{rokbox title=| Differences in pHT for paired measurements using unpurified (UNPUR) and purified (PUR) mCP from the cruises shown in Fig. 1 and listed in Table 1, plotted against pHT measured with PUR mCP and calculated using the Müller and Rehder (2018) (MR18) parameterization :: Image: Authors|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-ocean-acidification-crossroads-garcia-2026-thumb-et-al.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-ocean-acidification-crossroads-garcia-2026-et-al.jpg{/rokbox}

Marta Álvarez, **Maribel I. García-Ibañez**, Rubén Acerbi, **Rocío Santiago-Domenech**, Elisa F. Guallart, Noelia M. Fajar, Lisandro Arbilla ,2026.
Ocean acidification at the crossroads I: Harmonizing unpurifiedand purified meta-cresol purple spectrophotometric pHT measurementsbased on absorbance data.
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Abstract:Consistent monitoring of seawater spectrophotometric pH on the total hydrogen ion scale (pH T) has beenquestioned by an evolving method, with changes in parameterization and the purity of the meta-cresol purple(mCP). Using real seawater samples, we demonstrate that spectrophotometric pHT measurements obtained withunpurified (UNPUR) and purified (PUR) mCP can be harmonized to within 0.003 pH units, the climate-goal threshold. This agreement is only achieved when mCP impurities at 434 nm are quantified for both the UNPUR and PUR mCP, assuming no impurities affect 545 nm absorbances, and impurity-corrected absorbance data at 434 nm are used in the same parameterization to calculate pHT . We applied this approach to a ship-based pHTtime series transitioning from UNPUR to PUR mCP measurements. Our results show that previous claims suggesting that UNPUR mCP underestimates pH T in the upper pH range are misleading, as they were based onthe inappropriate use of absorbances obtained with UNPUR mCP with a parameterization developed for PURmCP. In fact, our data reveal better agreement between UNPUR and PUR pHT in the upper pH range of seawater,while UNPUR mCP tends to overestimate pHT in the lower pH range. These findings highlight the urgent need for the global chemical oceanography community to establish a spectrophotometric pH T method with full trace-ability to the International System of Units (SI), along with affordable and distributed certified reference mate-rials and characterized purified mCP. This work supports the need for harmonization efforts to ensure thereliability of pHT data in global synthesis products.

Keywords:chemical oceanography,instrumentation,measurement method,ocean

acidification,parameterization,seawater.