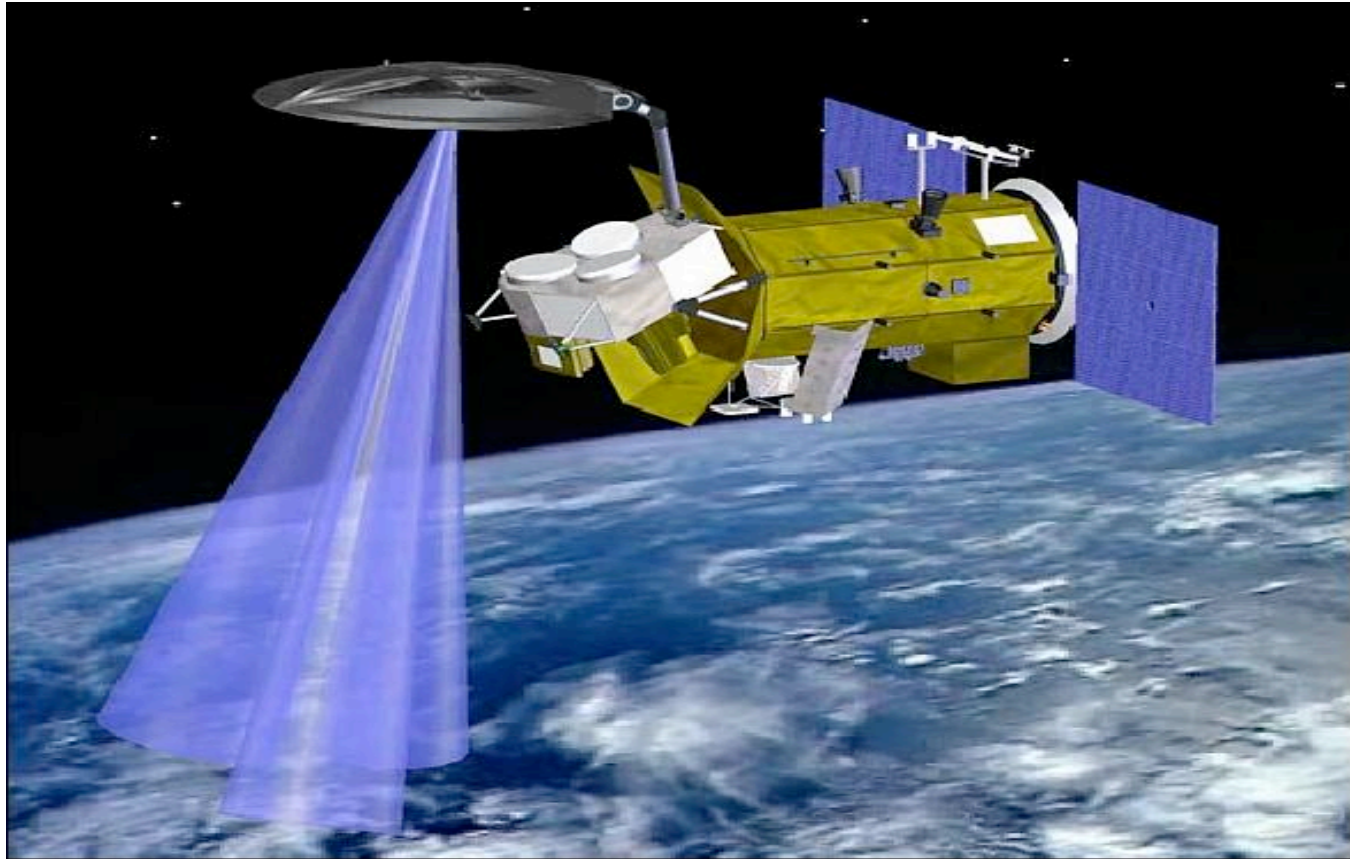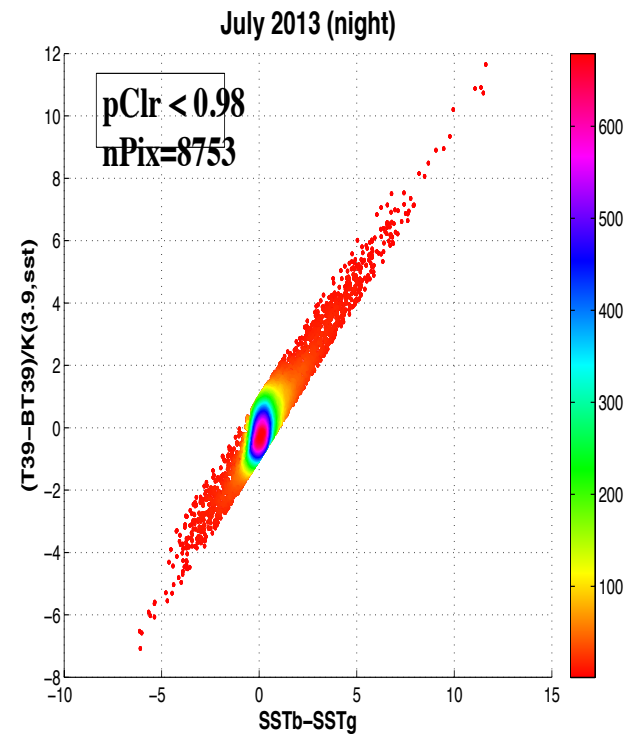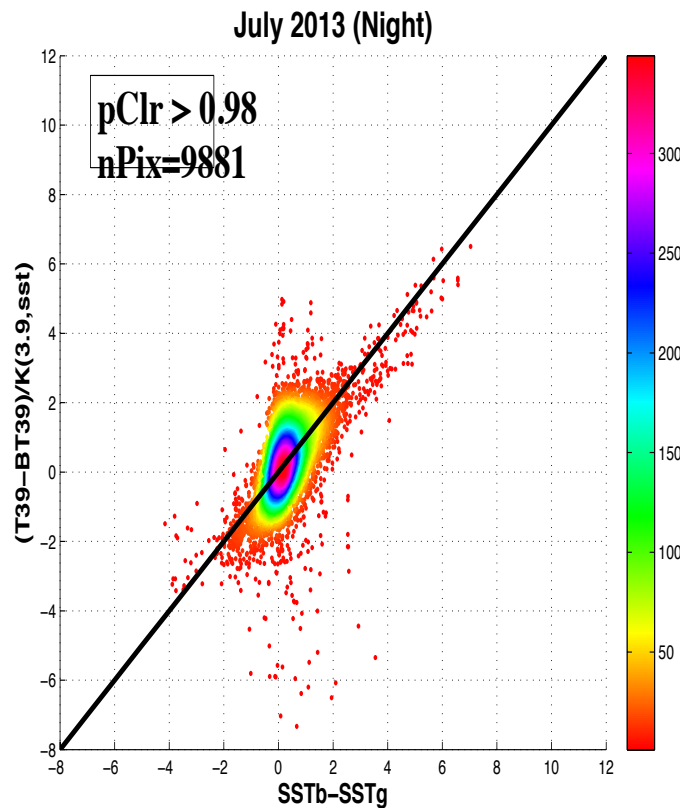# Evaluation of performance of different cloud schemes using long-term Geo-SST matchup database

