

## NOTIFICATION OF PROPOSED RESEARCH CRUISE

Page 1

## GENERAL

Part A

01. Name of research ship: **MARIA S. MERIAN** Cruise No. **MSM21/1**
02. Dates of cruise from **May 13<sup>th</sup> to June 22<sup>nd</sup>, 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**
04. Owner (if different from para 3) **Federal State Mecklenburg-Vorpommern, Germany**
05. Particulars of ship:
- |                 |                        |
|-----------------|------------------------|
| Name            | <b>MARIA S. MERIAN</b> |
| Nationality     | <b>German</b>          |
| Overall length  | <b>94.8 metres</b>     |
| Maximum draught | <b>6.5 metres</b>      |
| Nett tonnage    | <b>1750 NRZ</b>        |
| Propulsion      | <b>Diesel Electric</b> |
| Call sign       | <b>D B B T</b>         |
06. Crew
- |                |                       |
|----------------|-----------------------|
| Name of master | <b>Ralf Schmidt</b>   |
| No. of crew    | <b><u>max. 23</u></b> |
07. Scientific personnel:
- |   |   |
|---|---|
| Name and address of scientist in charge | <b>Dr. Jürgen Fischer</b><br><b>Düsternbrooker Weg 20</b><br><b>24105 Kiel</b><br><b>jfischer@ifm-geomar.de</b> |
| Tel./Fax/Telex No.                      | <b>+49 431 600 4106</b>   |
| No. of scientists                       | <b><u>max.23</u></b>  |
08. Geographical areas in which ship will operate (with reference in latitude and longitude)
- a) Labrador Sea 45°– 61°N, 40°– 61°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), shipboard observations of meteorological and physical oceanographic parameters in the water column**

**(temperature, salinity, oxygen, currents, sound velocity), and turbulence measured by an Autonomous Underwater Vehicle (AUV) . The work is funded by the European Commission (project THOR), by the German Ministry of Science, and the German Science Foundation (DFG).**

10. Dates and names of intended ports of call

**Reykjavik, Iceland, for two days stopover between June 8<sup>th</sup> and 11<sup>th</sup> 2012.**

**Reykjavik, Iceland for four days in a period from June, 19<sup>th</sup> to 28<sup>th</sup> (intended so far 22<sup>nd</sup> to 25<sup>th</sup>).**

11. Any special logistic requirements at ports of call

**Normal cargo handling, exchange of crew, bunkering**

## DETAIL

Part B

01. Name of research ship **Maria S. Merian** Cruise No. **MSM21/1**

02. Dates of cruise from: **May 13<sup>th</sup>** to: **June 22<sup>nd</sup>, 2012**

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, and turbulence within the bottom shear layers will be observed by AUV.**

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).

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

## 06. Details of moored equipment:

**Mooring recoveries**

<b>Date deployed</b>	<b>Deployment vessel</b>	<b>Name - description</b>	<b>Latitude N</b>	<b>Longitude W</b>
August 2011	RV Knorr	ADCP DS1-11 Current Meter M.	66°04.60' N	27°05.60' W
August 2011	RV Meteor	ADCP HHDS2-11 Current Meter M.	66°07.23' N	27°16.19' W
July 2010	RV Meteor	ADCP HHDS2-10 Current Meter M.	66°07.23' N	27°16.15' W
August 2011	RV Meteor	PIES HHDS1-11 PIES-mooring	66°04.58' N	27°04.88' W
August 2011	RV Meteor	PIES HHDS2-11 PIES-mooring	66°07.25' N	27°16.16' W
August 2011	RV Knorr	PIES HHNIJ-11 PIES-mooring	67°24.04' N	23°41.61' W

**Mooring deployments**

<b>Date deployed</b>	<b>Date recovery</b>	<b>Name - description</b>	<b>Latitude N</b>	<b>Longitude W</b>
June 2012	Summer 2013	ADCP DS1-12 Current Meter M.	66°04.60' N	27°05.60' W
June 2012	Summer 2013	ADCP HHDS2-12 Current Meter M.	66°07.23' N	27°16.16' W
June 2012	Summer 2013	PIES HHDS1-12 PIES-mooring	66°04.58' N	27°04.88' W
June 2012	Summer 2013	PIES HHDS2-12 PIES-mooring	66°07.25' N	27°16.16' W
June 2012	Summer 2013	PIES HHNIJ-12 PIES-mooring	67°24.04' N	23°41.61' W
June 2012	Summer 2013	ADCP DS3-12 Current Meter M.	66°03.00' N	26°57.63' W
June 2012	Summer 2013	ADCP DS4-12 Current Meter M.	66°03.79' N	27°01.10' W
June 2012	Summer 2013	ADCP DS5-12 Current Meter M.	66°05.24' W	27°07.48' W
June 2012	Summer 2013	ADCP DS6-12 Current Meter M.	66°06.00' N	27°10.11' W
June 2012	Summer 2013	ADCP DS7-12 Current Meter M.	66°06.62' N	27°13.15' W
June 2012	Summer 2013	ADCP DS8-12 Current Meter M.	66°08.11' N	27°19.65' W
June 2012	Summer 2013	ADCP DS9-12 Current Meter M.	66°09.00' N	27°23.11' W
June 2012	Summer 2013	ADCP DS10-12 Current Meter M.	66°10.49' N	27°29.08' W
June 2012	Summer 2013	ADCP DS11-12 Current Meter M.	66°11.60' N	27°35.50' 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**  
**RV Meteor cruise M85/2 August 2010**

- (b) Any previously published research data relating to the proposed cruise.

