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# Re-evaluating Sr/Ca-derived records of post-industrial era warming from the sclerosponge Ceratoporella nicholsoni

Peter Swart (1), Amanda Waite (2), Brad Rosenheim (3), and Angela Rosenberg (2)

(1) University of Miami, RSMAS, MGG, Miami, FL 33149 United States (pswart@rsmas.miami.edu), (2) Angari Foundation, West Pam Beach FL 33401, (3) College of Marine Science, USF, St Petersburg, FL 33701

While the Sr/Ca ratios in the skeletons of sclerosponges appear to be well correlated with water temperature, the measurement of Sr/Ca ratios from several specimens by different workers yields unexpectedly large (up to 4.4 ˚C) increases in temperature over the past 150 years, greater than spatially and temporally averaged observational temperature increases. One possible explanation for the larger than anticipated temperature changes in these samples arises from the calibration between temperature and Sr/Ca which was derived from specimens growing at relatively high temperatures, 26 to 30 ˚C. In order to improve the calibration, we acquired a number of samples of sclerosponges collected from localities and water depths at lower average water temperatures, and combined the Sr/Ca measurements from bulk samples representing the last ∼15 years of growth with the previous calibration dataset. Analysis of these samples reveals that the calibration between the Sr/Ca ratio in sclerosponge skeletons and temperature is better approximated by an exponential curve with a lower slope at cooler temperatures. This is similar to the relationship between Mg/Ca and temperature seen in foraminifera. Application of this equation to published data reduces the increase in temperature reconstructed from Sr/Ca ratios in the deeper-occurring samples to values in better agreement with spatially and temporally gridded observational ocean temperature data sets.