

NOTIFICATION OF PROPOSED RESEARCH CRUISE

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GENERAL

Part A

01. Name of research ship: **M E T E O R** Cruise No. **M 82/1**
02. Dates of cruise **from July 2nd Reykjavik to August 02nd 2010 St. John's**
03. Operating Authority **Institut für Meereskunde / University of Hamburg**
Bundesstr. 53, D-20146 Hamburg, Germany
Tel.: +49-40-42838-3974 - Fax: +49-40-42838-46 44
04. Owner (if different from para 3) **Federal Ministry of Education and Research**
05. Particulars of ship:
- | | |
|-----------------|------------------------|
| Name | METEOR |
| Nationality | German |
| Overall length | 97,5 metres |
| Maximum draught | 5,6 metres |
| Nett tonnage | 1284.0 NRT |
| Propulsion | Diesel Electric |
| Call sign | D B B H |
06. Crew
- | | |
|----------------|----------------------|
| Name of master | T. Wunderlich |
| No. of crew | max. 34 |
07. Scientific personnel:
- | | |
|---|-------------------------------------|
| Name and address of scientist in charge | Prof. Dr. Detlef Quadfasel |
| Tel./Fax/ | Bundesstr. 53, 20146 Hamburg |
| | +49 (40) 42838-5756 |
| | +49 (40) 42838-7477 |
| E-Mail | detlef.quadfasel@zmaw.de |
| No. of scientists | max. 30 |
08. Geographical areas in which ship will operate (with reference in latitude and longitude)
- a) Labrador Sea 45 - 60 N, 40 - 60 W**
- b) East Greenland Continental Slope, Denmark Strait 56 - 68 N, 20 - 50 W**
09. Brief description of purpose of cruise
- The physical oceanographic work during this cruise is aimed at quantifying the strength of the Atlantic Overturning Circulation, an important part of the global ocean circulation. The work comprises the recovery and re-deployment of autonomous instrumentation (floats, moorings) and shipboard observations of meteorological and physical oceanographic parameters in the water column (temperature, salinity, oxygen, currents, sound velocity). The work is funded by the European Commission (project THOR) and by the German Ministry of Science.**
10. Dates and names of intended ports of call
- Three days within 30. June – 5. July 2010 (planned: 1. – 3. July 2010), Reykjavik, Iceland**
11. Any special logistic requirements at ports of call
- Normal cargo handling, exchange of scientific crew, bunkering.**

DETAIL

Part B

01. Name of research ship **METEOR** Cruise No. **M 82/1**
02. Dates of cruise **from July 2nd Reykjavik to August 02nd 2010, St. Johns**
03. Purpose of research and general operational methods

Long term study of the Meridional Overturning Circulation in the North Atlantic, in particular the spill-over of dense water from the Nordic Seas through Denmark Strait and the sinking of dense water in the Irminger and Labrador Seas. The mixing of these source waters within the water column and their spreading and export to the south will be surveyed. CTD (hydrography) and ADCP (current profiling) sections will be run across the major current systems and across the basins from the shallow shelves into the deep regions. At key locations moorings will be deployed.

04. Attach chart showing (on an appropriate scale) the geographical area of the intended work, positions of intended stations, tracks of survey lines, positions of moored / seabed equipment.

see attachment

05. Types of samples required, e.g. Geological / Water / Plankton / Fish / Radioactivity / Isotope

water, hydroacoustic data,

and methods by which samples will be obtained (including dredging / coring / drilling).

Water sampling during deep stations with CTD – Rosette, hydroacoustic measurements of currents from moving ship and during stations.

