

Joint SCOR/IAPSO/IAPWS Committee on the Properties of Seawater (JCS)

Report to SCOR and IAPSO on JCS Activities July 2013-June 2014

Membership

Executive

Rich Pawlowicz (Chair)	Canada
Rainer Feistel Vice-chair	Germany
Trevor J. McDougall (Vice-chair)	Australia

Salinity/Density Subgroup

Frank J. Millero	USA
(Rich Pawlowicz)	Canada
Steffen Seitz	Germany
Hiroshi Uchida	Japan
Stefan Weinreben	Germany

Youngchao Pang

China ← NEW MEMBER

pH Subgroup

Maria Filomena Camoes	Portugal
Andrew Dickson	USA
Petra Spitzer	Germany

Relative Humidity Subgroup

Olaf Hellmuth	Germany
Jeremy Lovell-Smith	New Zealand

Thermodynamics

(Rainer Feistel)

Numerical Modelling and Applications

(Trevor J. McDougall)

Software

Paul Barker	Australia
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Industry Representatives

Paul Ridout (OSIL)	UK
Barbara Laky (Anton Paar)	Austria

Meetings

JCS met as a full group for several workshops at the 2013 International Conference on the Properties of Water and Steam (Greenwich, UK, Sept 2013). For each workshop, a set of tasks were defined in support of efforts to make SI traceable definitions for seawater salinity, pH, and the relative humidity of moist air. Partial meetings of the Salinity/Density and pH subgroups also took place at the ENV05

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final meeting (Berlin, June 2014) to discuss these tasks.

Activities

1. Sept 2013 – JCS workshops on Salinity/density, pH, and RH and 2013 International Conference on the Properties of Water and Steam (Greenwich, UK, Sept 2013)
2. Sept. 2013 – Seabird Electronics releases TEOS-10 support for their SBEDataProcessing software (assistance PB).
3. Nov 2013 - RF circulates draft of BIPM position paper.
4. Dec 2013 – release of v3.04 of GSW toolbox (includes gas solubilities and many sea-ice-related functions) (PB, TM)
5. April 7-11 2014 - RP attends BIPM/CCQM meeting (includes other members of pH and salinity./density subgroups) to work on SI traceability
6. May 19-23 - RF attends BIPM/CCT meeting (includes other members of RH subgroup) to work on SI traceability.
7. May 2014 - RF circulates draft of BIPM position paper.
8. June 16-17 2014 – EURAMET ENVO5 project has workshop (Berlin), many ENVO5 members are also in JCS, discussions of pH/salinity (also attending, RP, HU, AD).
9. June 23-27 2014 – IAPWS Annual meeting (Moscow), OH report, edit and re-release of ICRN 16 on Properties of Seawater

Web site

www.teos-10.org is getting 1500-2000 visitors per month with 24574 “unique views” since Oct 2010.

Web site Item	Unique downloads June 2011-June 2013	Unique downloads June 2013-June 2014
Manual	920	360
Getting Started	879	362
Slides	704	284
Primer	584	197
GSW_MATLAB_v3_0	1920	1102
GSW_FORTRAN_v3_	366	222
GSW_C_v3_0	202	84
GSW_PHP	-	55
SIA_VB_V3_0	72	100
SIA_FORTRAN_V3_0	59	118

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Other Progress

1. TM working with several modelling groups (MOM, NEMO) to add TEOS-10 support.
2. FM preparing paper summarizing all open-ocean density anomaly measurements.
3. RP/FM carry out density anomaly measurements in N. Pacific (Line-P program).
4. HU and FM continuing measurements of density in SSW batches.

Papers published

1. Kretzschmar, H.-J., Feistel, R., Wagner, W., Miyagawa, K., Harvey, A.H., Cooper, J.R., Hiegemann, M., Blangetti, F.L., Orlov, K. A., Weber, I., Sinch, A., and Herrmann, S., The IAPWS Industrial Formulation for the Thermodynamic Properties of Seawater, Desalination, doi: 10.1080/19443994.2014.925838 (2014).
2. IAPWS Certified Research Need – ICRN 16, Thermophysical Properties of Seawater, revised and re-issued June 2014, International Association of the Properties of Water and Steam (2014).
3. McDougall, T.J., Barker, P., Feistel, R., Galton-Fenzi B. K., Melting of Ice and Sea Ice into Seawater and Frazil Ice Formation, *J. Phys. Oceanog.*, 44, 1751-1775, (2014)

Papers in Preparation:

1. Metrological challenges for measurements of key climatological observables: Oceanic salinity and pH, and atmospheric humidity, R Feistel, R Wielgosz, S A Bell, M F Camoes, J R Cooper, P Dexter, P Fisticaro, D P Gatley, A H Harvey, M Heinonen, O Hellmuth, N Higgs, H-J Kretzschmar, J W Lovell-Smith, T J McDougall, R Pawlowicz, S Seitz, P Spitzer, D Stoica and H Wolf. (Position paper on future cooperation activities between BIPM and IAPWS, to be published in *Metrologia*)
2. Kretzschmar, H.-J., Feistel, R., Wagner, W., Miyagawa, K., Harvey, A.H., Cooper, J.R., Hiegemann, M., and Herrmann, S. (proposers): Advisory Note No. 5: Industrial Calculation of the Thermodynamic Properties of Seawater. The International Association for the Properties of Water and Steam, Greenwich, UK, September 2013, in preparation
3. Fiestel, R., Lovell-Smith, J., Hellmuth, O., A Virial equation for the Fugacity of Water in Humid Air, for *Int. J. of Thermophysics*.

R. Pawlowicz

JCS chair, July 15, 2014