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# *Interactive comment on* "Metrological traceability of oceanographic salinity measurement results" *by* S. Seitz et al.

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Presented manuscript set a goal to evaluate metrological traceability of the oceanographic salinity measurement results with respect to contemporary metrological concepts and will be valuable in the oceanographic community for discussion , especially in the focus of the TEOS-10 practical implementation History of the development of the salinity concept in oceanography has always been a matter of choice of the "conventional reference scale" (VIM 1.29). Introduction of the new measurement methods and principles (VIM2.4-2.5) resulted in adoption of new scales of salinity determination (Hydrographical Tables 1931, International Oceanographic Tables 1966, PSS-1978, TEOS-10) . No matter how "contemporary metrological concepts" will define traceability of salinity measurements results and how salinity scales express units of salin-



ity measurements, only practical methods of indirect salinity measurements can be taken in account for frequent routine observations. From this point of view, any salinity measurements results can be conventionally adopted as SI-compatible with specified level of the uncertainty of measurements made with adopted reference method. For example, quantitative difference between Practical Salinity and recently proposed Reference-Composition Salinity based only on different values of the conventionally adopted reference salinity value of 35 (based on Chlorinity titration determination for PSS-78 or mass fraction measurements for TEOS-10). Comparability of indirect salinity measurements made with different methods and scales now can be estimated with unpractical mass fraction measurements. Problem is only in practical impossibility of direct transferring of estimation of quantity of Reference-Composition Seawater Salinity to quantity of Natural-Composition Seawater Salinity, i.e. make routine salinity measurements for all natural waters without loosing of their metrological traceability Accepting of any models in Absolute Salinity determination leads to "conventional reference scale" and compromises direct mass fraction salinity measurement. Oceanographic community has to decide what is more convenient: to have limited quantity of direct Absolute Salinity observations, or millions of samples of practically achievable Practical Salinity. Conductivity Ratio principle and sophisticated algorithm of the PSS-78 have enough reserves to implement an independent to temperature method of conductometric salinometry, for example, by limiting of temperature of measurements by salinometers to 15°C (i.e. equal to K15 reference standardization temperature) and estimation of anomalies (correction factors) in conductivity ratio of samples, measured with salinometers, set at T=15°C and in situ temperatures . These practical methods are direct realization of the conductivity – salinity scale with limitation of the uncertainties contributed by unknown conductivity to temperature dependence of natural non-reference composition seawater.

Considerations of previous works and references are not complete. Needs more detaled analysis of independent measurements, which were done by A.Poisson (1980), T.Dauphinee(1980) and F.Culkin(1980) for determination of KCl solution primary stan-

dard for the PSS-78. This link authors have missed in evaluation of traceability of K15 to SI .

SSW was never calibrated in practical salinity quantity: "Each Standard Seawater batch is directly traceable to the standard defined KCl solution" - cited from: http://www.oceanscientific.com/PreparationandCalibrationofIAPSOSeawaterStan/tabid/108/[

Misinterpretation of these cornerstones of the PSS-78 leads to future inadequate consequences in evaluation of the traceability of Conductivity Ratio measurement results.

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