atlas

UNDERSTANDING DEEP ATLANTIC ECOSYSTEMS

WP3: Biodiversity and Biogeography

ATLAS 2nd General Assembly, Maiorca, April 2017

IMAR, Portugal; IEO, Spain; HWU, UK

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Vision

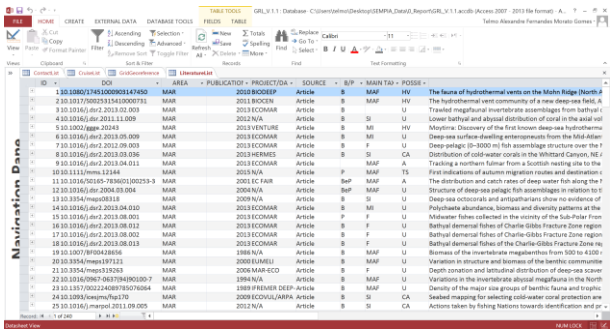
- To bring together existing and new biodiversity data along with results from analysis of North Atlantic circulation (WP1) and ecosystem functioning (WP2)

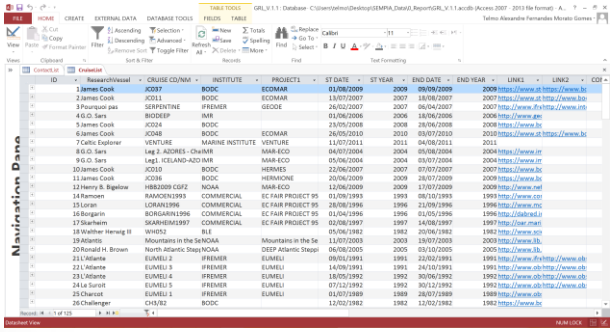
- With the main goal to deepen the understanding of the biodiversity and biogeographic patterns in the deep North Atlantic and forecast changes under future scenarios of water mass structure and ocean currents

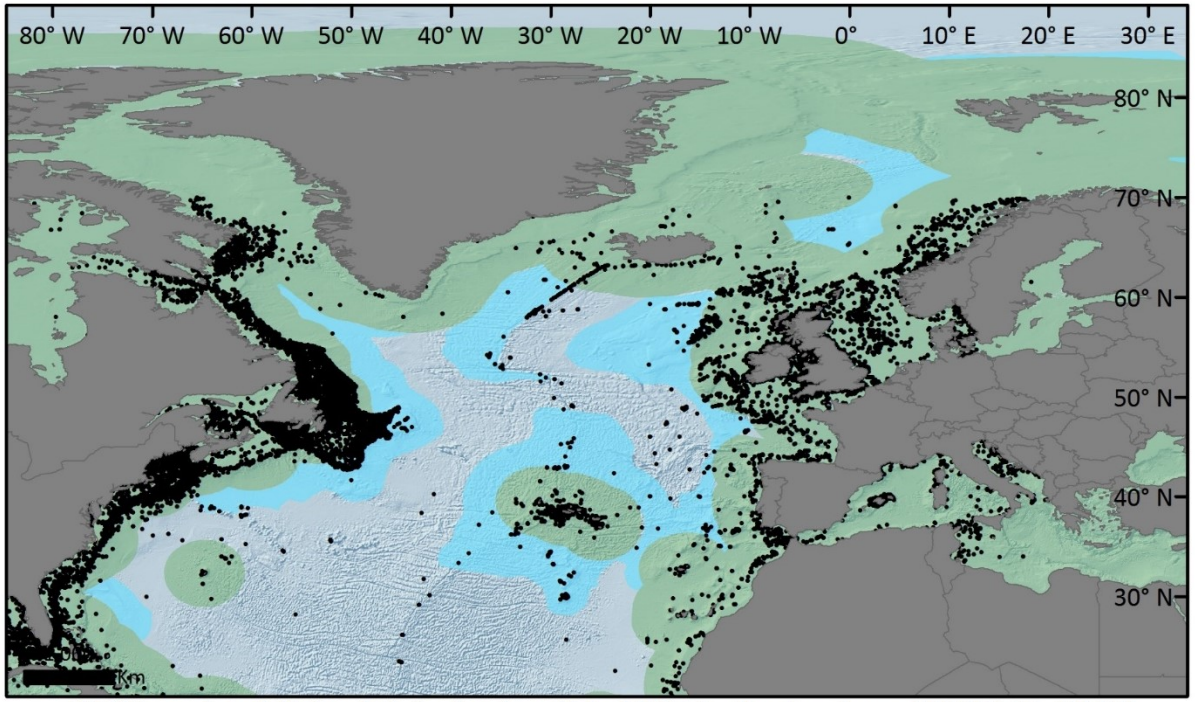
Task 3.1 Improve the understanding of biodiversity and biogeography in the deep N Atlantic (M1-M36)

