



NCEP Support for JCSDA Development

S. Lord

J. Derber, EMC Staff

JSDI supported investigators

Overview

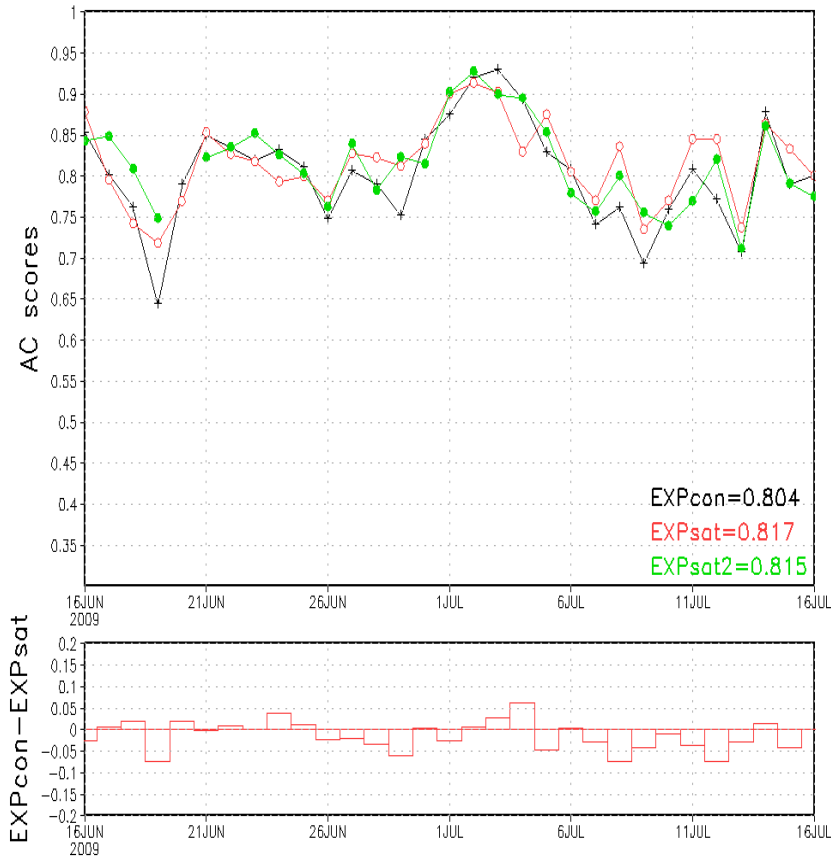
- List of NCEP/EMC projects and participants – FY10
 - Results not presented elsewhere
- Summary of ongoing diagnostics project (EMC, NRL, GMAO)
- Historical global forecast system improvement

List of NCEP/EMC projects and participants – FY10

- GSI code management
 - Infrastructure for all users of NCEP systems
 - Coordination among all partners and external investigators
- Support for FFO investigators
 - E. g., D. Behringer (with Bob Miller)
- CRTM development and maintenance
 - P. vanDelst, D. Groff
 - Preparation for new instruments
- AMSR-E improvements
 - A. Collard
 - Test CRTM upgrades in GSI
- Use of SEVIRI imager data
 - H. Liu
 - Improved upper tropospheric temperatures
 - Waiting for operational data availability
 - Reanalysis upgrades and testing (e.g. SSU)
- Satwinds QC and thinning
 - X. Su
 - EUMETSAT-9 winds implementation
 - ASCAT winds QC and ambiguity
 - Satwind errors characterization (cloud height, tracer, processing and QC technique)

