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

Report to SCOR and IAPSO on JCS Activities June 2016-May 2017

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
Henning Wolf	Germany
pH Subgroup	
Maria Filomena Camoes	Portugal
Andrew Dickson	USA
Daniela Stoica	France
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
Industry Representatives	
Richard Williams (OSIL)	UK
Barbara Laky (Anton Paar)	Austria

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Meetings

JCS did not meet as a full group in 2016-17. However, 6 JCS members did attend the 2016 IAPWS Annual Meeting in Dresden, Germany (Sept 11-16, 2016), including new member RW, head of the Standard Seawater Service, and 2 members attended the 2016 International Symposium on Stratified Flows (San Diego, Aug 29-Sept 1, 2016).

Web site

JCS maintains a web site at www.teos-10.org. This site gets 1400-2700 visitors per month (8560 in the past year, with 55689 "unique views" since Oct 2010). Annual downloads have decreased slightly in the last year compared to the previous two.

Web site Item	**Unique downloads June 2011-June 2013**	**Unique downloads June 2013-June 2014**	**Unique downloads June 2014-June 2015**	**Unique downloads June 2015-June 2016**	**Unique downloads June 2016-June 2017**
Manual	920	360	535	552	418
Getting Started	879	362	558	547	427
Slides	704	284	374	318	219
Primer	584	197	289	297	222
GSW_MATLAB_v3_0	1920	1102	1485	1814	1235
GSW_FORTRAN_v3_	366	222	171	162	127
GSW_C_v3_0	202	84	133	151	85
GSW_PHP	-	55	61	43	29
SIA_VB	72	100	46	45	45
SIA_FORTRAN	59	118	58	44	36

Other Progress

1. SIA software version 3.01.3 and 4.0.1 released.

2. RF attends BIPM CCT meetings for WG-Hu with support of IAPWS, and for the plenary session (Sevres, France) May 29-June 2 2017 to discuss the redefinition of Humidity on a thermodynamic basis, supporting SI traceability. An explicit proposal (Publication [1]) was presented and well-received, two subsequent companion papers on measurement principles and requisite equations are now in preparation. A detailed plan was also developed by WG-Hu to work towards inclusion of relative humidity in a future version of the SI brochure as

an example of a dimensionless quantity.

3. JCS writes support letter for a multi-institutional proposal related to JCS tasks; however, it is not funded.

4. The 4 Metrologia review papers published in January 2016 continue to be heavily downloaded, especially part 4 on relative humidity, although the rate for all has noticeably decreased since the end of open access at the end of 2016. As of 30/5/2017:
   Part 1: Overview – 3438 downloads (986 since 31/5/2016)
   Part 2: Salinity – 2195 downloads (671 since 31/5/2016)
   Part 3: pH – 2209 downloads (687 since 31/5/2016)
   Part 4: RH – 4579 downloads (1807 since 31/5/2016)
   total: 12421
5. RP/HU carried out a second set of density anomaly measurements in Canadian Arctic Archipelago (w/ K. Brown, WHOI – July 2016).
6. FM carried out density anomaly measurements over the East Pacific Rise (April 2017).
7. SW continued a decadal series of measurements of density anomalies in the Baltic.
8. HU, FM, HW are continuing measurements of density in SSW batches; this information will be collated in a planned publication.
9. HW, HU, SW, RP are still writing the 'Best Practices Guide for seawater Density Measurements' (still at version 13).
10. SS is still investigating instrument effects on conductance measurements.
11. BL reports an accredited lab for density measurements.
12. FC, DS, SS and others continue work along the lines of last year's publications, and are particularly engaged in a) measurement of alkalinity, b) uncertainty budgets and traceability, and c) education actions and tools on pH (https://iupac.org/projects/project-details/?project_nr=2013-013-1-500)
13. AD continues to provide seawater buffers for pH.
14. Through working with SCOR WG 145, in which he is a member, AD and two others are now funded for a 3 year program of work including developing a Pitzer model to estimate activity coefficients for Tris buffers in seawater (coordinating with SS, DS, and others) .
15.

Papers published

1. R. Feistel, J. W. Lovell-Smith, Defining Relative Humidity in terms of Water Activity. Part 1: Definition. Accepted by Metrologia, May, 2017.

2. P. M. Barker and T. J. McDougall, Stabilising hydrographic profiles with minimal change to water masses, accepted by Journal of Oceanic and Atmospheric Technology, May, 2017.

3. T. J. Mcdougall, S. Groeskamp, S. M. Griffies, Comment on Tailleux, R. Neutrality versus

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Materiality: A Thermodynamic Theory of Neutral Surfaces, Fluids 2016, 1,32, Fluids, Fluids 2017,2,19: doi:10.3390/fluids2020019

R. Pawlowicz

JCS chair, June 7 2017