- Compile existing and new ATLAS data for biodiversity, biogeography, mapping and modelling activities
- Synthesise data on influence of AMOC, N Atlantic gyres, and water mass properties on deep-water biodiversity
- Refine GOODS biogeographic classification scheme

MS3 Database on existing deep-sea biodiversity data in the N Atlantic completed (M10)

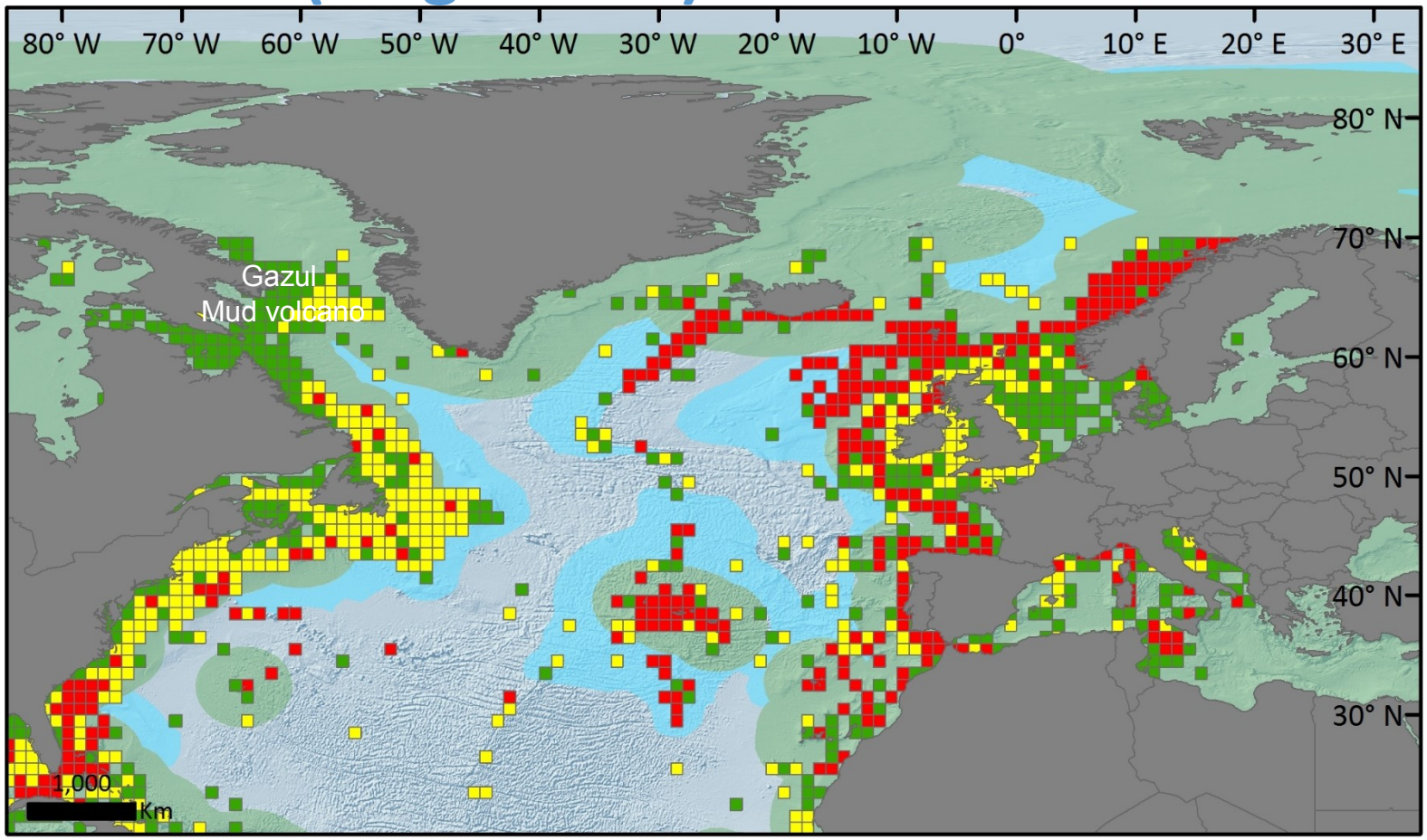




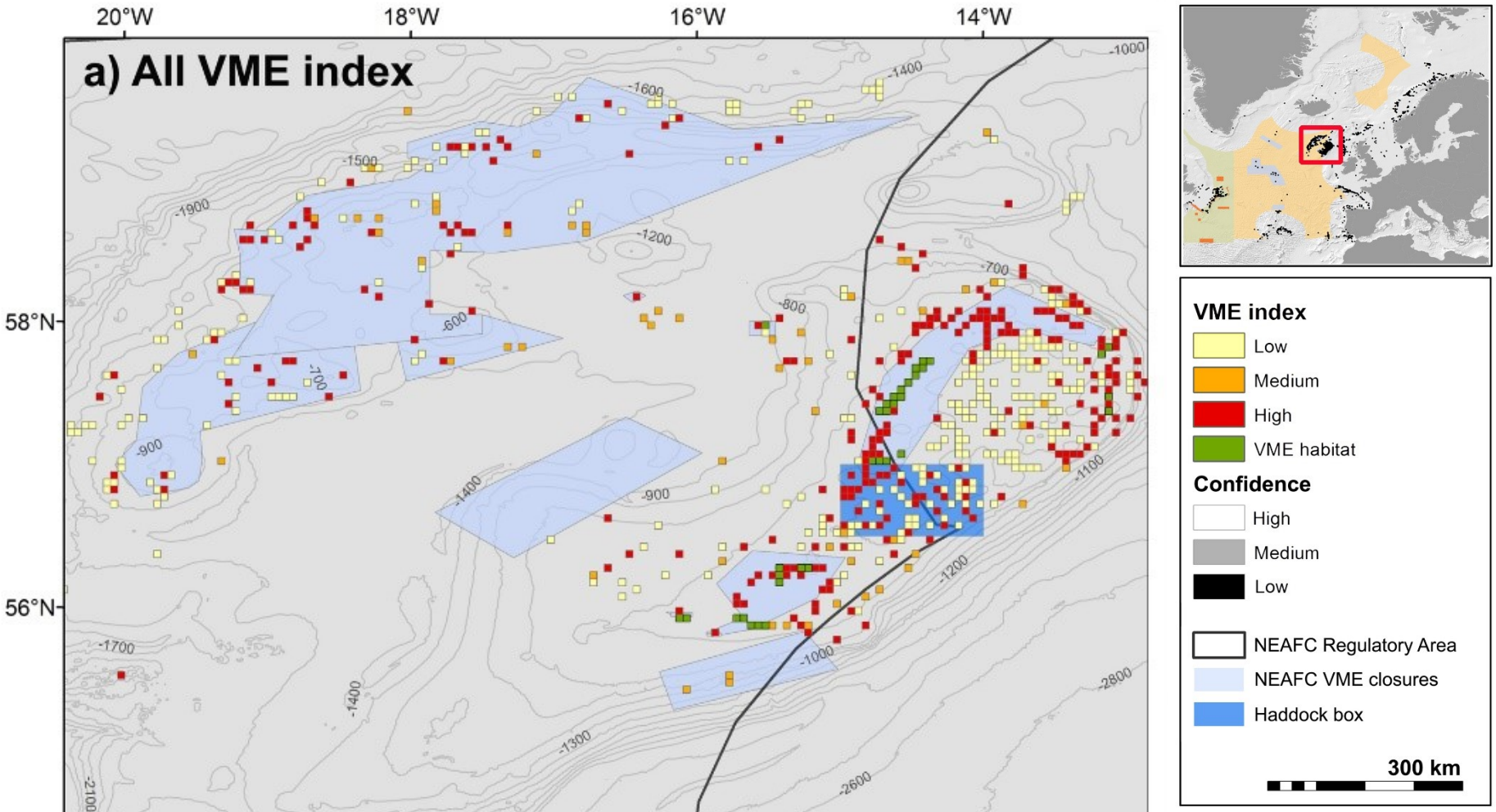


MEDWAVES Cruise

VME Index (Large-scale)



VME Index (Smaller-scale; Rockall Hatton Bank)



Task 3.2 Validate eDNA methods for monitoring and screening deep-sea biodiversity (M1-M36)

