

Precipitation Analyses and Their Applications in Drought Monitoring at NOAA's Climate Prediction Center

**Pingping Xie
NOAA's Climate Prediction Center**

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Background [1]

- Multiple precipitation analyses generated at CPC over the past ~20 years to satisfy various requirements
 - Gauge-based analyses
(GTS, CONUS, US-MEXICO ...)
 - Estimates derived from satellite observations
(GPI, OPI ...)
 - Gauge-satellite merged analyses
(CMAP, CAMS-OPI, RFE ...)

Background [2]

- Inconsistencies in CPC precipitation analysis products are due to differences in:
 - Input data;
 - Quality control;
 - Objective algorithms.

CPC Unified Precipitation Project

- To create a single suite of unified precipitation products for global / regional applications.
- To increase the accuracy, reliability and quantitative consistency of the new products.

Characteristics of the Unified Products

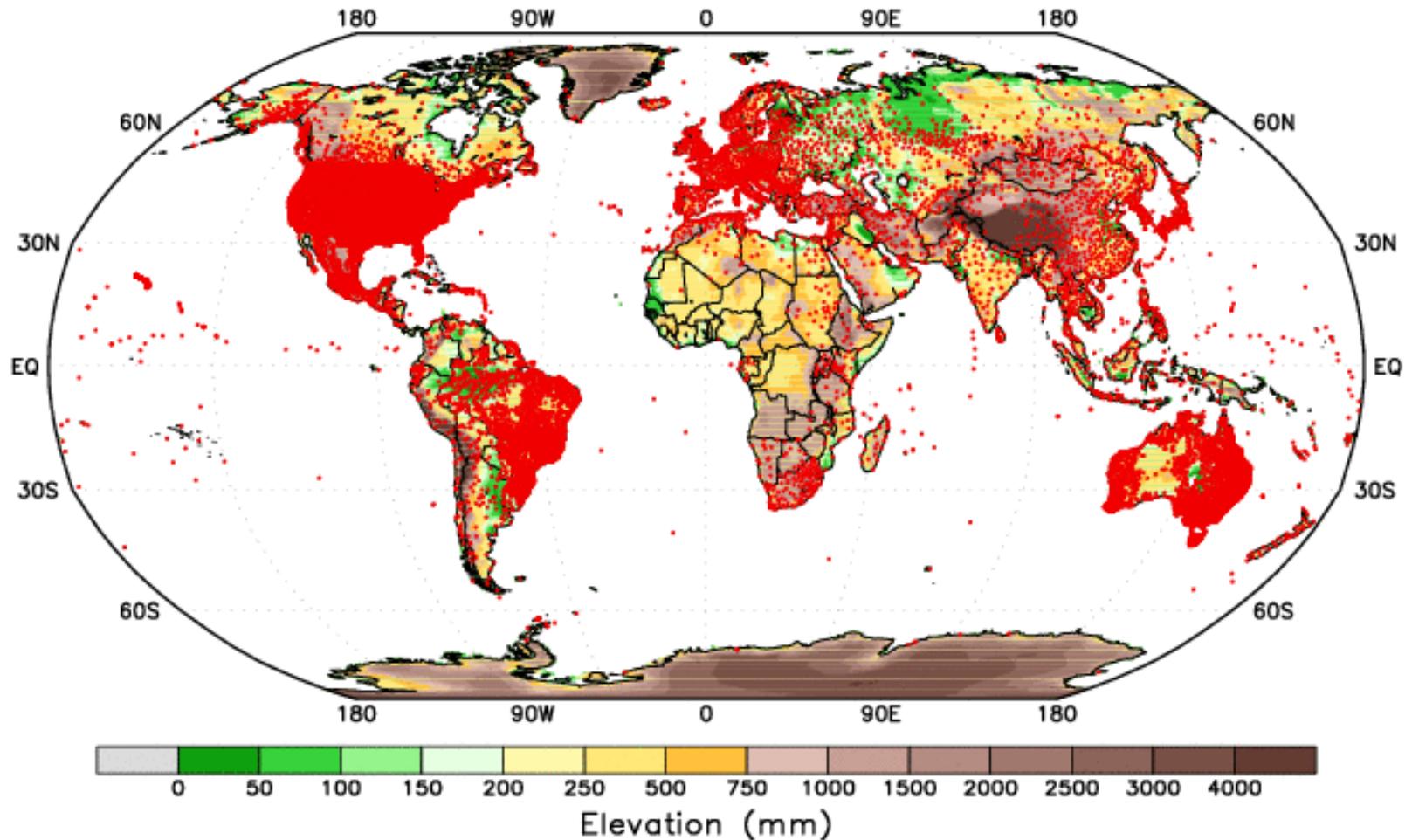
- Station reports
 - Unified, quality controlled
- Satellite estimates
 - Multiple satellites / multiple instruments
- Analyses
 - Global / Regional ; Daily / Pentad / Monthly / Hourly;
Retrospective / Real-time

