sensitive to any external interference.

The fact that Antarctica presents an opportunity for wilderness conservation on a hitherto unequalled scale, did not inspire the authors of the 1959 Treaty to anything more than a casual reference to „the preservation and conservation of living resources in Antarctica" (Art. IX par. 1f).

In subsequent years, the Consultative Parties, from their first meeting[43], step by step agreed on partial solutions of the conservation of Antarctic fauna and flora, stipulated in numerous facultative recommendations of the ATCMs, including the Agreed Measures and in two conventions on the conservation of Antarctic seals and marine resources[44]. The 1964 Agreed Measures for the Conservation of Antarctic Fauna and Flora[45] were frequently praised as one of the most comprehensive and successful international instruments for wildlife conservation that have yet been negotiated.

The idea of conservation of wildlife in Antarctica is inseparable from its complex system of protected areas, which is regulated in Annex V to the Protocol and from the preserve concept of the World Park[46].

The Agreed Measures proclaimed the Antarctic Treaty Area a Special Conservation Area in recognition of the scientific importance of the study of Antarctic fauna and flora, their adaptation to their rigorous environment and their interrelationship with that environment, and in consideration of their unique nature, circumpolar range, and particularly their defenselessness and susceptibility to extermination. Specifically, the Agreed Measures deal with protection of local flora and native fauna, minimalization of harmful interference with the normal conditions of any mammal or birds or any attempt at such harmful interference, prohibition of introduction of non-indigenous species, parasites and diseases, and finally with the central feature of the Measures, which are the Specially Protected Areas (SPA).

Annex II to the 1991 Protocol, dealing with conservation of Antarctic fauna and flora, follows in principle the ideas outlined ealier in the Agreed Measures, making them now legally binding rules.

In its nine articles, Annex II provides for detailed and strict regulations on the protection of Antarctic native fauna and flora, prohibiting any taking or harmful interference, except in accordance with special permits issued under rigorous procedure (Art. 3). Appendix A to the Annex enumerates the specially protected species. No less rigorous is the procedure regulating the introduction of non-native species, parasites and diseases to the Antarctic Treaty area. Appendix B to the Annex, regulating importation of animals and plants, allows in accordance with special permits issued under Article 4 of this Annex to import domestic plants and laboratory plants including viruses, bacteria, yeast and fungi. Appendix C provided for special precautions to prevent introduction of micro-organisms. Nothing in Annex II shall apply to the importation of food into the Antarctic Treaty area provided that no live animals are imported for this purpose and all plants and animal parts and products are kept under carefully controlled conditions and disposed of in accordance with Annex III to the Protocol, on disposal and waste management.

Annex II provides for preparation, availability and exchange of information on specially protected species and relevant protected areas (Art. 5 and 6). Art. 7 confirms the rights and obligations of Parties under the International Convention for the Regulation of Whaling of 2.XII.1946. Art. 8 obligates the Parties to keep under continuing review measures for the conservation of Antarctic fauna and flora, taking into account any recommendations from the Committee for Environmental Protection established by the Protocol. Annex II contains an emergency clause (Art. 2) similar to that in Annex I.

The adoption of Annex II to the Protocol constitutes an important step toward a comprehensive and compulsory system of the protection of Antarctic fauna and flora, especially in the light of the fact that the Agreed Measures did neither receive the approval of the United States, nor became effective under Article IX of the Treaty[47].

Waste disposal and waste management

It was never doubted that Antarctic station operations have a substantial local environmental effect. One of the most harmful is waste and sewage disposal. Rubbish dumps have been the object of repeated criticism. One of the Greenpeace scientific expeditions has indicated that investigation of local pollution from waste disposal will be on their priority list. Visitors to some stations decribed the trash heaps there as a „dreadful sight". One tourist

remarked that it was difficult to determine which was the base and which was the dump. But allowing for hyperbole, it is generally agreed that there have been good grounds for criticizing the waste disposal practices of most bases in Antarctica, some of which have taken on the appearance of sprawling dumps.

A general method of dealing with the problem was to deposit garbage of various types on the ice in order that it should float off to sea, resulting after melting in an offshore junkyard extending up to 3 miles from the coast. There are two dumps on ice-free ground inland from McMurdo, one for burnable materials. Much of this blows around, contaminating ice-free areas near the base. Pollution from burned trash produces black smoke and numerous organic pollutants. Japanese researchers have discovered PCB contamination near some of their stations presumably the result of burning chloronated plastics such as polyvinyl chloride without pollution control. Scientists report also that some birds refuse to migrate because of the available feed dumped at the stations year round.

It would appear that sewage discharge into the sea is a common procedure at many stations. Rather late and only few stations have installed sewage plants and incinerators. Despite repeated requests from the stations personnel, arriving vessels of various nationalities have continued to dump wastes or pump bilges into the sea. Some of this is redeposited on the shoreline. In some instances the environmental impacts were detected in considerable distances from the bases, not to say about the contamination of the vicinity of the stations[48].

Barnes consideres, that government initiatives „could make the Antarctic a *model* for disposal of waste so as not to jeopardize scientific, wilderness, and other values"[49].

Alarmed by the growing littering and increasing accumulation of rubbish and garbage in Antarctica, the ATCMs and SCAR have adopted a considerable number of recommendations and guidelines relating to waste disposal[50]. In September 1988, SCAR approved a report on „Waste Disposal in the Antarctic" following ATCM Rec. XIII – 4. The XVth ATCM, drawing on the SCAR report adopted a recommendation[51], which sets out agreed practices regarding waste management planning, waste disposal and adequate procedures to keep these practices under continuing review to ensure maximum protection of the Antarctic environment. In that recomendation the ATCPs pledge to reduce the amount of wastes produced, or disposed of, in Antarctica to the maximum extent possible so as to minimize impact on the Antarctic environment and minimize interference with scientific research, or other legitimate uses of the Antarctic.

The Recommendation also states that Governments must take measures within their competence to ensure compliance with the agreed practices by all those subject to their jurisdiction, including both private operations in Antarctica and activities sponsored by Governments. These practices do not prevent

any Government from applying more stringent standards to Antarctic activities subject to its jurisdiction. Each Government is encouraged as a matter of policy to ensure that its nationals and vessels are subject to measures governing waste disposal in Antarctica that are no less effective in affording protection of the environment than those applicable to their nationals and vessels outside of Antarctica. The Consultative Parties reaffirmed the exhortation contained in the Code of Conduct, that they should continue to avoid the use in Antarctica of leaded fuels or fuels containing ethylene bromide and ethylene chloride. The Parties reaffirmed their agreement to encourage the implementation and application of new and improved methods of waste disposal and the exchange of information on them,

Some representatives expressed concern about the possible environmental impacts of wrecked vessels and crashed aircraft, The Meeting noted, however, that in some cases efforts to remove such craft could result in environmental impacts more significant that non-removal. It stressed that the principal concern was that possible contaminants, such as fuel, should be removed.

