Geophysical Research Abstracts
Vol. 18, EGU2016-7991, 2016
EGU General Assembly 2016

Recent Progress on the Second Generation CMORPH: A Prototype Operational Processing System

Pingping Xie, Robert Joyce, and Shaorong Wu
NOAA/NWS/NCEP/CPC, College Park, United States (Pingping.Xie@noaa.gov)

As reported at the EGU General Assembly of 2015, a conceptual test system was developed for the second generation CMORPH to produce global analyses of 30-min precipitation on a 0.05deg lat/lon grid over the entire globe from pole to pole through integration of information from satellite observations as well as numerical model simulations. The second generation CMORPH is built upon the Kalman Filter based CMORPH algorithm of Joyce and Xie (2011). Inputs to the system include both rainfall and snowfall rate retrievals from passive microwave (PMW) measurements aboard all available low earth orbit (LEO) satellites, precipitation estimates derived from infrared (IR) observations of geostationary (GEO) as well as LEO platforms, and precipitation simulations from numerical global models. Sub-systems were developed and refined to derive precipitation estimates from the GEO and LEO IR observations and to compute precipitating cloud motion vectors. The results were reported at the EGU of 2014 and the AGU 2015 Fall Meetings. In this presentation, we report our recent work on the construction of a prototype operational processing system for the second generation CMORPH.

The second generation CMORPH prototype operational processing system takes in the passive microwave (PMW) retrievals of instantaneous precipitation rates from all available sensors, the full-resolution GEO and LEO IR data, as well as the hourly precipitation fields generated by the NOAA/NCEP Climate Forecast System (CFS) Reanalysis (CFS). First, a combined field of PMW based precipitation retrievals (MWCOMB) is created on a 0.05deg lat/lon grid over the entire globe through inter-calibrating retrievals from various sensors against a common reference. For this experiment, the reference field is the GMI based retrievals with climatological adjustment against the TMI retrievals using data over the overlapping period. Precipitation estimation is then derived from the GEO and LEO IR data through calibration against the global MWCOMB and the CloudSat CPR based estimates. At the meantime, precipitating cloud motion vectors are derived through the combination of vectors computed from the GEO IR based precipitation estimates and the CFSR precipitation with a 2DVAR technique.

A prototype system is applied to generate integrated global precipitation estimates over the entire globe for a three-month period from June 1 to August 31 of 2015. Preliminary tests are conducted to optimize the performance of the system. Specific efforts are made to improve the computational efficiency of the system. The second generation CMORPH test products are compared to the first generation CMORPH and ground observations. Detailed results will be reported at the EGU.