Cruise Reports – Guidelines for Authors

Cruise reports are published promptly after the conclusion of a cruise and serve as working papers for the group of persons concerned with the relevant cruise and interested researchers, as well as reports for the funding institutions. The cruise leader is responsible for preparing the reports.

No later than 2 months after the conclusion of a cruise, the cruise leader will submit the complete manuscript as a PDF file to the GPF office via the e-mail address gpf@dfg.de or will inform the GPF office that the cruise report can be downloaded from the relevant link. In order to ensure that reports take a standardised form, the authors are requested to observe the instructions compiled below when drawing up the report. Examples can be viewed at **https://www.pangaea.de/expeditions/**.

GENERAL INSTRUCTIONS

The CRUISE REPORTS must be prepared in **English**.

The total length of Chapters 3 to 6 should be a maximum of 40 pages.

Page format: DIN A4

Page margins: Inside: 25 mm, Outside: 20 mm, Top: 25 mm, Bottom: 20 mm.

Text: TIMES NEW ROMAN, 12 pt., line spacing 16 pt., justified, indent paragraphs left 0.5 cm (from the second paragraph after a heading)

Header: TIMES NEW ROMAN, *italics* 10 pt., align page numbers to outside, alternately right and left.

Example:

METEOR-Berichte, Cruise MXX, Leg Y, St. John's-Bergen, May 13 – June 06, 2012 2

Headings: TIMES NEW ROMAN, 12 pt., bold, initial caps (exceptions: words with fewer than three letters), set tab stop for start of text after chapter number at 20 mm. Authors in brackets under the heading, TIMES NEW ROMAN, 12 pt, indented 20 mm. Heading and author line each with 6 pt. spacing after line.

Example:

4.4.6.3 Particle Flux Measurements with Moored Particle Traps

(A. Schmidt, B. Meyer, C. Neumann, D. Scholz)

Particle flux measurements at the ESTOC (European Station for Time-series in the Ocean, Canary Islands) carried out since fall 1888 show ...

Figures: Figures should be numbered sequentially in the individual chapters. Similar to the approach for page numbering, they should be preceded in each case by the number of the chapter, for example Fig. 2.3 for the third figure in the second chapter. When labelling the figures, legibility on the black-and-white printout should be taken into account.

Tables: Like figures, tables should also be numbered sequentially in the individual chapters, for example Table 3.5 for the fifth table in the third chapter.

Captions for figures/table headings: TIMES NEW ROMAN, 10 pt., line spacing 14 pt., justified, set tab stop for start of text after chapter number and indent for following lines at 20 mm.

Example:

Fig. 3.1 Track chart of RV SONNE Cruise SO262. Bathymetry from Smith (2014). Six main working areas (Pacific Ocean and Working Areas A-E).

Please set **name of vessel** in capitals (RV SONNE), likewise registered names of measuring instruments (e.g. PARASOUND).

Specify **latitudes and longitudes, pH values, units of length and distance,** etc. using the English decimal notation.

STRUCTURE:

Cover sheet contains (in Arial 14, centred throughout):

- SONNE or METEOR or MARIA S.MERIAN or ALKOR or ELISABETH MANN BORGESE or HEINCKE-Berichte
- Title (in English, in bold, italic)
- Cruise No. (Cruise No. M, MSM, SO, EMB, AL or HEXX/Leg)
- Four blank lines
- Departure and return dates, departure and return ports (below each other)
- ACRONYM (identifier according to proposal)

  Example:

June 09 – June 22, 2012

Reykjavik (Iceland) – Bremerhaven (Germany)

ICEAGE

- Logo (in English)
- Authors (e.g. J Smith), bold
- Chief Scientist
- Institution
- Publication year

Table of Contents

1 Summary

English and German summary of the cruise (maximum total length one page).

2 Participants

2.1 List of the **principal investigators** including academic title and short name of 'home' institution.
2.2 List of the **cruise participants** including their name and academic title, specialisation and short name of 'home' institution. 2.3 List of the **participating institutions**.

3 Research Programme

Initial hypothesis and aims of the cruise. These requirements are not mandatory in relation to complexity of the hypothesis and aims for AL, POS, HE and EMB reports.

3.1 Description of the Work Area
3.2 Aims of the Cruise
3.2 Agenda of the Cruise

- Detailed station map showing the main working areas and the route of the cruise
- Development of the work carried out including deviations from the original work schedule, problems with technical implementation, any scientific or technical failures
- Explain what measures were taken to ensure responsible marine research and if applicable mitigation measures

4 Narrative of the Cruise

The precise daily sequence of the cruise is described here. The section should be written as continuous text (Examples are provided in **Appendix 1**).

5 Preliminary Results

In this section, the samples and data obtained on board during the cruise, initial scientific results of all working groups and planned further data analysis are briefly described. Where possible, a brief insight should be provided into the **expected results** after processing of the data and samples. The number of figures should be limited; detailed core descriptions of all sediment cores obtained and the logs of ROV dives should be summarised in an appendix.

6 Ship's Meteorological Station

Report of the on-board meteorological station about meteorological conditions during the cruise, where there is a meteorological station on the vessel.

7 Station List

Permissible **syntax** based on the DShip:

X…X	Vessel name identifier
n…n	Cruise number
/	Slash between cruise number and leg of cruise (a full stop is permitted as an alternative as the / is not possible in Unix data systems)
m…m	Number of cruise leg
_	Underscore to separate cruise, cruise leg and station or action
s…s	Station number
-	Separating character
r….r	Device use number

Examples: SO266/1_101-1 or SO266_101-1

Please observe the correct **acronyms**:

SONNE = SO

METEOR = M

MARIA S. MERIAN = MSM

ELISABETH MANN BORGESE = EMB

ALKOR = AL

HEINCKE = HE

Station list: The official ship station numbering must be used. This can be accompanied by your own institute's station numbering (e.g. GeoB numbers). Depending on requirements, other lists can be appended with keys to the abbreviations used. Degrees of longitude and latitude are to be stated using English decimal notation.

Example:

Station SONNE	Institute Identification	Device/ Gear	Date	Time	Latitude	Longitude	max. p [db]	Comment/ measurements
SO266/15-1	GeoB 13501-1	001	25.10.18	22:02	17° 04.17’N	24°51.16’W		CTD test station

Or

Station SO266	Institute Identification	Device/ Gear	Date	Time	Latitude	Longitude	max. p [db]	Comment/measurements
15-1	GeoB 13501-1	001	25.10.18	22:02	17° 04.17’N	24°51.16’W		CTD test station

8 Data and Sample Storage and Availability

Enter detailed information about the initial processing of the data and samples and the long-term destination of the data and samples here. Please name the place of storage and long-term data warehousing, the expected date of open access for other researchers, and the contact persons.

Example 1:

Biochemistry – samples and data are held at the Association for Marine Science in…

(responsible Dr…..) and at the University …. (responsible Dr.....). Samples are being analysed by a postgraduate student under the supervision of Dr. …

Example 2:

Table 8.1 Overview of data availability

Data Type	Database	Available	Open Access	Contact Person: Name, Inst. E-mail
hydrography		Date	Date	E-mail
raw data CTD, ADCP	PANGAEA	Jan. 2013	June 2014	

9 Acknowledgements

Thanks, acknowledgement of funding institutions, funding numbers, etc.

10 References

Bibliography: The formatting of the bibliography should be based on the format of “Deep Sea Research”. Paragraph formatting: hanging indent (0.5 cm), no blank line between the literature entries.

Examples:

Journal：

Smith, K.L., Ruhl, H.A., Kaufmann, R.S., Kahru, M., 2008. Tracing abyssal food supply back to upper-ocean processes over a 17-year time series in the northeast Pacific. Limnology and Oceanography 53, 2655-2667.

Book：

Sargent, J.R., 1976. The structure, metabolism and function of lipids in marine organisms. In: Malins, D.C., Sargent, J.R. (Eds.), Biochemical and Biophysical Perspectives in Marine Biology. Academic Press, London, pp. 149-212.

APPENDIX

Appendix 1

Examples for Narrative of the Cruise

Example 1 (M80/3, Thor Hansteen):

The final preparations for cruise M80/3 were carried out onboard the RV METEOR in the harbour of Dakar (Senegal). Ten scientists boarded the ship on 25 December and began the mobilisation of the remotely operated vehicle (ROV) KIEL 6000. A reception and ship's tour were held for the German ambassador in Senegal and other members of the embassy on 27 December. On 28 December the remaining scientists boarded the ship and started preparations in the laboratories on the following day.

The RV METEOR departed from Dakar on the evening of 29 December and began her transit to the first working area at Senghor Seamount in the northeast of the Cape Verde Archipelago. The scientists used the transit time to finish lab preparations and set up equipment. Scientific work began on 31 December with the recovery of two gravity cores to the northeast and northwest of Senghor Seamount. During the following hydroacoustic mapping in the night to 1 January, the ship's crew arranged an appropriate New Year celebration. The 2010 year began with another three gravity cores and two dredge hauls at Senghor Seamount followed by PARASOUND mapping to reveal the nature of its summit plateau.

The ROV KIEL 6000 was deployed on 2 January for the first time during the cruise to explore an area of Senghor's southwestern flank. The deployment, including coordination, operation and recovery, worked well; the dive was successful but had to be shortened for technical reasons. As the local weather conditions were rapidly getting worse, it was decided not to spend any more time at Senghor Seamount but to proceed to Cabo Verde Seamount 200 km further south. The next day the ROV dived for 9 hours within a collapse scar and crater-like depression to investigate the interior of this seamount, which is thought to be very old. The dive was very successful and the recovery of samples, even large samples, at any place exceeded the expectations. During the following 1 ½ days Cabo Verde Seamount was further sampled by three dredge hauls, three gravity cores were recovered in its vicinity, and bathymetric data were completed, before the RV METEOR headed for Maio Seamount.

The work at Maio Seamount began on 5 January with detailed hydroacoustic mapping of this hitherto unmapped and unsampled edifice. Immediately after mapping, a detailed digital map could be produced and three dredge localities were selected. The dredge hauls yielded many corals but no rocks, suggesting that Maio Seamount is a relatively old edifice. Similar work was carried out at the nearby Maio Ridge to the west, a subsided island for which bathymetric data and samples were lacking until now. After successful mapping and three dredge hauls the RV METEOR headed further west on 7 January. Three gravity cores were taken south of Santiago and Fogo islands, and Cadamosto Seamount southwest of the Fogo-Brava platform was mapped.

The next two ROV dives were carried out at Cadamosto Seamount on 8 and 9 January. Because of favourable weather conditions with the RV METEOR operating on the lee side of Fogo and Brava, the sea was relatively calm. The very successful dives lasted for 11 hours each and yielded a number of rock and coral samples from the summit region of Cadamosto. The ROV explored a number of apparently young lava flows, three steep crater rims, the bottom of one of these craters, and a recent volcanic vent. The work at Cadamosto was concluded with two dredge hauls at two volcanic cones on its northeastern flank that yielded some fresh volcanic rocks. During the next four days a total of 12 gravity cores were recovered around Brava and progressively farther north towards the central area of the archipelago. PARASOUND profiles in the southern parts of the archipelago revealed young faults with vertical displacements of up to 80 m, showing the importance of recent vertical tectonics for the regional geological evolution. On 14 January the RV METEOR reached the Charles Darwin volcano field southwest of Santo Antão. The first ROV dive to about 3400 m depth revealed some technical problems, which were fixed during the following day. The work programme was accordingly changed in order to recover two gravity cores west of the volcano field followed by multibeam mapping. During the next five days, four successful ROV dives were carried out at the volcano field at depths up to 3800 m, yielding a large number of samples and spectacular imagery of volcanic structures and colonization of deep seamounts by corals and sponges. The work was supplemented by six dredge hauls, multibeam mapping and some PARASOUND profiles in this area. On 16 January, Nola Seamount northwest of Santo Antão featuring two shallow plateaus was mapped in detail, and in the evening the "Bergfest" (mid-cruise celebration) was held during hydroacoustic mapping.

On the evening of 19 January, RV METEOR headed towards Sodade Seamount west of Santo Antão, which had been discovered some days earlier through hydroacoustic surveys. After carrying out more detailed mapping, the seamount was successfully sampled by four dredge hauls and explored by a long ROV dive during the following day. Two gravity cores were recovered west of Santo Antão on 21 January, and the volcanic area around Sodade Seamount was mapped before the ship went on to Nola Seamount. In spite of temporary winch problems, two dredge hauls at Nola were recovered in the night of 22 January, followed by completion of the local bathymetric mapping. The next day began with a ROV dive at Nola, which was interrupted soon after deployment by a complete power failure of the ROV. Whilst the vehicle was drifting upward by its own buoyancy, the skilled ROV team assisted by the ship's WTD team managed to repair the high-voltage power supply. The dive could be continued and yielded excellent imagery and samples from a part of Nola Seamount. In the evening two successful dredge hauls were carried out, before the RV METEOR headed for the next gravity-core station.

Between 23 and 25 January, seven gravity cores were recovered north of the Northern Cape Verde chain and close to Santo Antão. Because of successful and time-efficient coring, time was available for two more ROV dives at the Charles Darwin volcano field and at Nola Seamount on 25 and 26 January, respectively. The night between the two dives was used for three dredge hauls at Nola Seamount. On the morning of 26 January the RV METEOR began her transit to Las Palmas de Gran Canaria, briefly interrupted on 28 January in order to carry out a deep-sea diving test of the ROV to about 5200 m water depth.

The RV METEOR arrived at the port of Las Palmas on the morning of 1 February, having successfully completed cruise M80/3.

Example 2 (M84/2 Bohrmann):

On Saturday 26 February 2011 at 1 p.m. local time, RV METEOR left her location situated on Ahirkapi roads south of the Golden Horn of Istanbul and reached the Black Sea after crossing the Bosporus. During the night we also reached the first working area at Eregli, and we started to record the data from the multi-beam EM122 and the Parasound systems. Thanks to scientific information from previous cruises we were able to find acoustic anomalies in the water column very fast with the Parasound, which showed us strong emissions of free gas into the water column. During the second week of our cruise, we first of all investigated methane emissions in the western working area of the Turkish sector. If free methane escapes from the seafloor deeper than 750 m water depth, the emission of gas is always associated with the occurrence of methane hydrate in the sediments.

The 750 m water depth at 9°C marks the upper stability boundary for methane hydrate of structure I within the Black Sea. Earlier samplings proved methane hydrates down in the sediment to about 3-4 m below seafloor, and with the portable drilling system MeBo we can penetrate the sediments even deeper in order to understand the methane hydrate distribution there also. The acoustic systems of RV METEOR, the multibeam echo sounders EM122 and EM710 and the Parasound system were the most important tools we deployed during our search for occurences of methane hydrate. Drilling with MeBo at Eregli Seep showed only a drilling result of a few meters, but at least it sampled young sediments of the classic Black Sea sequence which we could not have sampled with the gravity corer in this area with considerably higher sedimentation rates. We saved further drillings in this area for our way back to Istanbul.

The further course of the expedition followed the Turkish Black Sea coast to the east into the next working area near the city of Samsun. The side trip was only short, and our course led us to the Georgian continental margin – our main work area. The third working week was entirely dedicated to the investigation of gas hydrates off Georgia, and we wanted to investigate the seepage areas of Batumi seep and Pechori Mound, previously the subject of thorough preliminary investigations, in depth by means of MeBo drillings. On Saturday evening we started the drilling at Pechori Mound. Pechori Mound is an active, seep structure of relatively large dimensions overtopping the seafloor by several tens of meters. We were able to core a sediment sequence of about 20 m, predominantly yielding massive gas hydrates. The thickness of the gas hydrate layers in particular was surprising. During the following nights we mainly performed profiles with the ship's own acoustic systems where we repeatedly measured the gas seeps that were already known to us in order to understand the time variability of the gas emissions. On the Monday night we investigated a previously unknown area at Kulevi Ridge, and there we also detected massive gas flares in the water column whose emissions almost reached the water surface. On this occasion we learned to combine the single beams of the echo sounder EM122, which are shown very frequently due to the narrow overlapping of the water column, and to assemble them into a 3-D-illustration to a very realistic image of the single gas plumes in the water column. Much to our surprise we could now see that the upper ends of the gas plumes are clearly influenced by the flow conditions in the water. This might explain why in the 2-D profiles view the gas plumes are normally cut off at the upper end. The finding that this is not true, but that the gas definitely migrates towards the water surface, is significant.

On Thursday 3 March we started MeBo drillings at Batumi Seep, our most important seep area. During a 20-hour deployment we could only proceed very slowly as the soft sediments of the Black Sea resulted in MeBo sinking in considerably, and therefore the motors of the drill rig constantly had to be cooled before continuing the drilling. Up to a drill depth of 10 m we were able to drill plenty of gas hydrates, which are very valuable for our scientific examination in Bremen. Unfortunately, due to damage at the drill rig we had to cease our drilling activities for this cruise.

