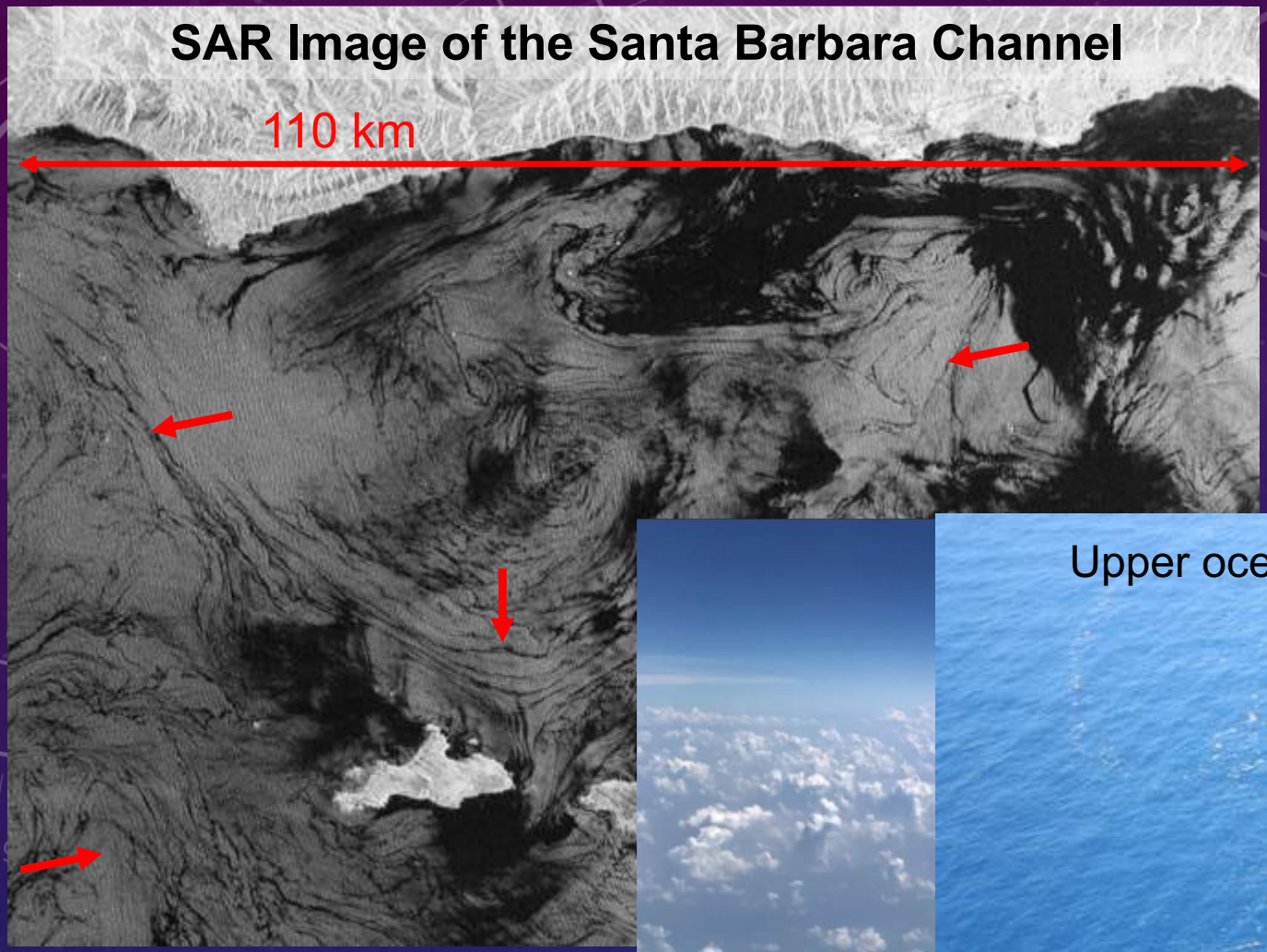
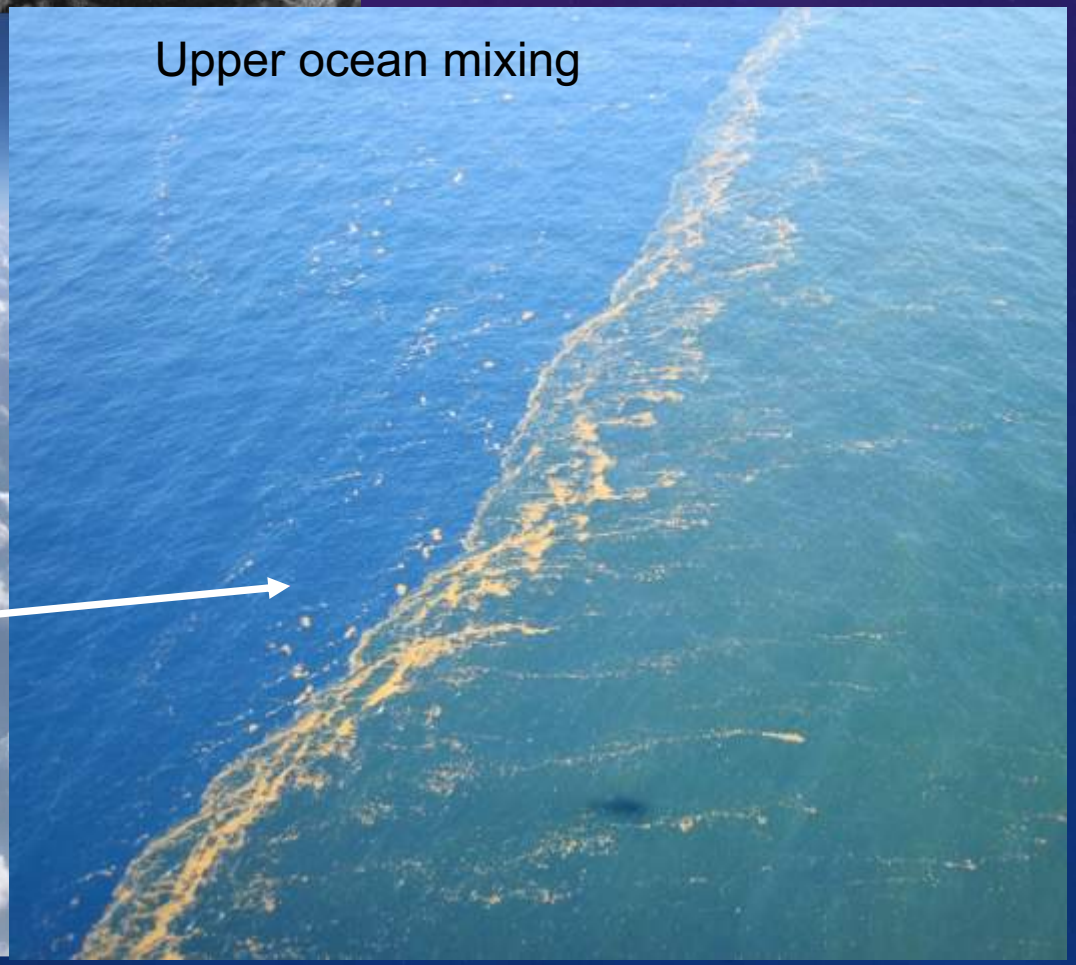
AIR-SEA INTERACTION AND SURFACE HETEROGENEITY