Some delegations raised the issue of whether certain wastes might have potential historic value. The meeting agreed that such cases could be dealt with under the existing mechanisms for the designation of Historic Sites and Monuments.

In further work there was discussion among other on appropriate technologies to conserve energy and water, on incineration technologies, dumping of wastes at sea, on national waste management plane, a system of classification of wastes, storage and handling of wastes[52].

Efforts to prevent the littering, pollution and contamination of the Antarctic environment culminated in the adoption of Annex III to the 1991 Protocol on Waste Disposal and Waste Management.

In 13 articles of that instrument a comprehensive legaly binding system was outlined providing among other for waste disposal by removal from the Antarctic Treaty area (Art. 2), waste disposal by incineration (Art. 3), other waste disposal on land (Art. 4), disposal of waste in the sea (Art. 5) and storage of waste in Antarctica (Art. 6). Art. 7 contains a list of products the introduction of which to Antarctica is prohibited. The coherent system of waste management planning, set up in Art. 8 contains a classification of the produced wastes into five groups[53]. In order to reduce further the impact of waste on the Antarctic environment, each Party shall prepare and annually review and update its waste reduction, storage and disposal, specifying for each fixed site, for field camps generally and for each ship[54]. Each such Party shall also prepare an inventory of locations of past activities, before the information is lost, so that such locations can be taken into account in planning future scientific programmes.

The final articles (Art. 9 and 10) provide for circulation and review of waste management plans and management practices. Art. 12 contains the usual

emergency clause. Annex III shall apply to activities undertaken in Antarctica pursuant to scientific research programmes, tourism and all - other governmental and non-governmental activities, with the aim to minimise the impact of wastes on the environment and to minimise interference with the natural values of Antarctica. Waste storage, disposal, removal, recycling and source reduction shall be the essential considerations in future planning and conduct of all activities in Antarctica. Wastes removed from there shall to the maximum extent practicable be returned to the countries responsible for generating the waste. The generator of past and present wastes is under the Annex obliged to clean up the used sites and remove such wastes with two exceptions, namely when a structure was designated as a historic site or monument and the removal would result in greater adverse environmental impact than leaving the structure or waste material in its existing location (Art. 1).

Thus, the entry into force of Annex III on Waste Disposal will practically mean an unprecedented cleaning up operation in Antarctica.

Prevention of marine pollution

At the very outset, it is necessary to recall the extreme caution displayed by the ATCPs in connection with any maritime questions, including the protection and conservation of the Antarctic marine environment. The Antarctic Treaty provisions did not provide them with an adequate legal basis on which they could act with full confidence, owing to the uncertainty of their scope, especially in respect of the problem of absence of usual maritime belts around the Antarctic continent and the Antarctic islands. The peculiar wording of the high seas exception to Article VI of the Treaty has given Consultative Parties continual problems and its full implications have still not been finally determined[55]. Treaty practice regarding offshore areas has undergone recently considerable changes. The confusion and controversy surrounding the drafting of the 1982 Law of the Sea Convention and the question of its application to Antarctica did not make easier the task. But the importance of the Antarctic marine ecosystem and the fact that Antarctica's principal resources are found in offshore areas, made it inevitable for the ATCPs to take up the entire set of problems associated with their conservation and the protection of their environment, including the prevention of marine pollution. Although relatively late, as compared with other ecological issues, also in that area the ATCMs adopted a number of relevant recommendations, measures and guidelines[56]. In addition to measures adopted within the ATS for environmental conservation policy, a need exists to account for the role that several international conventions might play in the prevention of marine pollution in Antarctica, especially related conventions drafted by the International Maritime

Organization (IMO) and the mentioned 1982 Law of the Sea Convention[57]. But of particular importance is the 1973 International Convention for the Prevention of Pollution from Ships, as amended by the Protocol of 1978 relating there to (hereinafter: MARPOL 73/78)[58], which designated for its purpose the Antarctic Treaty area as „a special area".

Special attention was paid to the prevention, control, and response to marine pollution at the XVth ATCM, resulting in the adoption after a profound discussion of a detailed recommendation[59]. The recommendation calls for governments to take measures to prohibit in Antarctica certain discharges and disposal from vessels and comply with relevant provisions of specified international conventions on vessel safety and pollution control. It calls in addition for the establishment of contingency plans for marine pollution response and sets forth a procedure for doing so. The Meeting took note of the difficulties and hazards posed for small yachts in meeting the requirements of the recommendation of having to dispose of food wastes and sewage beyond 12 nautical miles of land or ice shelves. In light of this, it decided that these provisions could be interpreted to provide a limited exception for such vessels, while affirming that every effort should be made to comply with them. Referring to the sovereign immunity clause for warships, state-owned and state-operated vessels contained in par. 3 of the recommendation, some representatives called for limiting the scope of potential exception provided by this clause, while others expressed difficulty in doing so. The Meeting affirmed that vessels with sovereign immunity in Antarctica should act in a manner consistent with relevant international conventions provisions.

The Meeting agreed that the establishment of waste reception facilities for vessels in Antarctica would not be desirable, because the wish was to avoid transferring the problem of waste disposal from vessels to Antarctic stations and facilities. It was noted that this could place a significant burden upon countries adjacent to Antarctica in providing such reception facilities. In light of this fact it was agreed that flag states of vessels concerned and commercial operators should consider means of assisting at ariving at an acceptable solution.

The Meeting drew also attention to the linkages between the issue of marine pollution and other related issues of human impact on the Antarctic environment, including waste disposal, hydrographic charting and the provision and improvement of hydrometeorological services for vessels and aircraft safety. In looking at future work, there was agreement that issues related to contingency plans for marine pollution response and liability for marine pollution damage warranted attention, as well as consideration of the relevance of additional international conventions to questions of marine pollution in Antarctica. In this context, specific mention was made of further restrictions on dumping and incineration at sea in Antarctica. Attention was also called to the hazards of vessel operation in the Antarctic seas and the view expressed that it would be useful to consider special requirements for vessel construction in the future[60].

The debate on the topic of marine pollution was continued at the XVI[th] ATCM. The Meeting welcomed the timely and important work by the Standing Committee on Antarctic Logistics and Operations (SCALOP) on the prevention of oil pollution by national Antarctic programms and the continuing development of a comprehensive format for oil spill contigency plans in the Antarctic. The Meeting recognised, however, that other wider marine pollution issues in Antarctica still had to be addressed fully, in particular such as: a – review of the work carried out by SCALOP on the prevention of oil pollution, b – assessment of the environmental effects of marine dumping and the disposal of sewage and food wastes into the Antarctic seas and review of the best practicable means to prevent or reduce such pollution, and c – investigation of the best practicable means to monitor marine pollution, as well as the establishment of base-line surveillance programmes to quantify actual levels of marine pollution in Antarctica[61].