- Evaluate the performance of next-generation genomic tools (meta-barcoding of eDNA) for assessing biodiversity
- Evaluate quantitative qPCR (plankton samples) as a sensitive tool to detect and quantify biomass of target species
- Validate the accuracy and sensitivity of meta-barcoding and qPCR on samples assessed using classical taxonomy in selected Case Studies

Task 3.2 Validate eDNA methods for monitoring and screening deep-sea biodiversity (M1-M36)

Mar Biol (2017) 164:112
DOI 10.1007/s00227-017-3141-x

METHOD

Development of a sensitive detection method to survey pelagic biodiversity using eDNA and quantitative PCR: a case study of devil ray at seamounts

Laura M. Gargan[1,2] · Telmo Morato[3] · Christopher K. Pham[3] · John A. Finarelli[2] · Jeanette E. L. Carlsson[1,2] · Jens Carlsson[1,2]

Task 3.3 Conduct biodiversity assessments to measure GES in European Case Studies (M1-M36)

- Improve the definition of GES in the context of deep-sea, and define and agree on descriptor indicators and methodological standards
- Applications of the indicators to data compiled
- Apply the Ecosystem Evaluation Framework to identify locations in the Atlantic that may constitute an EBSA and assign conservation categories as a precursor to the development of an Atlantic wide MPA network

Task 3.3 Conduct biodiversity assessments to measure GES in European Case Studies (M1-M36)

Task 3.4 Predict changes in GOODS and GES under future scenarios of dynamics of N. Atlantic water masses (M24-M48)

- Test the hypothesis that ocean dynamics impact biodiversity and biogeography through three Case Studies
- Conduct SDM and HSM under IPCC 21st scenarios (*or environmental data from WP1 and physiological responses from WP2*) and compare outputs with those created under current ocean conditions
- Predict changes in GOODS biogeography under future scenarios of dynamics of the North Atlantic (*Predict changes in GES of VMEs under future scenarios of dynamics of the North Atlantic*)

Task 3.4 Predict changes in GOODS and GES under future scenarios of dynamics of N. Atlantic water masses (M24-M48)

ELEMENTA Science of the Anthropocene

Sweetman, AK et al 2017 Major impacts of climate change on deep-sea benthic ecosystems. *Elem Sci Anth,* 5: 4, DOI: https://doi.org/10.1525/elementa.203

REVIEW

Major impacts of climate change on deep-sea benthic ecosystems

Andrew K. Sweetman[*], Andrew R. Thurber[†], Craig R. Smith[‡], Lisa A. Levin[§], Camilo Mora[‖], Chih-Lin Wei[¶], Andrew J. Gooday[**], Daniel O. B. Jones[**], Michael Rex[††], Moriaki Yasuhara[‡‡], Jeroen Ingels[§§], Henry A. Ruhl[**], Christina A. Frieder[§,‖‖], Roberto Danovaro[¶¶,***], Laura Würzberg[†††], Amy Baco[‡‡‡], Benjamin M. Grupe[§,§§§], Alexis Pasulka[‖‖‖], Kirstin S. Meyer[¶¶¶,****], Katherine M. Dunlop[*], Lea-Anne Henry[††††] and J. Murray Roberts[††††]