- **Prabhat K. Koner**
- **Andy R. Harris & Eileen Maturi**

Cloud detection verification

Suitability of Operational Bayesian Cloud Detection

- ❑ Significant cloud leakage due to scatter of left hand figure.
- ❑ Huge falls alarms (90% of passes cloud free)

Error Masking Algorithm

- ## High Cloud:
  - Dynamic threshold based Spectral Difference method (3.9, 6.7, 11 & 13.4 µms)
- ## Low Cloud, model error, glint & aerosol :
  - Differences of single channel retrieval of 3.9 & 11µms
  - Spectral test using Nearest Neighborhood Measurements
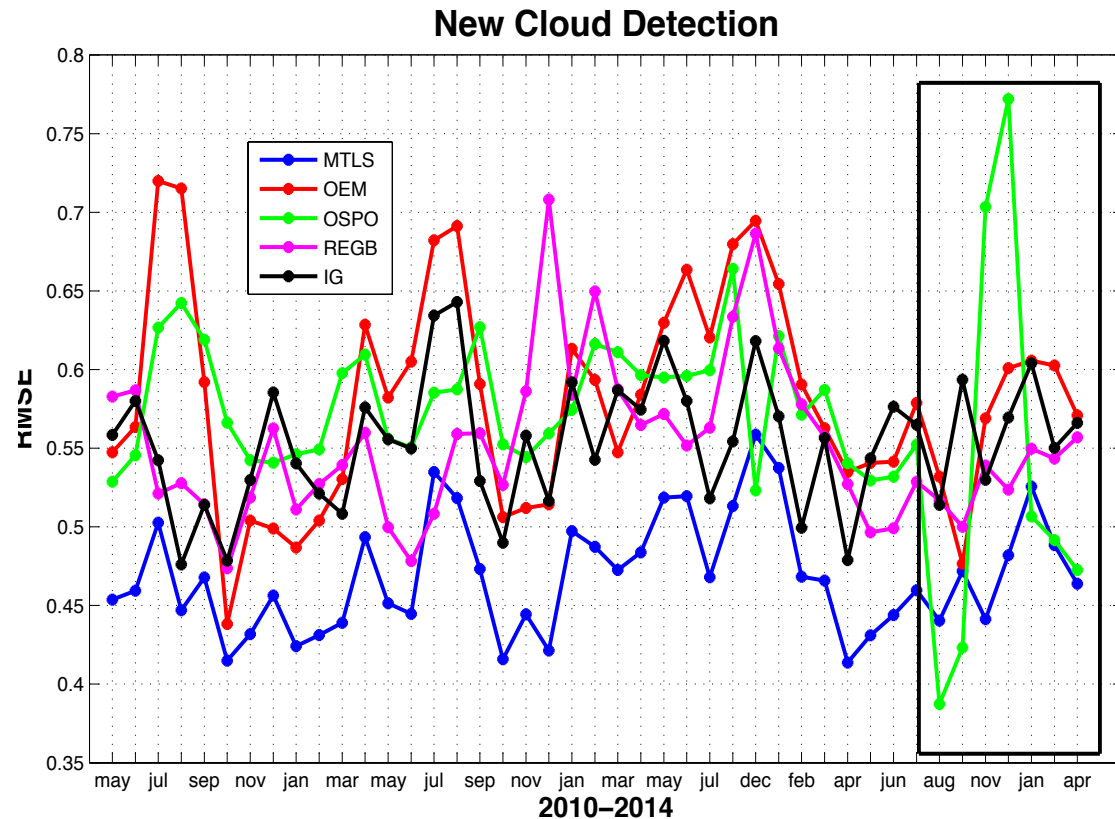
Results for different Cloud detections