06. Details of moored equipment:

Mooring recoveries

Date deployed	Deployment vessel	Name - description	Latitude N	Longitude W
June 2009	RV Merian	ADCP DS1-09 Current Meter M.	66° 04.6' N	27° 05.6' W
June 2009	RV Merian	ADCP HHDS2-09 Current Meter M.	66° 07.2' N	27° 16.1' W
July 2007	RV Merian	HHDS3-07 PIES-mooring	66° 45.2' N	25° 00.1' W

Mooring deployments

Date deployed	Date recovery	Name - description	Latitude N	Longitude W
July 2010	Summer 2011	ADCP DS1-10 Current Meter M.	66° 04.6' N	27° 05.6' W
July 2010	Summer 2011	ADCP HHDS2-10 Current Meter M.	66° 07.2' N	27° 16.1' W

07. Explosives: **no explosives**

- (a) Type and Trade name
- (b) Chemical content
- (c) Dept of Trade class and stowage
- (d) Size
- (e) Depth of detonation
- (f) Frequency of detonation
- (g) Position in latitude and longitude
- (h) Dates of detonation

08. Detail and reference of

- (a) Any relevant previous / future cruises

RRS Charles Darwin cruise 163/164 September 2004
WNA05 – Thalassa cruise in Summer 2005
RV Árni Friðriksson August 2005
RRS DISCOVERY cruise D311 September/October 2006
RV M.S. Merian cruise MSM05/2 May / June 2007
RV M.S. Merian cruise MSM05/4 July 2007
RV M.S. Merian cruise MSM12/1 May/June 2009

- (b) Any previous published research data relating to the proposed cruise.
(Attach separate sheet if necessary.)

- Avsic, T., J. Karstensen, U. Send, and J. Fischer (2006) Interannual variability of newly formed Labrador Sea Water from 1994 to 2005. *Geophys. Res. Lett.*, 33, L21S02, 10.1029/2006GL026913
- Böning, C.W., Scheinert, M., Dengg, J., Biastoch, A. and Funk, A. (2006) Decadal variability of subpolar gyre transport and its reverberation in the North Atlantic overturning: *Geophysical Research Letters*, 33, L21S01, doi:10.1029/2006GL026906.
- Cunningham, S. et al. (2009) The present and future system for measuring the Atlantic Meridional Overturning Circulation and heat transport; *OceanObs09, Community White Paper*.
- Dengler, M., Fischer, J., Schott, F. A., and Zantopp, R. (2006) The Deep Labrador Current and its variability in 1996-2005, *GRL*, 33, L21506.
- Dickson, B., S. Dye, S. Jónsson, A. Köhl, A. Macrander, M. Marnela, J. Meincke, S. Olsen, B. Rudels, H. Valdimarsson and G. Voet, 2008: The Overflow Flux west of Iceland: Variability, Origins and Forcing. In: Dickson RR et al.(eds): *Arctic-Subarctic Ocean Fluxes*. Springer Science + Business Media B.V., 443-474.
- Fer, I., G. Voet, K.S. Seim, B. Rudels and K. Latarius (2009) Intense mixing of the Faroe Bank Channel overflow. *Geophys. Res. Lett.*, submitted.
- Friedrichs, A. (2009) Overflow in Denmark Strait: a vorticity balance. Bachelor thesis, University of Hamburg.
- Karstensen, J., Avsic, T., Fischer, J., and Send, U. (2006) Subsurface temperature maxima in the Labrador Sea and the subpolar North Atlantic. *Geophys. Res. Lett.*, 33, L21S05, 10.1029/2006GL026613
- Käse, R.H. (2006) A Riccati model for Denmark Strait overflow variability. *Geophys. Res. Lett.*, 33, L21S09, doi:10.1029/2006GRL026915.
- Kieke, D., M. Rhein, L. Stramma, W.M. Smethie and D. LeBel (2006) CFC inventory changes and formation rates of upper Labrador Sea Water in the subpolar North Atlantic, 1997 – 2001. *J.Phys. Oceanogr.*, 36, 64-86.
- Neumann, U. (2007) The influence of heat and freshwater fluxes on convective activity in the Central Irminger Sea. Diploma Thesis, University of Kiel.
- Olsen, S.M.O., B. Hansen, D. Quadfasel, and S Østerhus (2008) Observed and modelled stability of overflow across the Greenland-Scotland ridge, *Nature*, 455, 519-523, DOI: 10.1038/nature07302.