Database of Gauge Reports

- Monthly & daily reports from over 32,000 stations
 - GTS, NCDC archives (GHCN/GDCN..), COOP, RFC, Mexico, Brazil, Australia, China...;
- Quality Control
 - with historical records, buddy check, satellite data, radar data (US only), and model forecasts

Station Distribution

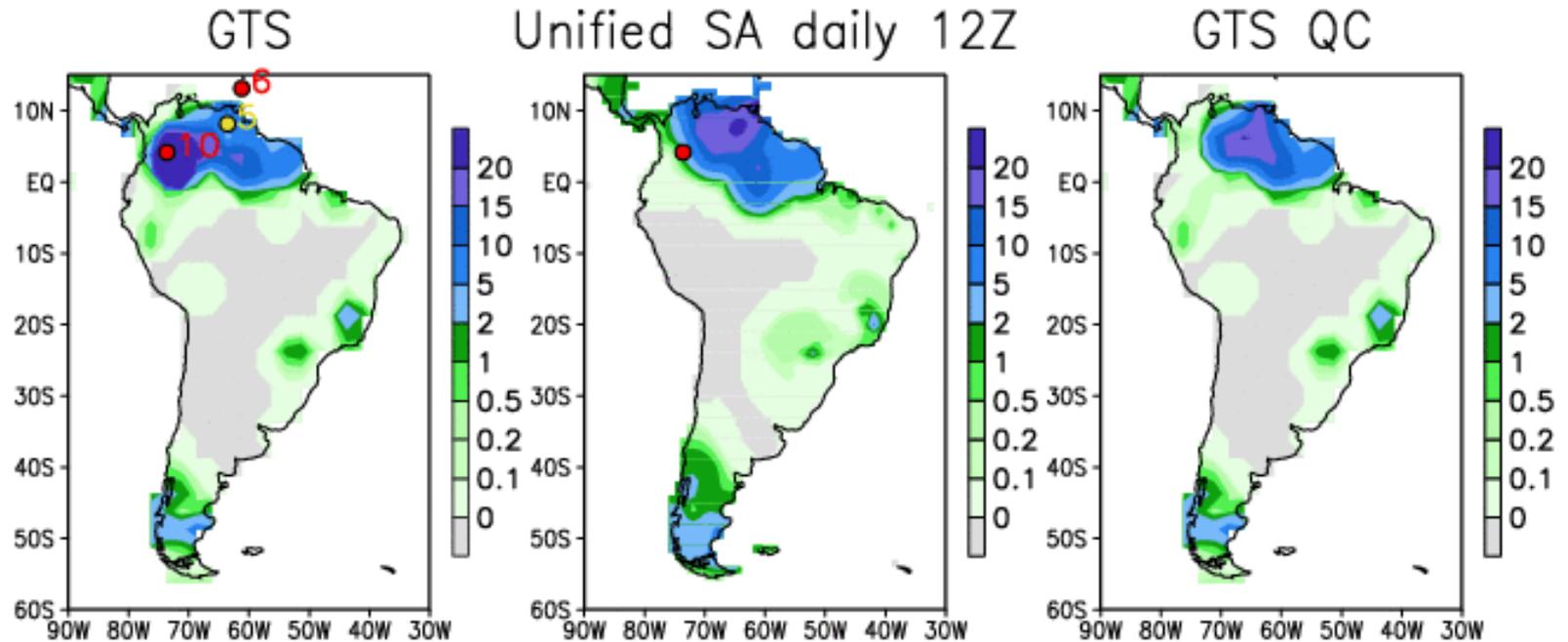
for July 1, 2003



QC Example