GOES13 Sep2011
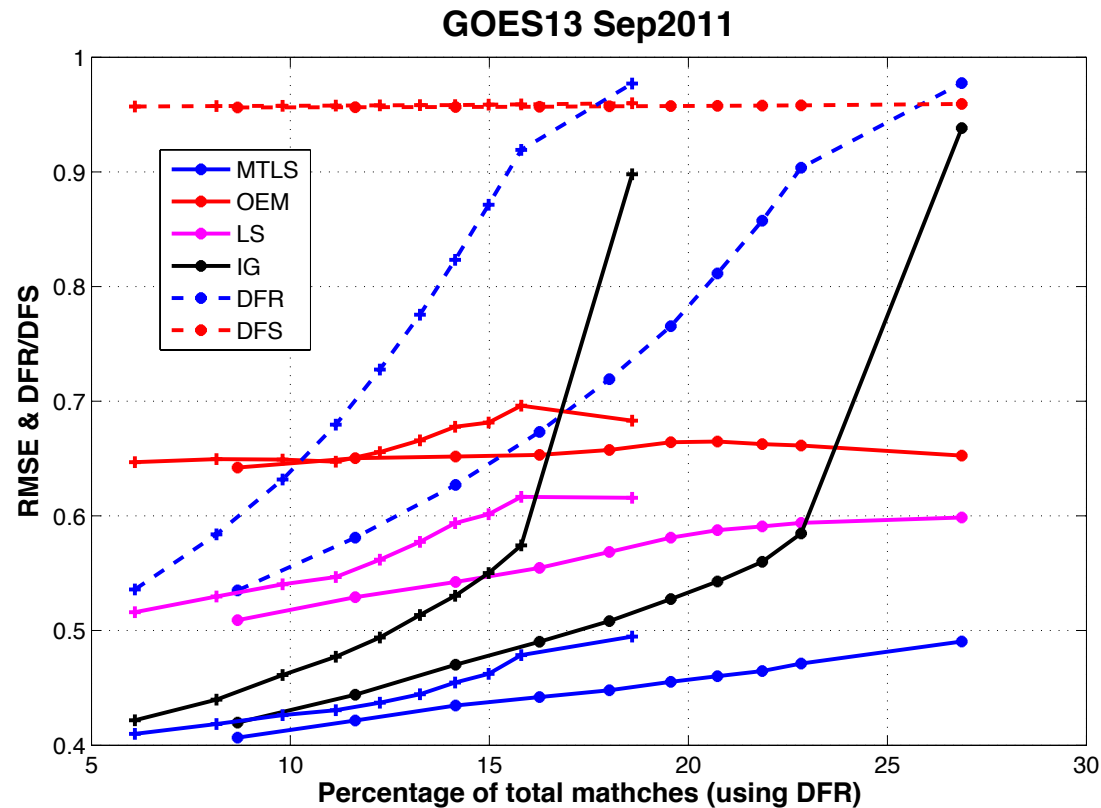
❑ Data coverage can be increased 50% using New Cloud (*)
❑ Significant falls alarm found in Bayesian Cloud Detection (+)
❑ Additional filter used to remove some cloud leakage in (BCD)
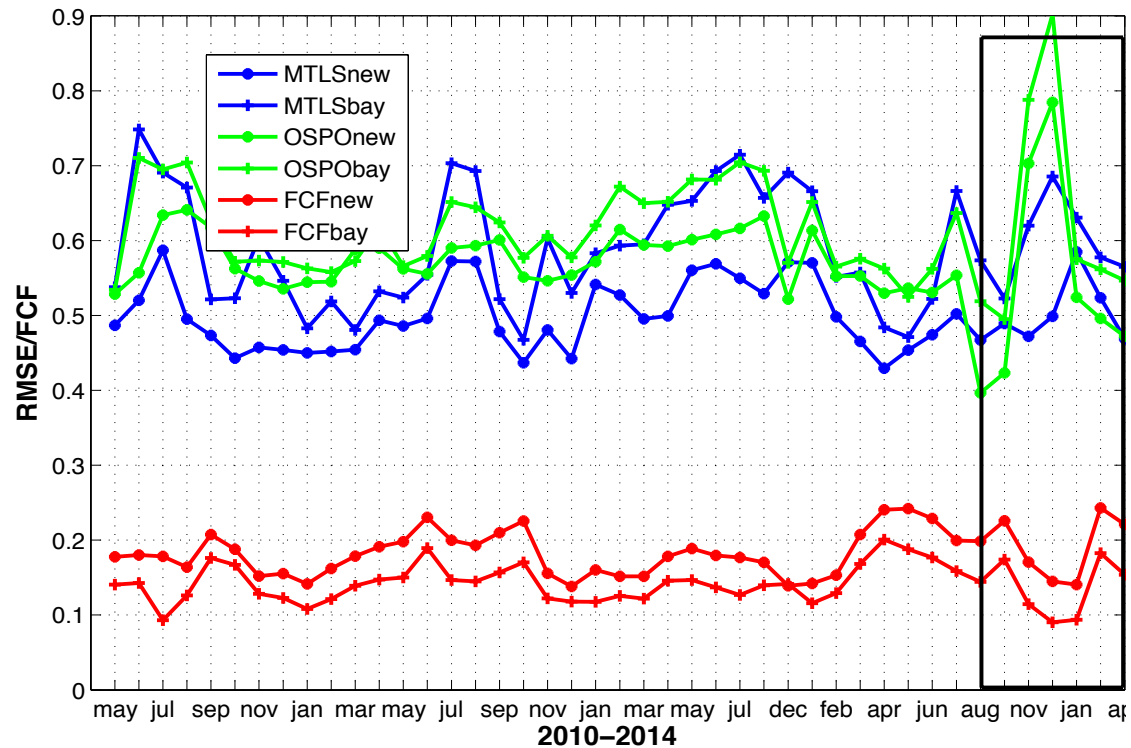
Time Series MTSAT Bayes Cloud

