NOAA/NCEP
Perspective

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NCEP's interest on COSMIC

- Data available in real-time
- Significant benefits of adding COSMIC into NCEP's Global Data Assimilation system have been shown
- This has been accomplished with work leveraged at the JCSDA
- We would like to see continuation of the use of RO data
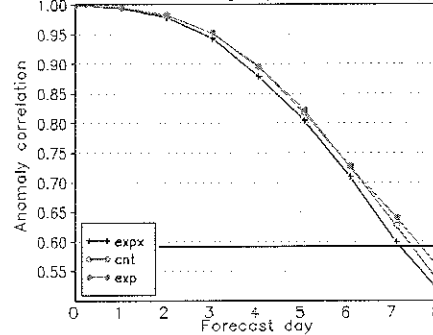
Interests (I)

- AC scores (the higher the better) as a function of the forecast day for the 500 mb gph in Southern Hemisphere
- 40-day experiments:
  - **expx (NO COSMIC)**
  - **cnt (operations - with COSMIC)**
  - **exp (updated RO assimilation code - with COSMIC)**
    - » Many more observations
    - » Reduction of high and low level tropical winds error

AVERAGE FOR 00Z25MAR2008 – 00Z30APR2008
SH 500 mb Height (wave 1–20 AC)

1. COSMIC provides 8 hours of gain in model forecast skill at day 4!!!!

Interests (II)

- Evidence suggests that the use of COSMIC in the Northern Hemisphere and Southern Hemisphere improves the performance of the model, alleviating "dropouts" in Anomaly Correlation Scores.
  - Data are not biased
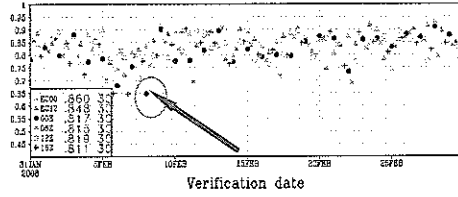 - There is no over sample

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"Dropout" study with COSMIC

(Courtesy of DaNa Carlis, EMC)

Anomaly Correl day 5 Z 500mb s hem lat 20–80

Verification date

- Skill score dropouts plague NCEP's global model performance in Northern and Southern Hemispheres

- Dropouts are defined by 5-day anomaly correlation (AC) scores < 0.70

- For example, the 00Z Feb. 03 2008 case, using GPSRO data alleviated a dropout in the southern hemisphere.

SH 5-day AC scores:

GFS=0.65 (NCEP's model)
GDAS=0.69
ECMWF=0.83

First guess+nodata=0.70
First guess+conven=0.68
First guess+conven+amsua=0.70
First guess+conven+airs=0.75
First guess+conven+amsub=0.77
First guess+conven+mhs=0.78
First guess+conven+gpsro=0.79
First guess+conven+mhs+amsub=0.78
First guess+conven+gpsro+mhs+amsub=0.87

2. COSMIC alleviates 'dropouts' in the Southern Hemisphere

Perspective on COSMIC

- There is high level of interest to further assess the benefits of COSMIC by
  - Improving the assimilation algorithm (forward operator, quality control checks, observation error characterization)
  - Reducing the on-site latency of the data
  - Formal discussions/reviews with NCEP management

- Our interests covers
  - NWP impact studies (weather- global and mesoscale scales)
  - Tropopause analysis (weather and climate)
  - Electron density of the ionosphere (space weather) - see Tim Fuller-Rowell's talk

- RO is the only observing platform that actively combines
  - Terrestrial Weather
  - Climate analysis and short-term forecasts
  - Space Weather Prediction

Operational needs

- Low latency
  - Global (6hr time window/2h45min cutoff for early analysis)
  - Regional (NAM: 3hr time window/1hr15min cutoff)

- Latency requirements may change with NPOESS era (lower latency)

- Data stream to be stable (not many changes)

- Sufficiently accurate data

- Early access and involvement with the data

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