- Østerhus, S, T Sherwin, D Quadfasel, and B Hansen (2008) The overflow transport east of Iceland. In Dickson RR et al. (eds): Arctic-Subarctic Ocean Fluxes. Springer Science + Business Media B.V., 427-441.
- Paka, V., B. Rudels, D. Quadfasel and V. Zhurbas (2009) A new tool to measure turbulence in the deep ocean: application to the Denmark Strait overflow. Doklady Akademii Nauk, submitted (in Russian).
- Quadfasel, D and R Käse (2007) Present-Day Manifestation of the Nordic Seas Overflows. In: Ocean Circulation – mechanisms and impacts – past and future changes of the meridional overturning. Eds: A Schmittner, JCH Chiang, SR Hemming. Geophysical Monograph, 173, AGU, Washington DC, 75-90.
- Schott, F. A., Fischer, J., Dengler, M., and Zantopp, R. (2006) Variability of the Deep Western Boundary Current east of the Grand Banks. GRL, 33, L21507.
- Send, U. et al. (2009) A Global Boundary Current Circulation Observing Network; OceanObs09, CWP
- Serra, N., R.H. Käse, A. Köhl, D. Stammer and D. Quadfasel (2009) On the low frequency phase relation between the Denmark Strait and the Faroe Bank Channel overflows. Tellus, (in revision)
- Voet, G. (2006) Entrainment in the Denmark Strait Overflow Plume by meso-scale Eddies. Diploma Thesis, University of Hamburg, 89 pp.
- Voet, G. and D. Quadfasel (2009) Entrainment in the Denmark Strait overflow plume by meso-scale eddies. Ocean Science, (submitted)

09. Names and addresses of scientists of the coastal state in whose waters the proposed cruise takes place with whom previous contact has been made.

Name: *Dr. Héðinn Valdimarsson*
Address: *Marine Research Institute*
Skulagata 4
121 Reykjavik
Iceland
Telephone: *00354 552 0240*
Telefax: *00354 562 3790*
e-mail: *hv@havro.is*

10. State:

- (a) Whether visits to the ship in port by scientists of the coastal state concerned will be acceptable.
Yes
- (b) Whether it will be acceptable to carry on board an observer from the coastal state for any part of the cruise and dates and ports of embarkation / disembarkation.
Yes, after discussion
- (c) When research data from intended cruise is likely to be made available to the coastal state and if so by what means.
- **Cruise Report three months after finishing the research cruise**
 - **Scientific publication within the following three years**

