



The role of the global ocean in changes of the Earth's climate system

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The current Earth's energy imbalance (EEI) is mostly caused by human activity, and is driving global warming. The absolute value of EEI represents the most fundamental metric defining the status of global climate change, and will be more useful than using global surface temperature. EEI can best be estimated from changes in ocean heat content, complemented by radiation measurements from space. However, improving the accuracy of estimates of Earth's climate state and variability is critical for advancing our understanding and prediction of the evolution of Earth's climate. Consistency checks through physical budget constraints with the combined use of climate observations (in situ, remote sensing) and tools (reanalysis, models) have a large potential to deliver a robust uncertainty assessment and to shed new light on unresolved climate science issues – the principal objective of the CLIVAR research focus CONCEPT-HEAT. This talk will give an overview on the development of ocean climate indicators such as EEI, and their use for physical budget constraints. Specific examples will be introduced, main outcomes and challenges are discussed and an overview on CONCEPT-HEAT activities is given.