



CERA-20C: The ECMWF coupled assimilation system for climate reanalysis

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The European Centre for Medium-Range Weather Forecasts (ECMWF) has developed a coupled assimilation system that ingests simultaneously ocean and atmospheric observations in a coupled ocean-atmosphere model. Employing the coupled model constraint in the variational method implies that assimilation of an ocean observation has immediate impact on the atmospheric state estimate, and, conversely, assimilation of an atmospheric observation affects the ocean state. This coupled approach has been used to produce a new global 20th-century reanalysis, called CERA-20C, which provides a long record of low-frequency climate variability and change using a consistent set of observations. The evolution of the global weather for the period 1901–2010 is represented by a ten-member ensemble of 3-hourly estimates for ocean, surface and upper-air parameters. The ensemble technique takes into account inevitable uncertainties in the observational record and the forecast model giving an indication of the data confidence.