

Deeper ocean remote sensing and deeper ocean response to climate change and global warming hiatus

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Global warming hiatus refers to the slow-down or even slightly decreasing trend of the mean global surface temperature and it has drawn much attention lately due to its ongoing occurrence since 2000. Subsurface/deeper ocean warming has been identified as one possible cause. Is “hiatus” real? Although a study found that by including polar region in the global mean temperature trend estimation, the trend will increase (Cowtan and Way, 2014), the global mean temperature trend after 2000 is still not as fast and steep as in the 1980s and 1990s. Different methods of trend estimation on the land surface temperature only (e.g. nonlinear estimation by Ji et al. 2014) did not show hiatus feature, so the ocean may play an even larger role during the hiatus period. Due to lacking of observing data for deeper ocean, deeper ocean remote sensing may play a more important role in climate hiatus research. Satellite remote sensors cannot see far beneath the surface layers of the ocean. However, many of subsurface phenomena have surface manifestations which can be interpreted with the help of models (including empirical, dynamical and numerical methods), and available deeper ocean observations to derive key parameters of deeper ocean processes. It is difficult but doable and important. The objective of this talk is to provide an overview and some new results of deeper ocean remote sensing and modeling techniques, which enable us to characterize subsurface and deeper ocean processes and features and their implications for the global warming hiatus. We also propose that more attentions should be given to the deeper ocean remote sensing and deeper ocean response to/and modulation of the climate, in the global ocean and climate change studies.