SST heterogeniety

Teleconnections?



Density filaments

Eric D'Asaro
Presentation
Jan 2019

ATMOSPHERIC & OCEAN BOUNDARY LAYER:

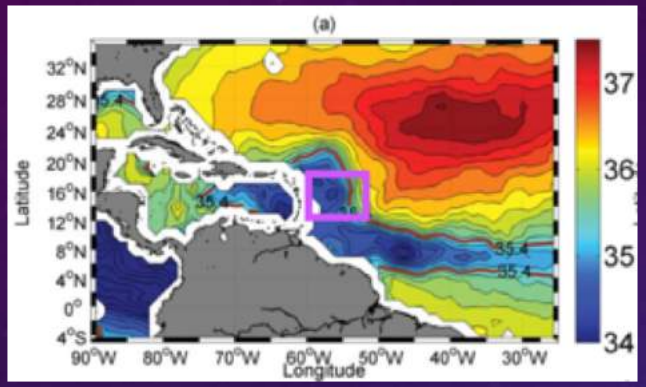
Subtasks:

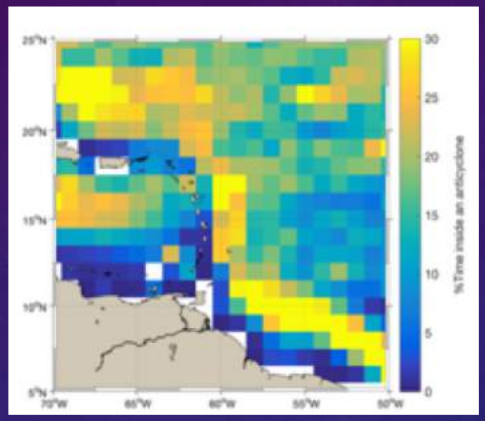
- Determine the strength of submesoscale processes within eddies and their role for the surface and the atmospheric boundary layer;
- Investigate the spatial and temporal variability of mixing processes within eddies and quantify diapycnal fluxes of heat and solutes
- Determine internal wave variability and its contribution to elevated mixing within eddies.