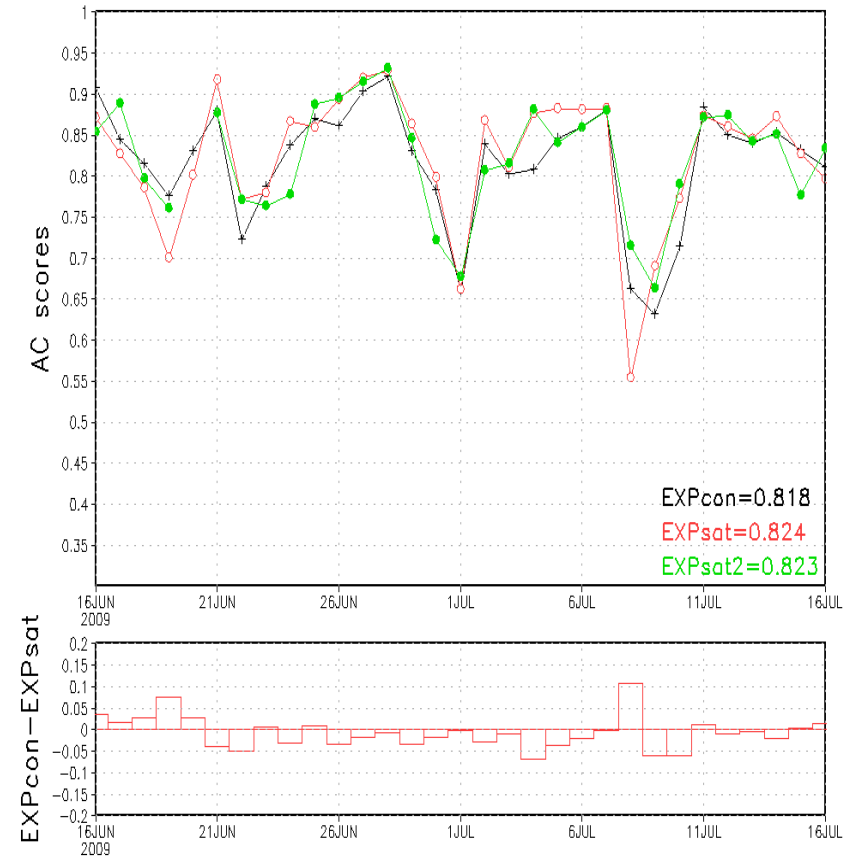
Satellite Wind QC Experiments

NH 500 mb Geopotential Height at day 5
for 00Z16JUN2009 - 00Z16JUL2009



YUEJIAN ZHU, GMB/EWC/NCEP/NOAA

SH 500 mb Geopotential Height at day 5
for 00Z16JUN2009 - 00Z16JUL2009



YUEJIAN ZHU, GMB/EWC/NCEP/NOAA

**QC 1: asymmetric gross check limits
depending on wind speed relative to guess**
**QC 2: removes all observations with speed less
than guess**

