**Grant Agreement no. 817578 - TRIATLAS**

**Milestone Number:** 4

**Milestone Name:** Initial agreement on common protocols and best practices for data collection (physical, biochemical, acoustics and biological)

**Due Date:** 30.11.2019

**Date Delivered:** 30.11.2019

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**Related WorkPackage(s):** 1,2,3,4,5

**Comment:** On time

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| **Measurement** | **Instrument/Platform** | **Related International Program**  | **Protocols** | **Protocol documentation by** | **WP** |
| General entry |  |  | <https://www.oceanbestpractices.org/> |  |  |
| General entry |  |  | <https://www.go-ship.org/HydroMan.html> |  |  |
| Temperature | CTD from ship | GO-SHIP | <https://www.go-ship.org/HydroMan.html> | G. Krahmann | 1 |
| Salinity | CTD from ship | GO-SHIP | <https://www.go-ship.org/HydroMan.html> | G. Krahmann | 1 |
| Currents | sADCP and lADCP | GO-SHIP | <https://www.go-ship.org/HydroMan.html> | G. Krahmann | 1 |
| Turbulence | Microstructure | https://microstructure.ucsd.edu/MacKinnon, et al. (2017)  | Schafstall et al. 2010 | M. Dengler | 1 |
| SST | satellite |  | not relevant, used as given | n.a | 1 |
| SSS | satellite |  | not relevant, used as given | n.a | 1 |
| SLA | satellite |  | not relevant, used as given | n.a | 1 |
| multiple | ARGO buoys | Argo | not relevant, used as given | n.a | 1 |
| multiple | Moorings | PIRATA | not relevant, used as given | n.a | 1 |
| multiple | Moorings | others | See calibration procedures for relevant parameters. Sensors (e.g. T, S, oxygen) should be attached to a CTD prior and after deployment and values compared to this reference. Calibration stops at different depth are recommended. | R. Kiko | 1 |
| Oxygen | CTD SBE |  | <https://www.go-ship.org/Manual/McTaggart_et_al_CTD.pdf> | R. Kiko | 2 |
| Oxygen | Winkler on Niskin bottle samples |  | <https://www.go-ship.org/Manual/Langdon_Amperometric_oxygen.pdf> | R. Kiko | 2 |
| Nutrients | CTD Niskin bottle, profiling sensors on CTD |  | https://www.go-ship.org/Manual/Hydes\_et\_al\_Nutrients.pdf ; profiling sensors should be calibrated using niskin bottle data | P. Croot | 2 |
| Chl a from fluorometer | CTD Niskin bottle, profiling sensors on CTD |  | Protocols for the Joint Global Ocean Flux Study (JGOFS) core measurements, UNESCO (1994).https://www.nodc.noaa.gov/archive/arc0001/9900162/2.2/data/0-data/jgofscd/Files/protocols/chap13.html | E. Marañón | 2 |
| Size fractionnated Chl a | CTD Niskin bottle |  | CALCOFI Methods Manual http://cce.lternet.edu/data/methods-manual/augmented-cruises/chlorophyll-a-size-fractionation | E. Marañón | 2 |
| Ocean colour phytoplankton | Satellite | <http://marine.copernicus.eu/services-portfolio/access-to-products/?option=com_csw&view=details&product_id=OCEANCOLOUR_GLO_CHL_L4_REP_OBSERVATIONS_009_082> |  | P. Croot | 2 |
| Primary productivity | Satellite | <http://orca.science.oregonstate.edu/1080.by.2160.monthly.hdf.vgpm.v.chl.v.sst.php> | Behrenfeld and Falkowski1997 | P. Croot | 2 |
| Flow cytometry/Bacteria | CTD Niskin bottle |  | Marie et al. 2001 | P. Croot | 2 |
| Flow cytometry/Pico&Nano | CTD Niskin bottle |  | Marie et al. 2001 | P. Croot | 2 |
| Flow cytometry / HNF | CTD Niskin bottle |  | Rose et al. 2004, Christaki et al. 2011 | P. Croot | 2 |
| Phytoplankton biovolume and biomass | CTD Niskin bottle |  | HELCOM Manual on phytoplankton biovolume http://www.helcom.fi/Lists/Publications/BSEP106.pdf | E. Marañón | 2 |
| Phytoplankton size spectra | CTD Niskin bottle |  | Huete-Ortega et al. 2010 | E. Marañón | 2 |
| Primary productivity | CTD Niskin bottle |  | Hernández-Hernández et al. 2018 | J. Aristegui | 2 |
| Particle abundance | UVP5 on CTD |  | Picheral et al. 2010 | R. Kiko | 2 |
| Plankton biomass / size spectra | UVP5 on CTD |  | Picheral et al. 2010 | R. Kiko | 2 |
| Zooplankton biomass / size spectra / composition | Nets |  | <https://www.sciencedirect.com/book/9780123276452/ices-zooplankton-methodology-manual> | R. Schwamborn | 2 |
| Acoustic backscatter (focus on zooplankton) | ADCP |  | Mullison 2017 | R. Kiko | 2 |
| Acoustic backscatter (focus on zooplankton) | Acoustic Zooplankton Fish Profiler | NA | <https://aslenv.com/azfp-processing.html> | S. Hernández León | 2 |
| Electron Transport System activity | Rate measurement on caught zooplankton | NA | Pdf available on request | Santiago Hernández León | 2 |
| Zooplankton gut fluorescence | Measurement on caught zooplankton | NA | Pdf available on request | Santiago Hernández León | 2 |
| Acoustic backscatter (focus on fish) | Echosounders other than ADCP and AZFP | NA | <http://www.mesopp.eu/wp-content/uploads/2019/01/D3.1-MESOPP_18-0003-Report-of-acoustic-processing-routines-and-quality-checking-methods.pdf> | Tim Dudeck | 3 |
| Fish biomass, size spectra and composition | Nets | NA | Fock and Ehrich 2010, https://mar-eco.no/sci/component\_projects/pelagic\_nekton/hamburg\_pelagic\_fishes\_database\_available\_to\_mar-eco\_users.html | Henrike Andresen | 3 |
| Stable isotopes | Measurement on caught fish |  | Schwamborn and Giarrizzo 2015 | Ralf Schwamborn | 3 |
| Individual movement (focus on seabirds) | Tagging with GPS/Dive sensor/3D accelerometer | NA | Nunes et al. 2018 | S. Bertrand | 3 |
| Otoliths | Measurement on caught fish |  | **Otolith chronologies:**(1) Morrongiello and Thresher 2015(2) Smoliński and Mirny 2017**Otolith isotope analysis:**(1) Grønkjær et al 2013 | M. Wilhelm | 3 |

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| **Further info data submission** | **Further info data submission** | **Tutorial on data submission to Pangaea** |
| <https://wiki.pangaea.de/wiki/Main_Page> | <https://wiki.pangaea.de/wiki/Parameter> | [https://portal.geomar.de/documents/18749/1192630/2018-09-27\_PANGAEA+Data+Submission+Tutorial.pdf/94d2da0e-256b-40ab-b7f6-313144b88823](https://portal.geomar.de/documents/18749/1192630/2018-09-27_PANGAEA%2BData%2BSubmission%2BTutorial.pdf/94d2da0e-256b-40ab-b7f6-313144b88823) |

**Abbreviations:**

GO-Ship: Global Ocean Ship-Based Hydrographic Investigation Program

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