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Observations for climate: A high-resolution real-time analysis of global oceanic precipitation

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Supported by NOAA CPO / Climate Observation and Monitoring (COM) program, an objective operation system has been developed at NOAA Climate Prediction Center (CPC) to produce high-quality, high-resolution precipitation analysis for the real-time monitoring over global oceans. First, precipitation information from all available satellite platforms is integrated into a quantitative map of 30-min precipitation on an 8kmx8km grid over the globe from 60S to 60N through the CMORPH technique (Joyce et al. 2004). Here, the gridded fields of 30-min precipitation are defined by propagating the instantaneous rain rates estimated by the passive microwave (PMW) observations from low earth orbits (LEO) satellites through the cloud systems advection vectors derived from consecutive infrared images taken from geostationary (GEO) platforms. The CMORPH integrated satellite precipitation estimates are then calibrated against a long-term precipitation analysis with coarser resolution to ensure quantitative consistency of this high-resolution but relatively short precipitation record for climate applications. To this end, the Probability density function (PDF) of the original CMORPH satellite estimates are constructed and adjusted to match with that of the pentad GPCP precipitation analysis. The adjusted CMORPH precipitation estimates present quantitative consistency with the GPCP climate record, while they retain the high-resolution variations depicted in the original CMORPH estimates. The new high-resolution precipitation estimates demonstrated strong capability in capturing oceanic precipitation variations of various space / time scales. Retrospective processing of the bias-adjusted high-resolution oceanic precipitation has been performed for a 13-year period from 1998 to the present. The new high-resolution precipitation analysis is applied to examine the oceanic precipitation variations from diurnal to inter-annual time scales and to verify how these variations are captured by the NCEP/ CFS Reanalysis (CFSR) and other high-resolution numerical models. Detailed results will be reported at the conference.