EXPcon=control

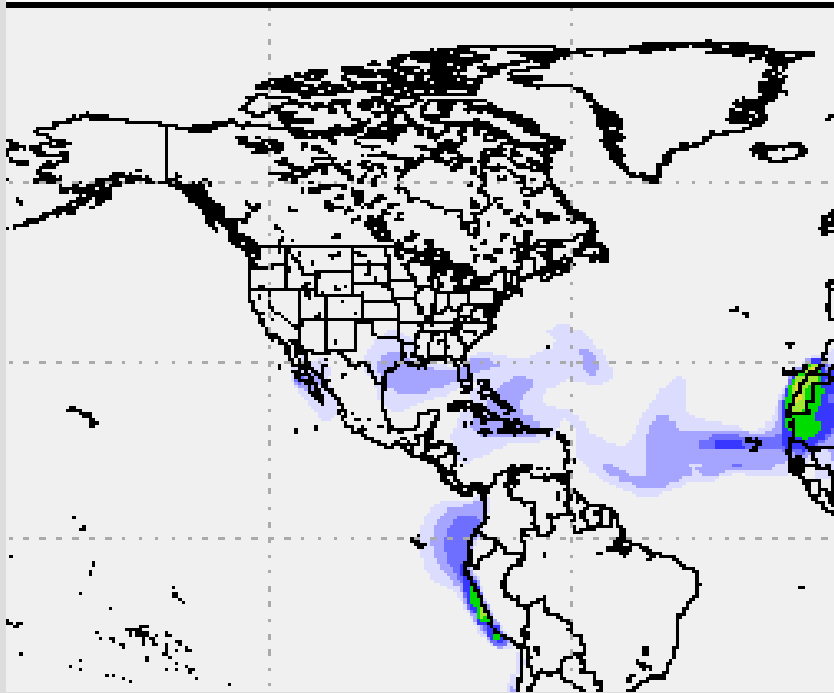
EXPsat=QC 1

EXPsat2=QC 2

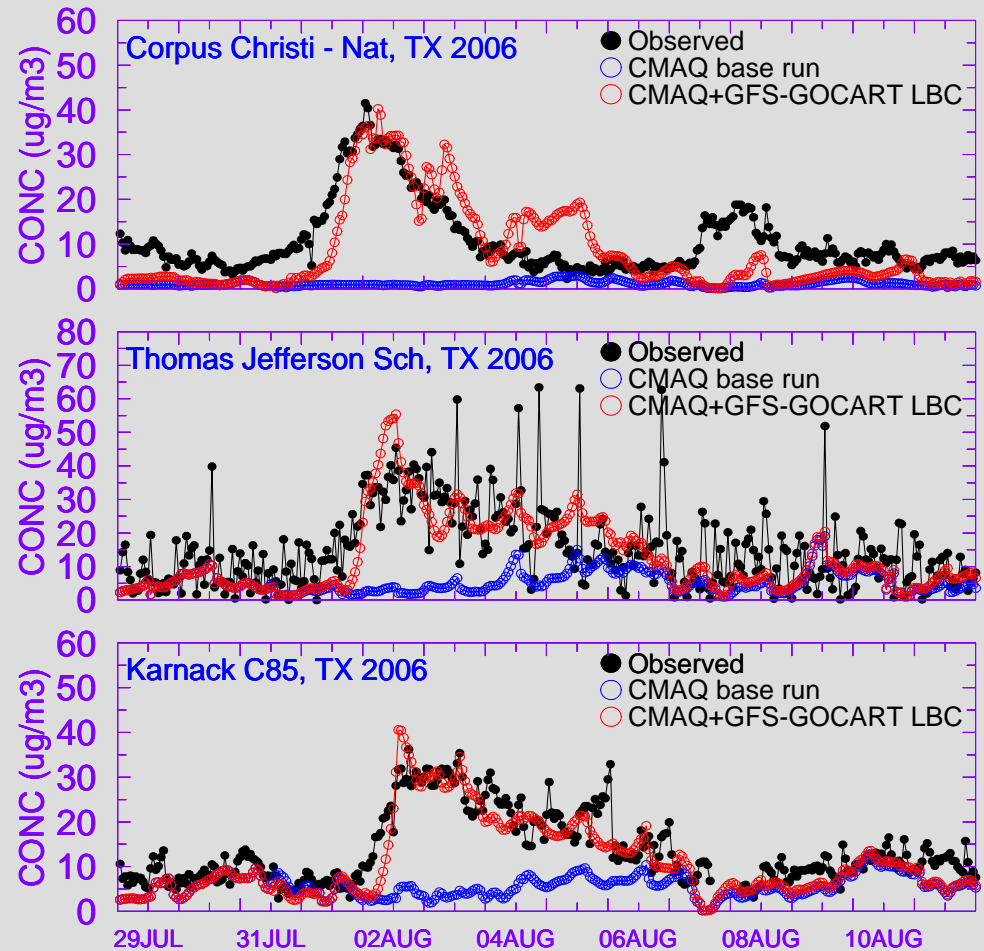
List of NCEP/EMC projects and participants – FY10 (cont)

- Land surface
 - M. Ek, W. Zheng, V. Wong
 - Land Data Assimilation Working Group
 - Microwave surface emissivity (with CRTM group) and assimilation testing
 - Impact of observed land surface data on short term forecasts
- SST
 - X. Li, B. Katz
 - Near-Surface SST model and Satellite Data Assimilation
 - Real-time high resolution SST analyses maintenance and quality control
- Global aerosol data assimilation
 - S. Lu, Ho-Chun Huang and Youhua Tang
 - GOCART integration - Arlindo da Silva
 - Global Forecast System tracer capability

