CDR IN OPERATIONS

Operational Daily, 25km Precipitation from UCI: PERSIANN

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Outline

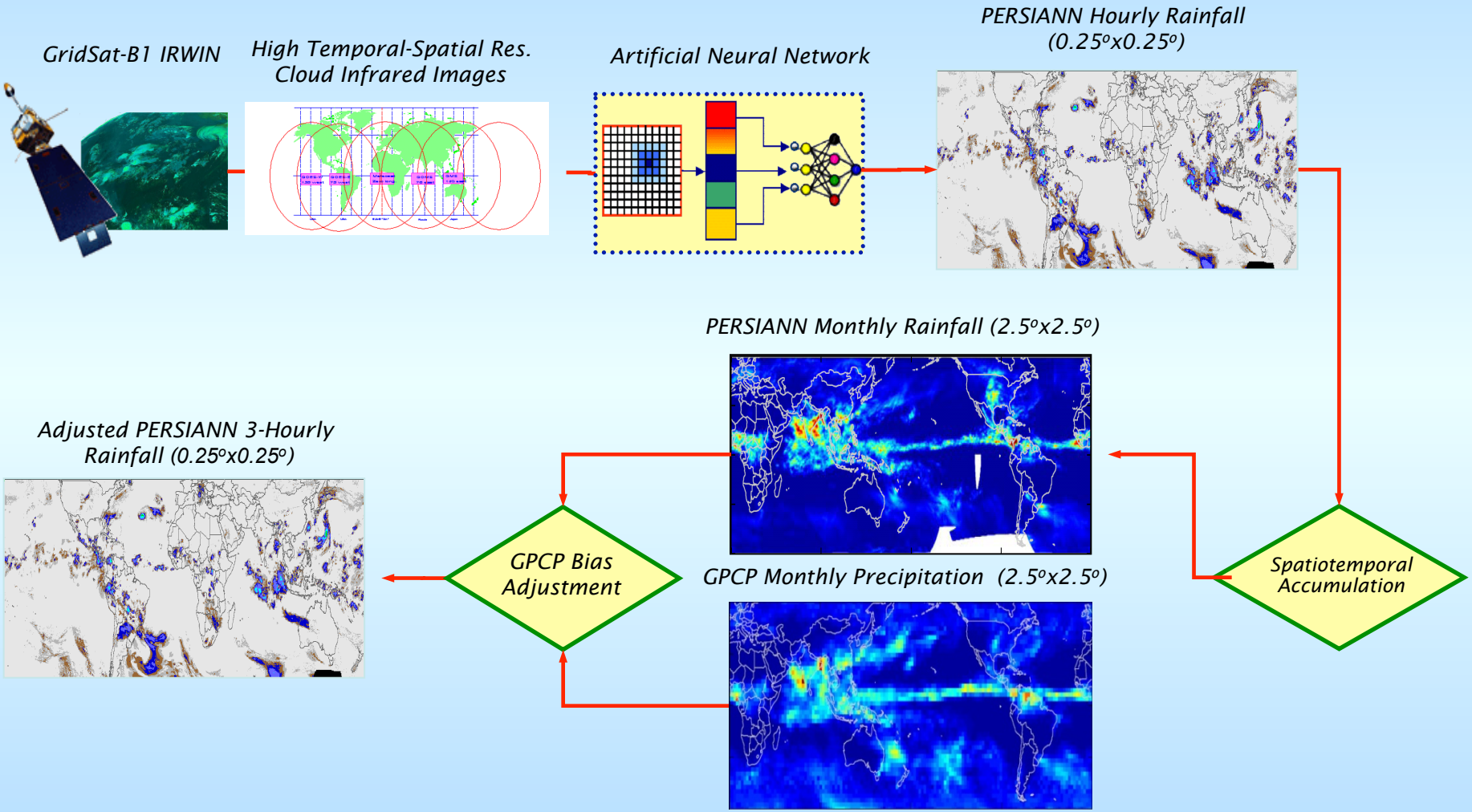
- Project Description
- PERSIANN-CDR Algorithm
- Quality Assurance
- Applications
- Schedule & Issues

Project Description

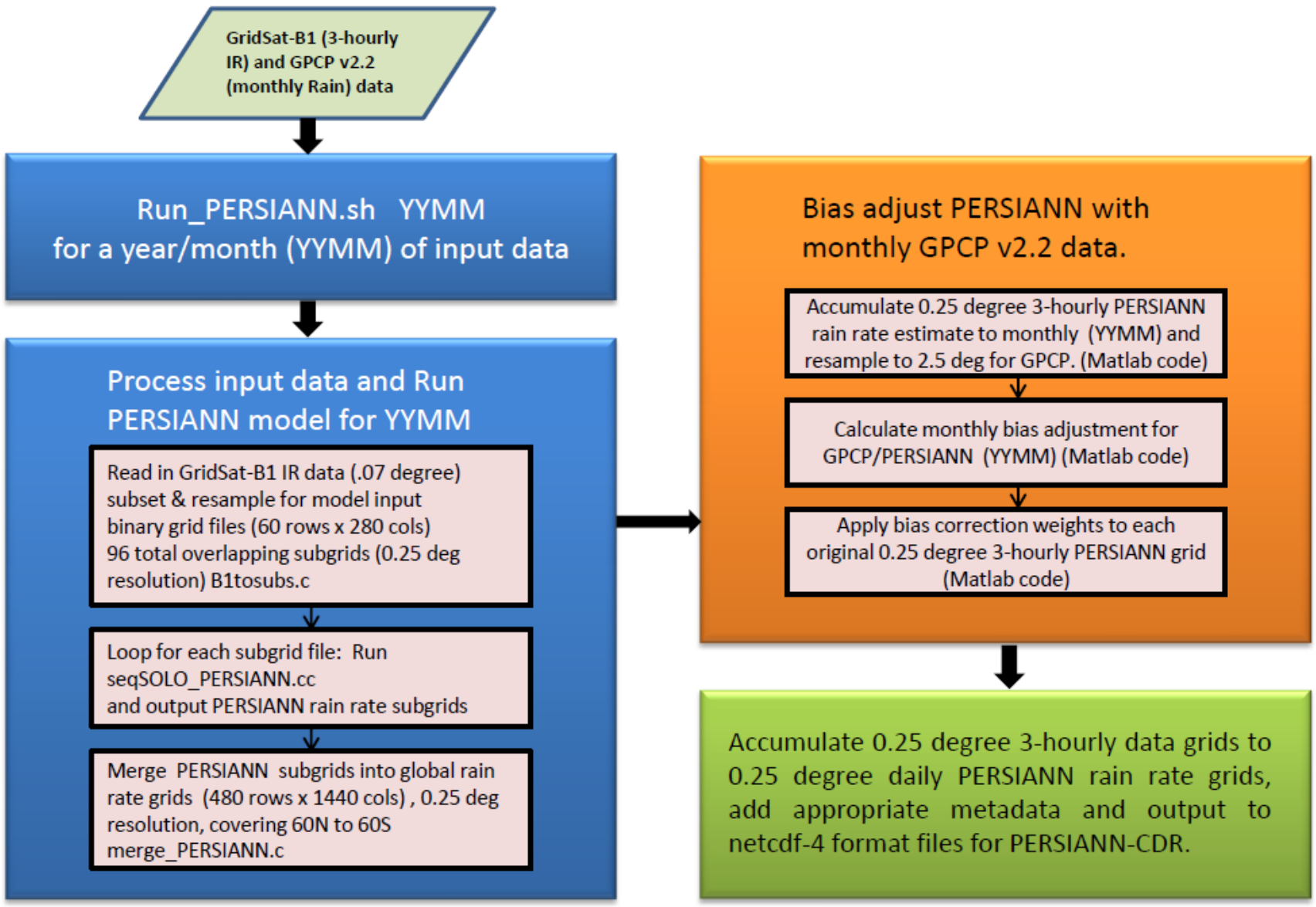
- PERSIANN (Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks) algorithm is used to produce more than 30-year of daily precipitation data (1979-current time). Global monthly GPCP precipitation data is used to adjust daily PERSIANN rainfall. The adjusted daily PERSIANN is consistent to the GPCP rainfall at monthly scale.