The start of the fourth week of the cruise was concerned with an intensive sampling programme at the different seep locations in Georgia. On this occasion the dynamic autoclave piston corer (DAPC) could be deployed for the first time during the cruise to sample the upper 250 cm of the sediments. Besides the sediments, gases and gas hydrates were also sampled under in-situ pressure of the seafloor in the pressure-tight autoclave. While the gas fractions get lost in large part during the normal sampling using the gravity corer and the gas hydrates decompose because of the pressure reduction during heaving, the gases and gas hydrates in the autoclave survive and allow a quantitative determination.

We had discovered these new seeps by their oil slicks shown in satellite imaging. The hydro-acoustic measurements of these oil seeps showed that they are connected to gas emissions, and the sampling proved that gas hydrates can be encountered near the seafloor. After this intensive deployment of our devices we left the working area in Georgia on Tuesday and arrived at the Samsun working area in Turkey after a 7-hour transit. Several areas with a higher backscatter signal on the seafloor at 1,200-1,400 m water depth were known from former expeditions here also, and we had the suspicion that these were also gas emissions on the seafloor. Here again we used the EM122 and tried to compare the backscatter pattern measured with the deep-towed Sidescan Sonar with the backscatter images of the EM122 mapping. We were surprised to find identical figures of structures in the areas of the overlapping measurements, which caused us to map the entire ridge during the first night. We found that we were able to trace 22 areas with higher backscatter signals along the approx. 25 km ridge, half of the patches showing active gas emissions to the water column.

A sampling programme with the gravity corer on five of these patches with higher backscatter proved that gas hydrate was abundant everywhere so that we could clearly document the rise of gas from the underground. The gas emissions seem to follow a tectonic line. As the ridge was unnamed to date, and we intend to publish our investigations, we agreed with our Turkish colleagues on board to name this ridge “Ordu Ridge”. The ridge can be clearly separated morphologically and is situated in a south/north prolongation of the provincial town Ordu, so that we think we have found a suitable name for the subject matter of our investigation.

On Thursday 17 March 17, RV METEOR entered the port of Trabzon in order to embark part of the scientific crew and also the expedition equipment on Thursday and Friday. On Saturday we moved back to the Samsun working area where we will carry out our final investigations. During week 5 of our cruise we completed the work in the Turkish working area of Samsun. The transit to Ukraine working area was exhausting as the METEOR could proceed only very slowly with strong winds of around Beaufort 8. In the Ukraine our first destination was a strong gas emission site in a water depth of 900 m which is well-known by the name Kerch Flare. This time the sampling of a sediment core rich in gas hydrate succeeded at once, as we could locate the emissions more exactly. An extensive sampling programme was carried out by Thursday evening. We used the night as well as the whole of Friday for mapping on the continental slopes of Kerch deep sea fan, development of the mountains as well as the Crimean Peninsula. These showed how, depending on the landward side, the continental ridge shows completely different morphologies.

On Sunday we had already visited the two mud volcanoes Dvurechenskii MV and Helgoland MV and had recorded gas activity by acoustic analyses as well as sampling sediments of the mud volcanoes. We wanted to continue this work the next day. But meanwhile our little post-processing group on board had completely processed the multibeam echo sounder data measured along the Ukrainian continental slope thus far, and we took time to admire the amazing maps. Unfortunately, though, there were several blanks in the data due to lack of time which we would rather have liked to fill in by reproduced measurements.

Furthermore, we found a couple of gaps in the backscatter intensity maps which we wanted to fill with further measurements. We therefore quickly decided to plan a further measuring day in the area of Kerch Fan in order to substantiate the pressing questions with further data. So far, we had left out an area in the North on the Ukrainian Shelf, which had been restricted for us because of military exercises for several days from 7:30 a.m. until 11:30 p.m. We had hoped now to have another chance to measure those parts of the shelf during this new measurement. But on Monday morning the vessel received another message which prevented us from doing so. We had to divert once again. But in the end we were able to fill in the gaps during the measurements on the upper continental slope, and so we could achieve a complete detailed image from this extremely interesting slope morphology giving us an important insight into the geological processes. We were astonished at the highly detailed structures which are characterised by down-slope transport. The overlaying areas with high backscatter intensity turned out to be areas with stronger gas emissions which strengthen our work hypothesis of quantifying these emissions.

