

## **The ECCO Consortium: Assessing the respective value of global observing systems**

Gael Forget<sup>†</sup>; Patrick Heimbach; Rui Ponte

<sup>†</sup>Massachusetts Institute of Technology, USA

Leading author: [gforget@mit.edu](mailto:gforget@mit.edu)

This study principally aims at making progress with regard to an important and vast question: what is the respective 'value' of operational ocean observing systems to oceanography and climate science? To which extent do they reduce uncertainties in ocean and/or climate estimates? We focus on the relatively well observed year 2006, and use the MITgcm ECCO framework to produce full ocean state estimates. Specifically we carry a series of estimation experiments where data sets are added or withheld. This allows us to infer the error variance reduction, in key aspects of the global ocean circulation, due to either sea level data, SST data, or Argo profiles. It is found that all three observing systems provide efficient constraints to estimate the ocean circulation, while Argo has the bigger overall impact. We further assess errors that may prevail despite the available data, and draw perspectives regarding the design of future observing systems.