- Inputs: GridSat-B1 CDR Data (IRWIN)
  GPCP monthly v2.2
- Output: GPCP adjusted PERSIANN precipitation
  Resolution: Daily, 0.25°x0.25° Lat-Lon scale
  Coverage: Near global coverage 60°S to 60°N
- Output format: NetCDF-4 to allow for metadata and the global grid (480 rows x 1440 cols).

Bias Adjustment of PERSIANN Estimates



PERSIANN-CDR Data Flow Diagram



Product Delivery Description

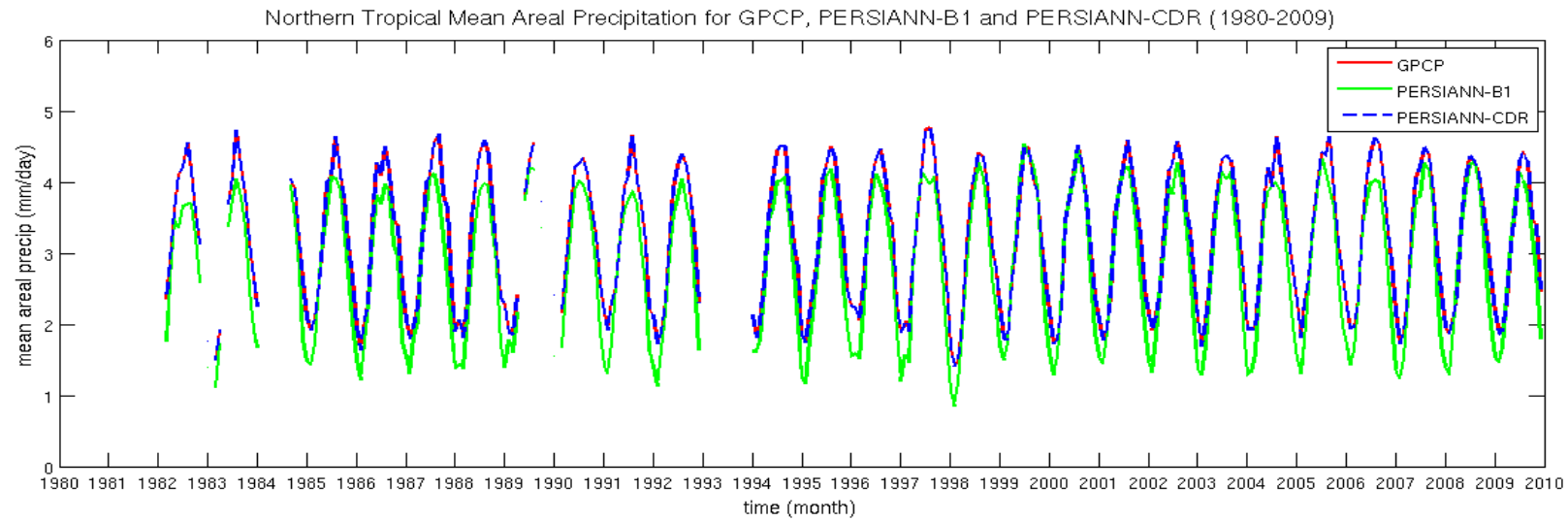
CDR(s)	Period of Record	Temporal Resolution	Update Frequency	Update Lag	Spatial Resolution	Data file distinction criteria	Do you publicly serve the CDR at your institution?
Daily Precipitation Climate Data Record	1980-present	Daily	Monthly	~6 months depending on the availability of GridSat-B1 and GPCP monthly data	0.25°x0.25°	Each daily data is in a separate file named with both the date of the data and the creation date. These daily files are grouped in a monthly tar file for each calendar month.	It is planned to serve the CDR at our institution (CHRS).

