Review of CeDAMar (The Abyssal Plain) proposal:

This is an interesting and timely proposal concerned with assessing biodiversity in a much under-studied environment, namely the abyssal plains. Our knowledge of this ecosystem is limited by its immense size and the difficulties of sampling such an environment, and any efforts to improve our understanding should be welcomed.

Our main concern with the proposal is that although a vast amount of information will be gathered and suitably stored, there appears to be little thought on how it will be analyzed. This cannot be done entirely post-hoc, as the manner in which the data are gathered will affect the analytical possibilities and tools available. Therefore some thought should be given as to the optimal way in which to collect the data.

The questions you ask should affect how the data is collected. For example, one of the long-term outstanding questions is: what is the total diversity of the deep sea? The pioneering work of Grassle and Maciolek (1992) has not really been followed up, nor have the hypotheses generated therein been tested. The proposal would be greatly strengthened if solid, alternative hypotheses could be developed, simulations of the predictions of the alternative hypotheses tested, and the predicted outcome of different sampling strategies examined in order to best utilize sampling resources.

The joint analysis of existing data, combined with the careful development and testing of alternative hypotheses and concomitant predictions is an enormously powerful technique. Such a meta-analysis would be expedited if existing data from well known papers was incorporated into OBIS in a framework that promoted ease of analysis.

The Future of Marine Animal Populations (FMAP) project has proposed a workshop for developing standardized tools for the analysis of biodiversity in under-sampled environments with several CeDAMar reearchers, and hopes to hold this workshop within 6 months. FMAP is developing some preliminary models along these lines, but requires samples of detailed datasets to guide these efforts. If these can be developed, it should be

possible to move forward relatively quickly. Such a hypothesis driven approach also may allow CeDAMar to have a greater chance of obtaining external funding along these lines, and allow for the considered integration of data collection, storage, and analysis.

In terms of budgetary allocation, the outreach budget seems fairly small given the ambitions outlined and the necessity of informing members of the public of this work; perhaps a greater amount should be alloted in order to maximize such efforts.

Overall, this is an interesting proposal to examine an environment about which our knowledge is sorely lacking. The planning and coordination of cruises, funding sources, and resources seems well thought through and appropriate; the results will certainly be very fruitful; we look forward to the new discoveries!

Review of COMARGE (Continental margin) proposal:

This proposal is very well constructed with considerable thought given to collecting and storing data in order to understand continental margin biodiversity, a highly important marine ecosystem. However, beyond this, it lacks a focused theme, other than to collect data for understanding biodiversity.

For example, common macroecological patterns such as range-size, abundance, latitudinal distributions, relative species abundances etc. are all relatively easy to explore given appropriate data, and such themes could form a more comprehensive and focused study than simply looking at species richness and its drivers. Although species richness is a very important component of biodiversity, it is not the only one, and considering some of the other aspects (such as??) would utilize resources more fully and provide a greater breadth of understanding as to the processes that make continental margins unique ecosystems.

In order to answer such questions, considerable thought must be given to the manner in which samples are collected for analysis; this would mean generating alternative hypotheses for patterns of distribution and biodiversity prior to collecting samples, and then using these hypotheses (along with simulated outcomes) to guide sampling so as to effectively be able to be able to accept or refute these hypotheses. Again, some work here could provide considerable pay-off in terms of maximizing resource usage and being able to collect data in such a way as to be able to effectively answer the questions of interest.

Combining newly gathered data with existing data in a meta-analytic framework would be a powerful tool for enhancing our understanding of these environments. The COMARGE database described in the proposal would seem a good opportunity to integrate existing and newly-collected data in a standardized format for ease of analysis; we recommend this use of ‘old’ and ‘new’ data in a consistent manner be emphasized, as

data that has been collected but is awkward to analyze or access represents an inefficient use of use of resources.

The budget is well thought through and feasible, with a considerable (and appropriate) amount dedicated to outreach.

Overall, this seems like a very reasonable proposal with considerable care and attention given to the procedures necessary to ensure that the project will be a success. Such detail can only be applauded, and with a slight change of focus we feel that this proposal has every chance of adding significantly to our knowledge of continental margins.

Review of ARCOD renewal proposal

This is a strong proposal concerning an important topic. The Arctic Ocean is probably among the most quickly changing bodies of water in the world, and to establish a biodiversity baseline against which change can be measured is supremely important. As is pointed out, the trend is to fund process-oriented studies that largely ignore the biodiversity component. However, it is clear that the data gaps are daunting, as is the lack of general synthesis that stems from the natural history focus that is traditional in Arctic science. This situation is partly due to the fact that the Arctic Ocean, like the deep sea, is so poorly explored that the gathering of primary information on species occurrence and distribution is (still) key. There is a profound sense of discovery associated with this project, which has also been communicated to the public through the team's excellent outreach efforts. The PIs of ARCOD are very well positioned to guide this endeavor further along and bring it to fruition. They are also trying to integrate diverse data sources in order to compile the most comprehensive picture of arctic biodiversity yet produced. This involves merging of North American and Russian databases, which we see as the potentially most important legacy of this project. If successful, this will allow us the see the arctic ecosystem in its entirety for the first time (as opposed just to the western hemisphere). FMAP is particularly interested in the goal to use this synthetic information in order to reveal ocean-wide biodiversity patterns in the arctic, along with their environmental drivers and correlates. The ARCOD team could be more specific in how they are planning to integrate these diverse data and which synthetic questions and hypotheses they attempt to address. Clearly the response to changing SST fields and the impact of sea ice loss on species distribution and primary productivity need to be addressed in some way. The synthetic capacity in ARCOD seems at this point limited, and building strong liaisons with FMAP and HMAP is encouraged. The ongoing data collection and its integration in a complete database should go hand in hand. Having said that - the future field components of ARCOD remain a bit vague. What are the habitats that are going to be sampled and how do they fit within the general matrix of well-

sampled versus under-sampled habitats? Is there a strategy for integrating these with existing data?

The budget seems modest enough and appropriate. Little detail is provided on the exact tasks that will be tackled by new ARCOD member Huettmann.

The outreach component has so far been excellent and has provided much added visibility for the Census. We would encourage the ARCOD team to build on these existing efforts and to remain as publicly visible as they have been in the past few years.

In summary we congratulate the ARCOD team to their exciting project and look forward to work closer with them in the future.