Aerosol Lateral Boundary Conditions Tests: Trans-Atlantic dust Transport

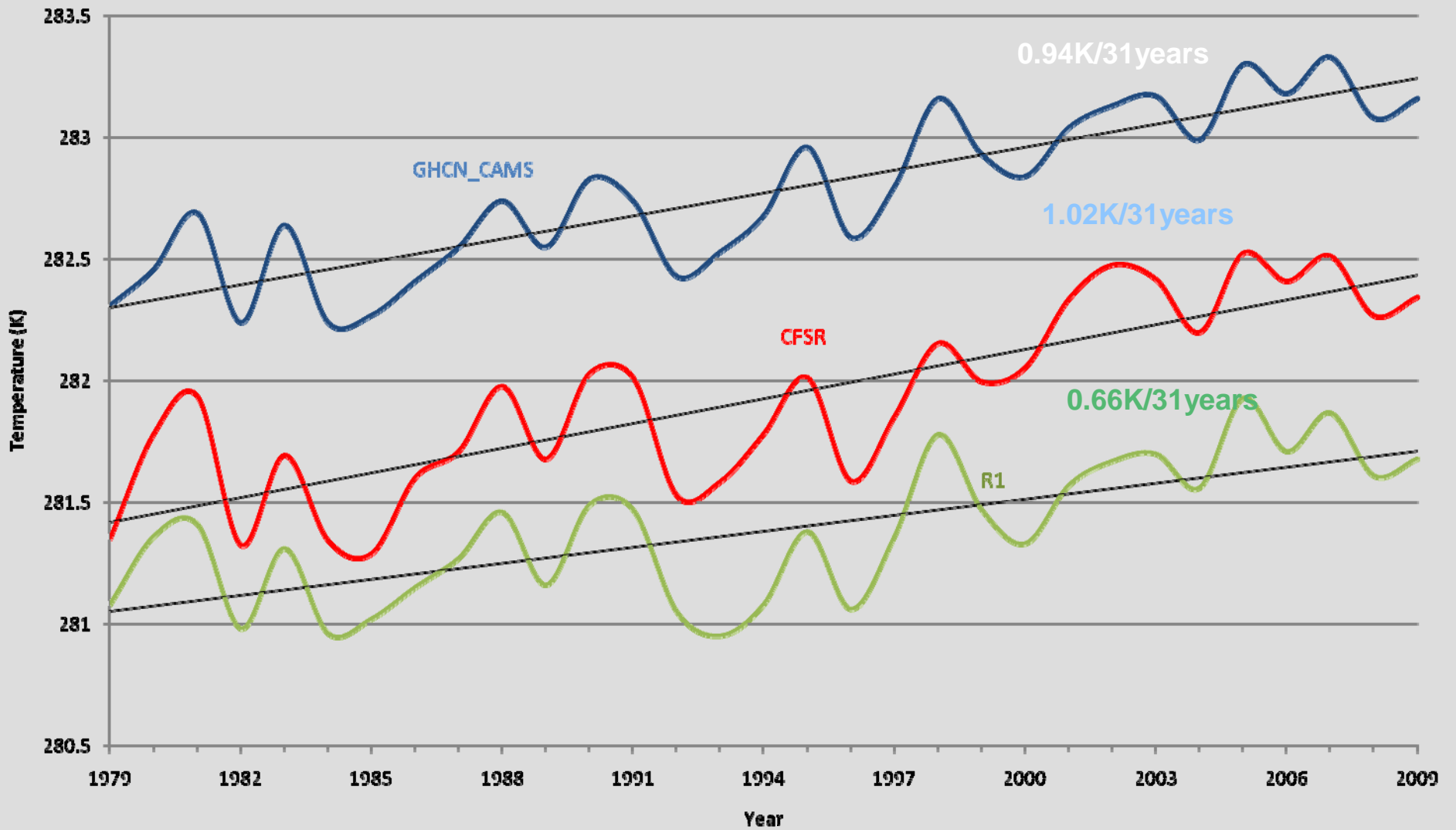


- During Texas Air Quality Study 2006, the model inter-comparison team found all 7 regional air quality models missed some high-PM events, due to trans-Atlantic Saharan dust storms.
- These events are re-visited here, using dynamic lateral aerosol boundary conditions provided from dust-only off-line GFS-GOCART.



Youhua Tang and Ho-Chun Huang (EMC)