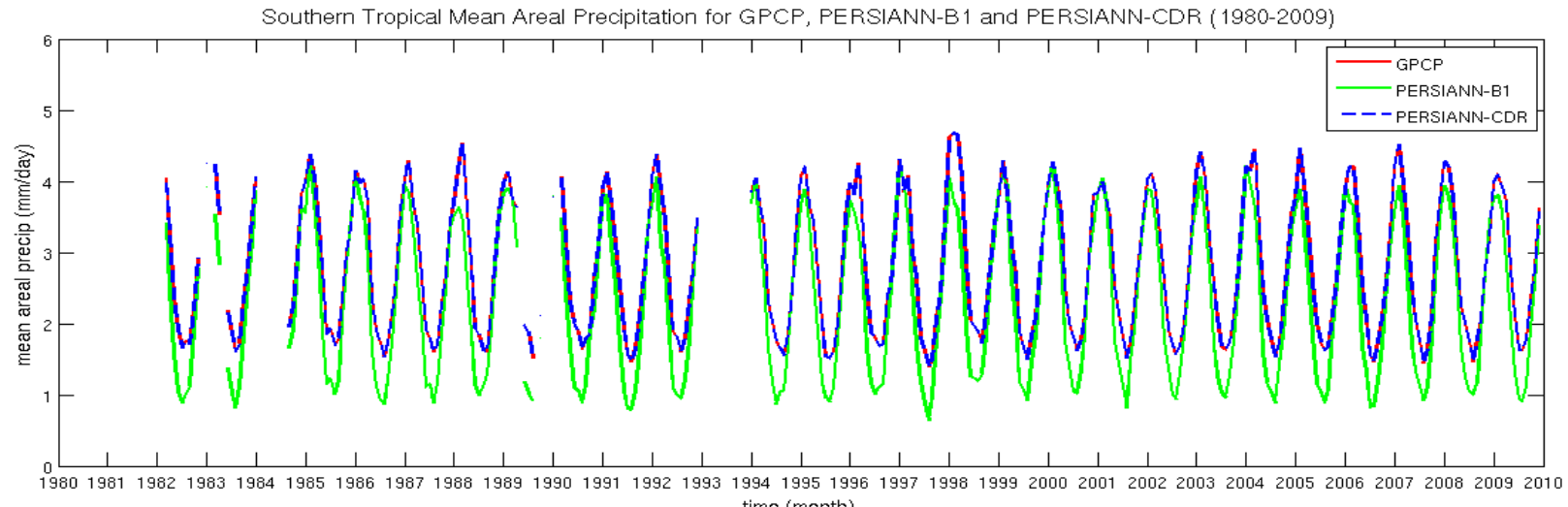
Quality Assurance Approach

- Evaluate PERSIANN estimates (before and after GPCP monthly precipitation adjustment).
- Compare PERSIANN with GPCP 1DD daily estimation for the period of 1997—2009.
- Compare PERSIANN with stage IV radar/gauge estimates over CONUS.

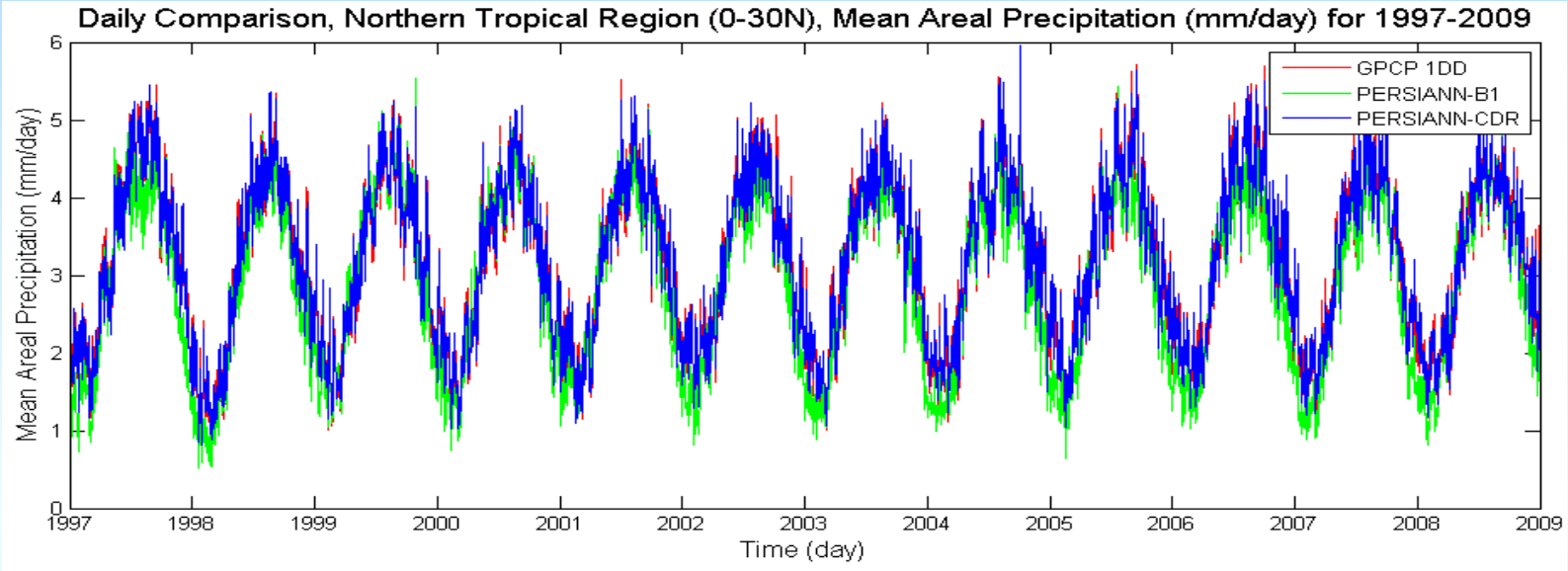
GPCP and PERSIANN-CDR Precipitation (0-30°)

