

DETAIL

Part B

01. Name of research ship **MERIAN** Cruise No. **MSM 21/2**
02. Dates of cruise from: **Reykjavik June, 24th 2012** to: **Nuuk July, 25th, 2012**
03. Purpose of research and general operational methods
- 1) measure the temperature / salinity / oxygen / velocity distribution along the Midatlantic Ridge and along 47°N with high resolution CTD/LADCP stations
 - 2) take water samples on several stations in the Irminger Sea, the Newfoundland basin and the Labrador Sea on CTD/LADCP stations to be analysed for SF₆ and CFCs
 - 3) recover 8 moorings at the Charlie Gibbs Fracture Zone
 - 4) recover and redeploy 3 moorings at the Midatlantic Ridge, and recover and redeploy PIES
 - 5) recover and redeploy 3 moorings at the continental shelf at 47°06'N and recover 1 and redeploy 2 moorings at Flemish Pass at 47°06'N

Types of samples And data	Methods to be used	Instruments to be used
T,S,O ₂	Profiling of CTD	CTD
velocity	Profiling	Lowered ADCP attached to carousel
S,O ₂ , CFCs, SF ₆	Analysing water samples	10L bottles attached to carousel
velocity	Vessel mounted ADCP	Vessel mounted ADCP
depth	Echo sounder, multibeam echosounder	Echo sounder, multibeam Echosounder
Surface T,S Standard meteorological measurements	Thermosalinograph Meteorological sensors	Thermosalinograph Meteorological sensors

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 / Radio-activity / Isotope

water, hydroacoustic data

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

Pumping, sampling with water bottles attached to a carousel

06. **Moored equipment**

None in Icelandic waters

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

RV Meteor, cruise M59-2 July,23 – August, 29, 2003
 NO THALASSA, cruise SPOL, June,1 – July, 12. 2005
 RV MERIAN cruise MSM051 April – May 2007
 RV MERIAN cruise MSM091 July – August 2008
 NO THALASSA cruise SPOL2 August – September 2008
 RV MERIAN cruise MSM 12-3, July 2009
 RV METEOR cruise M82/2, August 2010
 RV METEOR cruise M85/1 and M85/2, June – August 2011

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

See attached sheet

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.

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

- (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

NOTIFICATION OF PROPOSED RESEARCH CRUISE

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GENERAL

Part A

01. Name of research ship: **MARIA S. MERIAN** Cruise No. **MSM21/2**
02. Dates of cruise from **Reykjavik June, 24th 2012** to **Nuuk July, 25th 2012**
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
Telex: 212586 ifmhh d
04. Owner (if different from para 3) **Federal State Mecklenburg-Vorpommern, Germany**
-
05. Particulars of ship:
- | | |
|-----------------|------------------------|
| Name | MARIA S. MERIAN |
| Nationality | German |
| Overall length | 94,8 metres |
| Maximum draught | 6,5 metres |
| Nett tonnage | 1750 NRZ |
| Propulsion | Diesel Electric |
| Call sign | D B B T |
06. Crew
- | | |
|----------------|-----------------------|
| Name of master | Ralf Schmidt |
| No. of crew | <u>max. 23</u> |
07. Scientific personnel:
- | | |
|---|---|
| Name and address of scientist in charge | Prof. Dr. Monika Rhein
Universität Bremen
Otto-Hahn-Allee Geb. NW1
28334 Bremen, Germany |
| Tel./Fax/Telex No. | ++49-421-218-62160 /fax:7018 |
| Email | mrhein@physik.uni-bremen.de |
| No. of scientists | 23 |
08. Geographical areas in which ship will operate (with reference in latitude and longitude) **45°N – 65°N, 20°W – 60°W**
09. Brief description of purpose of cruise
- study strength of the subpolar gyre by time series from Inverted Echo Sounders and moorings at the Midatlantic Ridge
 - study transport and water masses of the deep western boundary current at 47°N off Newfoundland by moored T/S and velocity sensors

- estimate transports and water mass exchange across the western basin at 47°N with moored PIES and shipboard measurements
 - measure transport through Flemish Pass with moored instruments (T/S and velocity sensors)
 - measure CFCs on selected stations in the Irminger Sea, the Newfoundland basin and the Labrador Sea to infer together with data taken in 2011 the change of deep water formation rates
10. Dates and names of intended ports of call
Reykjavik for four days in a period from June, 19th – 28th 2012 (intended so far June, 22nd – 25th 2012) see MSM 21/1.
11. Any special logistic requirements at ports of call
Crewchange, bunkering, container handling

COASTAL STATE: Iceland

SCIENTIFIC EQUIPMENT

11. Complete the following table - SEPARATE COPY FOR EACH COASTAL STATE

(indicate 'YES' or 'NO')

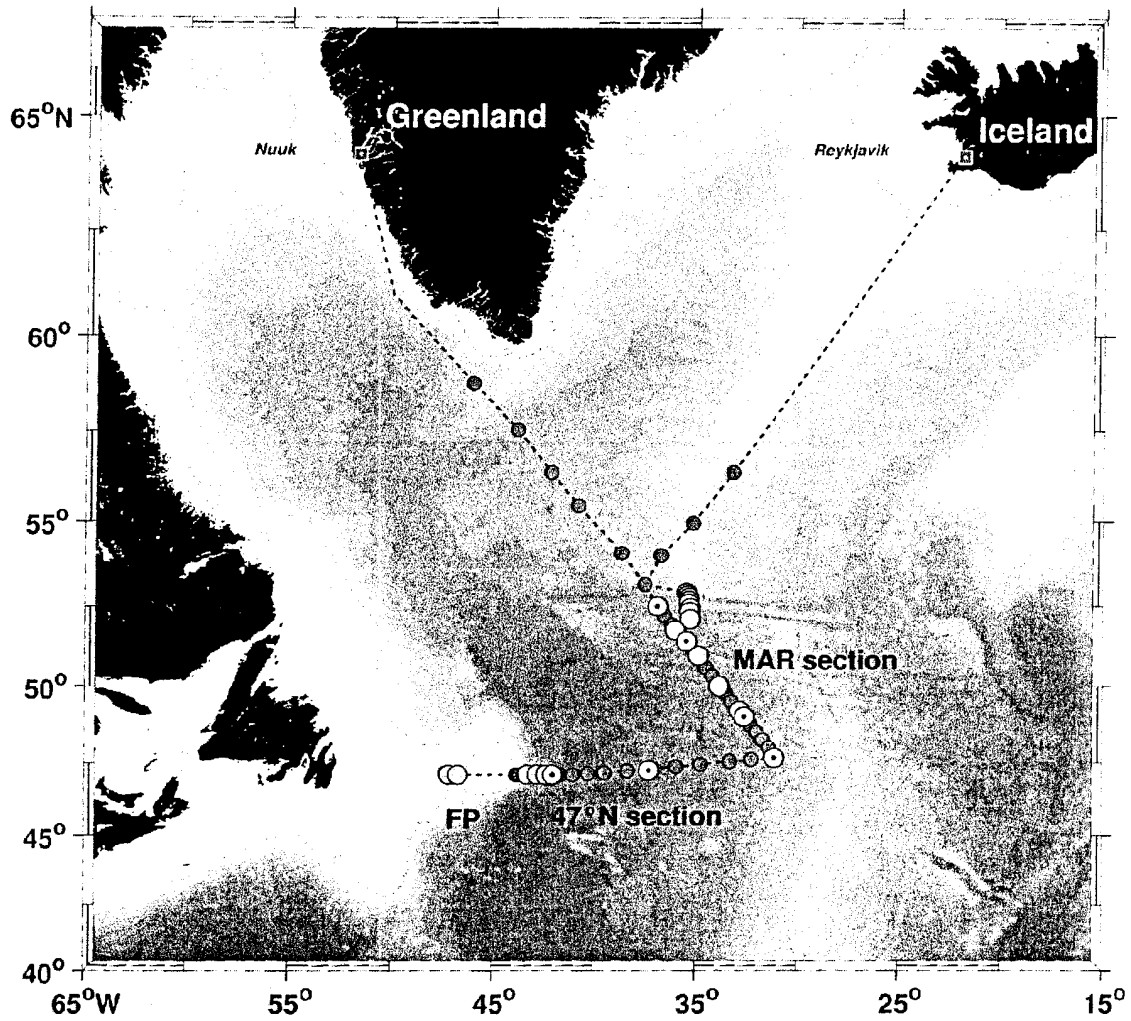
List of all major Marine Scientific Equipment it is proposed to use and indicate waters in which it will be deployed	Fisheries Research within Fishing Limits	Research concerning Continental Shelf out to Coastal State's Margin	Within 3 NM	Between 3 - 12 NM	Between 12 - 50 NM	Between 50 - 200 NM
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a) vessel mounted systems: hydroacoustic mapping / measuring (incl. ADCP, and Multibeam echosounder)	No	No	No	No	Yes	Yes
permanent surface water sampling / pumping (incl. Thermosalinograph)	No	No	No	No	Yes	Yes
b) mobile equipment CTDO ₂ - LADCP/ Water bottles	No	No	No	No	Yes	Yes
XBTs	No	No	No	No	No	No
Argo floats	No	No	No	No	Yes	Yes