Bayesian Cloud Detection

MTLS +RBC
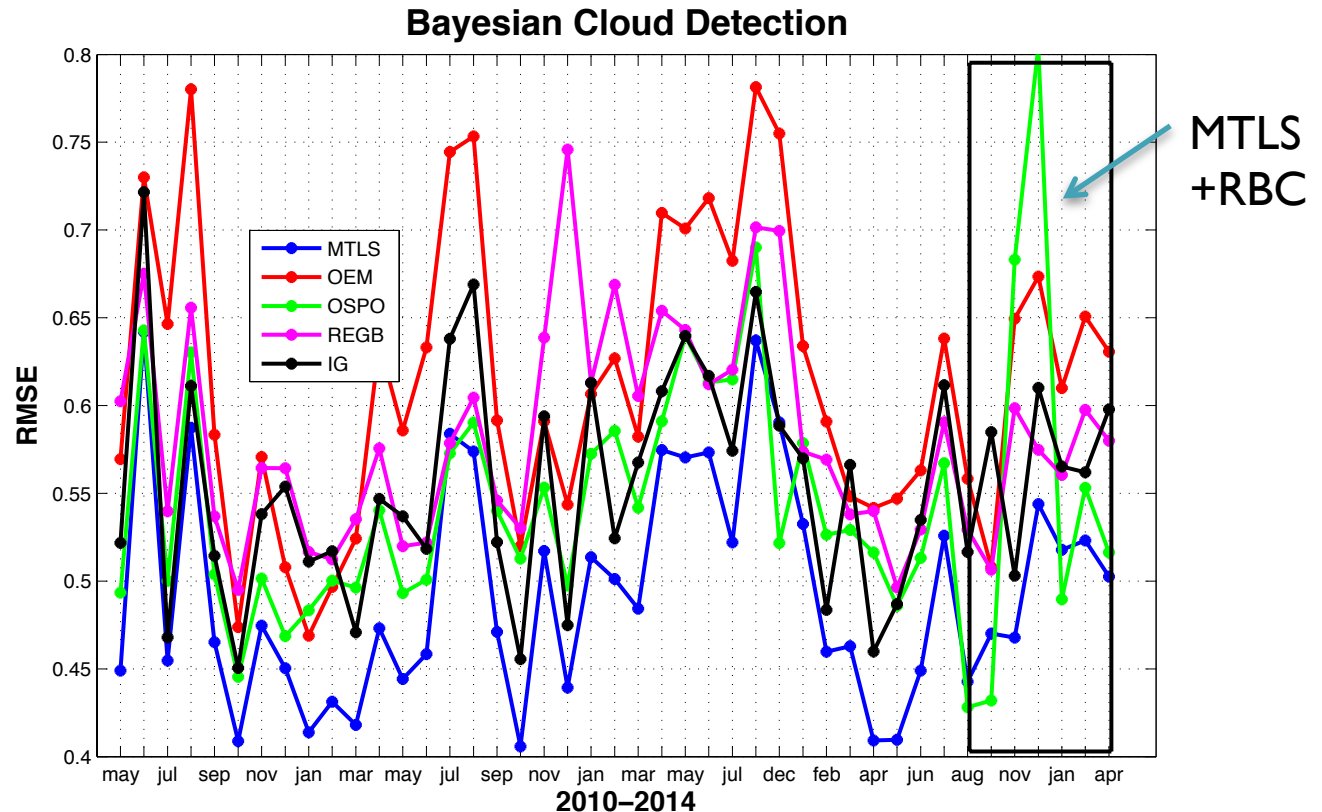
- ❑ OEM error is higher than *a priori* error for allmost of all months
- ❑ RBC can improve a little, but increased error double sometimes.

