

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

Report to SCOR on JCS Activities Jun 2024-Aug 2025

Membership

JCS Executive			
Rich Pawlowicz (Chair)	Canada		
(temporarily vacant)			
Steffen Seitz (Vice-chair)	Germany		
Salinity/Density Taskgroup		Chemical Speciation Taskgroup	
(Rich Pawlowicz) (Chair)		David Turner (Chair)	Sweden
(Steffen Seitz)		(Simon Clegg)	
Hiroshi Uchida	Japan	Peter Croot	Ireland
Ryan Woosley	USA	Claudia Foti	Italy
Yohei Kayukawa	Japan	Martha Gledhill	Germany
pH Taskgroup		Mathis Hain	USA
Andrew Dickson (Chair)	USA	Pablo Lodeiro	Spain
Maria Filomena Camoes	Portugal	Laura Haffert	Germany
Simon Clegg	UK		
Frank Bastkowski	Germany		
		Expert subgroup: Numerical Modelling	
Relative Humidity Taskgroup		Trevor J. McDougall	Australia
Olaf Hellmuth (Chair)	Germany	Industry Representatives	
Jeremy Lovell-Smith	New Zealand	Richard Williams (OSIL)	UK
Rainer Feistel	Germany	Christine Bachler (Anton Paar)	Austria
Stephanie Bell	UK		
Expert subgroup: Thermodynamics		Expert subgroup: Software	
(Rainer Feistel)		(temporarily vacant)	

*Proposed new member

Meetings

The JCS executive and Taskgroup chairs met with the SCOR executive director and IAPSO President virtually on April 22nd 2025. The chemical speciation taskgroup has held regular virtual meetings over the past year, but no other taskgroups have done so. JCS then held an in-person meeting on July 22 2025 at the IAMA-IACS-IAPSO Joint Assembly in 2025 (Busan, S. Korea), followed by a special session on the Thermophysical Properties of Seawater at that same meeting. A report on that Workshop, along with the significant proposed changes to the structure of JCS has been shared with the SCOR

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Executive Committee. These changes were then circulated to the entire membership of JCS over August 2025, and although the comments received were generally unhappy with the “shrinkage” of JCS under this proposal (rightly pointing out that it would greatly reduce the likelihood of attracting new researchers), no workable alternatives were proposed.

Web site

JCS maintains a web site at www.teos-10.org. This site get around 1000 visitors per month. Annual downloads of most items are stable, with the GSW Matlab toolbox being the most downloaded item (between 1500-2000 times a year). GSW software is also available from a github repository (github.com/TEOS-10) for developers and those interested in contributing to the software. At present, however, the loss of our software subgroup member, who maintained these sites, means that continued upkeep is uncertain, as in the attached document we propose that an archival responsibility be taken over by IAPSO.

Other Progress

- 1) SS and others are involved in a MINKE project related to CTD calibrations.
- 2) RP is part of SCOR WG-172 (on salt intrusions in rivers) and is working towards improvements in the handling of rivers in TEOS-10.
- 3) HU has published several papers on the long-term history, characteristics, and stability of SS, and is continuing this work.
- 4) HU is developing a Multi-parameter Standard Seawater (MSSW).
- 5) YK and HU are working towards absolute density measurement of SSW and MSSW.
- 6) TM gave the Alfred Wegener Medal lecture at the European Geosciences Union (EGU) General assembly (April 2025) on the role of Thermodynamics in Seawater.
- 7) SC has been awarded a 3 year joint NERC-NSF project in collaboration with the National Oceanography Centre UK) and the Monterey Bay Aquarium Research Institute (USA): *Seawater pH: Bridging the Gap Between Free and Total pH Scales From Estuaries to the Deep Ocean, and Application to Current Sensors*. This project will build on the collaboration between the pH and Chemical Speciation Task Groups.