Daily analysis (mm/day) 20050727

● large ● zero

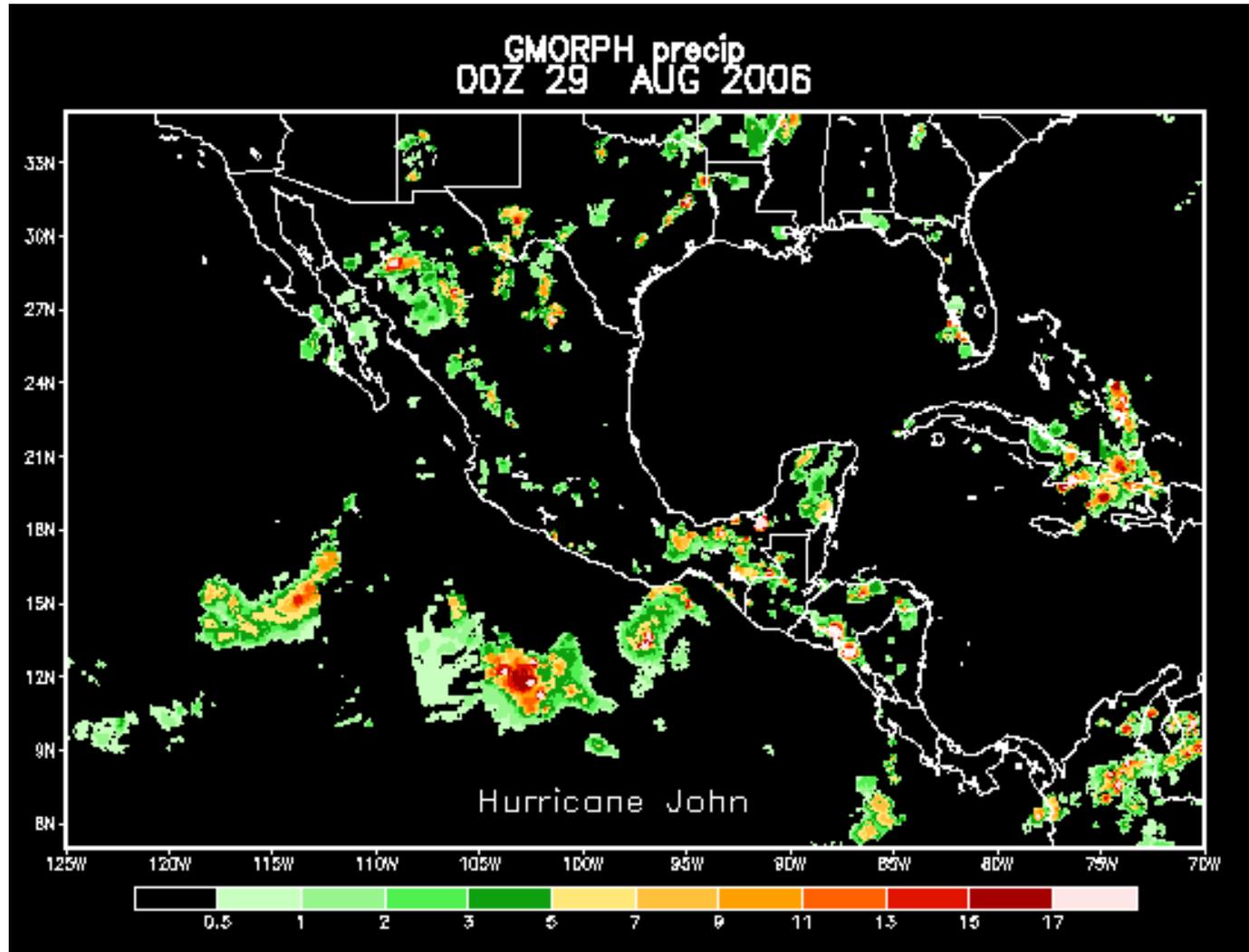


Satellite Precipitation Estimates

- Collecting estimates from individual satellites
 - NESDIS / Satellite Applications; NASA
- CMORPH
 - CPC MORPHing technique
 - Combining MW / IR satellite obs to define hi-res precipitation estimates over the globe

Hurricane John (2006)

