

Proceedings of the Conference on Impact of Acoustics on Marine Organisms, 17 - 19 June 2002, Berlin* - A Preface -

by Ludger Kappen¹

The use of hydro-acoustic instruments is inevitable for many of the scientific investigations in the oceans everywhere in the world and even so in the Antarctic region. Far off the usual traffic and trade lines the Antarctic region is still widely unexplored. According to the Antarctic Treaty the region south of 60 °S is designated to scientific research and the protection of the environment. As Antarctica has the most undisturbed and pristine nature it provides the unique chance of studying naturally functioning ecosystems. The worldwide importance of Antarctica as a control system for the global climate is accepted, as Antarctica reflects superfluous heat by its albedo and because the Antarctic ice is containing an archive of the global climatic development lasting over geological periods of time. Also the circum-Antarctic ocean is unique in the world, as it has a special geological history. It has an unexpectedly rich fauna which still widely remains to be investigated. The marine food-web which includes the whole vertebrate fauna of the Antarctic coasts is most complex and contains several marine species that are threatened elsewhere in the world.

Protecting the existence and abundance of marine organisms may raise conflicts with the other legal demand of investigating the biota and their environment. However, one depends on the other: if we do not know exactly the physical and geographical conditions, the biological diversity and its performance along the time scale, we will not be able to adequately evaluate and protect the biota. It is therefore necessary to support research activities and to extend them over the whole region. Just leaving nature on its own and perhaps only allowing superficial observations may imply possible risks. If the investigation of the ecosystems and their environmental conditions would be inhibited we might not gain experience about the success and reasonability of protection concepts. As nature protection today is based strongly on management concepts it has a great need to define the underlying mechanisms. On the other hand, it is well known that nature functions by means of catastrophic events. Nature protection has to recognise these effects as well. Are we therefore in a dilemma?

It was the aim of this meeting to find a balance between both, the demands for investigation and for protection in the Antarctic region particularly the circum-Antarctic ocean and its vertebrate biota. It is gratefully acknowledged that the Deut-

sche Forschungsgemeinschaft (DFG) has sponsored the participants of the meeting and has provided its conference centre in Berlin. Here DFG president Prof. Dr. Ernst-Ludwig Winnacker welcomed the conference members, and Prof. Dr. Rüdiger Wolfrum chaired the sessions. Experts in audio-biology, in application and construction of hydro-acoustic devices and in nature conservation and protection came together. This conference, recommended to be held by SCAR Germany, was to some extent continuing a discussion which started in Kiel (1998) and in Cambridge (2001) under the auspices of SCAR. Apparently we are still far from a principal solution acceptable to everybody. Moreover, the problem was recognised to be much more complicated because protection of the Antarctic region is implemented under the national legal acts of the expedition leaders. This implies a manifold variety of regulations which particularly in joined international expeditions and research programmes may cause large conflicts. Actions that are considered harmful according to the regulations of one nation might be unobjectionable according to the others'. How to proceed in such conflicting situations without impeding equivalent cooperation of all of the expedition members?

At the moment the strongest discrepancies arise with respect to the marine research activities. The major question was in many cases how can seismic, geomorphological seafloor, and biological investigations be performed by means of hydro-acoustic methods in waters in which marine mammals are present or are expected to be there. Two main questions were coming up:

- (1) what is the reasonable threshold of disturbance of any marine mammal or bird, and
- (2) how could hydro-acoustic methods be constructed and applied with less disturbing effects?

World-wide experts in both questions were invited to this meeting. In particular, the question of disturbance proved to be extremely complex with the consequence that there is a great need for extended research in order to find reasonable criteria that will form a basis for agreed regulations. The complexity does not only result from the great variety of species-specific audio-physiology but also from the varying properties of the water and from ontogenetic and conditionary differences of the individual animals, etc. By contrast, it is realistic to expect that the technical development of the instruments will more easily be able to reduce the disturbing effects. However, in many cases the magnitude and the animal's perception of sounds remains to be better defined, and as a consequence the

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technologists still receive vague and inconsistent requirements.

So far, more questions and problems have been posed and discussed than solutions were generated at this conference. It is an important step forward that these questions have been more precisely formulated at this meeting, so that bio- and geoscientists, technical experts, and nature protection agencies may better appreciate the problems and recognize ways of more effective cooperation. It is clear to everybody that the international adjustment of regulations will only then be feasible if consistent criteria can be presented. Thus far, we have to consider the lack of objective measures instead of political differences. Nevertheless, a code of conduct and a recommendation of minimizing disturbance by novel technology were discussed.

In the following the papers, mainly in the form of extended abstracts, are given nearly in the sequence of their presentation at the meeting during two days, together with a report on the discussions of the papers of each day. In order to digest the results and consequences gained at the conference three *ad hoc* working groups were established on the second day. Within about three hours the following topics were treated in parallel sessions:

- Impacts on marine mammals (WG 1),
- Marine mammal surveillance and detection (WG 2), and
- Proposals for hydro-acoustic methods with minimal impact (WG 3).

The reports of the working groups were given on the third day and are included in the proceedings. Finally, a list of the participants, as far as recorded, is given below.

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