A prototype integrated database of surface and sub-surface temperature and salinity observations

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As part of Work Package 4 (Quantifying and Reducing Uncertainties), a new prototype database of ocean temperature and salinity observations (1900-present) has been created to support the assimilation of ocean observations in future coupled climate reanalyses. The database is 'integrated', in that it brings together surface and sub-surface components of the ocean observing system which have traditionally been treated separately for climate monitoring purposes. The surface observations are taken from version 2.5.1 of the International Comprehensive Ocean Atmosphere Data Set (ICOADS 2.5.1) and have Met Office Hadley Centre quality control flags applied. Quality controlled subsurface observations are taken from version 4 of the Met Office Hadley Centre EN dataset (EN4). In bringing together observations from multiple observation types and platforms, it is necessary to understand and, where possible, adjust for any biases that may exist between different instruments, to ensure the observations are homogenous in space and time. We apply to the ICOADS 2.5.1 temperature observations best available bias adjustments and uncertainties, which are derived from those applied in the Met Office Hadley Centre HadSST3 dataset. The bias model developed for HadSST3 is extended to other observations in the database, however in many cases it is not yet possible to populate fully all the components of this model for a particular observation due to limitations in our understanding of the ocean observing system. Further problems arise in situations where necessary observation metadata are missing or unreliable; in these cases best estimate bias adjustments have to be applied. The framework of this prototype database highlights such gaps in our present knowledge of ocean observations and is flexible enough to incorporate gradual improvements in our understanding as they occur. One way improvements may be achieved is through use of reanalysis feedback information which will be added to the database as it becomes available. To facilitate this a unique identifier has been applied to each observation. This presentation will outline the concept of our prototype integrated database, discuss some of the difficulties and issues encountered in its design and creation, and outline further work that would benefit future versions. The possibility of creating an ensemble of integrated databases will also be addressed.