OCEAN MESOSCALE & SUBMESOSCALE

Riverine water at surface

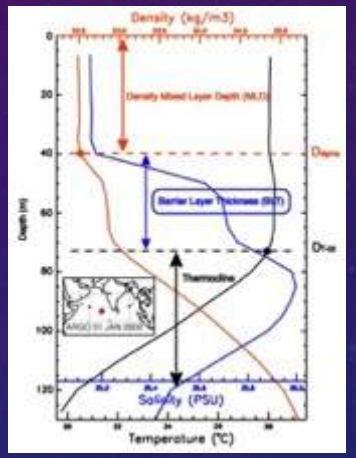
Eddies transport agents





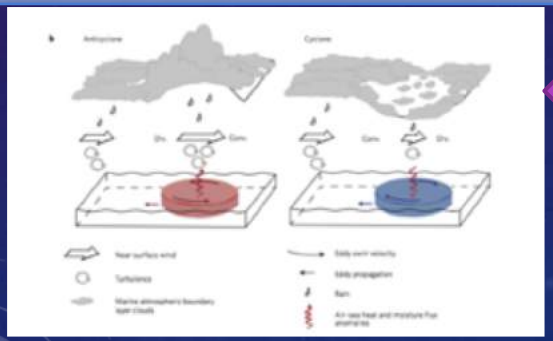
Barrier layer

Trapping of heat & momentum



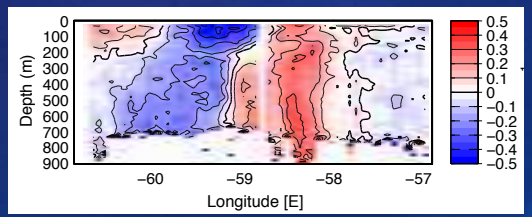
Surface anomalies

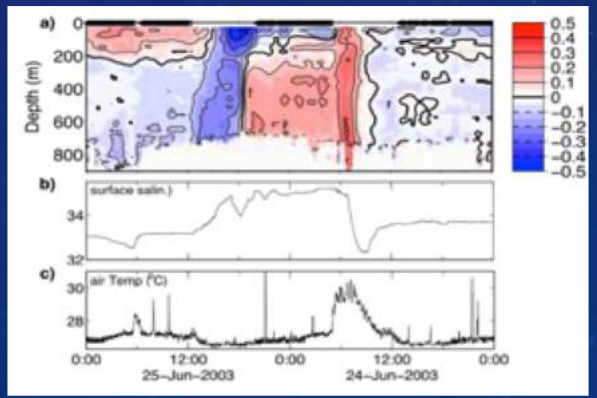
Atmosphere/cloud feedback



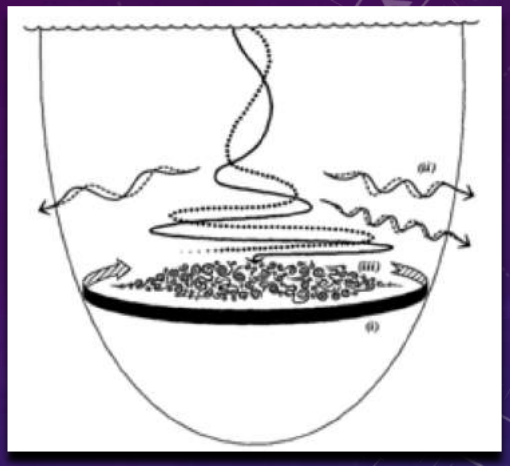
Mesoscale anomalies

Persistence: subsurface processes

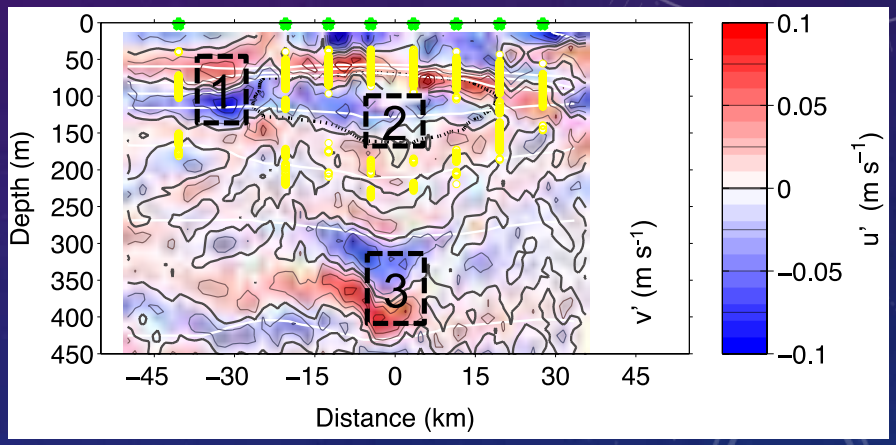




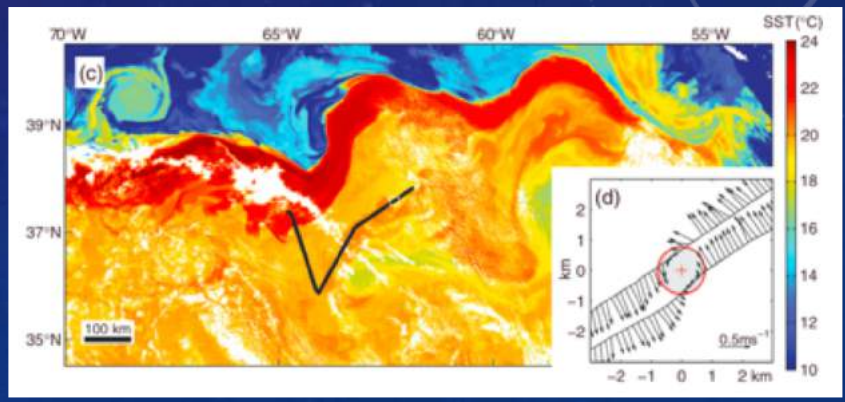
OCEAN INTERIOR
NEAR-INERTIAL WAVES (NIW)



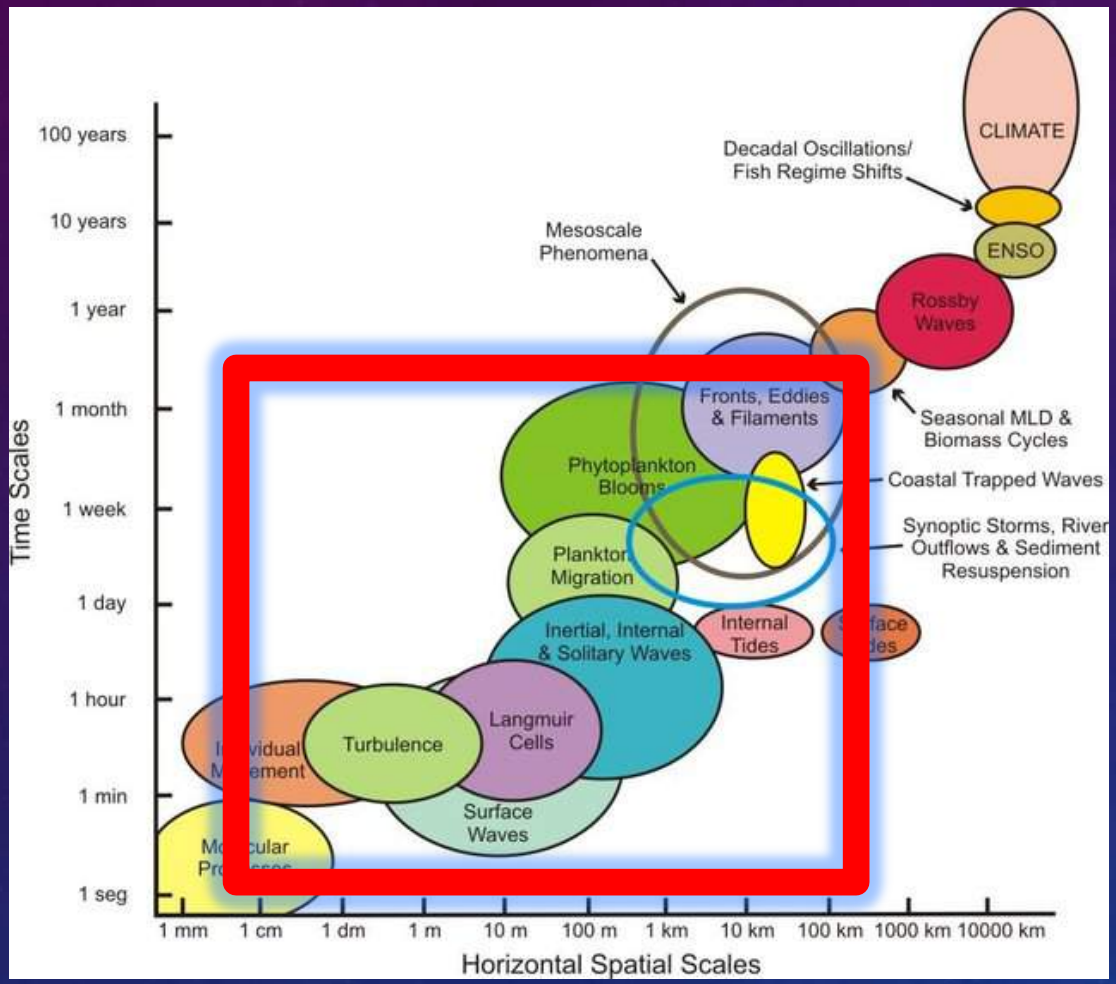
- Generation and decay of NIW and currents (including the spatial scales of wind variability)
- Vertical vorticity and NIW propagation in eddy vicinity
- Full rotation of eddy – 14 days