Publications in peer reviewed journals 2006 -2011 related to the proposed cruise

Bold: member of the group organizing the cruise

- Rhein, M., D. Kieke, S. Hüttl-Kabus, A. Röbber, C. Mertens, R. Meissner, B. Klein, C. W. Böning and I. Yashayaev (2010)**, Deep-water formation, the subpolar gyre, and the meridional overturning circulation in the subpolar North Atlantic. *Deep-Sea Res. II*, doi: 10.1016/j.dsr2.2010.10.061
- Steinfeldt, R., T. Tanhua, J. L. Bullister, R. M. Key, M. Rhein, and J. Köhler (2010)**, Atlantic CFC data in CARINA. *Earth System Science Data*, 2, 1-15.
- Kieke, D., B. Klein, L. Stramma, M. Rhein, and K. P. Koltermann (2009)**, Variability and propagation of Labrador Sea Water in the southern subpolar North Atlantic. *Deep-Sea Res. I*, 56(10), 1656-1674.
- Kieke, D., M. Rhein, L. Stramma, W.M. Smethie, D. LeBel, and W. Zenk, 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.
- Kieke, D. and M. Rhein, 2006**, Variability of the Overflow water transport in the western subpolar North Atlantic, 1950-1997. *J.Phys.Oceanogr.* 36, 435-456.
- Walter, M., C. Mertens and M. Rhein, 2005**: Mixing estimates from a large scale hydrographic survey in the North Atlantic. *Geophys. Res. Lett.* 32, L13605, doi: 10.1029/2005GL022471, 2005
- Keir, R., **J. Sültenfuß, M. Rhein, G. Petrick, and J. Greinert (2006)**, Separation of ³He and CH₄ signals on the Mid-Atlantic Ridge at 51°N and 5°N. *Geochim. Cosmochim. Acta*, 70(23), 5766-5778.
- Kieke, D., M. Rhein, L. Stramma, W. M. Smethie Jr., J. L. Bullister, and D. A. LeBel (2007)**, Changes in the pool of Labrador Sea Water in the subpolar North Atlantic. *Geophys. Res. Lett.*, 34, L06605, doi:10.1029/2006GL028959.
- Rhein, M., D. Kieke, and R. Steinfeldt (2007)**, Ventilation of the Upper Labrador Sea Water, 2003-2005. *Geophys. Res. Lett.*, 34, L06603, doi:10.1029/2006GL028540.
- Smethie Jr., W. M., D. A. LeBel, R. A. Fine, **M. Rhein, and D. Kieke (2007)**, Strength and variability of the deep limb of the North Atlantic meridional overturning circulation from chlorofluorocarbon inventories. In: A. Schmittner, J. Chiang, and S. Hemming, editors, *Ocean Circulation: Mechanisms and Impacts*, Geophysical Monograph Series, Vol. 173, pgs. 119-130.
- LeBel, D. A., W. M. Smethie Jr., **M. Rhein, D. Kieke, R. A. Fine, J. L. Bullister, D.-H. Min, W. Roether, R. F. Weiss, C. Andrie, D. Smythe-Wright, and E. P. Jones (2008)**, The distribution of CFC-11 in the North Atlantic during WOCE: Inventories and calculated water mass formation rates. *Deep-Sea Res. I*, doi:10.1016/j.dsr.2008.03.009.
- Stöber, U., M. Walter, C. Mertens, and M. Rhein (2008)**, Mixing estimates from hydrographic measurements in the Deep Western Boundary Current of the North Atlantic. *Deep-Sea Res. I*, 55(6), 721-736.
- Haine, T., C. W. Böning, P. Brandt, J. Fischer, A. Funk, **D. Kieke, E. Kvaleberg, and M. Rhein (2008)**, North Atlantic Deep Water Transformation in the Labrador Sea, Recirculation through the Subpolar Gyre, and Discharge to the Subtropics. In: *Arctic-Subarctic Ocean Fluxes - Defining the Role of the Northern Seas in Climate*, R. R. Dickson, J. Meincke, P. Rhines (Eds.), Springer, Vol. X, chap. 26.
- Kieke, D., L. Stramma, B. Klein, M. Rhein, and K. P. Koltermann (2008)**, Variability and pathways of Labrador Sea Water in the southern subpolar North Atlantic. *Deep-Sea Res. I*, 56(20), 1656-1674.
- Steinfeldt, R., M. Rhein, J. L. Bullister, and T. Tanhua (2009)**, Inventory changes in anthropogenic carbon from 1997-2003 in the Atlantic Ocean between 20°S and 65°N. *Global Biogeochem. Cycles*, doi: 10.1029/2008GB003311



White/black: locations of the moored PIES (Inverted Echo Sounder with Pressure sensor), green: positions of moorings. Red: CTD/LADCP stations with SF₆/CFC sampling will also be carried out on the transits from Reykjavik to the Midatlantic Ridge and on the transit to Nuuk. CTD/LADCP stations are also planned in the Flemish Pass.