

# GO-SHIP Repeat Hydrography Manual: A Collection of Expert Reports and Guidelines

IOCCP Report No. 14

ICPO Publication Series No. 134

Version 1.1, 2019







## GO-SHIP Repeat Hydrography Manual: A Collection of Expert Reports and Guidelines IOCCP Report Number 14 ICPO Publication Series Number 134

#### ACKNOWLEDGEMENTS

Support for GO-SHIP is provided by the IOC-SCOR International Ocean Carbon Coordination Project (IOCCP) and the WCRP Climate Variability and Predictability Project (CLIVAR). Major financial support for this project is provided by the U.S. National Science Foundation through a grant to UNESCO - IOC (OCE - 0715161) and to the Scientific Committee on Oceanic Research (OCE – 0608600 and OCE - 0938349) for the IOCCP.

For bibliographic purposes, this collection that should be cited as:

Hood, E.M., C.L. Sabine, and B.M. Sloyan, eds. 2010. *The GO-SHIP Repeat Hydrography Manual: A Collection of Expert Reports and Guidelines.* IOCCP Report Number 14, ICPO Publication Series Number 134. Available online at http://www.go-ship.org/HydroMan.html.

Individual chapters written for this collection should be cited as:

Lastname1, A., B. Lastname2, C. Lastname3. 2010. Chapter Title. In *The GO-SHIP Repeat Hydrography Manual: A Collection of Expert Reports and Guidelines*. Hood, E.M., C.L. Sabine, and B.M. Sloyan, eds. IOCCP Report Number 14, ICPO Publication Series Number 134. Available online at: <a href="http://www.go-ship.org/HydroMan.html">http://www.go-ship.org/HydroMan.html</a>.

Individual chapters previously published elsewhere should use the original citation accompanying the chapter.

#### **Updates in Version 1.1:**

Recommendations for the Determination of Nutrients in Seawater to High Levels of Precision and Inter-Comparability using Continuous Flow Analysers (Hydes et al., 2010)

was superceeded by:

The precise and accurate determination of dissolved inorganic nutrients in seawater; Continuous Flow Analysis methods and laboratory practices (Becker et al., 2019)

### **CONTENTS**

Introduction Preface to the First Edition
B.M. Sloyan and C.L. Sabine Introduction to the Collection of Expert Reports and Guidelines[pdf 164KB] E.M. Hood
<b>Data Acquisition Overview</b> Reference Quality Water Sample Data: Notes on Data Acquisition[pdf 2.2MB]  J.H. Swift
Mothods for Water Sampling and Analysis
Methods for Water Sampling and Analysis  Method for Salinity (Conductivity Ratio) Measurement[pdf 300KB]
T. Kawano
The precise and accurate determination of dissolved inorganic nutrients in seawater;
Continuous Flow Analysis methods and laboratory practices[Web]
S. Becker, M. Aoyama, E.M.S. Woodward, K. Bakker, S. Coverly, C. Mahaffey,
and T. Tanhua
Determination of Dissolved Oxygen in Seawater by Winkler Titration Using the
Amperometric Technique
C. Langdon
Guide to Best Practices for Ocean CO2 Measurement (2008)[Web]  A. G. Dickson, C.L. Sabine, and J. R. Christian
Sampling and Measurement of Chlorofluorocarbon and Sulfur Hexafluoride in
Seawater
J.L Bullister and T. Tanhua.
Collection and Measurement of Carbon Isotopes in Seawater DIC[pdf 500KB]
A.P. McNichol, P.D. Quay, A.R. Gagnon, and J.R. Burton
Sampling and Measuring Helium Isotopes and Tritium in Seawater[pdf 290KB]
W. J. Jenkins, D. E. Lott, K. Cahill, J. Curtice, P. Landry
CTD Methods  Notes on CTD/O. Data Apprication and Propagating Using Seekind Handware and
Notes on CTD/O <sub>2</sub> Data Acquisition and Processing Using Seabird Hardware and Software (as Available)
K. E. McTaggart, G. C. Johnson, M. C. Johnson, F. M. Delahoyde,
and J. H. Swift
CTD Oxygen Sensor Calibration Procedures
H. Uchida, G.C. Johnson, and K.E. McTaggart
Calculation of the Thermophysical Properties of Seawater (2010)[pdf 6MB]
T.J. McDougall, R. Feistel, D.G. Wright, R. Pawlowicz, F.J. Millero,
D.R. Jackett, B.A. King, G.M. Marion, S. Seitz, P. Spitzer, and C-T.A. Chen
A Manual for Acquiring Lowered Doppler Current Profiler Data[pdf 2.14MB]
A.M. Thurnherr, M. Visbeck, E. Firing, B.A. King, J.M. Hummon,
G. Krahmann, and B. Huber

<b>Underway Measurements</b>	
Ship-mounted Acoustic Doppler Current Profilers	[pdf 160KB]
E. Firing and J.M. Hummon	
A Guide to Making Climate Quality Meteorological and Flux Measurements at Sea	
(2006)	[pdf 3.3MB]
F. Bradley and C. Fairall	
IHO Standards for Hydrographic Surveys (2008)	[pdf 700KB]
International Hydrographic Organization	