Observed by CMORPH



Precipitation Analysis Products

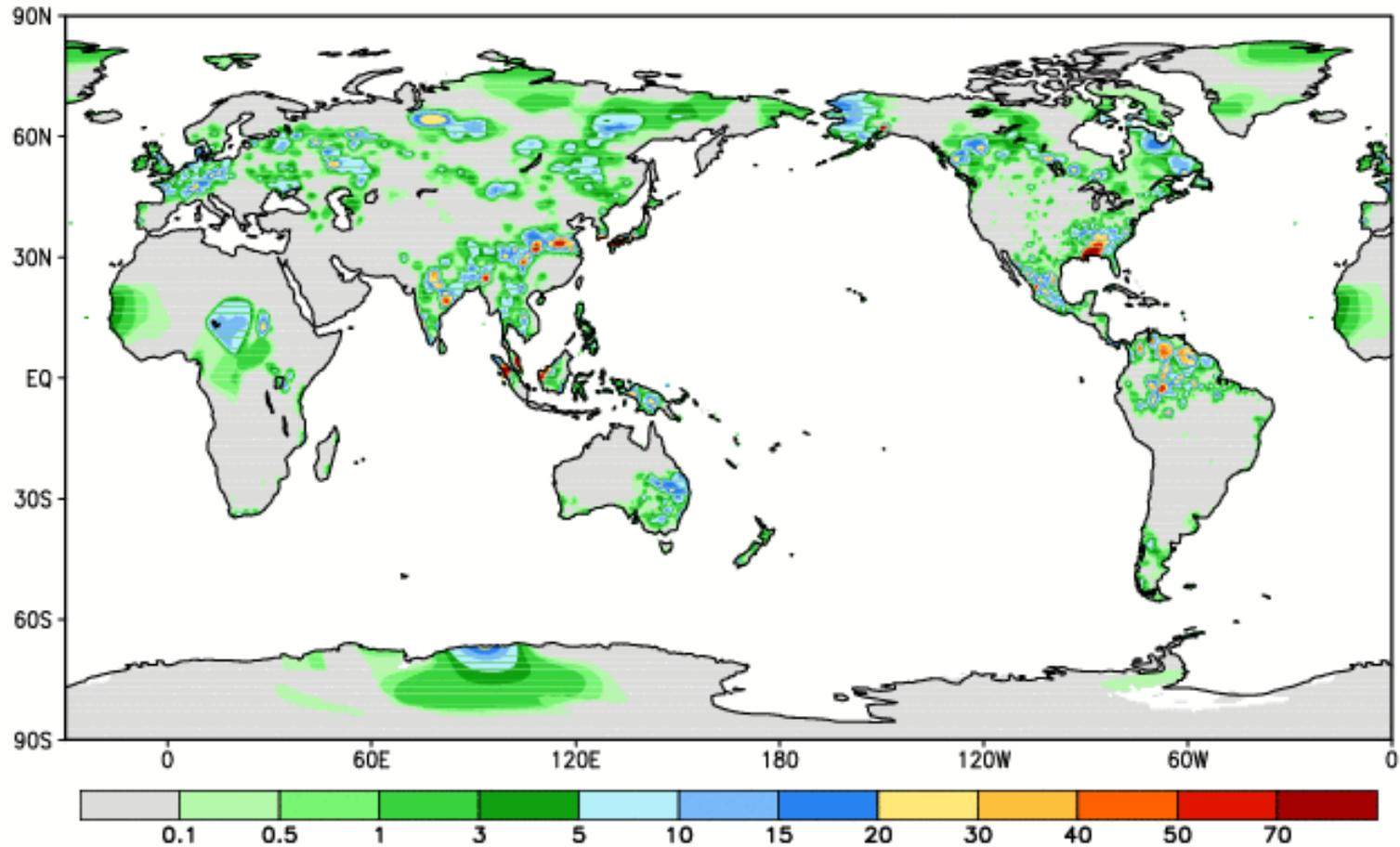
- Gauge-based & satellite-gauge
 - Global / Regional; Daily / Pentad / Monthly
- State-of-the-art objective analysis techniques
 - Optimize available gauge and satellite observations

Gauge Analysis of Global Daily Precipitation

- >30K station reports
 - Enhanced networks over US, Mexico, Brazil, Australia
 - GTS elsewhere
- Optimal Interpolation (OI) with orographic correction
- 0.5°lat/lon grid over global land
- Daily fields from 1979 to present
- Real-time operations