- 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
- 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. Macrandar, 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 (2010) Intense mixing of the Faroe Bank Channel overflow. *Geophys. Res. Lett.*, 37, L02604, doi:10.1029/2009GL041924.
- 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
- 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 Starit 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.
- Serra, N., R.H. Käse, A. Köhl, D. Stammer and D. Quadfasel (2010) On the low frequency phase relation between the Denmark Strait and the Faroe Bank Channel overflows. Tellus, 62, doi: 10.1111/j.1600-0870.2010.00445
- 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 (2010) Entrainment in the Denmark Strait overflow plume by meso-scale eddies. Ocean Science, 6, 301-310.
- Fischer, J., M. Visbeck, R. Zantopp, and N. Nunes (2010), Interannual to Decadal Variability of Outflow from the Labrador Sea, Geophys. Res. Lett., doi:10.1029/2010GL045321,
- Han, G., K. Ohashi, N. Chen, P. G. Myers, N. Nunes, and J. Fischer (2010), Decline and partial rebound of the Labrador Current 1993-2004: Monitoring ocean currents from altimetric and CTD data, J. Geophys. Res., doi:10.1029/2009JC006091

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**

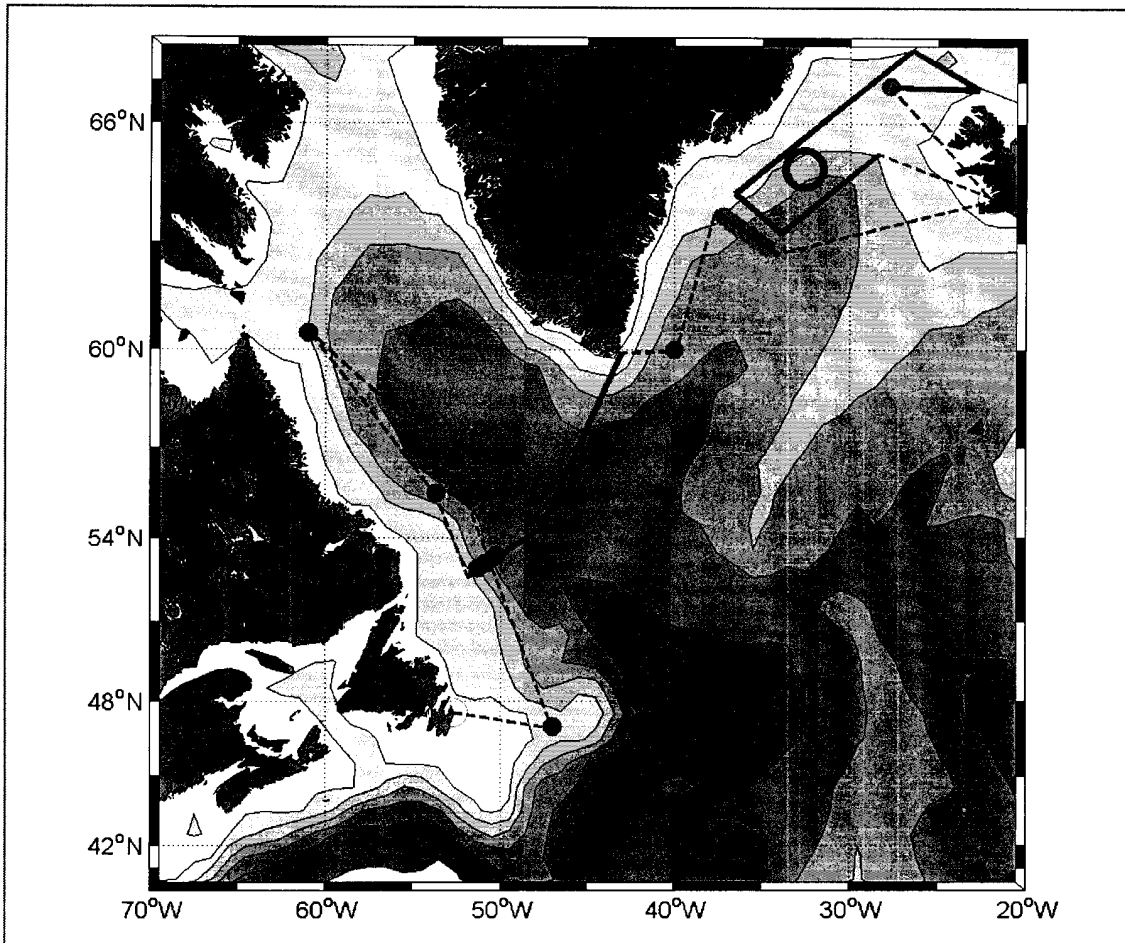
COASTAL STATE: **Iceland**

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	Between	Between	Between
			3 NM	3 - 12 NM	12 - 50 NM	50 - 200 NM

<b>a) vessel mounted systems:</b>						
hydroacoustic mapping / measuring (incl. ADCP, Parasound and multibeam)	No	Yes	No	Yes	Yes	Yes
permanent surface water sampling / pumping (incl. Thermosalinograph)	No	No	No	Yes	Yes	Yes
<b>b) mobile equipment :</b>						
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
AUV operation for turbulence	No	Yes	No	Yes	Yes	Yes

**Attachment: Map of intended work components:**

**Locations of moored current meter stations (for positions see table 11) as colored dots and green bar. Hydrographic sections along solid lines (high density) and along dashed lines (low station coverage). Magenta area for AUV operation and turbulence measurements.**