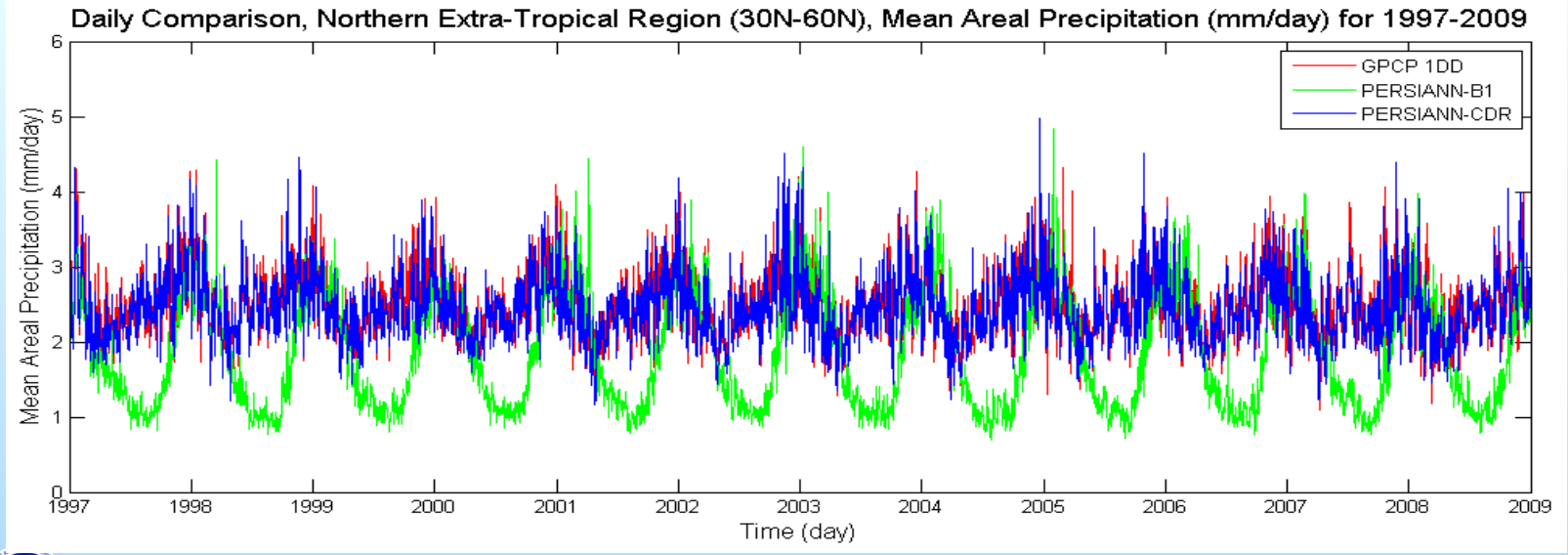
- **Mean Areal Precipitation (MAP) for Northern and Southern tropical regions (0-30°).**
- **The GPCP adjusted PERSIANN matches GPCP monthly rainfall**