Time Series MTSAT New Cloud

New Cloud Detection

2010–2014

- ❑ MTLS errors are low and stable
- ❑ Difference between MTLS & OSPO is high
- ❑ OEM errors are higher than *a priori* error for most of the months
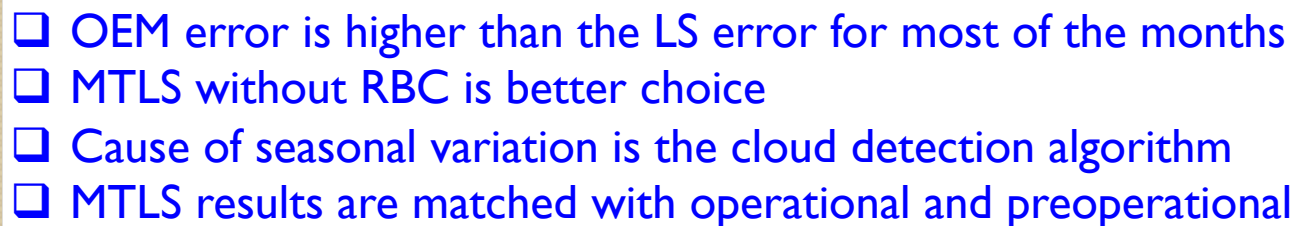- ❑ OEM and REGB errors are also reduced
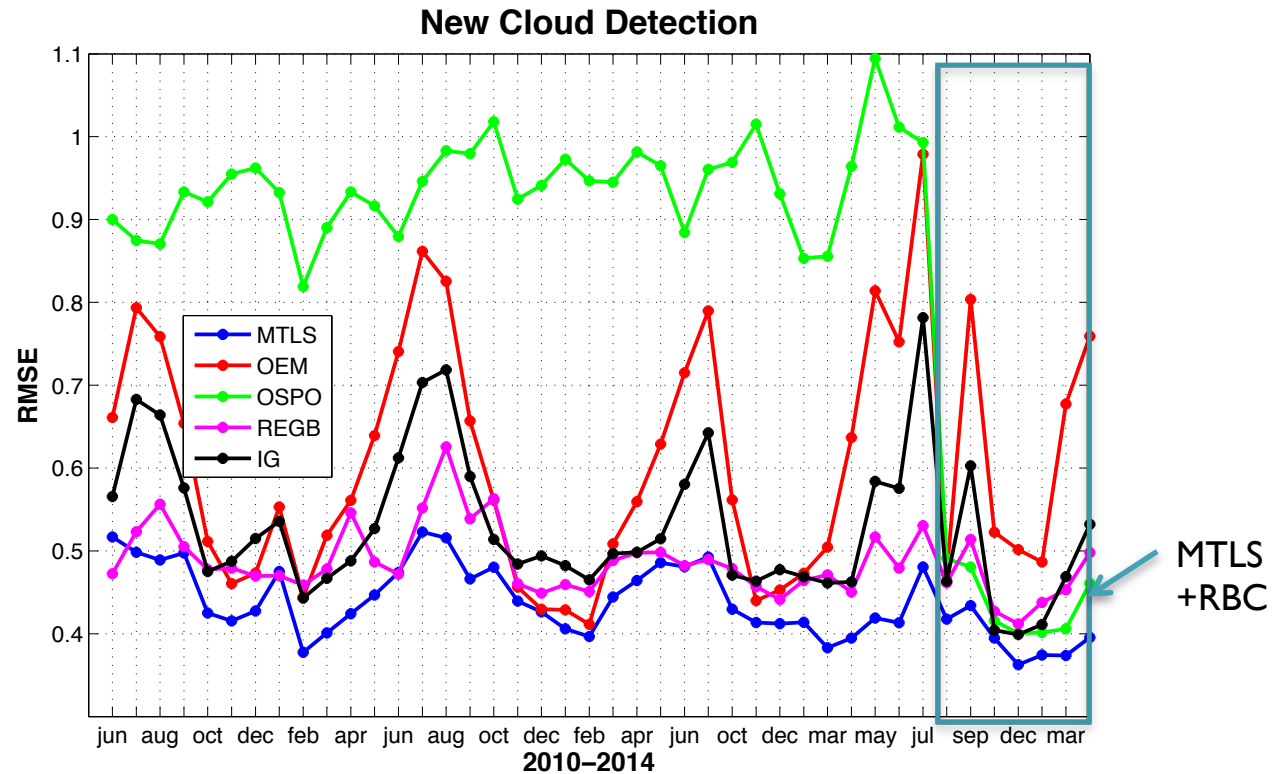
Comparative Results

- ❑ No additional filter for bayesian cloud detection
- ❑ No reduction of data under DFR (> 0.95)
- ❑ 50% more data coverage in new cloud detection
- ❑ MTLS error is much lower in new cloud detection

Time Series GOES13 Bayes Cloud

Bayesian Cloud Detection

- ❑ OEM error is higher than the LS error for most of the months
- ❑ MTLS without RBC is better choice
- ❑ Cause of seasonal variation is the cloud detection algorithm
- ❑ MTLS results are matched with operational and preoperational

Time Series GOES13 New Cloud

New Cloud Detection

Legend: MTLS, OEM, OSPO, REGB, IG

RMSE (y-axis), 2010–2014 (x-axis)

MTLS +RBC

- ❑ OSPO error is high continuously in new cloud detection
- ❑ All other errors in new cloud detection is lower
- ❑ RBC introduces additional error
- ❑ MTLS produce low error and stable