A special role in the reduction of marine pollution in Antarctica was assigned to the Marine Sites of Special Scientific Interest (MSSSI), established in 1987 with the aim: „to protect marine scientific investigations which might suffer from willful or accidental interference" and „inshore marine sites of scientific interest where harmful interference is generally recognized to be likely"[62].

The entire set of legal problems related to marine pollution in Antarctic waters, was only recently formulated in a single comprehensive and coherent international instrument, namely in Annex IV to the 1991 Protocol, entitled „Prevention of Marine Pollution". That legal instrument applies „with respect to each Party, to ships entitled to fly its flag and with respect to any other ship engaged in or supporting its Antarctic operations, while operating in the Antarctic Treaty area" (Art. 2).

In its 15 articles, Annex IV prohibits among other the discharge into the Antarctic seas of oil, oily mixtures and substances containing oil (Art. 3) and any noxious liquid substances (Art. 4), the disposal of garbage, including all plastics, synthetic ropes and fishing nets, plastic garbage bags, paper products, rags, metal, bottles, crockery, dunnage, incineration ash, lining and packing materials (Art. 5) and discharge of sewage (Art. 6).

Annex IV commits the Parties to ensure that all ships before enterning the Antarctic waters are fitted with a tank or tanks of sufficient capacity on board for the retention of all sludge, dirty balast, tank washing water, other oily residues and mixtures, and have sufficient capacity for garbage, while operating in Antarctica and have concluded arrangements to discharge such oily residues and garbage at a reception facility after leaving that area. Ships shall also have sufficient capacity for noxious liquid substances. It commits further the Parties at whose ports ships depart en route to or arrive from Antarctica to ensure that adequate facilities are provided for the reception of the above mentioned garbage, without causing undue delay or place an inequitable burden on

countries adjacent to Antarctica (Art. 9). The objectives of Annex IV shall be taken into account in the design, construction, manning and equipment of ships engaged in or supporting Antarctic operations (Art. 10). The remaining articles contain stipulations on the sovereign immunity (Art. 11), the usual emergency clause (Art. 7) and preventive measures and emergency preparadeness and response to marine pollution emergencies in accordance with Article 15 of the Protocol. Accordingly, the Parties shall develop contingency plans for marine pollution, including contingency plans for ships other than small boats, and shall also establish procedures for cooperative response to pollution emergencies and shall take appropriate response actions in accordance with such procedures (Art. 12). In implementing the provisions of this Annex, due consideration shall be given to the need to avoid detrimental effects on dependent and associated ecosystems outside the Antarctic area (Art. 8). Annex IV pledges a close relationship with MARPOL 73/78 (Art. 14).

Although its implementation will evidently impose hardships upon its Parties, the entry into effect of Annex IV and strict adherence to its stipulations, will meaningly contribute to the prevention of marine pollution in particular and the improvement of the quality of the environment in Antarctica in general.

Area protection and management

During its three decades activities, the ATCMs have built up a highly developed and complex Antarctic Protected Area System (APAS), composed of eight types of specially protected areas and sites, with differentiated conservation regimes, submitted to management procedures formulated in respective recommendations[63]. The protected areas and sites, growing fast in number, generated conflicts of interests – environmental, scientific and economic – leading to controversies and disputes[64], which soon turned into criticism of the entire APAS. That System provided a useful index of the Consultative Parties' implementation of their professed responsibilities to safeguard the Antarctic environment. In form the System was an ambitious experiment in conservation, but the practical level of frequent breaches was rather high. The inadequacies of APAS were subject of continuous anxiety of the Consultative Parties which demanded its review.

During a discussion held in 1989 at the XVth ATCM on APAS, and in particular on the designation of new categories of protected areas, it was recognized „that the expanding scale and scope of activities in Antarctica were increasing the risk of activities interfering with each other and causing cumulative environmental impacts, particularly in certain high-use areas" which „could be avoided or minimized by cooperative planning and coordination of activities in areas where a variety of activities were going on or

were planned"[65]. But concerns were also expressed that, while it was not intended, further designation of APAs, as recommended by SCAR, might result in restricting access to parts of Antarctica and the freedom of scientific research[66]. Further, uncertainties were noted as to who would be able to propose designating APAs and related management plans; how proposals would be developed, considered, and approved; who would be responsible for implementing approved management plans; and how approved plans would be revised and updated to take account of changing circumstances? Also, uncertainties were noted as to the size and number of areas that might be proposed for designation as APAs. The exchange of views on this matter indicated that some of this uncertainty was caused by the different use of the term „Antarctic Protected Area". To some, this term implied that the purpose of APAs was simply to protect areas that may be damaged by the cumulative effects of multiple activities in those areas, while during the debate it was noted that the purpose may be twofold: to promote cooperative planning and coordination of activities and to avoid environmental damage.

The debate disclosed that there were more questions than answers to the many doubts, which had to wait for being dispelled till the next ATCM. The uncertainties which cropped up during the Paris debate led to a full scale debate on the review of APAS in Bonn at the XVIth ATCM held in 1991. Recalling that the issue had already been discussed during the XIth Special ATCM, the representatives of the United Kingdom and the United States pointed out that, because of the many types of designation, the present system had led to confusion in the regulations relating to Protocol Areas. They recommended that the system required major rationalisation but without any loss to the existing quality of protection. It was stressed that the system should be concise, unambiguous and in conformity with the existing Annexes to the Protocol on Environmental Protection. Most representatives taking floor in the debate on that item, supported the British-American move, indicating to the inadequacies of the present system and expressing the desirability of having a more workable regime. Some expressed the wish that the new regime should integrate the existing protected areas into a new system[67].

After intensive discussion the Meeting reached consensus of a final text in which the wishes of the debaters took the shape of Annex V to the Protocol[68].

In 12 articles of Annex V the revised system of areas protection and management was outlined with the objective that „activities in those Areas shall be prohibited, restricted or managed in accordance with Management Plans adopted under the the provisions of this Annex". (Art. 2).

Annex V reduces the complex APAS to two basic types of protected areas, including marine areas, namely: Antarctic Specially Protected Areas (ASPA – Art. 3) and Antarctic Specially Managed Areas (ASMA – Art. 4), as well as Historic Sites and Monuments (HSM – Art. 8). The Meeting agreed that the definition of ASMA set out in Art. 4 would allow such areas to be

established for the purpose of prohibiting, restricting or managing activities, including tourism. SPAs and SSSI were redesignated as ASPAs. Entry into an ASPA requires special permit issued under Art. 7, while entry into an ASMA does not require such permit.

Art. 5 on Management Plans is the focal point of the entire Annex V. According to the available definition, Management Plan" means a plan to manage the activities and protect the special value or values in an ASPA or an ASMA. The promotion of Management Plans in Annex V into such a high rank, reflects the fundamental philosophy behind the entire Protocol and its Annexes, according to which the effectiveness of any legal rules on preservation, protection and conservation of the environment, providing for prohibition and restriction depends on their connection with adequate management procedures, including planning, implementation and reporting.