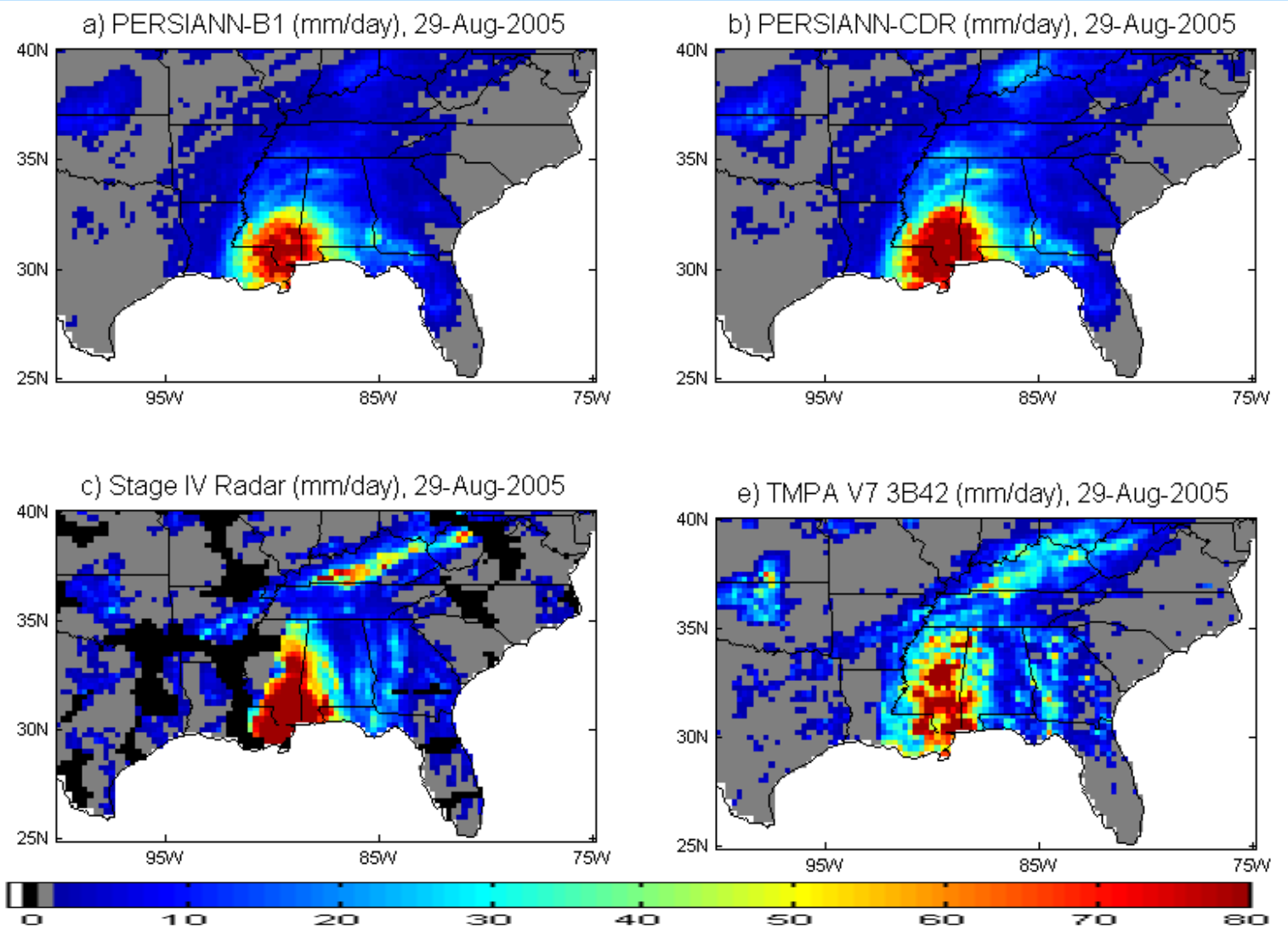


PERSIANN-CDR and GPCP-1DD

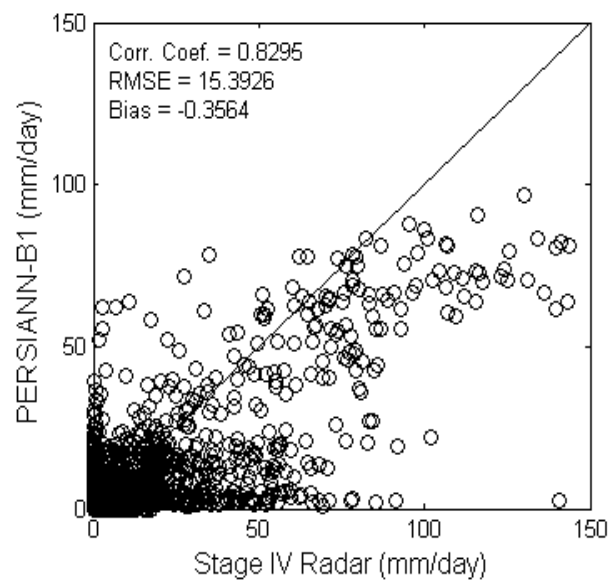


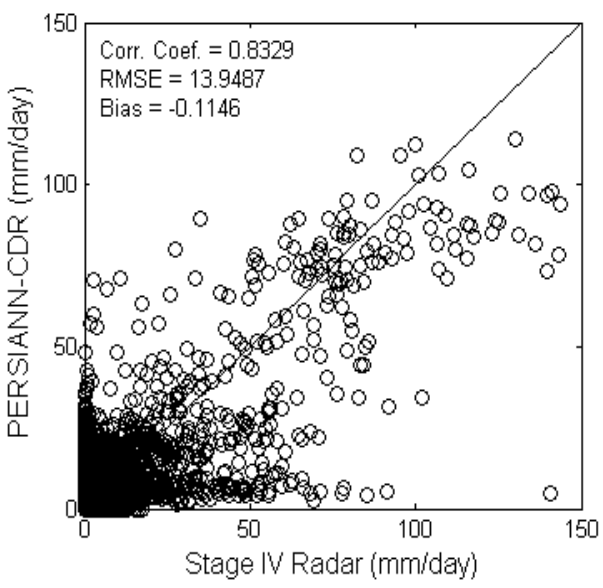


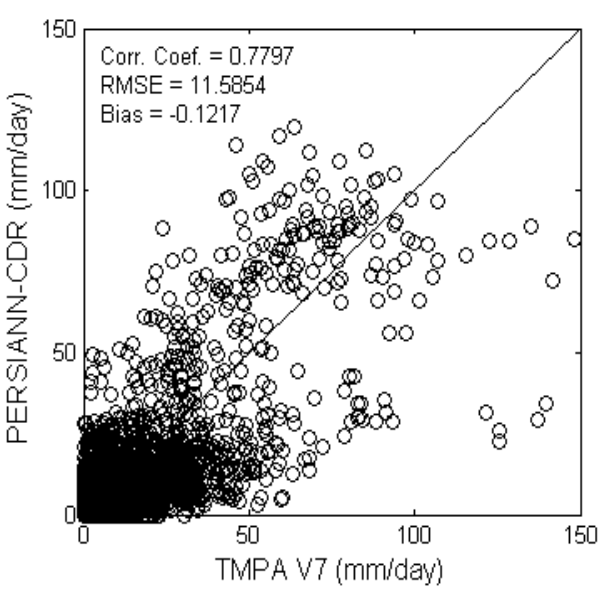
Hurricane Katrina, 29 Aug. 2005



Hurricane Katrina, 29 Aug. 2005
Scatterplots





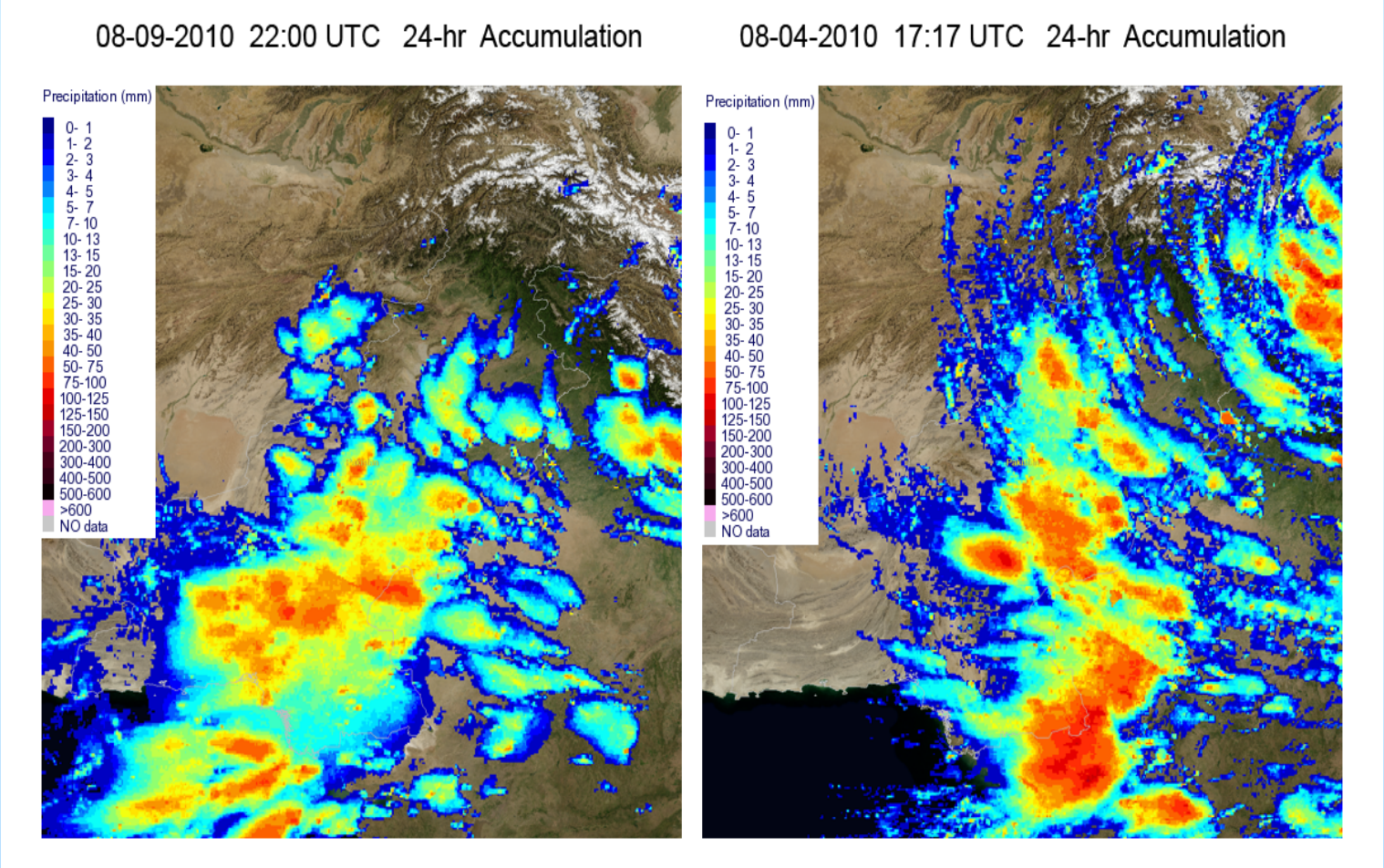


Applications: Water Focus

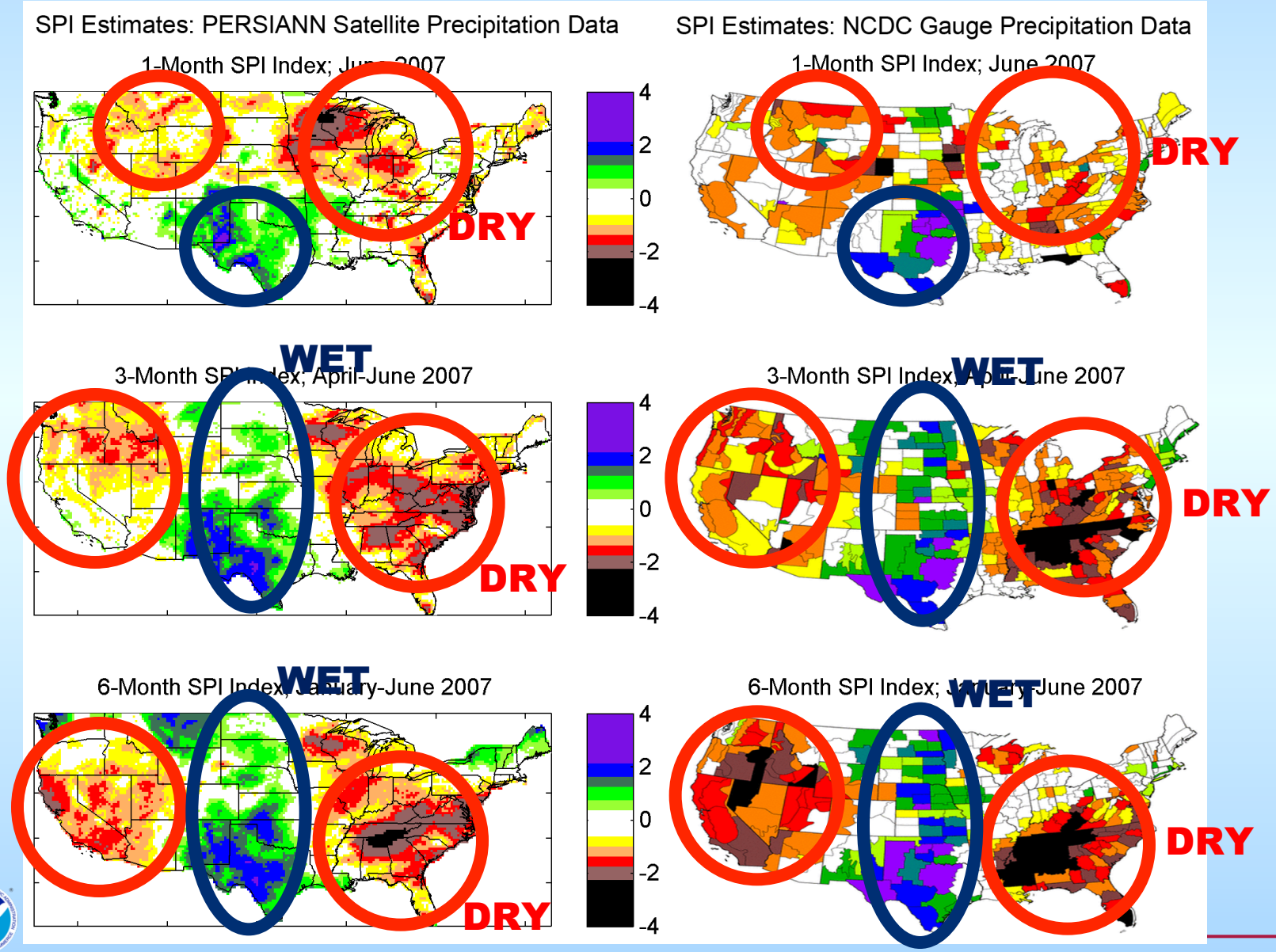
- **Applications:**
  - Water resources systems planning and management
  - Extreme events analysis (intensity, frequencies, and duration of floods & droughts)
- **Users:**
  - Dept. of Water Resources (DWR), State and National Water Agencies