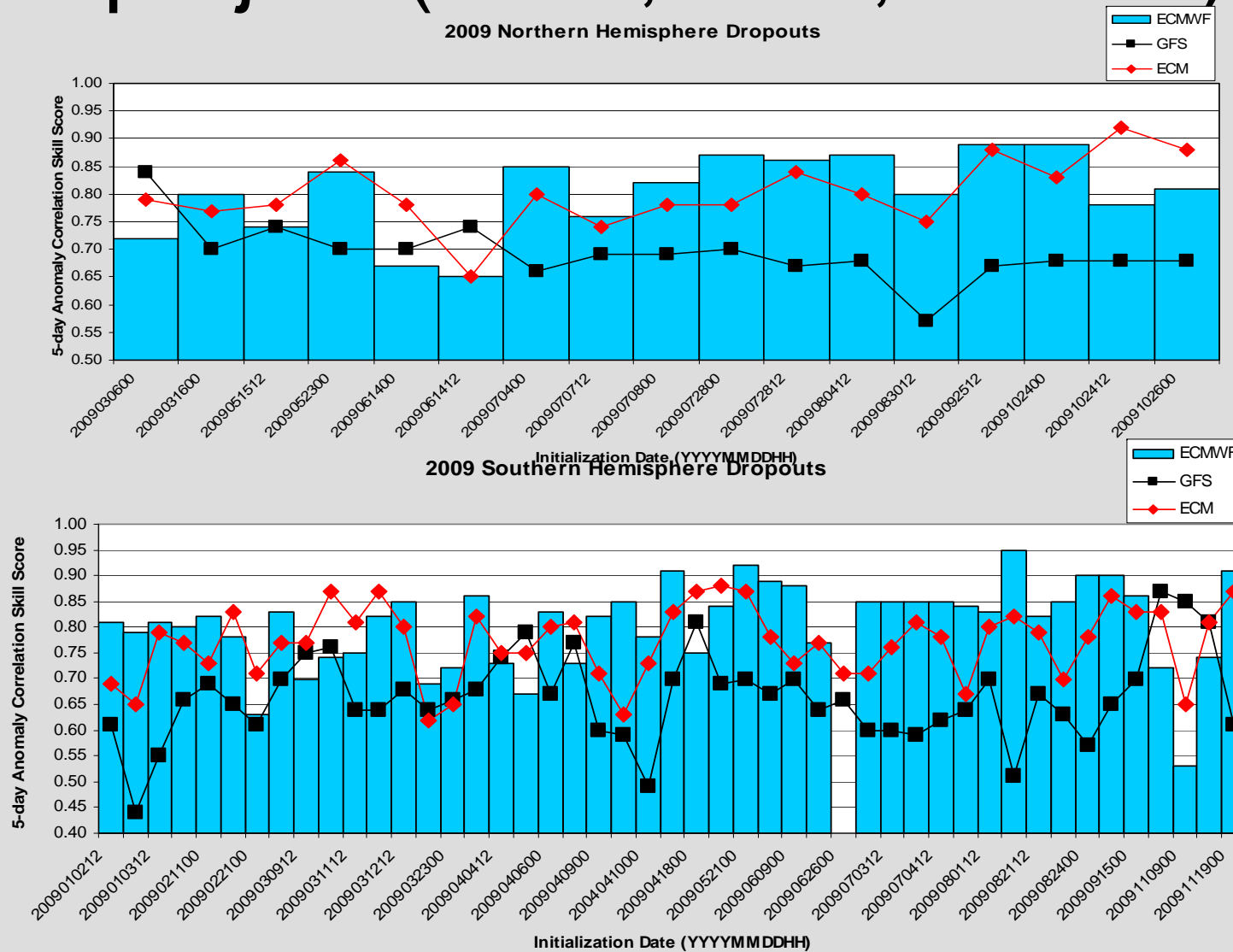
Annual & Global Mean Land T2m



- CFSR has less bias than R1, relative to GHCN_CAMS
- Upward trend in CFSR larger than in R1, more like GHCN_C

NWS/CPC
H. Vandendool

Summary of ongoing diagnostics project (EMC, NRL, GMAO)

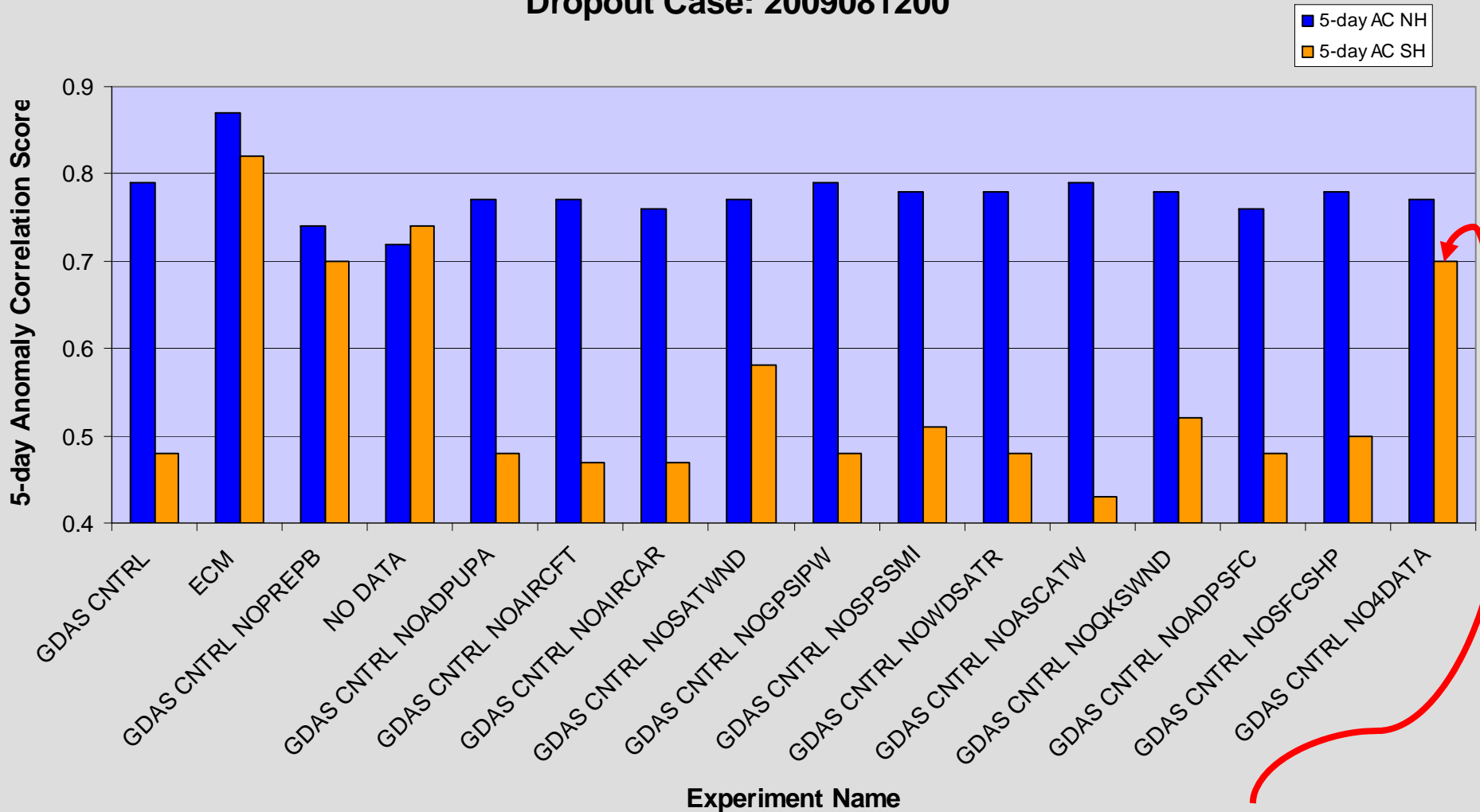


Summary of ongoing diagnostics project (EMC, NRL, GMAO)