Example of Gauge-based Analysis

for July 1, 2003



Satellite-Gauge Merged Analysis of Global Daily Precipitation

- Prototype algorithm completed
- Combining gauge analysis with CMORPH satellite estimates
- Quasi complete global coverage with improved quality over land

Gauge-based Analysis of Hourly Precipitation Over CONUS

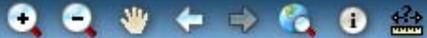
- Based on station data from NCDC TD-3240 and HADS data
- Quantitative consistency with daily gauge data
- Quasi real-time update
- 1948 – present
- Will be available in ~one year

Applications / Outreach

- **CPC climate monitoring and assessment products**
- **CFSRR input and validation**
- **Online applications (e.g GIS)**

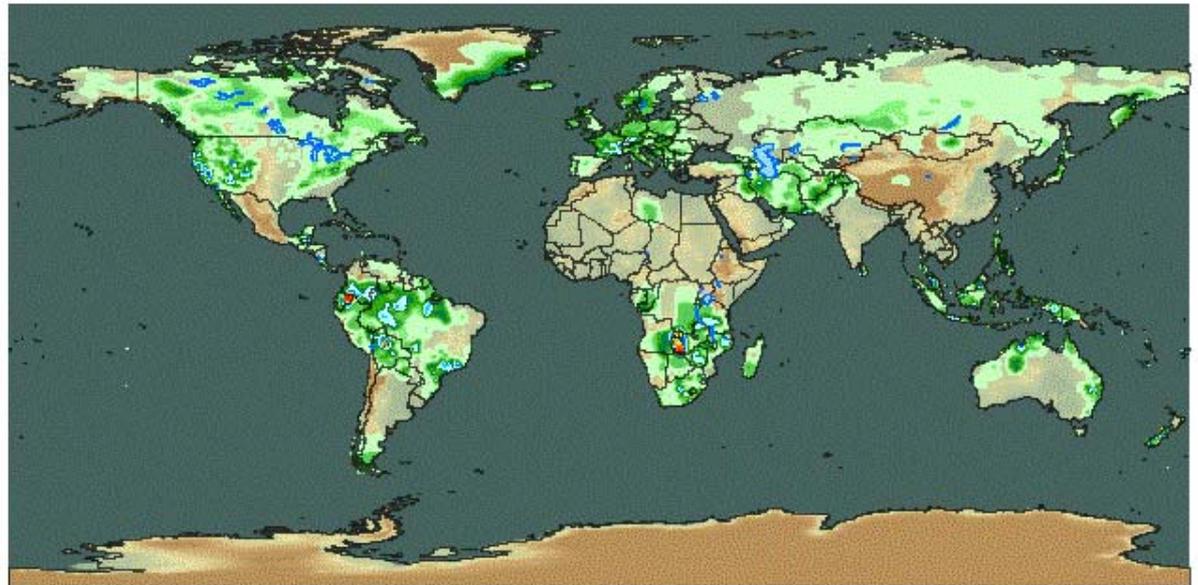
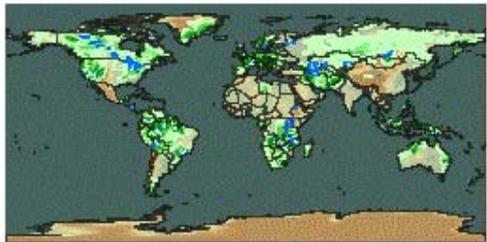
Example of CPC GIS Products

Global Daily Gauge Precipitation



Help

- Results
- Result Details
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- Map Overview



Summary

- **Gauge-based analysis**
 - Daily / 0.5°lat/lon / global land / 1979 – present
- **Satellite estimates (CMORPH)**
 - 30-min / 8kmx8km / global / 2003 - present
- **Merged analysis**
 - CMAP [monthly, pentad / 2.5°lat/lon / global / 1979 – present]
 - Coming soon
 - Gauge-CMORPH merged analysis
[daily or finer / 0.25°lat/lon / global / 2003 – present]
- **All available through ftp at**
 - <ftp.cpc.ncep.noaa.gov/precip>

Application in Drought Monitoring

