Gambar: Ocean Heat Content

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Importance of ocean heat content
Improvements in measurement
New developments
Future challenges
Importance

- ~90% of global warming
- ~40% of sea level rise
- Melts ice sheets
- Feeds marine heatwaves
- Increases stratification
- Energizes the atmosphere
Improvements

3810 Floats
19-Jul-2023
Improvements

- IGY -> MBT & full depth
- IDOE -> Shallow XBT
- WOCE -> Deep XBT & full depth
- Argo (< 2 km) & GO-SHIP (full depth)
- Accuracy as well as coverage
- Deep Argo next?

Lyman & Johnson (2014) updated
New Developments

- 5 group estimates of 0-2000 m OHCA from in situ data
- RFROM: Predicts OHCA from satellite SSH and SST trained with in situ data by machine learning
- RFROM variance of first differences is 0.09 to 0.40 of in situ only estimates
New Developments

- Feb. 2015 T @ 100 dbar: Scripps Argo Clim. (left) and RFROM (right)
- Gulf Stream warm core and cold wall resolved
- Eddies resolved (to the degree done by SSH maps)
- RFROM maps reach the coast

Roemmich & Gilson (2009)

Lyman & Johnson (2023)
New Developments

- Warming of the ocean for $z > 2000$ m estimated at 5-15% of total
- Strongest signal in Antarctic Bottom Water
- Deep Argo data reducing uncertainties by an order of magnitude
- Limited to deep basins with regional pilot arrays

Zilberman et al. (submitted)
Future Challenges

- Maintain Core Argo
- Build up Deep Argo
- Increase high latitude, marginal sea, and shelf/slope sampling

Argo Networks
3849 operational units

June 2023

- Deep (TSO only) (55)
- Deep (190)
- BioGeoChemical (without TSO only) (355)
- Core + O2 (TSO) (137)
- Core (3059)
- Equivalent (156)

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Projection: Plate Carrée (-150,0000)