  - USGS, NWS, WMO UNESCO-IHP
  - International partners to validation the products: Taiwan, India, Israel, Italy, Thailand, Namibia…

Extreme Event Analysis: Floods (intensity, frequency, duration…)

Pakistan Flood



Extreme Event Analysis: Drought Monitoring (intensity, frequency, duration…)



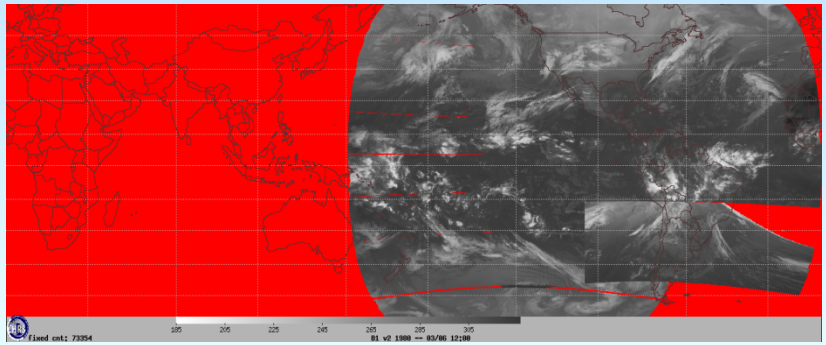
Schedule & Issues

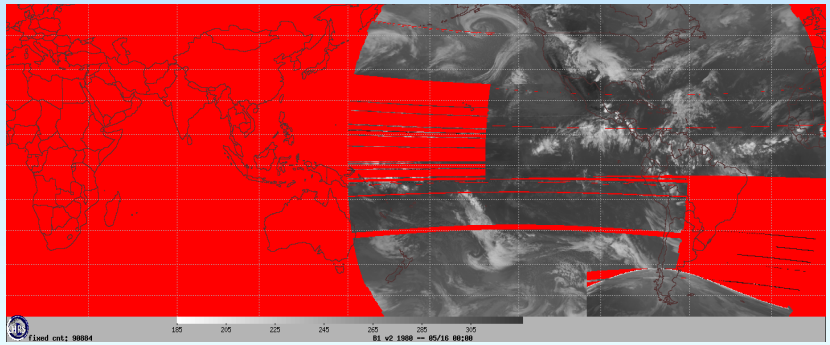
- CDR status
  - ATBD of PERSIANN-CDR is delivered to NCDC; the PERSIANN-CDR paper is submitted for publication.
  - Initial PERSIANN-CDR data is ready to deliver.
  - Few years of PERSIANN-CDR data (e.g. 1981 and 1982) require modification.