- 1 (or 2) ships: Estimate vertical/relative vorticity, divergence, and strain statistics – background, eddies, fronts

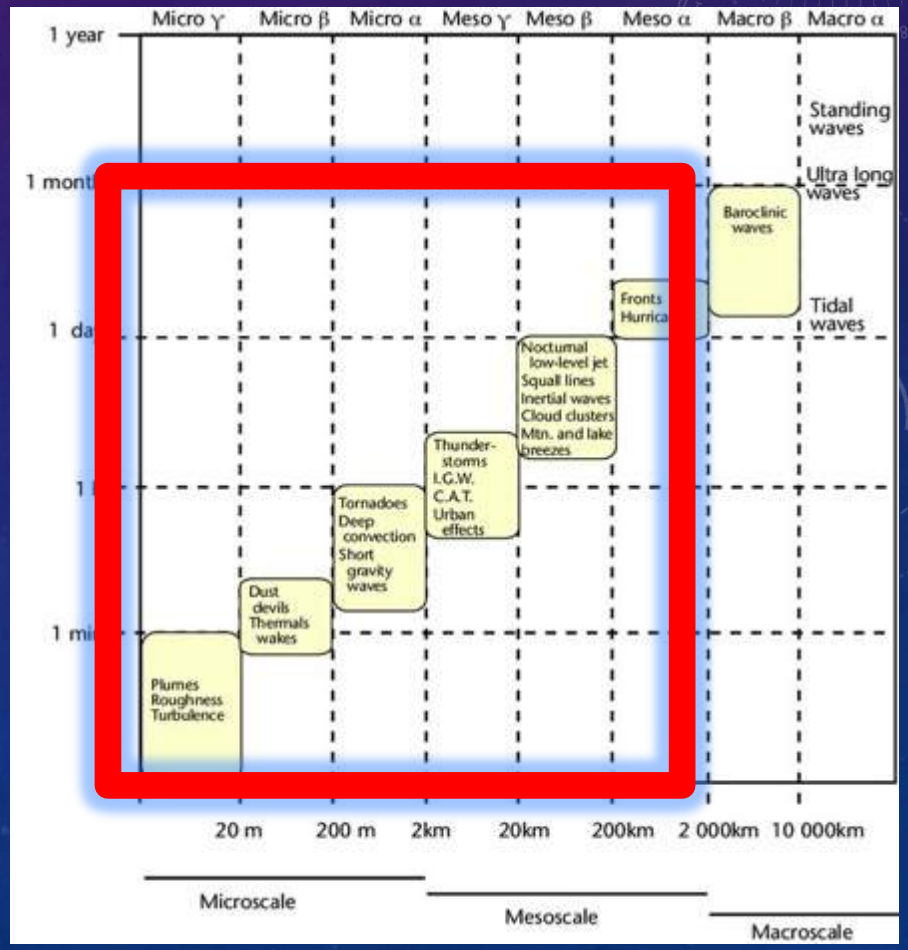


STOMMEL DIAGRAM OCEAN & ATMOSPHERE



Renzi 2014

Orlanski 1975



MARIA S MERIAN

JOHANNES KARSTENSEN

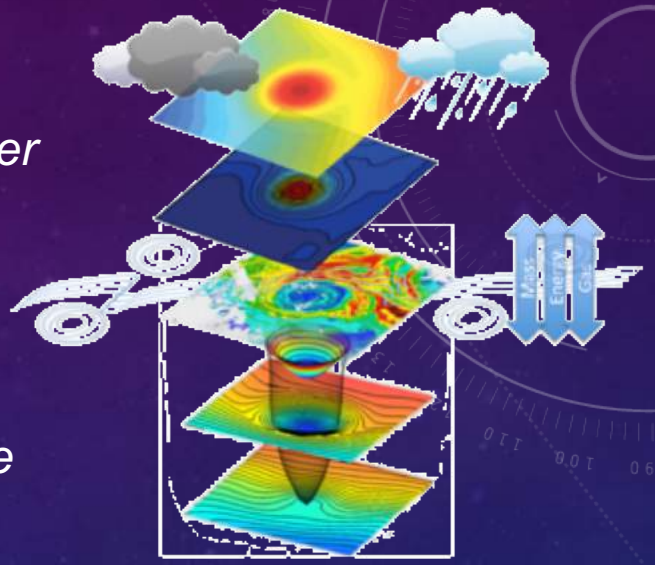
GEOMAR

SCIENTIFIC GOALS

Atmospheric Boundary Layer

Air/Sea Interface

Upper Ocean at mesoscale



1. Life-cycle of clouds
   (a concerted effort with Ship 1+, BCO, aircrafts)
2. Evolution of the lower atmospheric, considering the ocean underneath
3. Understanding of atmosphere and ocean on the oceanic mesoscale