Submission of a proposed Management Plan to the ATCM is a prerequisite for designation an area as ASPA or ASMA, Art. 5 contains a detailed format of such Plan, while art. 6 contains the designation procedure. The issue of entry permits was assigned to appropriate authorities appointed by each Party in accordance with the procedure outlined in Art. 7. The Meeting agreed that if an activity is permitted under a Management Plan this would not derogate from the obligation to meet all other requirements of the Protocol including environmental assessment before any decision to proceed with such activity. It was noted that it would be a responsibility of the appropriate authority issuing the permit to require that the planned activity is in accordance with all aspects of the Protocol prior to issuing a permit.

Existing Historic Sites and Monuments which have been listed as such by previous ATCMs shall be included in a new list under Art. 8 of Annex V which regulates the procedure of their designation and protection from damaging, removal or destruction.

The remaining articles provide for information and publicity procedure to ensure that all visitors in Antarctica understand and observe the relevant conservation rules (Art. 9), as well as exchange of information (Art. 10). Art. 11 contains the usual emergency clause.

It is expected that the entry into force of Annex V will improve considerably the effectiveness of the preservation of environment in Antarctica by means of specially protected areas.

Effects of tourism and non-governmental activities on the Antarctic environment

Inaccessible Antarctica, called the last frontier of our planet, has long been the object of dreams of all kind of voyagers and adventurers. But for a long time only few were able to reach it. Until 1966 virtually all expeditions to

Antarctica were organised either by governments or had governmental support. However, the development of technique and the improvement of means of transportation, has suddenly brought Antarctica within the range of world tourism, creating new serious threats to its vulnerable environment. Since 1966 commercial operators have run regular tourist sea-voyages to the Antarctic. The rapidly increasing numbers of private visitors – tourists, non-governmental expeditions and even mountaineering parties – have given the Consultative Parties special cause for concern and became subject of the Consultative Meetings' discussions[69].

In 1970s the situation reached alarming proportions. Large numbers of tourists brought on some cruises disrupted the work of the relatively small Antarctic bases incapable of handling up to 1000 visitors at one time. Wildlife reserves, scientific stations and historic sites are most frequently attracting private visitors and constitute a focus for tourist ships, making difficult to safeguard the specially protected areas and to ensure observance of the Agreed Measures. Complaints about tours' vandalism and damage to remote sites, flora and fauna were lodged.

A few tourists have also visited Antarctica by air, but until recently the lack of suitable aircraft and runway facilities has imposed limits on that type of tourism. More tourists (perhaps up to 11 000) have seen parts of Antarctica from the air as passengers on round-trip flights.

Another category of visitors are not strictly tourists, but their activities are somewhat analogous. Small, privately-founded non-governmental expeditions to Antarctica have been conducted for a variety of purposes, ranging from mountaineering, restoration of historical sites, pleasure trips to ecology (i.e. Greenpeace International). Although only few hundred adventurers have visited Antarctica in this manner, their activities require legal regulations like tourism, especially when only very few travel agencies and private organisations have taken pains to ensure observance by their clients of environmental protection measures in Antarctica.

Private activities in Antarctica also raise problems of another nature, such as safety of persons and craft, affecting in case of accident also the environment. The extremely difficult conditions of sea and air navigation in Antarctica affect in the same way official expeditions and those who journey for pleasure. But many forget that despite tremendous scientific and technological advances, human activity in Antarctica, of whatever nature, remains inherently hazardous. At least seven commercial tourist sea-going tours to Antarctica run into trouble and required assistance of national support vessels, disrupting their tight schedule of the short Antarctic summer. A number of smaller private expeditions have also needed to call upon the help of scientific stations and official expeditions. The tragic air crashes in Antarctica reminded us all of the continuing danger associated with any human activity in Antarctica[70].

To the new challenges posed by tourism and private activities in Antarctica, which were not anticipated in the 1959 Treaty, the ATCPs responded in the usual way by adopting a series of recommendations[71]. Recognizing the inadequancy of national legal solutions and of the station entry rules, the Consultative Parties have initiated in 1970 a discussion on specific measures governing tourism in Antarctica. At the VIth ATCM a recommendation[72] was passed which commits the governments to make appropriate efforts[73] to ensure that visitors do not engage in any activity contrary to the principles and purposes of the Treaty or Recommendations and comply with conditions or restrictions on their movements and do not enter SPAs and respect designated areas. Aware that exhortations of this type are too vague to be enforcable the ATCPs carried on their work on drafting more specific regulations. The very narrow scope of conditions to be imposed on tourists and private visitors reflects, however, the inability of the ATCPs to agree upon truly effective measures which would involve enforcement. Little substantial progress was made at the next, VIIth ATCM[74]. A significant change in attitude was marked at the VIIIth ATCM which acknowledged that tourism is in Antarctica a „natural development" which requires regulation and recommended the elaboration at successive Consultative Meetings of a „Statement of Accepted Practices and the Relevant Provisions of the Antarctic Treaty" and designation of Areas of Special Tourist Interest (ASTI)[75]. Their prescription was intended to divert tourists from stations, SPAs and SSSIs. A Statement of Accepted Principles[76] formulated at the Xth ATCM placed special emphasis on observance of the Agreed Measures, while non-governmental expeditions were urged to carry adequate insurance cover against risk of incurring financial charges or material losses. It also provided valuable guidance to all non-official visitors on appropriate conduct in Antarctica. Also SCAR has published a helpful guidebook for private visitors to Antarctica[77].

The problems of preventing harmful interference with the vulnerable Antarctic environment and ensuring safe operations have grown and became more acute with the inevitable increase of tourist and private activities. Hotel accommodation has been built in the Antarctic Peninsula area and tourists are now arriving there regularly by air[78]. Since some countries are contemplating actively encouraging and supporting tourism as a means of offsetting some of the growing costs of their Antarctic programmes, the implications of a further growth of tourism had to be taken seriously by the ATCPs. Even if tourist activities in Antarctica to date do not appear to have had severe environmental consequences, there are already some worrying signs of cumulative adverse impacts, especially in cases of significant increase in number of tourists involved and in the frequency of their visits to the same sites. While at one time it may have seemed an attractive solution to confine tourists to a few limited areas of ASTI, no such sites have yet been settled and now it is rather

uncertain whether this is the wisest course. It seems, that in the light of Annex V provisions, that idea will rather be abandonned.

Tourism and non-official expeditions have undoubtedly created serious problems for the ATCMs, but it would be both politically unacceptable and legally difficult for most Consultative Parties to prevent private activities in Antarctica. Such tendencies were already noted within SCAR, where the problem was considered in 1982 and suggestions were made that Consultative Parties adopt a common negative response policy to any enquiries for support received from commercial or private operators intending to travel to Antarctica[79]. While such an approach would certainly have been clear-cut, its success seems rather doubtful. Thus, the ATCPs have chosen a more realistic policy and started to prepare for the drafting of another Annex to the Protocol on effects of tourism and non-governmental activities in Antarctica, with the aim to regulate their activities by means of legally binding rules.