On our route back to the west to the two mud volcanoes, we crossed numerous mud volcanoes among which the Tbilisi MV, the Odessa MV, Vodianitskii MV as well as the NIOZ mud volcano clearly showed activities in the form of flares. The Dvurechenskii mud volcano now also showed a definite gas flare in its centre. The mud volcanoes of the Sorokin Trough in general are related to the zone of diapirs formed by the Maikop Formation in the underground. In the cap area of the mud diapirs, usually due to the higher gas pressure, break-throughs of relatively liquid and gas-bearing mud appear, channelling upwards along discontinuities and developing cone-like structures where they escape the seafloor, which we consider to be actual mud volcanoes. The Sogokin Trough itself is characterised by crustal compression which supports the diapir-like uplifting of the mud formation and which had been shaped in the course of the Caucasus Mountain’s development.

Back to the two mud volcanoes, the Dvurechenskii and the Helgoland MV, it turned out that both were active whereas two days previous the Dvurechenskii had seemed to be in a dormant phase. However, a precise analysis of echo sounder data taken two days previously showed that the Dvurechenskii MV had already been active, but that we could not see this in the proximate profile the vessel. An 18-hour long sampling programme followed, mainly at Helgoland mud volcano, and we were able to take extremely interesting sediment cores. One gravity core was very near the conduit of the mud volcano where we measured temperatures of about 20°C and we could directly sample fluids rising from a great depth. The extremely high ammonium concentrations of the pore waters are an indication of special diagenesis conditions occurring at greater depth. Ten meters beneath, we were able to sample gas hydrates with a gravity corer, i.e. the temperature there is already lower than 16°C. Still a little deeper, in the area of the edge of the inner volcano structure we even measured 9°C corresponding to the normal bottom water temperature in the deep Black Sea. After further measurements at Ukraine and in Turkey we finished our station and profile work of this cruise on Friday, 1 April at 10:37 a.m.

The cruise finished on Saturday 2 April, when RV METEOR completed her passage through the Bosporus and berthed at Haydarpasa (berth 13) at 7.12 p.m. This was around one day later than planned, because of the thick fog in the channel which severely restricted passage. Like many other ships, RV METEOR was forced to wait at the entrance to the channel.

Appendix 2

Guidelines for the Transfer and Storage of Zoological Material Collected on Cruises with the Research Vessels

Researchers on board the Research Vessels collect zoological material with the support of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) and other public funding organisations. Given the high costs arising from collecting material on research vessels and the value of the finds for science, it is necessary to ensure that the materials remain generally accessible. In the long term, this is only possible in research museums. For this reason, materials are merely held in trust by collectors (who can also be the persons who process the objects). The German Centre for Marine Biodiversity (DZMB) was established in line with the recommendation of the German Council of Science and Humanities as a department of the Senckenberg Research Institute to strengthen taxonomic and systematic research on marine organisms in Germany. One of the tasks of the DZMB is to regulate the documentation, archiving and location of the samples taken on cruises of German research vessels.

The following guidelines are intended to serve both the interests of the persons processing the material and its museum conservation.

I. The materials archive

As a service institution for German marine research, the DZMB is responsible for managing the materials archive, and forms the link between the collector, the staff performing the taxonomic processing and the ultimate repositories. The DZMB operates an appropriate database for this purpose. Coordinators, cruise leaders and other researchers on cruises during which zoological material is collected are under an obligation to collaborate with the materials archive.

1. After each cruise during which zoological material was collected, the archive receives a notification about the type of samples collected and the responsible researchers. The respective cruise leaders are responsible for this information flow by communicating the cruise programme and the cruise report.
2. The archive gathers specific types of information about the materials in a questionnaire (e.g. scope, conservation, initial processor, nature of initial processing, special requests from the initial processor). It archives the information and makes it available to interested parties.
3. The materials archive publishes an information sheet for this purpose and forwards requests from subsequent processors to collectors and initial processors. It accepts materials requests in relation to future cruises and forwards them on.
4. If required, the materials archive can make an on-board biologist available to German cruises for the initial processing and documentation of the material on board.
5. The materials archive, in consultation with the ultimate repository, aims to ensure that the material – wherever possible – is processed within a reasonable period. It is provided with updates about subsequent processing, the results of which are made known to the collector, the initial processor, and the DFG. The ultimate repositories are under an

obligation to collaborate with the materials archive to that end.