WORKING AREA & PLAN

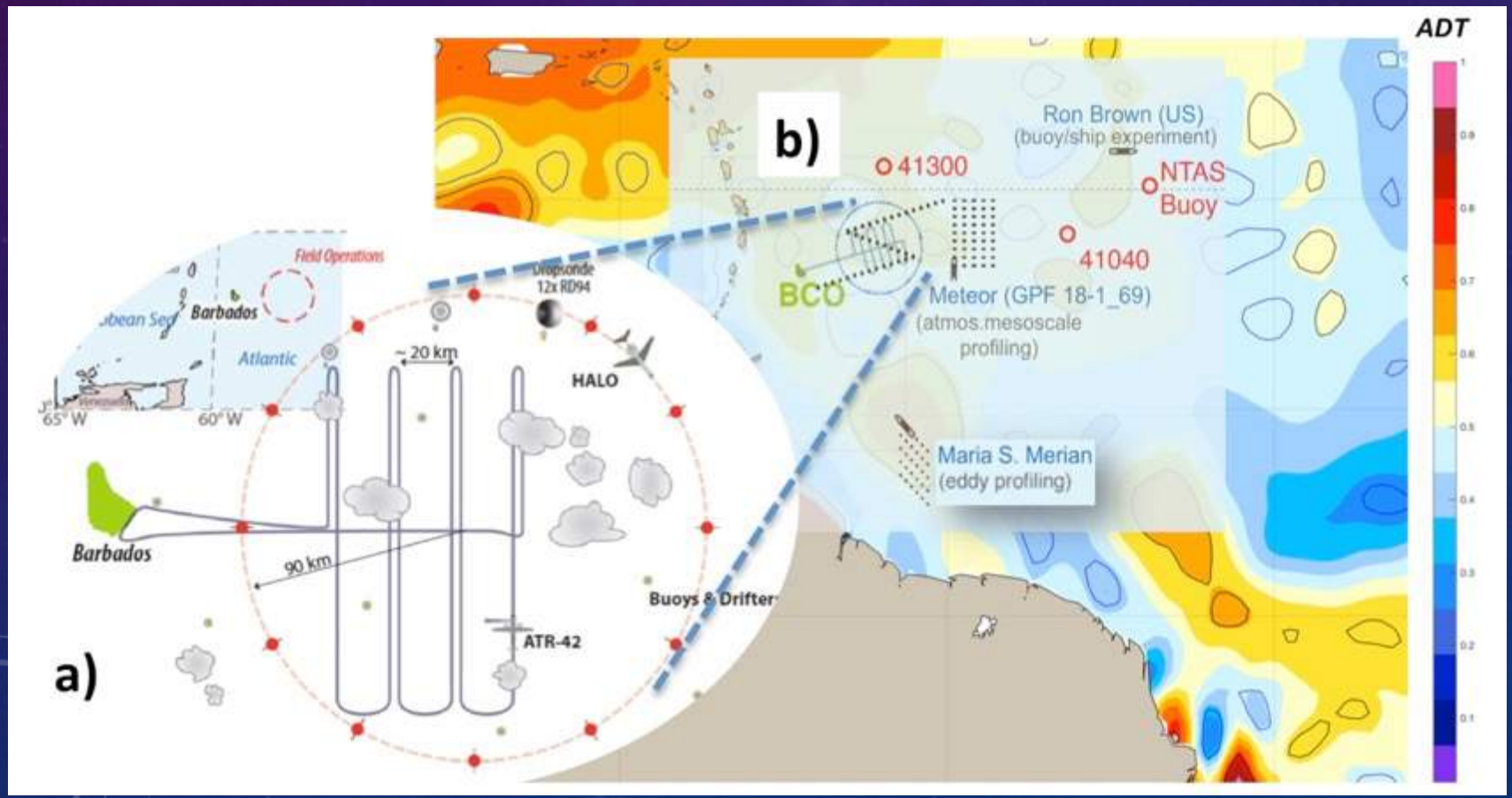
Transit working area one:

- Ships steam in parallel (Intercalibration of instruments, vertical vorticity-ocean) – 1 day

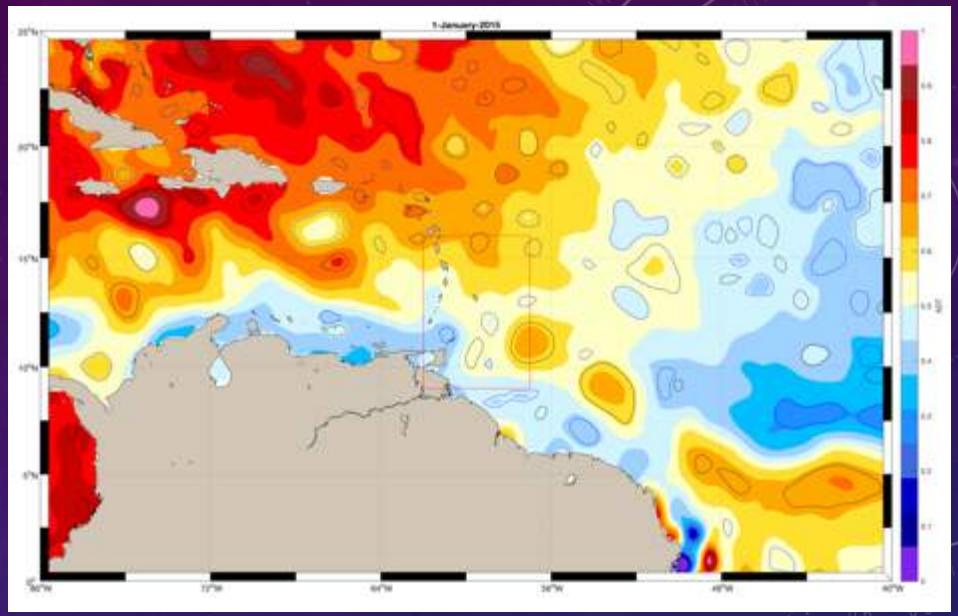
- Cloud evolution/life-cycle experiment (Concerted activity with Ship 1+ and aircraft surveys) - 7 days