Comparative Results
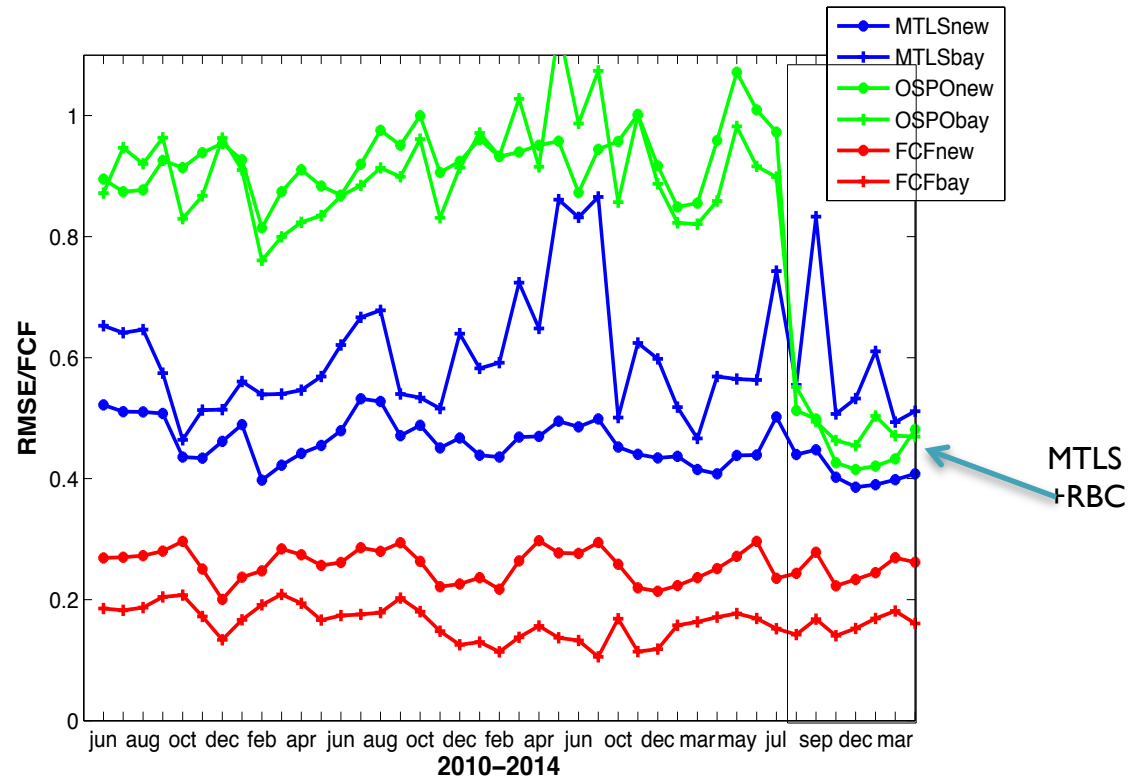
- ❑ No additional filter for bayesian cloud detection
- ❑ No reduction of data under DFR (> 0.95)
- ❑ 50% more data coverage in new cloud detection
- ❑ MTLS error is much lower in new cloud detection (cloud leakage significant)
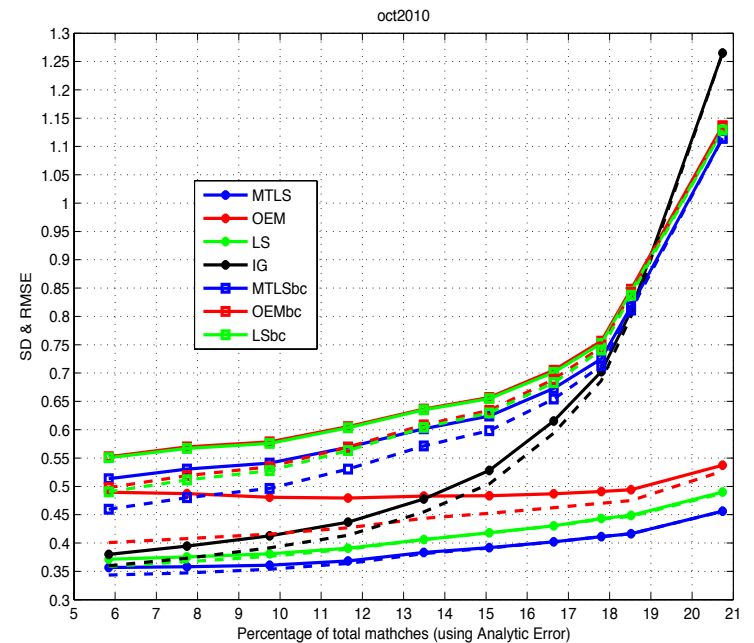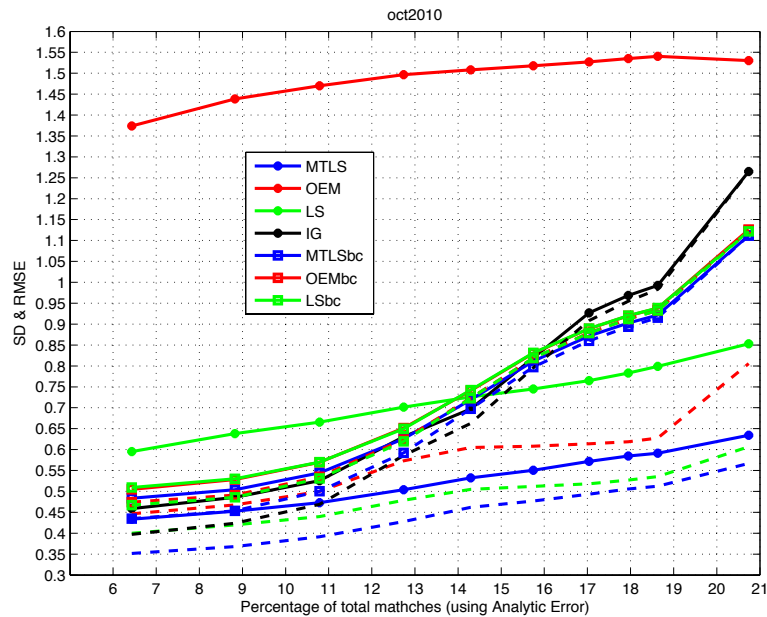- ❑ RBC introduces additional error in MTLS