At the XV[th] ATCM in 1989 it was noted with concern that the scale of tourism and non-governmental activities in Antarctica continued to increase. But at the same time it was accepted, that Antarctica should remain open to such activities, which could be broadening public awareness and appreciation of the continent. However, there continued to be concern that such activities, if uncontrolled or excessive, could have potentially serious adverse impacts on the Antarctic environment. In this context some delegations indicated that a distinction should be drawn between tourism and non-governmental activities.

The Meeting therefore agreed that a comprehensive review of the issue was required, including a survey of the relevant Treaty provisions and existing Recommendations, with the view of an amelioration of the situation. The need to consider questions such as the control of tourist and private activities, responsibility, insurance, liability, safety, search and rescue, and self-sufficiency was also pointed out be some delegations. In conclusion, it was agreed that such a review should take place within the context of the XI[th] Special ATCM scheduled for 1990[80].

Bearing in mind that decision and previous Recommendations, a sub-working group, headed by the representative of Brazil initiated a detailed examination of tourism in Antarctica. It studied the proposals for a future Annex to the Protocol adopted in Madrid and submitted a draft recommendation subsequently adopted by the Meeting[81].

Rec. XVI–13 called for the convening on 9.XI.1992 in Venice of an informal meeting of the ATCP with a view to making proposals to the XVII[th] ATCM for a future Annex to the Protocol on Environmental Protection on the question of a comprehensive regulation of tourist and non-governmental activities in Antarctica. It was also recommended that prior to the convening of that meeting proposals should be prepared including *inter alia*: environmental issues (*i.e.* implementation of the Protocol and its Annexes,

number of tourists and carrying capacities, homologation of standards relating to vessels, permanent infrastructure for tourists, concentration and disposal of tourist activities, access to unexplored areas) and operational issues (exchange of information, system for granting permission to visitors, self-sufficiency, insurance, training of guides, control and monitoring and organisational procedures).

One of the crucial problems involved is the exercise of jurisdiction over tourist and other private activities in Antarctica. ATCPs have until now been able to ignore jurisdictional questions generally since the bulk of human activity in Antarctica has been undertaken by official national expeditions and under unwritten understanding, in the context of the Antarctic Treaty, that flag state jurisdiction will apply[82]. Tourist and private expeditions, however, raise new jurisdictional problems which will have to be solved in the now drafted Annex. But, even after its entry into force, the Consultative Parties will have to remain alert to the effects of tourist and other private activities within the Antarctic natural reserve designated by the 1991 Madrid Protocol. For the time being, according to Art. 3, par. 4 of the Protocol, activities undertaken in Antarctica pursuant tourism and all other governmental and non-governmental activities, including associated logistic support activities, shall „take place in a manner consistent with the principles in this Article, which is outlining the „Environmental Principles". The activities shall „be modified, suspended or cancelled if they result in or threaten to result in impacts upon the Antarctic environment or dependent or associated ecosystems in consistent with those principles".

Liability for environmental damage

The XI[th] Special ATCM underlined in its Final Act the commitment of the Parties to the 1991 Madrid Protocol in its Art. 16 „to elaborate rules and procedures relating to liability for damage arising from activities taking place in the Antarctic Treaty area", with a view to their inclusion in one or more Annexes and expressed the wish that work on their elaboration could begin at an early stage. In this context, the XVI[th] ATCM took up the issue and discussed the need for early consideration of an Annex on Liability[83].

The complex problem of liability for environmental damage has already its background record within the ATS[84], especially in connection with the negotiations on the 1988 Antarctic Minerals Convention[85]. According to Art. 8 of that Convention, each operator undertaking any Antarctic mineral resource activity is required to take necessary and timely response action, including prevention, containment, clean-up and removal measures, if that activity results in or threatens to result in damage to the Antarctic environment or dependent and associated ecosystems. The operator is in any case strictly liable

for damage to the environment, loss of, or impairment to, an established use on the continent, and loss of or damage to the property of a third party. The operator is similarly liable for the reimbursement of reasonable costs incurred by a third party in relation to necessary response action including prevention, containment, clean-up removal measures and action taken to restore the *status quo ante* where the operator's activities result in or threaten to result in damage to the Antarctic environment.

An operator is, however, exempt from any liability if the damage is caused directly by an event „constituting in the circumstances of Antarctica a natural disaster of an exceptional character which could not have been reasonably foreseen". Similarly, there is no liability for any damage that is caused directly as a result of armed conflict or an act of terrorism against which no resonable precautionary measures could reasonably have been effective (Art. 8 par. 4).

The liability provisions in the Mineral Convention were drafted in general terms with the perspective in view of elaboration of further rules and procedures in respect of liability through a separate Protocol. The rules and procedures in the Protocol which were to be designed to enhance the pollution of the Antarctic environment were *inter alia* to include provisions setting appropriate limits on liability where such limits can be justified, mechanism for adjudicating claims against operators, and a means to assist with immediate response action. It was also envisaged that the future Protocol will set up a Fund which could, *inter alia*, be used to underwrite the cost of response action in relation to environmental damage of indeterminate origin or cases where the operator is incapable of meeting its obligations full or where the cost exceeds any relevant limits of liability (Art. 8 par. 7).

The IVth Special ATCM in its Final Raport agreed that Art. 8 par. 10 of the Minerals Convention was to be interpreted as excluding multiple judgments in respect of the same liability claim.

Although the drafted Annex to the Madrid Protocol is envisaged as an instrument of a much wider scope than that of the above referred Art. 8 of the Mineral Convention, the knowledge and experience acquired in this respect at the IVth Special ATCM will undoubtedly be very helpful in future negotiations.

Taking into consideration the unique and largely unknown nature of the Antarctic environment, the drafted Annex will bring a whole new dimension to the problems of liability which may flow from activities therein. From the law-making point of view that difficult legislative task is comparable perhaps only with that done earlier in respect to outer space[86].

Any human activity inevitably brings with the risk of accidents and consequent difficulties over liability, although so far in Antarctic practice fortunately only few problems of that nature have arisen[87]. But the scope and kinds of activities in Antarctica are constantly changing and expanding and may one day reach a scale unimaginable by today's standards of what has been done so far in that part of our globe. The risks are increasing proportionally,

calling for adequate liability regulations. No doubt the moratorium on mining reduced considerably the environmental risks, but the overall intensification of various activities in Antarctica, the introduction into the area of modern technologies and new materials, but especially the uncontrolled mass influx of tourist and private parties, pose new dangers, which give rise to loss or damage at some kind. Accidents in the Antarctic region are likely to be results not only exceptional natural conditions, but also of human error and incautionsness. All these circumstances must be taken into account in the law making processes when drafting the environmental liability regulations for Antarctica.

