



## **Sea and land surface temperatures, ocean heat content, Earth's energy imbalance and net radiative forcing over the last decade**

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The Earth's global mean surface temperature (GMST) has increased less rapidly since the early 2000s than during the previous decades. Here we investigate the regional distribution of the reported temperature slowdown, focusing on the 2003-2014 decade of most complete global datasets. We find that both land surface temperature (LST) and sea surface temperature (SST) have increased at a rate significantly lower than over the previous decades with small regional differences. While confirming cooling of eastern tropical Pacific during the last decade, our results show that the reduced rate of change is a global phenomenon. We further evaluate the time derivative of full-depth ocean heat content to determine the planetary energy imbalance based on three different approaches: in situ measurements, ocean reanalysis and an indirect measure through the global sea level budget. For the 2003-2014 time span, it is estimated to  $0.5 \pm 0.06 \text{ Wm}^{-2}$ ,  $0.64 \pm 0.04 \text{ Wm}^{-2}$ , and  $0.6 \pm 0.07 \text{ Wm}^{-2}$ , respectively for the 3 approaches. We constrain the ocean heat uptake rates using the EBAF energy imbalance time series from the CERES/TOA project and find significant agreement at interannual scales. Finally, we compute the net radiative forcing of the last decade, considering the radiative feedback from observed GMST and the 3 different rates of the total ocean heat content. We obtain values of  $1.6 \pm 0.19 \text{ Wm}^{-2}$ ,  $1.75 \pm 0.17 \text{ Wm}^{-2}$ , and  $1.70 \pm 0.19 \text{ Wm}^{-2}$ , respectively over 2003-2014. We find no evidence of decrease in the net radiative forcing in the recent years, but rather increase compared to the previous decades.