Task 3.4 future sc masses (

REVIEW

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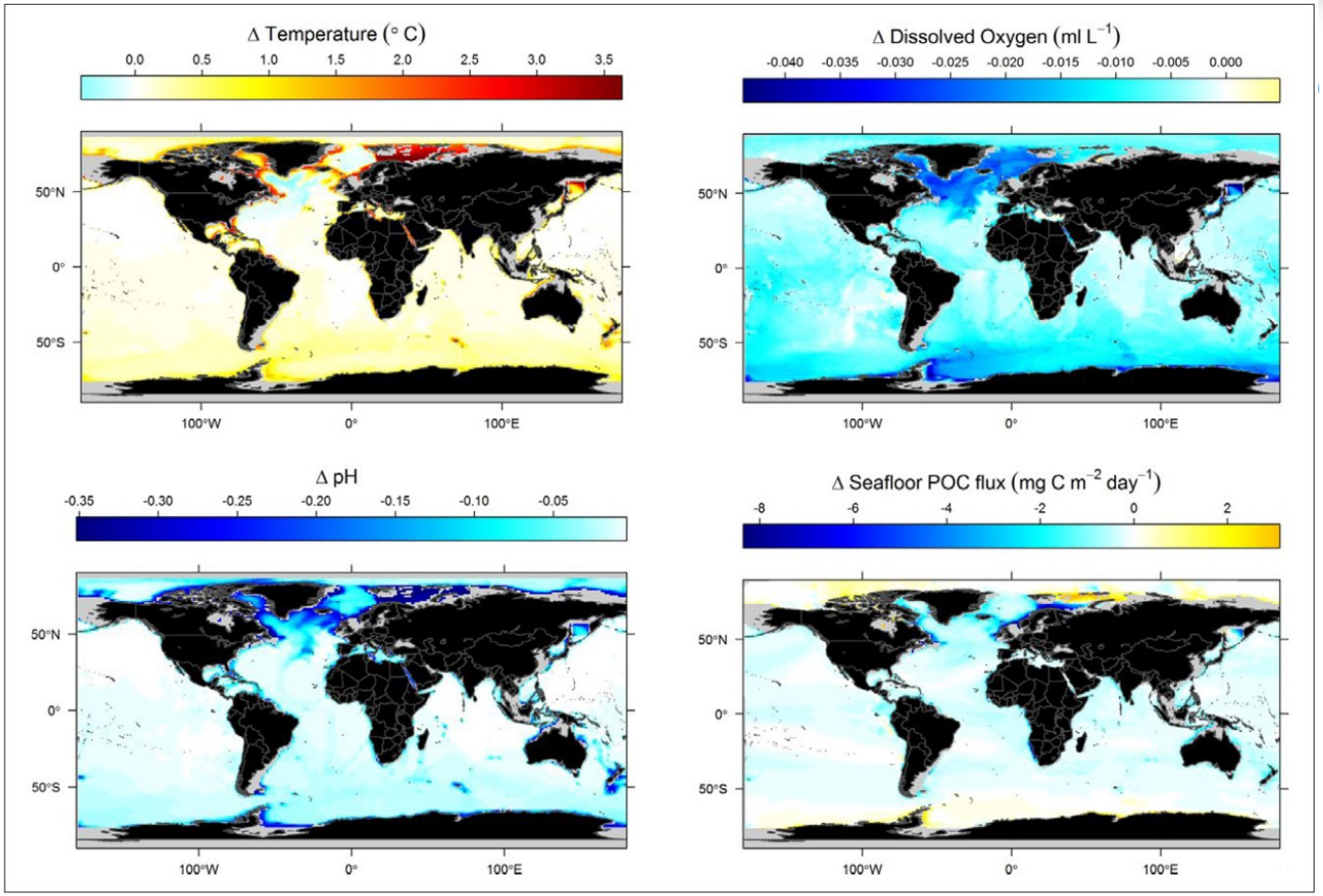

Figure 2: Modelled environmental changes at the deep seafloor in the year 2100. Modeled changes in temperature (°C), dissolved oxygen (mL L^{-1}), pH, and seafloor POC flux (mg C m^{-2} d^{-1}) conditions that could be seen at the at the deep (> 200 m) seafloor by 2100 relative to present-day conditions. DOI: https://doi.org/10.1525/elementa.203.f2

Breakout sessions

Thursday 27 April 2017

12:30 – 13:30 Breakout Session 3

GROUP 1: Planning and standardising SDM and HSM in the context of ATLAS

Lead: Telmo Morato

Location: Sala Es Trenc

ATLAS WP3 will develop SDM and HSM for multiple deep-sea species, biotopes or VMEs under current and future climate scenarios, and at different spatial scales. This breakout group aims at planning ongoing and future SDM/HSM related work, discuss possibilities for standardizing techniques (occurrence data, environmental information and modelling approaches), establish collaborations within the consortium, and discuss possible collaborations outside the consortium.

Breakout sessions

Thursday 27 April 2017

14:15 – 15:15 Breakout Session 4

GROUP 1: Developing an approach for assessing GES in the deep-sea

Lead: Cova Orejas

Location: Sala Es Trenc

Discussion points:

- The Main constraints to addressing GES in the Deep sea:
    1) the lack of baseline data
    2) the remoteness of the DS ecosystems,
    3) the limitations of the sampling methods currently available.
- Defining spatial and temporal scale to assess GES in the Deep Sea.
- Define the type of indicators to be used in the deep sea: previous ones already identified, e.g. in DEVOTES, which can be apply in the DS and specific ones.

Special thanks to all WP3 members

Marina Carreiro Silva

Covadonga Orejas

Lea-Anne Henry

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MapGES Cruise