The crucial question which arises is who – if anyone – should be held liable for making good the loss or damage to whatever extent is appropriate? The answers to that question and many others related, remain for the time being uncertain, as uncertain are the conditions in which all kind of activities in Antarctica are taking place. The liability and compensation issues have to be taken together with other associated elements of the Antarctic environmental legal regime – such as the various ways of securing compliance with that regime, set up in the Protocol and its Annexes, the dispute settlement procedure (Art. 18–20) and the arbitration procedure outlined in the Schedule to the Protocol, so that all elements will together ensure the effectiveness of the regime. It is with this in mind that, while for the negotiated Annex on liability issues we will have probably to wait a while, it will undoubtedly be of a great value for the effectiveness of the whole Antarctic environmental legal regime.

Conclusions

In assessing the contents and importance of the 1991 Madrid Protocol and its Annexes, it is necessary to point out its following features:

1 – it is the first comprehensive and legally binding instrument within the ATS, which covers the whole spectrum of the protection of the Antarctic environment;

2 – it transforms the conservation ideas outlined in the Treaty and the vague preservation and protectionist measures formulated in the ATCMs recommendations, into legally binding rules, merging them inseparably with pragmatic management provisions, resulting in a uniform coherent Antarctic environmental legal regime, furnished with necessary executive and judical instruments;

3 – it is characterised by the high degree of flexibility, achieved through the application of Annexes unlimited in number and contents, ensuring that regime longevity and perspective for future development and enabling constant adaptation to the fast changing conditions.

Received August 31, 1992
Revised and accepted October 1, 1992

Notes and references

1. Protocol on Environmental Protection to the Antarctic Treaty, opened for signature in Madrid on 4.X.1991, Doc.XI ATSCM/2 of 21.VI.1991 (hereinafter: Protocol).

2. Art. VI of the Antarctic Treaty and Art. 1 (b) and Art. 2 of the Protocol. For purposes of this article it is useful to bear in mind the vastness of the Antarctic continent (approximately 13,9 million sq.km), the permanent ice cap covering 98 percent of the continent (averaging 2160 m in thickness and at some points exceeding 4500 m) extending offshore and forming vast ice shelves which constitute more than 10 percent of the continent's area, the highest average elevation of all the continents (1800 m). Despite its apparent barrenness, Antarctica, and especially its coastal areas, supports a variety of ecological units linked with each other within the more general classification of terrestrial, inland water and marine ecosystems. Boczek B.A. 1986. Specially Protected Areas as an Instrument for the Conservation of the Antarctic Nature. – *In*: Antarctic Challenge II. Proceedings of an Interdisciplinary Symposium 17–21.IX.1985 (hereinafter: Antarctic Challenge II). Berlin: 65–101.

3. It should be noted, however, that at the UN World Conference on the Environment and Development, held in June 1992 at Rio de Janeiro, Brasil, the Antarctic Treaty Parties, following consequently their policy of non-interference into Antarctic affairs from third parties, have objected the inclussion into the Conference agenda of an item on the protection of the Antarctic environment.

4. Rec. VI–4(1970), VII–1(1972), IX–5(1977), X–4 and 6(1979), XII–3 and 4(1983), XIII–4 and 5(1985), XIV–2 and 3 (1987) on Man's impact on the Antarctic environment; Rec. VIII–13(1975) on The Antarctic environment.

5. Rec. I–VIII(1961), II–II(1962) and III–VIII(1964) containig Agreed Measures for the Conservation of Antarctic Fauna and Flora (herinafter: Agreed Measures); also Rec. III–IX, X and XI(1964), IV–18, 19, 20, 21 and 22(1966), V–6(1968).

6. Rec. III–VIII(1964) Specially Protected Areas (SPA) and Special Conservation Areas (SCA), VII–3(1972) Sites of Special Scientific Interest (SSSI), XIV–6(1987) Marine Sites of Special Scientific Interest (MSSSI), VIII–9(1975), Areas of Special Tourist Interest (ASTI), I–IX(1961), V–4(1968) and VI–14(1970) Historic Sites and Monuments (HSM), XV–10(1989) Specially Reserved Areas (SRA), XV–11(1989) Multiple –Use Planning Areas (MPA).

7. The texts of the relevant recomendations are included in the consecutive Reports of the Consultative Meetings.

8. Rec. VIII–11(1975), Annex.

9. Rec. X–8(1979), Annex.

10. Among the extra-ATS agreements are those regulating whaling: Convention for he Regulation of Whaling of 24.IX.1931, *in*: LNTS 155(1935): 349–365; International Convention for the Regulation of Whaling of 2.XII.1946, in: UNTS 161(1953): 72–92. Whales are specifically excluded from the operation of the Agreed Measures by Art. IIa. UNESCO Convention of 1972 for the Protection of the World Cultural and Natural Heritage, *in*: ILM 11(1972): 1358–1374; Convention of 1973 on International Trade in Endangered Species of Wild Fauna and Flora, in: ILM 12(1973): 1085–1104; International Convention of 1950 for the Protection of Birds, in: UNTS 638(1968): 185; Convention of 1979 on the Conservation of Migratory Species of Wild Animals, reprinted in: B. Rüster, B. Simma and M. Bock (eds.)1981. International Protection of the Environment. 23,:1–39; Convention of 1940 on Nature Protection and Wildlife Preservation in the Western Hemisphere, in: UNTS 161(1953): 193. There are also a number of bilateral treaties which protect some species of migratory birds frequenting Antarctic regions.

11. Boczek considers that „The Recommendations of the Consultative Meetings are international agreements and must be approved by representatives of all the Consultative Parties, becoming effective after final approval by all Parties, usually in the form of ratification or acceptance". Boczek, *op.cit.* (note 2): 74–75. The approval procedure provided in Art. IX par. 4

of the Antarctic Treaty for the effectiveness of the recommendations varies from country to country and it is doubtful whether they can be recognized as „international agreements" in the meaning of international law.

12. Convention for the Conservation of Antarctic Seals, signed 1.VI.1972, in force 1978, reprinted in: ILM 11(1972): 251–261.

13. Convention on the Conservation of Antarctic Marine Resources, done 20.V.1980, in force 1980, reprinted in: ILM 21(1982): 1261–1354.

14. Convention on the Regulation of Antarctic Mineral Resource Activities, done 2.VI.1988, has not yet entered into force, Doc. AMR/SCM/88/78.

15. Wong F. and Newman F. 1986. Restrictions to Freedom of Scientific Research through Environmental Protection. –*In*: Antarctic Challenge II,: 103–109; Machowski J. 1990. The right to freedom of research under the Antarctic Treaty System. –*In*: Polish Polar Research, 11, 3–4,: 419–434.

16. Resource Regimes and Environmental Protection (Part Two). –*In*: The Antarctic Legal Regime (Ch.C. Joyner and S.K. Chopra eds.) 1988,: 129–269; Blay S.K.N. and Piotrowicz R.W. 1991. The Future of Oil and Gas in Antarctica: A Miner's Guide. –*In*: Oil and Gas Law and Taxation Review, 1,: 9–18.

17. Nicholson I.E. 1986. Antarctic Tourism – The Need for a Legal Regime? –*In*: Antarctic Challenge II,: 191–203.

18. Among them the most active were Greenpeace International and the Antarctic and Southern Ocean Coalition (ASOC) formed in 1977 and including more than 165 organizations from 35 countries.

19. The cross-currents within the negotiating group divided its members along various lines: liberal and conservative, claimant and non-claimant, developed and developing countries, conservationist and non-conservationist, potential mining states and non-mining states. For example, the United States conservationist in its approach to living resources, is somewhat divided in respect of minerals under domestic and international environmentalists' pressures. Auburn analysing the relevant documents on US Antarctic policy, observes that „even when one takes into account that the 1975 statement related to resource exploration, the differences between the views of 1965, 1970 and 1975 were substantial and apparently passed unnoticed by the US government. Plant and animal life, was to be protected in 1965; in 1970 this became, the Antarctic environment, and by 1975 any such clause had been omitted". Auburn F.M. 1982. Antarctic Law and Politics. London – Canberra,: 77. France, probably the least environmentalist member of the mineral negotiating group, became on of the authors of the motion on the Protocol on Environmental Protection.

20. Working Papers ATCM XV/WP 2 and 3.

21. Working Papers ATCM XV/WP 2, 3, 4, 7, 8 and 14. For details see: Antarctic Treaty, Final Report of the Fifteenth Antarctic Treaty Consultative Meeting, Paris 9–20.X.1989, pp. 12–17, 43–47 and Annex C and D, pp. 219–267.

22. Rec. XV–1(1989) par. 2 and XV–2(1989).

23. Report of the Chairman of the XIth Antarctic Treaty Special Consultative Meeting (Viña del Mar). –*In*: Final Report of the Sixteenth Antarctic Treaty Consultative Meeting, Bonn 7–18.X.1991, p. 260.

24. Report of the Chairman of the XIth Antarctic Treaty Special Consultative Meeting (Madrid). *In*: *ibid.* p. 261–262.

25. The Guardian, 26.III.1991.

26. Blay and Piotrowicz, *op.cit.* (note 16): 17.

27. Note 1.

28. Rec. XVI–10(1991) Antarctic Protected Area System: Review of the System, Annex.

29. Final Report XVIth ATCM (note 23), p. 11, par. 29 and 30.

30. See 43 SCAR Bulletin, 1973,: 913, also Barnes J.N., Legal Aspects of Environmental Protection in Antarctica. –*In*: The Antarctic Legal Regime, 1988,: 241–268, 243.

31. Rec. VIII–11(1975) Man's Impact on the Environment including the Code of Conduct for Antarctic Expeditions and Station Activities.

32. Benninghoff R. and Bonner N. (eds), Man's Impact on the Antarctic Environment: a Procedure for Evaluating Impacts from Scientific and Logistic Activities, Cambridge: SCAR 1985,: at 32–35 and the table at 46, for a list of activities that should require assessments to be prepared.

33. Rec. XIII–4 and 5(1985) Man's Impact on the Antarctic Environment.

34. Rec. VIII–13(1975) The Antarctic Environment.

35. Rec. IX–5(1977) Man's Impact on the Antarctic Environment.

36. Barnes *op.cit.* (note 30),: 244.

37. ASOC Paper No. 1, ANT SCM/8, Environmental Assessment, 16.IV.1986.

38. ASOC, Background Paper on The French Airfield at Pointe Geologie, Antarctica, 1.III.1985; ASOC, ATCM 13/NGO/2 Legal Aspects Concerning the French Airstrip Construction Programme, 22.IV.1985; ASOC, ATCM 12/NGO/3, Chronology of the Airstrip Issue, 22.IV.1985 and Antarctica Briefing No 9, 30.VII.1986, The French Airstrip – A Breach of Antarctic Treaty Rules?

39. B.C. Parker, M.G. Mudrey, K. Cartwright and L.D. McGinnis, Environmental Appraisal for the Dry Valley Drilling Project, Phases III, IV, V(1973–74, 1974–75, 1975–76 and B.C. Parker, R.V. Howard and F.C.T. Allnut, Summary of Environmental Monitoring Assessment of the DVDP, both *in*: B.C. Parker (ed.) 1978, Environmental Impact in Antarctica, Blacksburg, Va.

40. B.C. Parker, Ross Ice Shelf Project Environmental Impact Statement. – *In*: Parker *op.cit.* (note 39).

41. The NCPs do not know how they are supposed to act, since there is no permanent body to convey them a list of their obligations. For instance, when China decided to establish a base on the Antarctic Peninsula, it was under no obligation to study potential sites or to analyse environmental implications. In result, the construction of the Chinese station involved numerous irregularities and environmental abuses. Barnes, *op.cit.* (note 30), 245.

42. ECO 1984, May, Vol. XXVII No 3,: 2231; ANT 84/IV SCM/5 (NGO5, Rev. 1, 1984) How Might An AEPA Work in a Minerals Regime?

43. Rec. I–VIII(1961) Conservation of Fauna and Flora containing General Rules on conservation of fauna and flora.

44. Notes 12 and 13.

45. Note 5.

46. The first important step toward a comprehensive protection of the Antarctic wilderness was taken at the Second World Conference on National Parks, held in Yellowstone Park, USA in 1972. The implementation of the recommendation passed there on an international Antarctic environmental sanctuary under the auspices of the United Nations, was reiterated in 1982 by the World Park Congress. That idea gained a strong support from the non-governmental movements ASOC and Greenpeace International, the actions of which in Antarctica focussed on the World Park approach.

47. Auburn, *op.cit.* (note 19): 270–273.

48. Auburn, *op.cit.* (note 19): 269, Barnes, *op.cit.* (note 30): 250–251, Hidaka H. and Taksukawa R., 1985, Environmental Pollution of Chlorinated Hydrocarbons around Syowa Station.

49. Barnes, *op.cit.* (note 30): 251.

50. Rec. VIII–11(1975) (note 31), VIII–12(1975) Disposal of Nuclear Waste, XII–4(1983) and XIII–4(1985) Code of Conduct... Waste Disposal.

51. Rec. XV–3(1989) Human Impact on the Antarctic Environment: Waste Disposal.

52. Antarctic Treaty, Final Report of the XVth ATCM (note 21), pp. 18–21 par. 77–88, pp. 48–53 and p. 200 par. 3. 2. 2.

53. Group: 1 – sewage and domestic liquid wastes, 2 – other liquid wastes and chemicals, including fuels and lubricants, 3 – solids to be combusted, 4 – other solid wastes and 5 – radioactive material (Art. 8 par. 1).

54. The plans shall contain: a – programmes for cleaning up existing waste disposal sites and abandoned work sites, b – current, and planned waste management arrangements, including final disposal, c – current and planned arrangements for analysing the environmental effects of waste and waste management, and d – other efforts to minimise any environmental effects of wastes and waste management (Art. 8 par. 2).