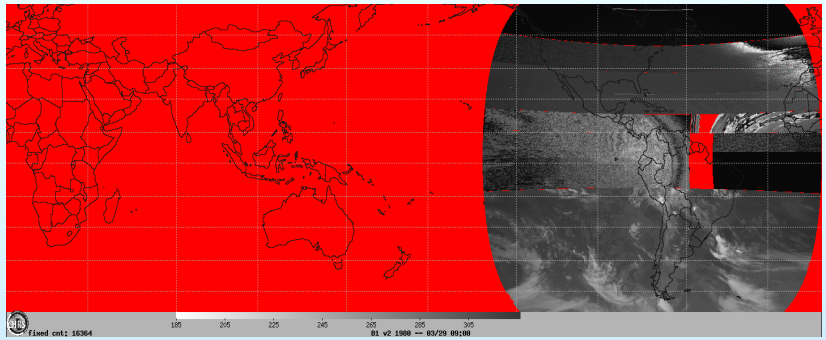
- Issues
  - PERSIANN-CDR updates depend on input data sources (GridSat-B1 and GPCP).
  - GridSat-B1 is completed through year 2012.
  - Some errors/problems on GridSat-B1 data required further attention. The main concern with updates is the required manual/visual handling to remove some bad GridSat-B1 files.
  - GPCP v2.2 completed through year 2012. Some months for 2013 also available.

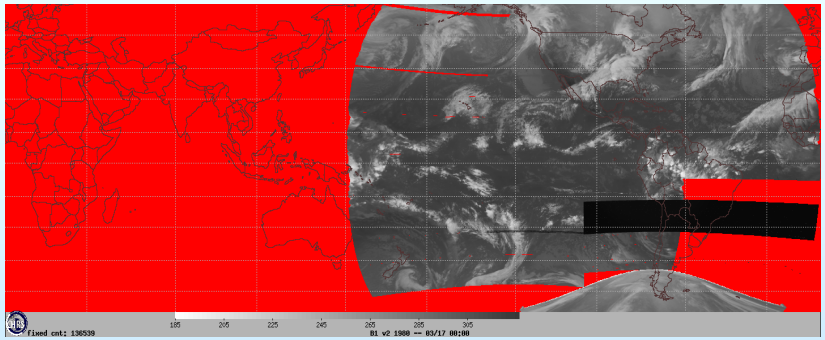
Known issues on GridSat-B1

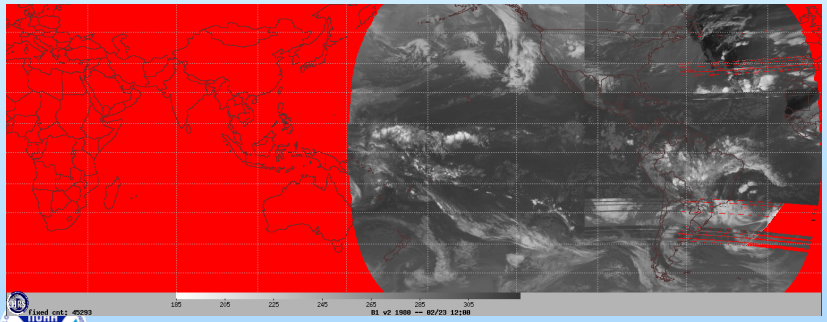
Many time steps of the input GridSat-B1 v2 data have significant problems ~ 2.0% and needed to be removed. with some more effort and manually cropping some of those time steps could be used.