- Mesoscale eddy experiment (South, North Brazil Current Rings) – 22 days

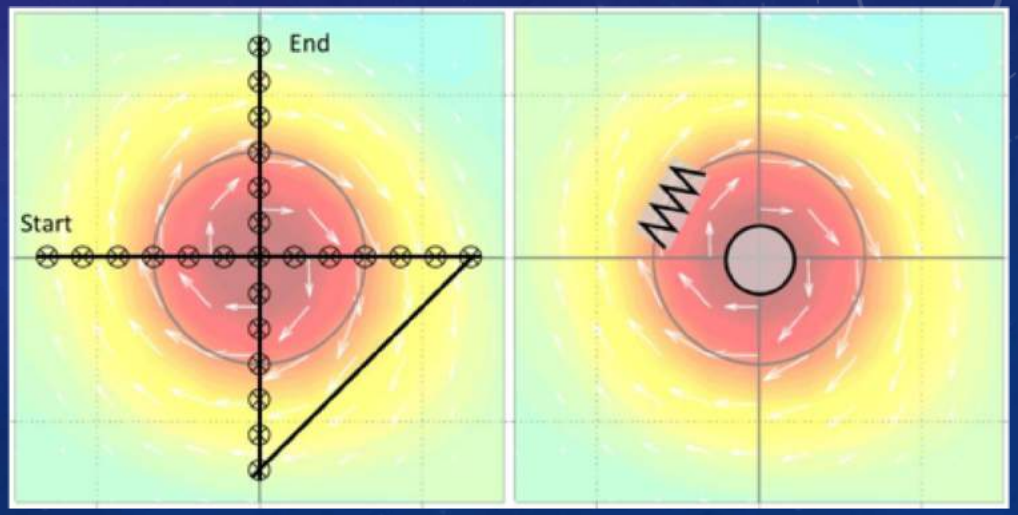
Transit to Bridgetown – 2 days



(SUB-)MESOSCALE SURVEYS



- *Sampling a mesoscale eddy (order 100-200km/10h at 10kn)*
- *Sampling submesoscale: l=0.1–10km in the horizontal, h = 0.01–1 km in the vertical, hours-days in time*
- Ship continuous: ADCP currents, underway hydrography and pCO2?, underway CTD (upper200-500m)
- Ship discrete: CTD/rosette – multiple sensors, Microstructure
- Underwater glider: 1-2kn; upper 1000m max, Microstructure, SUNA Nitrate



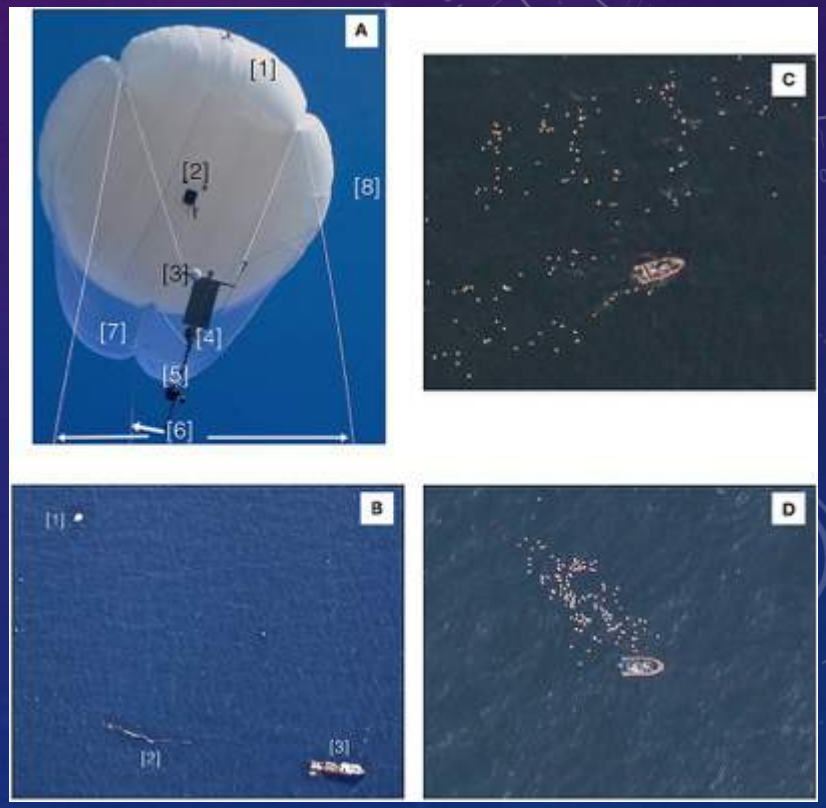
MARIA S MERIAN (PROPOSAL VIEW)

- User:
  Germany: GEOMAR Kiel, MPI-Meteorology Hamburg, MPI-Microbiology (Bremen), MPI-Dynamics/Self-organization (Göttingen), University of Cologne; University of Hamburg
  International: ENS, LMD, LOCEAN
- Period: 18. January 2020 - 20. February 2020
  (Bridgetown - Bridgetown)
- Chief Scientist: Johannes Karstensen, jkarstensen@geomar.de
- Funding (transportation only):
  - University Cologne – 1 x 20” container (radar), 2 boxes (Microwave)
    MPI-DS – 2 x 20” container (cloud kite), 3 boxes
    MPI-MM – 1 x 20” container
    University Hamburg/MPI-M: 2 boxes
    GEOMAR – 2 x 20” container
  - 19 flights: for German participants (return)

IDEA:
NEAR SURFACE FLOW OBSERVATIONS

- Small-scale and high-frequency variability at the air-sea interface
- Ship-Tethered Aerostat Remote Sensing System (STARSS) tracking *biodegradable bamboo dinner plates*
- "STARSS-like set-up" making use of cloud kites?