55. Auburn *op.cit.* (note 19): 129–138, Vicuña F.O. 1988. The Law of the Sea and the Antarctic Treaty System: New Approaches to Offshore Jurisdiction. – In: The Antarctic Legal Regime,: 97–127.

56. Rec. VIII–10(1975) Antarctic Marine Living Resources, IX–2(1977), XI–2(1981) Antarctic Living Resources (including Interim Guidelines for the Conservation of Antarctic Marine Resources), IX–6(1977), X–7(1977) Oil Contamination of the Antarctic Marine Environment.

57. Art. 234 of the 1982 Law of the Sea Convention provides for special laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone.

58. Vessels engaged in or supporting Antarctic operations must also comply with the relevant provisions on prevention on marine pollution contained in the following conventions: the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, the 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (the STCW Convention), the 1974 International Convention for the Safety of Life at Sea and the 1978 Protocol relating thereto (SOLAS), the 1966 International Convention on Load Lines and 1972 Convention on the International Regulations for Preventing Collisions at Sea (COLGRES).

59. Rec. XV–4(1989) Human Impact on the Antarctic Environment: Prevention, Control and Response to Marine Pollution.

60. Antarctic Treaty Final Report of the XVth ATCM (note 21), pp. 21–22, par. 89–95 and pp. 54–56.

61. Federal Republic of Germany, Final Report of the XVIth ATCM (Bonn, 7–18 October 1991), pp. 19–20, par. 70–72.

62. Rec. XIV–6(1987) Marine Sites of Special Scientific Interest. In 1970 Chile, motivated by political consideration of asserting its jurisdiction in offshore waters within the ATS, made its first of a series of proposals for marine SPAs and SSSI. At the VIIIth ATCM in 1975 it was agreed that the agenda items on „Specially Protected Marine Areas" and „Marine Sites of Special Scientific Intrest" should be deleted, in spite of the SCAR interest in designating such areas and sites.

63. *See* note 6. By 1992 the number of SPAs reached 30, of SSSIs 33, of Marine SSSIs 35 and HSM 59.

64. *See*: Auburn, *op.cit.* (note 19): 273–277; Boczek, *op.cit.* (note 2): 65–101; Wong and Newman *op.cit.* (note 15).

65. Final Report of the XVth ATCM (notes 21 and 60): pp. 25–32, par. 112–143 and pp. 60–88.

66. *See* Machowski *op.cit.* (note 15).

67. Final Report of the XVIth ATCM (note 61): 23–25, par. 84–94.

68. Rec. XVI–10(1991) Antarctic Protected Area System: Review of the System, containing Annex V to the Protocol on Area Protection and Management.

69. Auburn *op.cit.* (note 19): 115–116 and 277–283; Reich R. 1980. The Development of Antarctic Tourism. – *In*: Polar Record 20,: 203–214, Nicholson *op.cit.* (note 17). Between 1966 and 1986 more than 80 tourist sea-voyages have been made to Antarctica, carrying more than than 16 000 fare-paying visitors. Most ships were small (100–200 passengers), although some

larger vessels have also visited. Over the 25 years since the Antarctic Treaty was signed on average probably less than 1000 visitors per year have visited Antarctica, by the mid of 1970s the numbers have been much higher than this, in the 1980s the number of tourist visitors appears to have levelled out.

70. A civil aeroplane crash as part of a round-the-world private trip was reported even at the South Pole, *see*: „The personal note", 1970, *in*: Antarctic, 5(9): 378. The tragic crash of an Air New Zealand DC-10 on the slopes of Mt Erebus on 28.XI.1979 brought the death of all the 257 crew and tourists. Rec. XI-3 (1981) Disaster on Mount Erebus; Rec. XIV–9(1987) Air Safety in Antarctica.

71. Rec. IV–27(1966) Effects of Antarctic Tourism, providing for prior notifications of tourist and non-scientific expeditions and granting of permissions for tourist groups.

72. Rec. VI–7(1970) Effects of Tourists and Non-governmental Expeditions to the Antarctic Treaty Area.

73. Such efforts were undertaken by some individual countries *i.e.* in response to the voyage of *Magga Dan* which in 1968 ran around on a shoal off Ross Island and had to be towed off by the US icebreaker *Westwind*. New Zealand and the United States formulated tourist guidelines; Conditions covering visitors to the Argentine Sector of Antarctica, ANT/33 of 13.VI.1975; Policy Statement on the Role of New Zealand in Tourist Expeditions to Antarctica in: Department of Scientific and Industral Research, Antarctic Operations Manual, 1975.

74. Rec. VII–4(1972) Effects of Tourists *etc.*

75. Rec. VIII–9(1975) Effects of Tourists *etc.*

76. Rec. X–8(1979) Effects of Tourists *etc.* and annexed Statement of Accepted Principles.

77. A Visitor's Introduction To The Antarctic and Its Environment, SCAR, October 1980.

78. Headland R.K. and Keage P.L. 1982. Activities on the King George Island Group, South Shetland Islands, Antarctica. *In*: Polar Record, 22, No 140,: 475–484.

79. Report of the XVII[th] Meeting of SCAR, Leningrad 5–9.VII.1982. –*In*: SCAR Bulletin, January 1983, No 73,: 39.

80. Final Report of the XV[th] ATCM, p. 35, par. 155–158.

81. Rec. XVI–13(1991) Tourism and Non-governmental Activities in the Antarctic Treaty Area and Final Report of the XVI[th] ATCM, pp. 29–30, par. 111–113 and pp. 133–134.

82. Nicholson, *op.cit.* (note 69): 200–202.

83. Final Report of the XVI[th] ATCM, p. 12, par. 33.

84. Watts A.D. 1986, Liability for Activities in Antarctica – Who Pays the Bill to Whom? –*In*: Antarctic Challenge II (note 2): 147–161; Blay and Piotrowicz, *op.cit.* (note 16): 16.

85. Note 14.

86. Convention on International Liability for Damage Caused by Space Objects of 29.XI.1971, opened for signature on 29.III.1972, entered into force on 9.X.1973; 24: 3U.S.T. 2389(1973); T.I.A.S. 7762.

87. In personal dimension into consideration come some 3000 or so residents during the summer season, plus numerous shorter-term visitors, including hundreds of tourists, and a hard core of about 1000 people who over winter. But even such modest scale of activity has occasioned considerable problems of liability on at least one occasion, the tragic Mt Erebus crash (note 70), litigation on which still continues in the United States.

Streszczenie

Artykuł zawiera ogólny przegląd przepisów prawnych oraz praktyk stosowanych w zakresie ochrony środowiska na obszarze Układu Antarktycznego, ze szczególnym uwzględnieniem postanowień madryckiego Protokołu o Ochronie Środowiska z 1991 r. oraz jego aneksów.

Author's residence and mail address:
Jacek MACHOWSKI
Kwiatowa 139
05–120 Legionowo, POLAND