- Impact tests shutting off major classes or sub-classes of data such as aircraft, satellite winds and satellite radiances for **dropout cases**
 - Satellite radiance data: usually positive
 - Satellite winds: often negative impact
 - Aircraft data are not showing consistent positive or negative impact
- Improved data filtering and usage:
 - Satellite winds
 - Improved aircraft track-checking QC
 - Working with Australia and South Africa to get their group track-check errors fixed
 - Aircraft temperature and surface pressure data bias correction
 - Improved reject-list criterion
 - Surface data processing (e.g. altimeter setting, etc)
- Use adjoint data impact technique
 - NRL - Langland
 - GMAO (included in GSI) – Gelaro
- Improve station data dictionary
 - Station elevation, location, metadata

Prepbufr Experiments

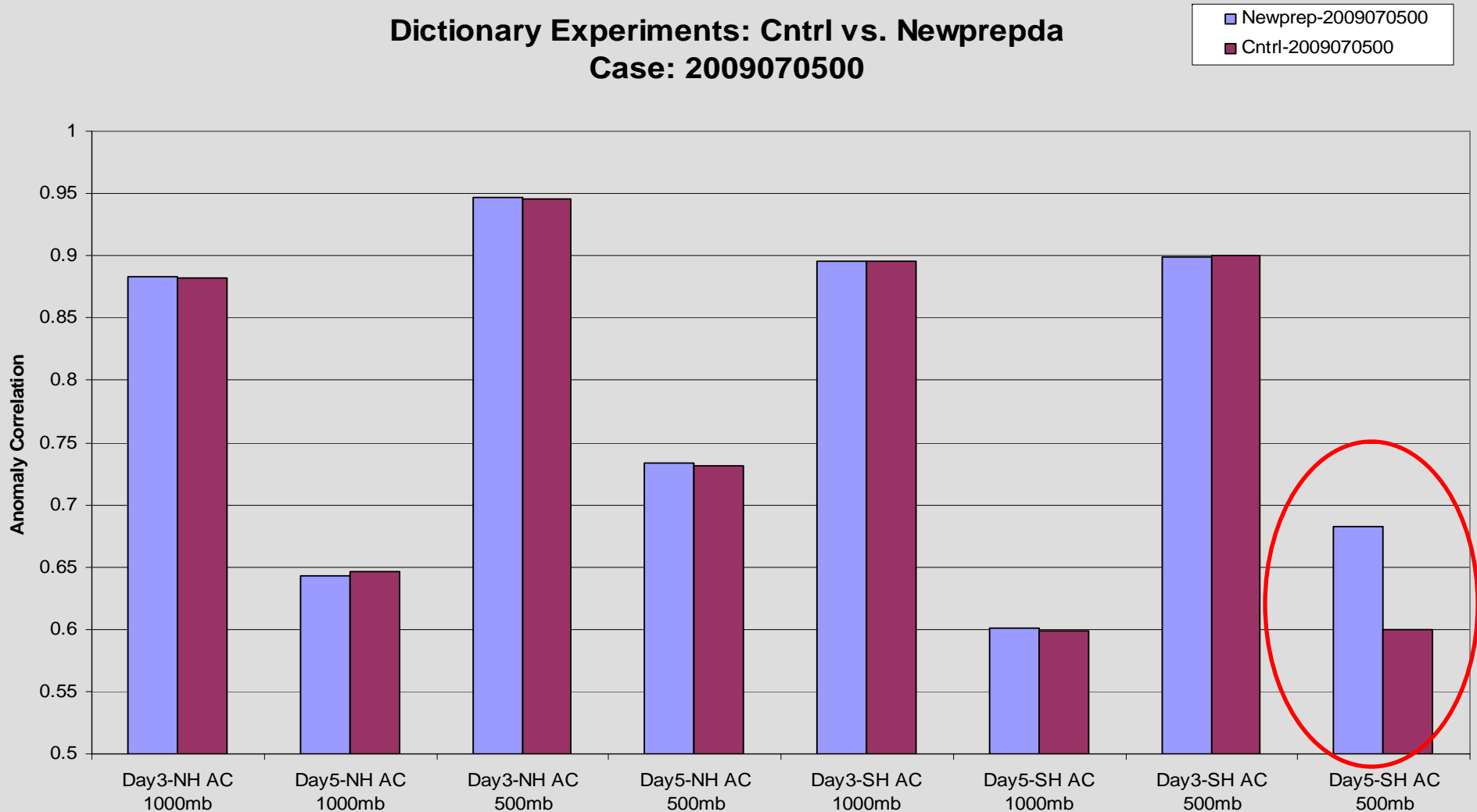
Dropout Case: 2009081200



SH Dropout Case in Orange

SH 5-day AC scores improve by removing SATWND, SFCSHIP, QKSWND, and SPSSMI

Dictionary Experiments: Cntrl vs. Newprepda Case: 2009070500

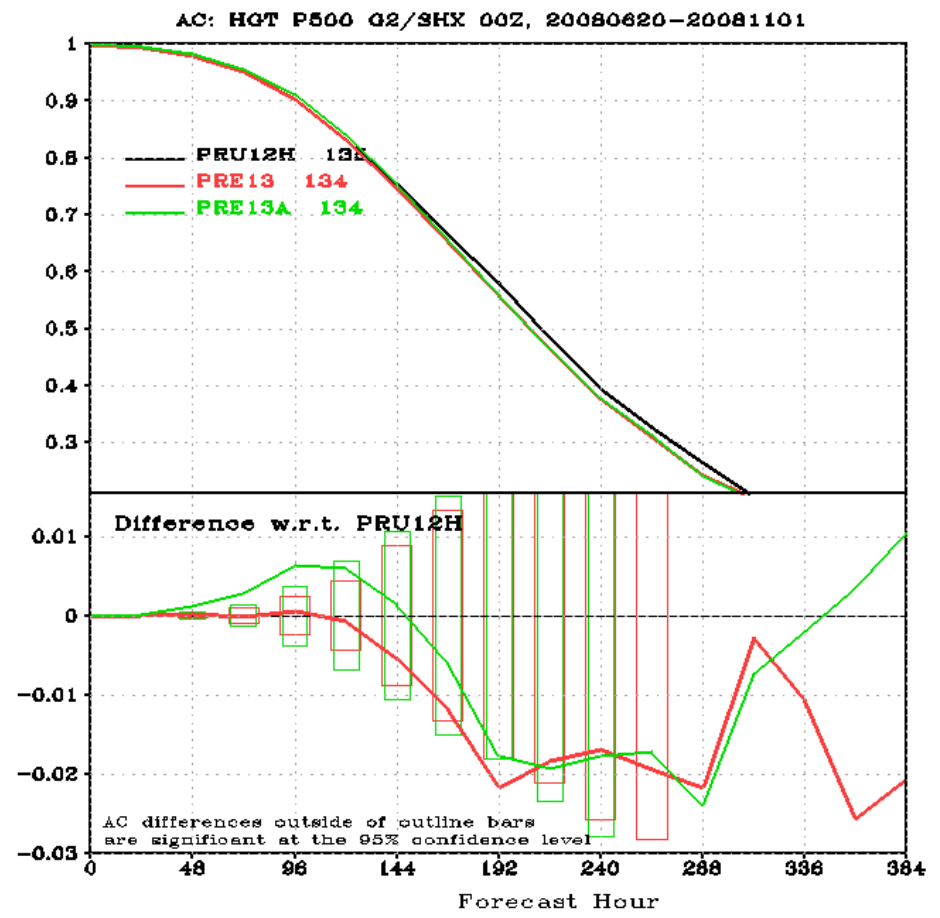
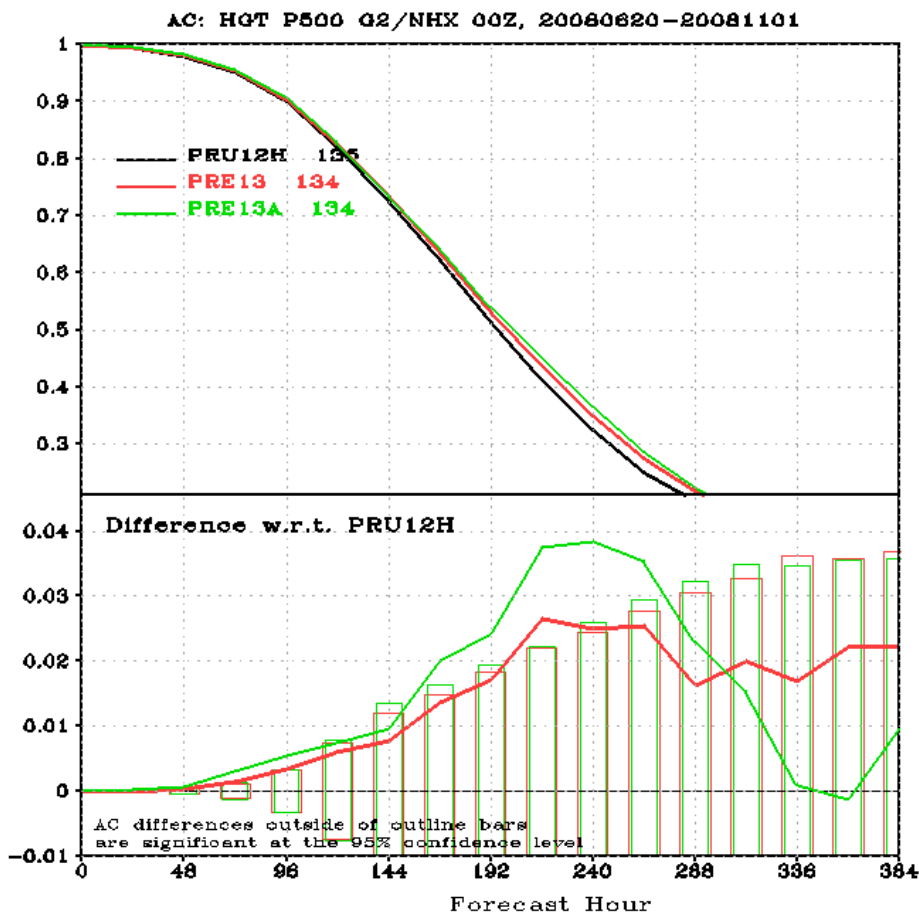