6. The collector is under an obligation to send remaining samples of scientific interest to the materials archive. The DZMB makes storage rooms available for this purpose.
7. The address of the materials archive is: Deutsches Zentrum für Marine Biodiversitätsforschung, Forschungsinstitut und Naturmuseum Senckenberg, Südstrand 44, D-26382 Wilhelmshaven. E-mail: pmartinez@senckenberg.de
8. The website of the materials archive is: www.material-archiv.de

II. Ultimate repositories

1. The only potential ultimate repositories are German research museums that can guarantee the long-term infrastructure necessary for storage and care of the materials.
2. For the various groups of animals, preference should be given to those museums that make a staff member available for processing. The museums impose an obligation on such staff members to collaborate with the materials archive and to inform it about results. An updated list of the responsible ultimate repositories can be found on the website of the materials archive.
3. Where there is good cause, the materials archive can make a new determination on the storage location after consulting with the ultimate repository concerned. This should not happen on a routine basis due to short-term changes. Good cause would be, e.g., the establishment of a position for a researcher who assumes responsibility for a group of animals not previously processed at one of the museums.

List of museums acting as ultimate repository

If two museums are listed for a group of animals, this means that the first-named museum has the lead role.

Radiolaria	Senckenberg
Foraminifera	Senckenberg
Tintinnoidea	Kiel
Porifera	Senckenberg, Hamburg
Hydrozoa	Munich, Hamburg
Scyphozoa, Actinaria, Zoantharia	Hamburg, Senckenberg
Madreporaria	Stralsund, Hamburg
Octocorallia	Stralsund, Senckenberg
Ctenophora	Hamburg
Bryozoa	Senckenberg
Brachiopoda, Phoronida	Berlin
Chaetognatha	Hamburg
Tardigrada	Hamburg
Polychaeta	Hamburg, Senckenberg
Oligochaeta	Hamburg
Nematoda	Senckenberg

Kinorhyncha	Berlin
Loricifera	Senckenberg, Berlin
Priapulida	Senckenberg
Rotifera	Hamburg
Gastrotricha	Berlin
Plathelminthes, Gnathostomulida	Hamburg
Nemertini	Hamburg
Sipunculida, Echiurida	Senckenberg, Hamburg
Aplacophora	Munich, Hamburg
Polyplacophora	Munich, Senckenberg
Gastropoda	Munich, Senckenberg, Hamburg
Bivalvia	Senckenberg, Munich, Hamburg, Stralsund
Scaphopoda	Senckenberg
Cephalopoda	Hamburg
Pantopoda	Munich
Acari	Hamburg
Tardigrada	Hamburg
Harpacticoidea (+ other benth. Copepods)	Senckenberg
Calanoida (+ other plank. Copepods)	Hamburg
Siphonostomatoida (+ parasit. Copepods)	Senckenberg
other Copepods	Senckenberg
Ostracoda	Hamburg, Senckenberg
Cirripedia	Kiel
Ascothoracida	Kiel
Tantulocarida	Senckenberg
Leptostraca	Senckenberg
Mysidacea	Hamburg
Euphausiacea	Senckenberg, Hamburg
Decapoda, Stomatopoda	Senckenberg, Munich
Tanaidacea	Hamburg, Berlin
Cumacea	Hamburg
Isopoda	Hamburg, Senckenberg
Amphipoda	Hamburg, Berlin
Insecta	Senckenberg
Echinodermata	Munich, Hamburg
Tunicata	Hamburg
Pisces: Atlantic	Hamburg, Stralsund
Pisces: Indo-Pacific and Mediterranean	Senckenberg
Reptilia	Senckenberg
Mammalia	Stralsund

Addresses:

- Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt a.M.
- Zoological Institute and Zoological Museum, Martin-Luther-King-Platz 3, 20146 Hamburg

- Zoological Museum Kiel, Hegewischstr. 3, 24105 Kiel
- Bavarian State Collection of Zoology, Münchhausenstr. 21, 81247 Munich
- German Oceanographic Museum, Katharinenberg 14-20, 18439 Stralsund
- Museum of Natural History, Invalidenstrasse 43, 10099 Berlin