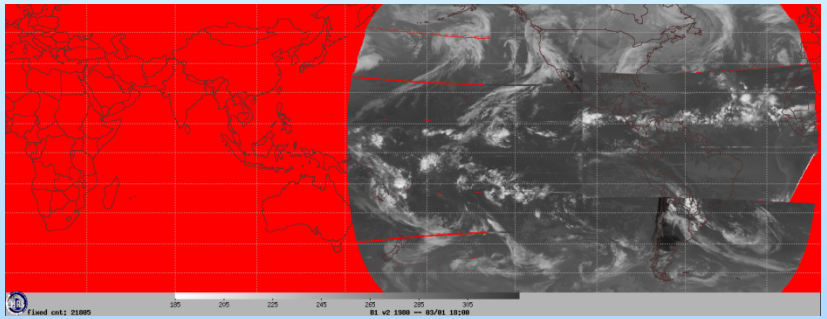




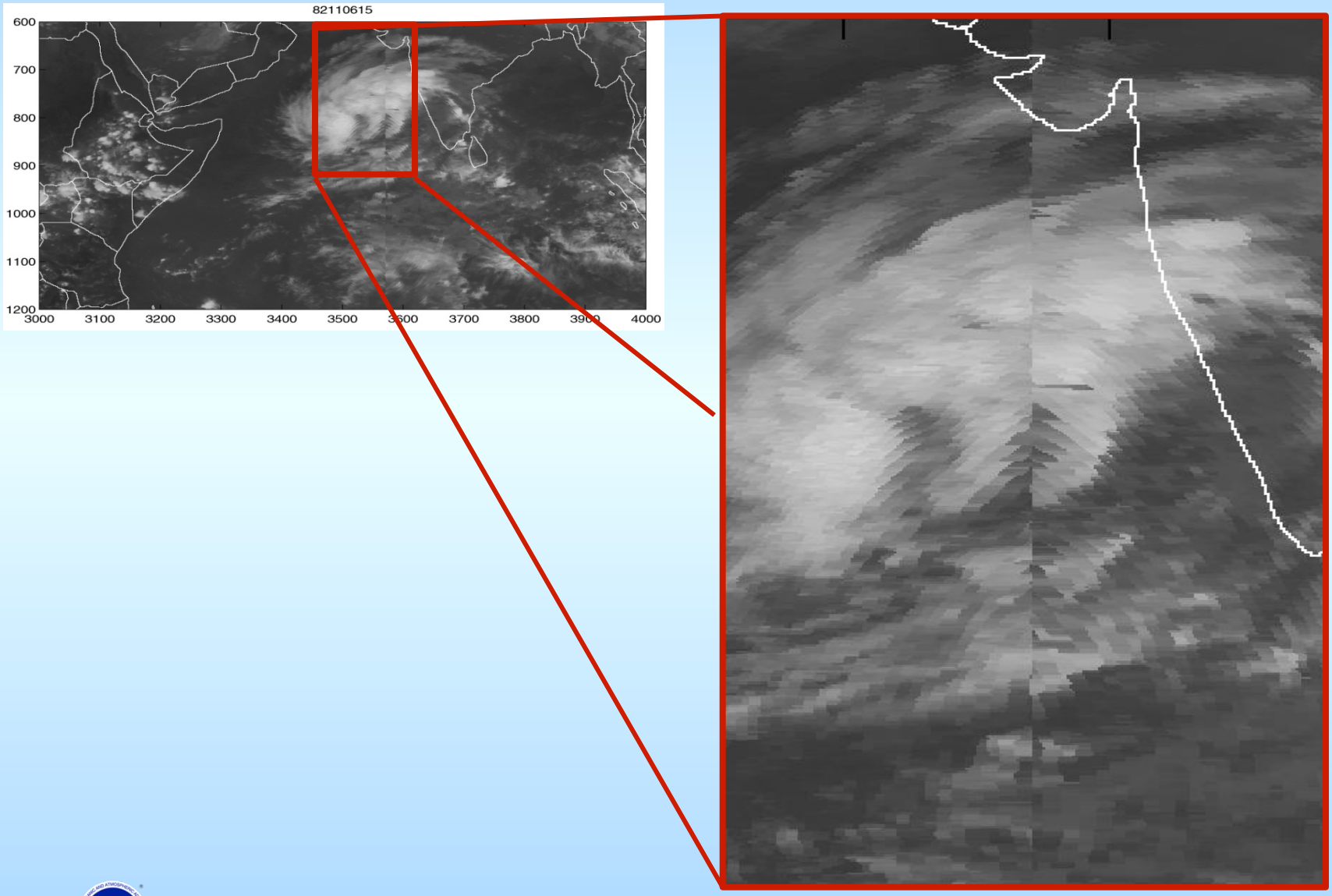




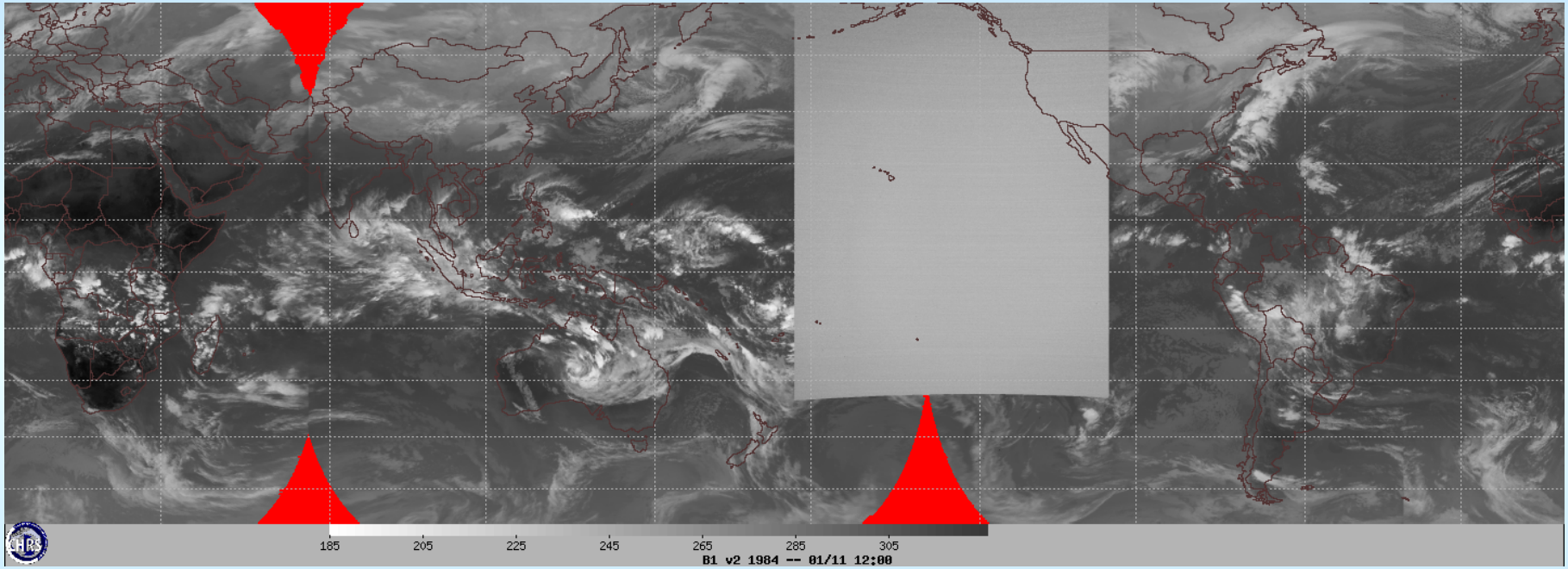




Known issues on GridSat-B1



Known issues on GridSat-B1
Big patch of cold clouds



Plans

- 1-3 Year Planning Horizon
  - **Data Product Improvements/Updates**
    - After improvements in GridSat-B1 v2, second version of PERSIANN-CDR will be delivered.
    - Uncertainty analysis of the PERSIANN-CDR estimates will be provided.
    - Evaluation of PERSIANN-CDR performance in extreme precipitation events will be tested.
    - Algorithm improvements (using PMW observations) will be developed.

  - **Application and User Community Engagement**
    - Product application to hydrology and hydroclimatology studies.
    - Engagement with operational agencies (CDWR, State and National Water Agencies, USGS, NWS, WMO UNESCO-IHP)
    - Working on the collateral products (drought and flood indexes).