Papers published

- 1) A. Jenkins and R. Williams, **The History of Standard Seawater for Salinity Measurements**, 2025, pg. 117-138, in *Chemical Reference Materials for Oceanography: History, Production, and Certification*. Eds: M. Aoyama, C. Cheong, and A. Murata, Springer Nature, Singapore.
- 2) H. Uchida, M. Oe, and M. Wakita, **History of Batch-to-Batch Comparative Studies of International Association for the Physical Sciences of the Oceans Standard Seawater**, 2025, pg. 139-162, in *Chemical Reference Materials for Oceanography: History, Production, and Certification*. Eds: M. Aoyama, C. Cheong, and A. Murata, Springer Nature, Singapore.
- 3) H. Uchida, M. Wakita, A. Makabe, A. Murata, A. Petrovic, **Changes in the Composition of**

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- International Association for the Physical Sciences of the Ocean Standard Seawater**, 2025, pg 163-189, in *Chemical Reference Materials for Oceanography: History, Production, and Certification*. Eds: M. Aoyama, C. Cheong, and A. Murata, Springer Nature, Singapore.
- 4) H. Uchida, **On Japanese Standard Seawater for Salinity Measurements Used During and After World War II**, 2025, pg 191-201, in *Chemical Reference Materials for Oceanography: History, Production, and Certification*. Eds: M. Aoyama, C. Cheong, and A. Murata, Springer Nature, Singapore.
 - 5) H. Uchida, A. Murata, M. Wakita, H. Mitsuda, Y. Nagasawa, T. Tanaka, etl a., 2025, pg 203-235, **Development of Multiparametric Standard Seawater (MSSW) for CO₂ Parameters, Dissolved Oxygen and Density of Seawater**, 2025, pg. 203-235, in *Chemical Reference Materials for Oceanography: History, Production, and Certification*. Eds: M. Aoyama, C. Cheong, and A. Murata, Springer Nature, Singapore.
 - 6) H. Uchida, M. Wakita, M. Oe, F. Santiago-Mandujano, **Possible Increase in the Practical Salinity of IAPSO Standard Seawater**, *J. Oceanic and Atmospheric Technology*, 42 (7), 745-760, 2025, <https://doi.org/10.1175/JTECH-D-24-0049.1>
 - 7) G. Capitaine, R. Schäfer, F. Bastkowski, D. Stoica, O. Pellegrino, R. Quendera, E. P. Achterberg, T. Wagener, S. L. Clegg, S. Seitz, P. Fisticaro, **pH_T measurements of TRIS buffer solutions in an artificial seawater matrix in the salinity range 5–40 and temperature range 5–40 °C. Part 1: measurements and data fitting**, *Marine Chemistry*, 273, 104551 <https://doi.org/10.1016/j.marchem.2025.104551>
 - 8) B. R. Carter, J. D. Sharp, M. I. García-Ibáñez, R. J. Woosley, M. B. Fong, M. Álvarez, L. Barbero, S. L. Clegg, R. A. Easley, A. J. Fassbender, X. Li, K. M. Schockman, Z. Aleck Wang (2024) **Random and systematic uncertainty in ship-based seawater carbonate chemistry observations**. *Limnology and Oceanography* **69**, 10, 2473-2488.
 - 9) I. Maksimov, T. Asakai, Y. Hibino, and S. L. Clegg (2025) **Activity coefficients of HCl in solutions related to ‘Tris’ buffers in artificial seawater. I. HCl + TrisHCl + H₂O from 1.0 to 5.0 mol kg⁻¹ ionic strength, and from 5 °C to 45 °C**. *J. Chem. & Eng. Data* **70**, 1994-2005.
 - 10) I. Maksimov, T. Asakai, Y. Hibino, and S. L. Clegg (2025) **Activity coefficients of HCl in solutions related to ‘Tris’ buffers in artificial seawater. II. HCl + NaCl + TrisHCl + H₂O, and Tris buffer + NaCl + H₂O, to high ionic strength and from 5 °C to 40 °C.**, *J. Chem. & Eng. Data*. **70**, 3614–3629
 - 11) F. Bastkowski, B. Sander, and S. L. Clegg (2025) **Activity coefficients of HCl in solutions related to ‘Tris’ buffers in artificial seawater. III. Tris buffer + NaCl + H₂O, from 0.2 to 3.25 mol kg⁻¹ ionic strength and from 5 °C to 45 °C**. Submitted to *J. Chem. & Eng. Data*.

R. Pawlowicz

JCS chair, Sept 12 2025