STARSS images

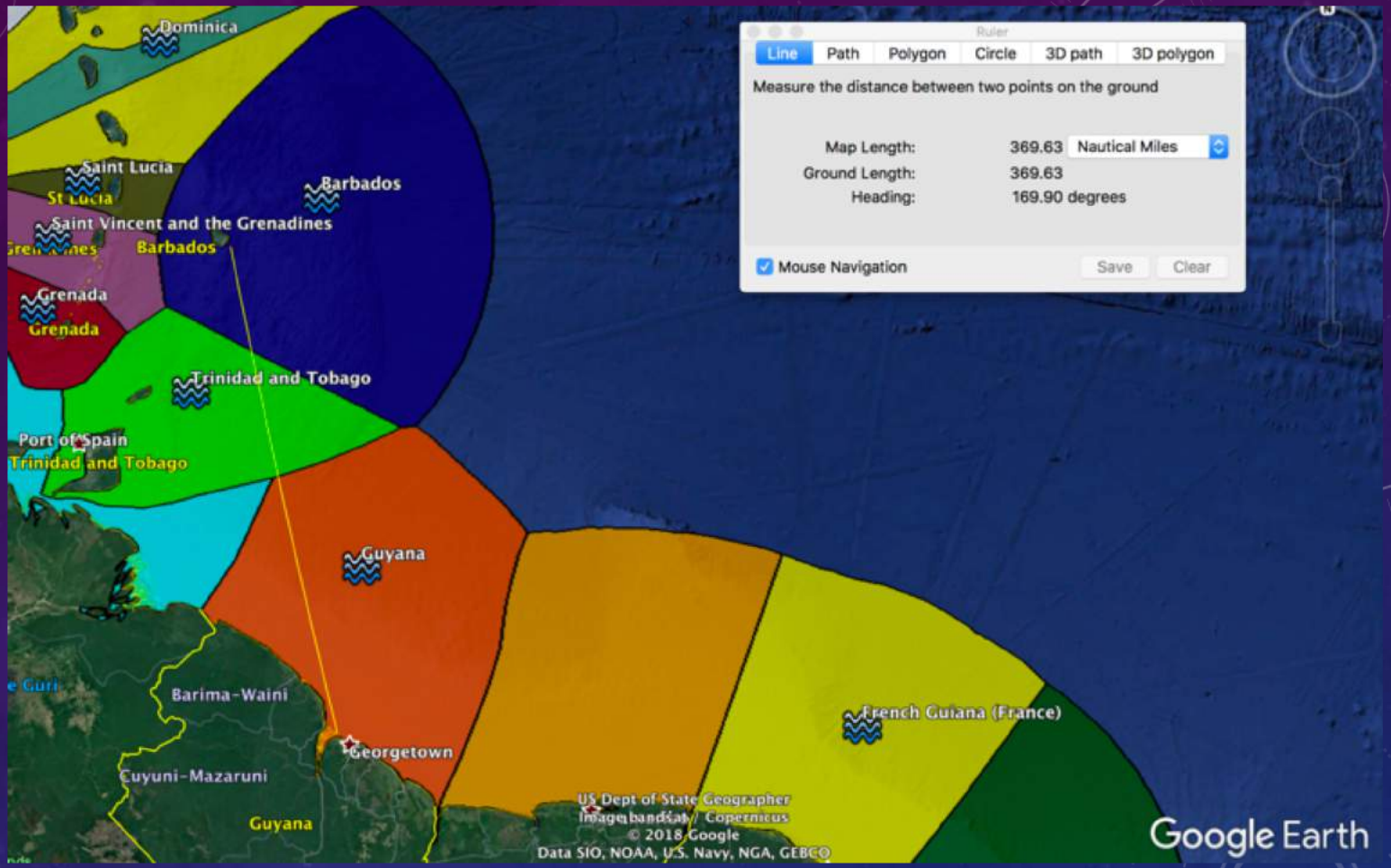


(Carlson et al. 2018; Frontiers)

SHIP INSTALLED EQUIPMENT (SEE MANUAL)

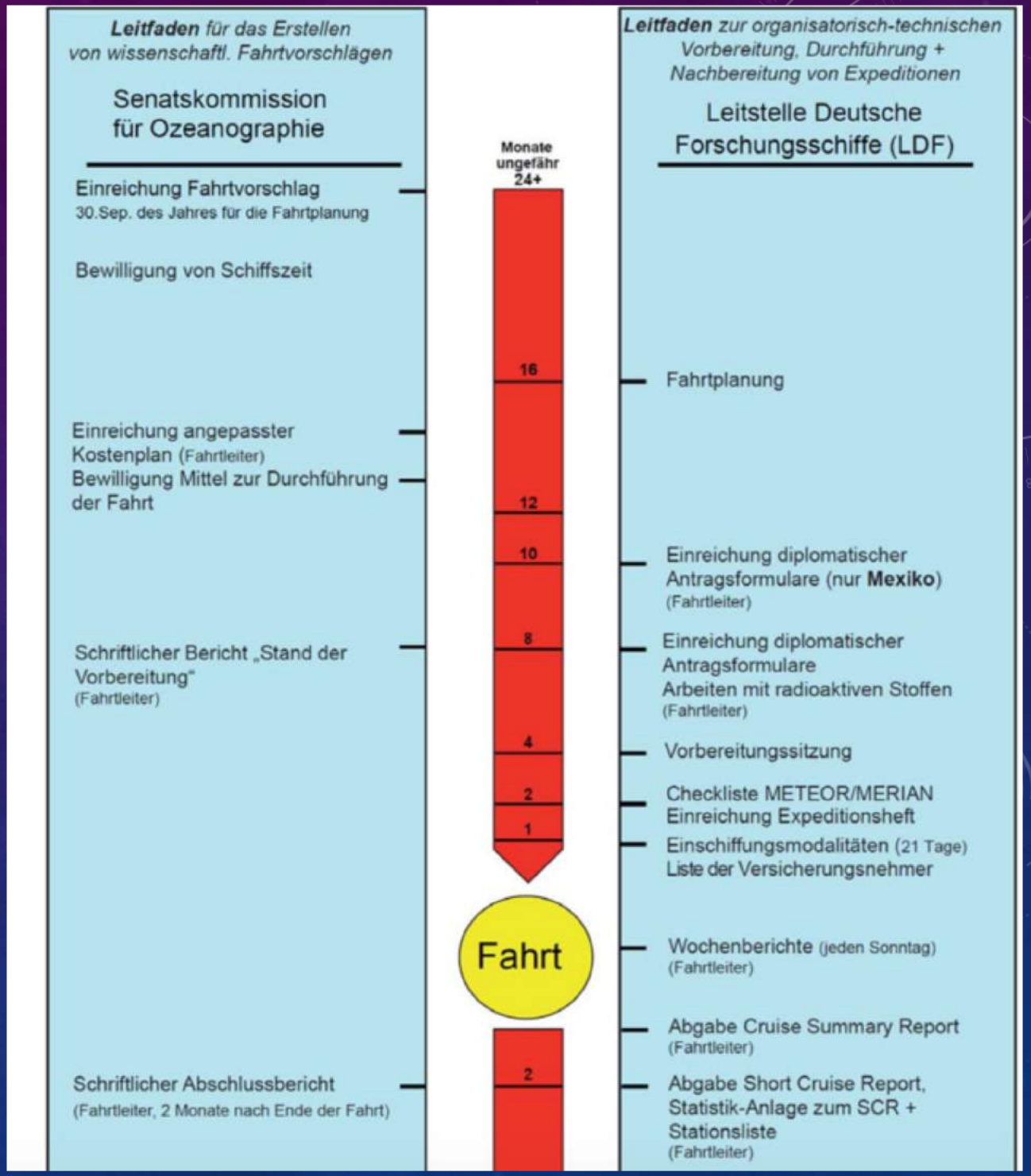
- ADCP 38, 75kHz
- Thermosalinograph
- Winch CTD (up to 5000m)
- Hydrophone
- Internet)
- Autom. Weatherstation & Radiosonde
- Surface waves observations (expertise??)