COASTAL STATE: ICELAND

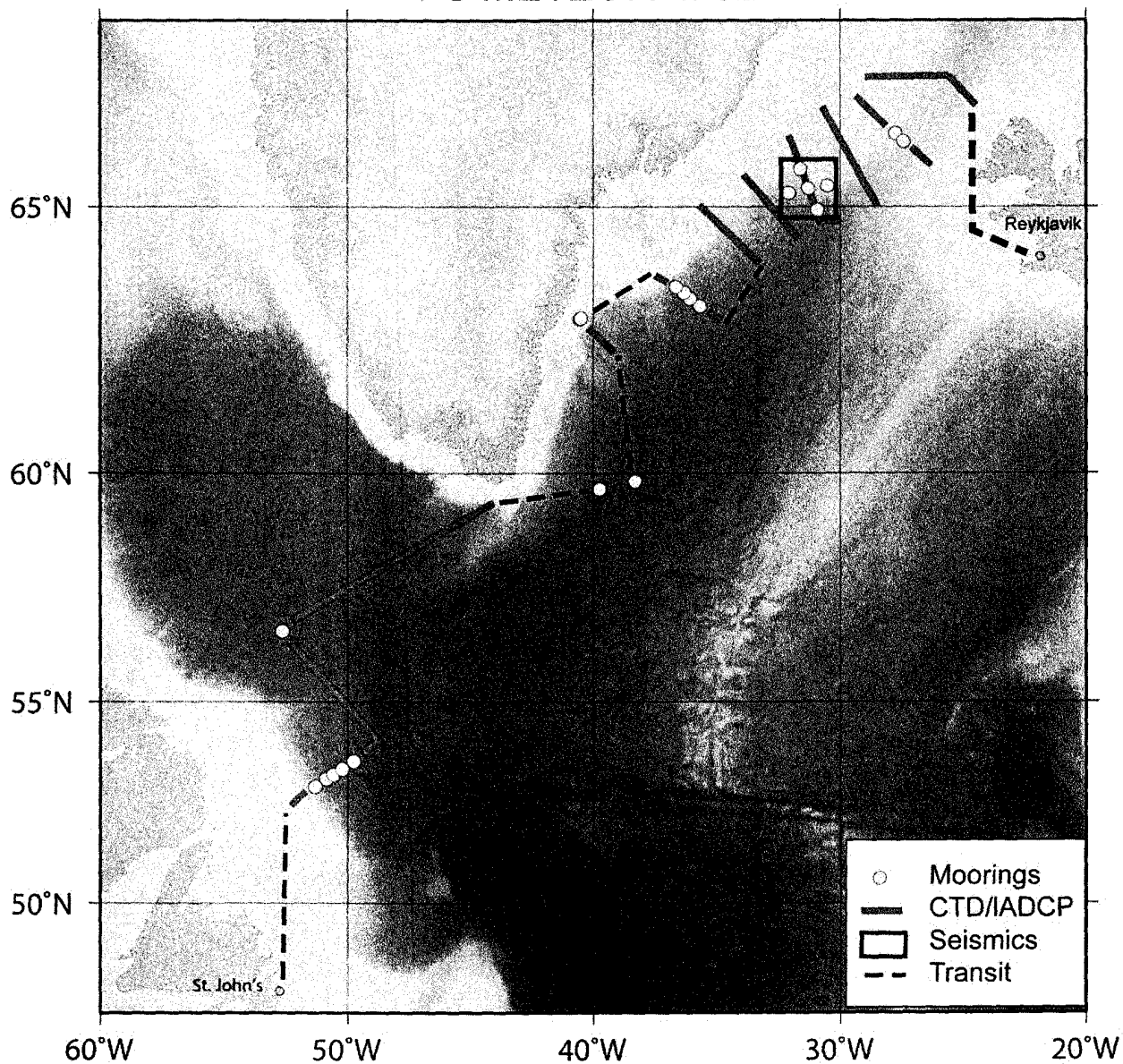
SCIENTIFIC EQUIPMENT

11. Complete the following table - SEPARATE COPY FOR EACH COASTAL STATE
(indicate 'YES' or 'NO')

List of all major Marine Scientific Equipment it is proposed to use and indicate waters in which it will be deployed	Fisheries Research within Fishing Limits	Research concerning Continental Shelf out to Coastal State's Margin	Within 3 NM	Between 3 - 12 NM	Between 12 - 50 NM	Between 50 - 200 NM
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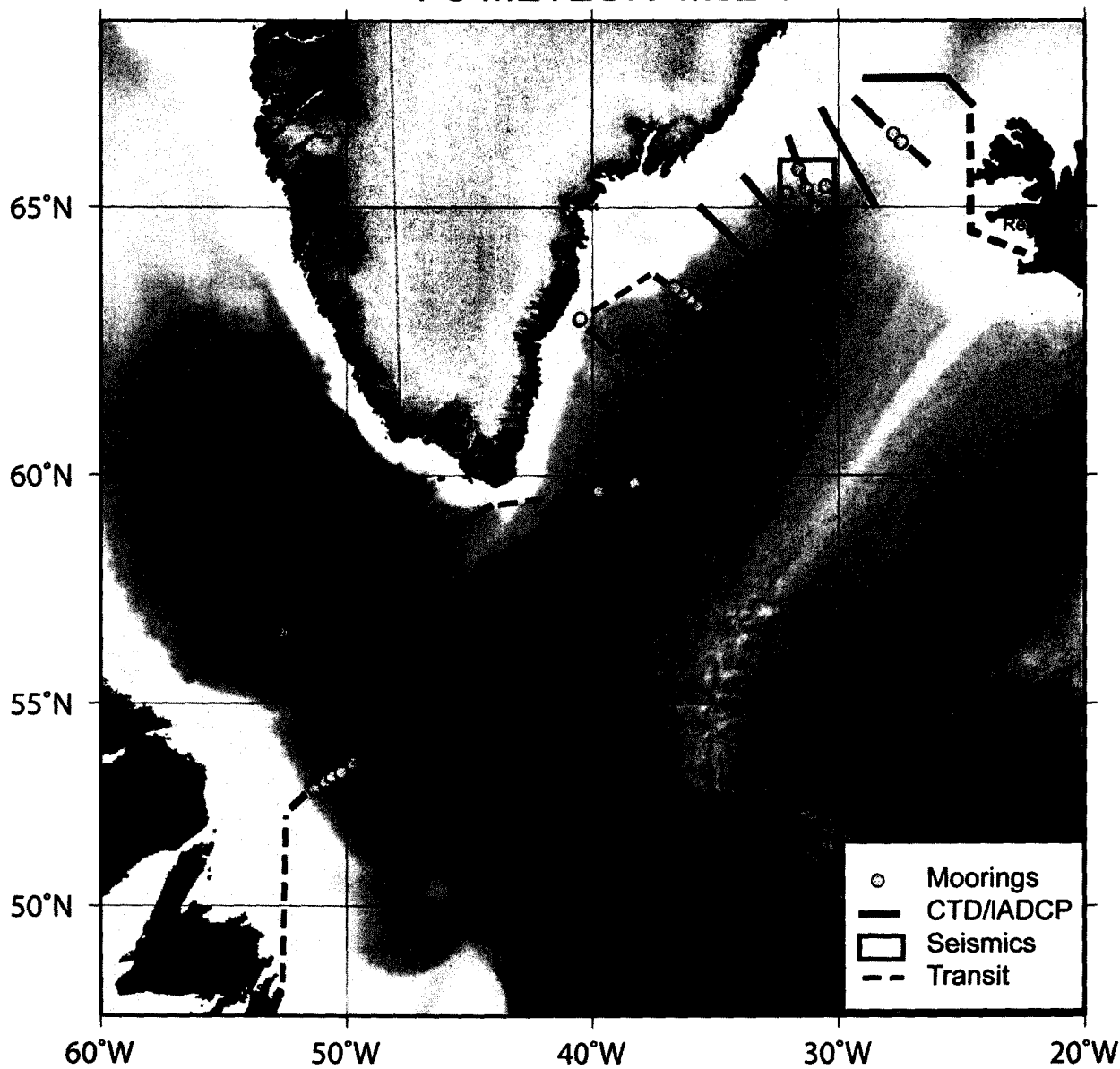
a) vessel mounted systems:						
hydroacoustic mapping / measuring (incl. ADCP, Parasound and multibeam)	No	Yes	No	Yes	Yes	Yes
permanent surface water sampling / pumping (incl. Thermosalinograph)	No	Yes	No	Yes	Yes	Yes
b) mobile equipment :						
CTD with lowered ADCP on all stations	No	Yes	No	Yes	Yes	Yes
Current meter moorings, for positions see table	No	Yes	No	Yes	Yes	Yes

FS METEOR M82-1



Planned cruise track of RV METEOR cruise M82/1 from Reykjavik to St. John's, 2. July – 2. August 2009.

FS METEOR M82-1



Planned cruise track of RV METEOR cruise M82/1 from Reykjavik to St. John's,
2. July – 2. August 2009.