{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-secondary-crossroads-santiago-2026-thumb-et-al.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-ocean-acidification-secondary-crossroads-santiago-2026-et-al.jpg{/rokbox}

Marta Álvarez, **Maribel I. García-Ibáñez**, Rubén Acerbi, **Rocío Santiago-Domenech**, Elisa F. Guallart, Noelia M. Fajar, Lisandro Arbilla, 2026.
Ocean acidification at the crossroads I: Harmonizing unpurified and purified meta-cresol purple spectrophotometric pHT measurements based on absorbance data.
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Abstract:Consistent monitoring of seawater spectrophotometric pH on the total hydrogen ion scale (pHT) has been questioned 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 with unpurified (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 pHT time series transitioning from UNPUR to PUR mCP measurements. Our results show that previous claims suggesting that UNPUR mCP underestimates pHT in the upper pH range are misleading, as they were based on the inappropriate use of absorbances obtained with UNPUR mCP with a parameterization developed for PUR mCP. 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 pHT method with full traceability to the International System of Units (SI), along with affordable and distributed certified reference materials and characterized purified mCP. This work supports the need for harmonization efforts to ensure the reliability of pHT data in global synthesis products.

Keywords: