

Ocean Heat Content: Estimates and uncertainties 1950 - present

Bruce INGLEBY and Matthew PALMER

Hadley Centre, Met Office, Exeter, UK

Subsurface ocean data (temperature and salinity) have been quality controlled and monthly analyses produced for 1950-2006. Anomaly persistence (slightly damped) is used to give the background, or first-guess, for the analysis of the next month. The geographical and depth sampling is poor, particularly in the earlier decades and in the Southern Hemisphere - in recent years coverage is much better due to the Argo programme of profiling buoys. In data voids the analyses relax towards climatology.

Analyses, and Ocean Heat Content (OHC) estimates, have also been produced without Mechanical/eXpendable BathyThermograph (MBT/XBT) data. These NoBT analyses are slightly cooler - there is some evidence in the literature and in our work that XBTs are biased slightly warm. Thus extra care is needed in looking at OHC trends since about 2000 as we have moved from an XBT-dominant to an Argo-dominant observing system. The AllData, NoBT and NoArgo analyses are used to explore this issue. All the analyses show significant warming in the 1990s.

The AllData analyses show a broad maximum of OHC centered on the late 1970s then lower values in the mid/late 1980s. This is very similar to that shown by Levitus et al (2000,2005), however the reality of such decadal variability has been questioned by other groups. This maximum is largely absent in our NoBT analyses - by itself this result should be treated with caution because the NoBT sampling is significantly worse. However comparison with sea surface temperature analyses at the points where we have subsurface data also tends to suggest that the 1970s OHC maximum may be an artifact rather than a real feature.