GENERAL



- Diplomatic clearance (6-8 month before cruise) – all observations must be declared
- Dangerous goods (6 month)
- Safety issues (drones, cloud kites, ...)

TIMELINE SHIP COORDINATION GROUP



TIMELINE SHIP COORDINATION GROUP

***Leitfaden** für das Erstellen von wissenschaftl. Fahrtvorschlägen*

Senatskommission für Ozeanographie

Einreichung Fahrtvorschlag
30.Sep. des Jahres für die Fahrtplanung

Bewilligung von Schiffszeit

Monate ungefähr 24+

16

***Leitfaden** zur organisatorisch-technischen Vorbereitung, Durchführung + Nachbereitung von Expeditionen*

Leitstelle Deutsche Forschungsschiffe (LDF)

Fahrtplanung

From: **LPL Projects + Logistics GmbH**
Gotenstr. 12
20097 Hamburg

Contact: **Klaus Bohn**
Phone: +49 (40) 23 88 03-520
Fax: +49 (40) 23 64 81-520
Email: klaus.bohn@lplogistics.de

MSM71 - MSM74

Subject: Vorbereitungssitzung am 13.11.2017 in Hamburg / Vorschläge Verschiffungstermine für MSM71-74

MSM71 = LAS PALMAS / AN: 04.02.18 / AB: 07.02.18 / FL: KOPP

Anmeldeschluss für evtl. Gefahrgut	05.01.2018
Abholtermin der Container in Kiel	12.01.2018 / morgens
Abfahrtstermin Hamburg	17.01.2018
Ankunftstermin Las Palmas	25.01.2018 >>> 10 Tage vor Ankunft MERIAN
Bemerkungen: 1 x wöchentlich Hamburg / Las Palmas, Transitzeit ca. 8 Tage, in Umladung	

MSM72 = HERAKLION / AN: 27.02.18 / AB: 02.03.18 / FL: HAINBUCHER

Anmeldeschluss für evtl. Gefahrgut	10.01.2018
Abholtermin der Container in Kiel	24.01.2018 / morgens
Abfahrtstermin Hamburg	29.01.2018
Ankunftstermin Heraklion	14.02.2018 >>> 13 Tage vor Ankunft MERIAN
Bemerkungen: 1 x wöchentlich von Hamburg nach Heraklion, Transitzeit ca. 16 Tage, in Umladung	

- Einreichung diplomatischer Antragsformulare (nur **Mexiko**) (Fahrtleiter)
- Einreichung diplomatischer Antragsformulare Arbeiten mit radioaktiven Stoffen (Fahrtleiter)
- Vorbereitungssitzung
- Checkliste METEOR/MERIAN Einreichung Expeditionsheft
- Einschiffungsmodalitäten (21 Tage) Liste der Versicherungsnehmer
- Wochenberichte (jeden Sonntag) (Fahrtleiter)
- Abgabe Cruise Summary Report (Fahrtleiter)
- Abgabe Short Cruise Report, Statistik-Anlage zum SCR + Stationsliste (Fahrtleiter)

TIMELINE S
COORDINAT
GROUP

***Leitfaden** für das Erstellen von wissenschaftl. Fahrtvorschlägen*

***Leitfaden** zur organisatorisch-technischen Vorbereitung, Durchführung + Nachbereitung von Expeditionen*

Coordination Meeting

BRIESE RESEARCH
FORSCHUNGSSCHIFFFAHRT

Port:	ETA:	ETD:
St. John´s	**22.05.2018**	**25.05.2018**

Name of Agency:	**Eimskip**
Postal Address:	33 Pippy Place, Suite 305 St. Johns, NL, A1B 3X2 Canada
E-Mail	tah@einskip.ca
Phone	+1 709 754 7227
Person in charge:	Thordis Thorlacius

From: **LPL Project**
Gotenstr. 12
20097 Hambur

Contact: **Klaus Bohn**
Phone: +49 (40) 23 88
Fax: +49 (40) 23 64
Email: klaus.bohn@lp

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(Fahrtleiter)

- Vorbereitungssitzung
- Checkliste METEOR/MERIAN Einreichung Expeditionsheft
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- Wochenberichte (jeden Sonntag) (Fahrtleiter)
- Abgabe Cruise Summary Report (Fahrtleiter)
- Abgabe Short Cruise Report, Statistik-Anlage zum SCR + Stationsliste (Fahrtleiter)

DATA POLICY

- The ship application include a data policy that need to be followed by the participants:
- The Kiel Data Management Team (KDMT) maintains the Ocean Science Information System (OSIS) as a central information and research data sharing utility for marine research projects at GEOMAR and Kiel University. It is publicly accessible and can be utilized by all cruise participants, including national and international collaborators. OSIS merges information on expeditions, experiments and numerical models with peer review publications and available research data. The view of all information in OSIS is open to the public while access to actual data in ongoing research projects may be restricted for definable periods of time (moratorium). Alternatively the submission status of data files including the responsible investigator as contact person is visible to the public and may foster collaborations with interested researchers.
- Members of the KDMT are active PANGAEA data curators and can assist researchers during preparation of their sample archival and data publication procedures in a World Data Center (e.g. PANGAEA) which will then warrant long-term archival and access to the research data. This data publication process will be based on available files in OSIS and is therefore transparent to all reviewers and other researchers. Cooperation with a world data center and the union for application of International Geo Sample Numbers (IGSN) will make data and samples globally trackable and increase their scientific value and usability. Links to data publishers or principle investigators provide contact information for external scientists.
- The chief scientist and all principal investigators involved in this cruise's research will comply with the time schedule below regulating the availability of all information and all research data and where applicable also of physical samples resulting from this cruise. Following the cruise the KDMT will support and assist researchers in their data management activities.
- Availability of metadata in OSIS (https://portal.geomar.de/osis): 2 weeks after completion of the cruise and related experiments Availability of data in OSIS (https://portal.geomar.de/osis): 6 months after completion of the cruise and related experiments. Availability of data in a WDC/PANGAEA (http://www.pangaea.de or as compilation at http://www.pangaea.de/search?q=campaign:CRUISENAME): 3 years after completion of the cruise and related experiments.