Conclusions

- In this study, MTLS displayed the best performance among the set of tested algorithms

- New cloud detection shows increased data coverage by ~50% and a significant reduction in cloud leakages.

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- In this study, OEM did not perform as well as other methods.

- Operational version of Bayesian cloud detection displays both cloud leakage and significant false alarms
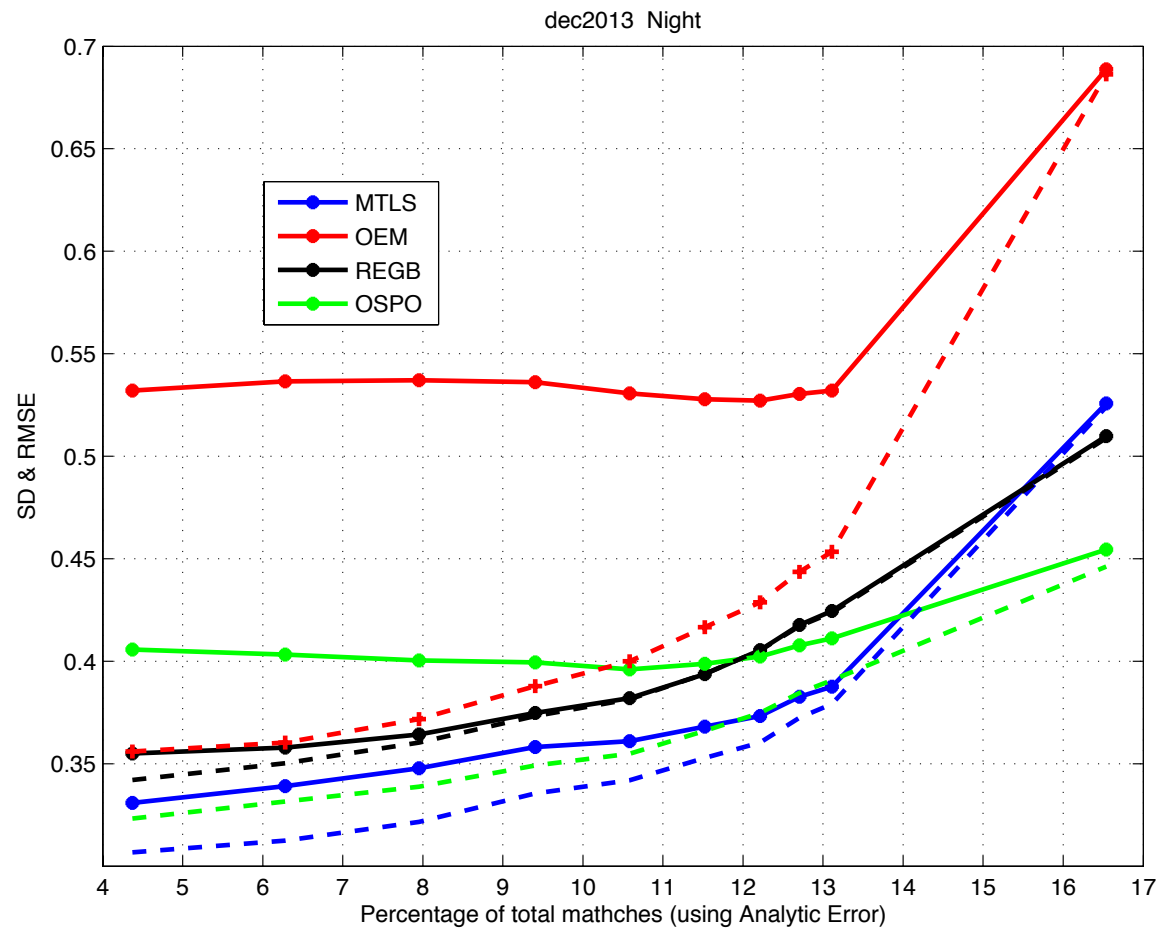
THANKS!

Bias Corrections

Bias Corrections

dec2013 Night

Cloud