- Overall, results show that the dictionary updates have little impact on our 3-day and 5-day AC scores.
- However, there is one particular case (2009070500) where the SH 5-day AC score is improved for the Newprepda (0.68) compared to the control (0.60)

500 MB Anomaly Correlation

Northern Hemisphere

Southern Hemisphere



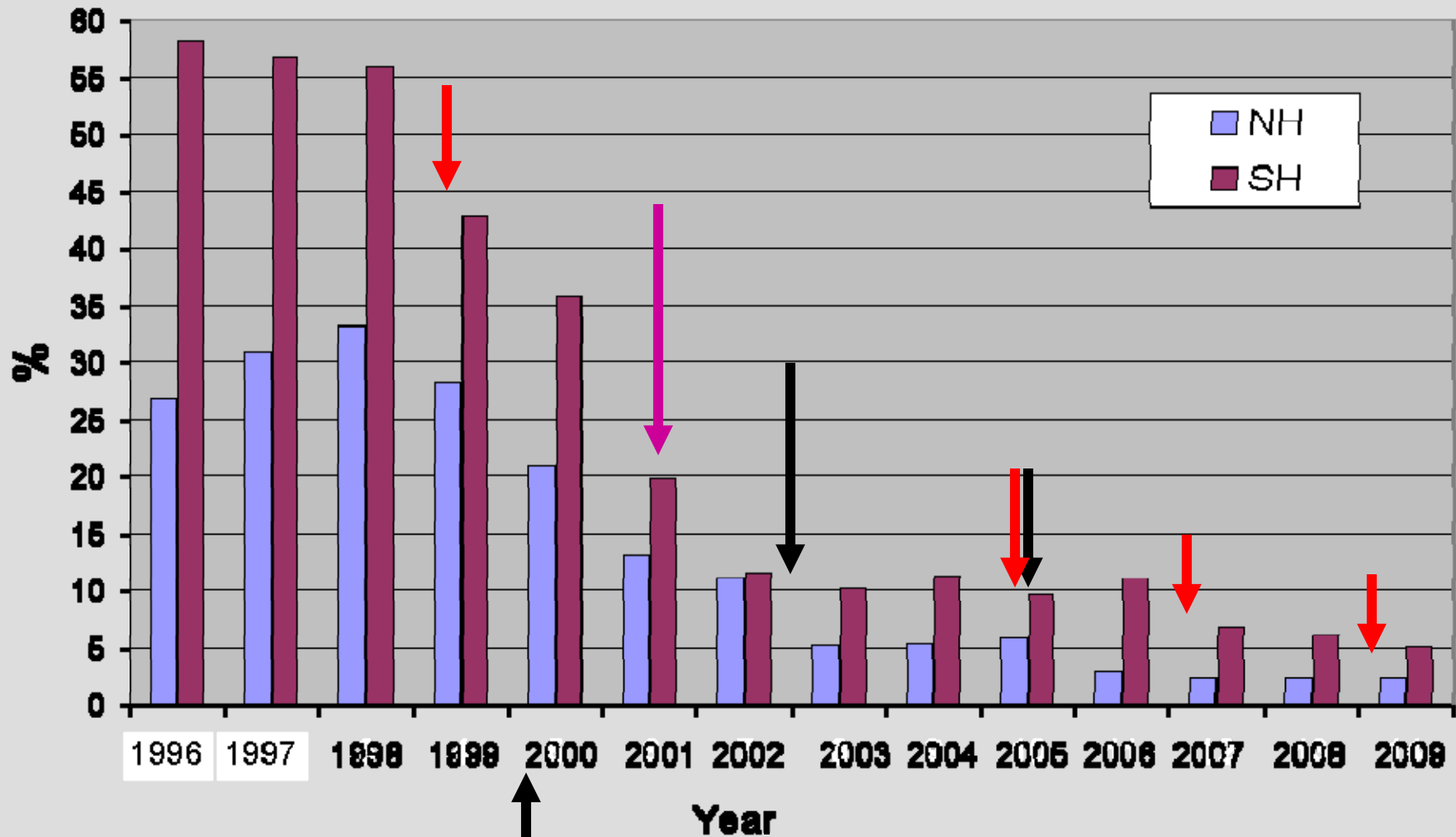
Red: res. Incr. 38 → 27 km

Green: add'l physics changes

Percent of Poor (Busted) Forecasts

Percent Count of Anomaly Correlations Below 0.7
GFS 00Z-Cycle Day-5 Forecast, 500hPa Height

Fanglin
Yang

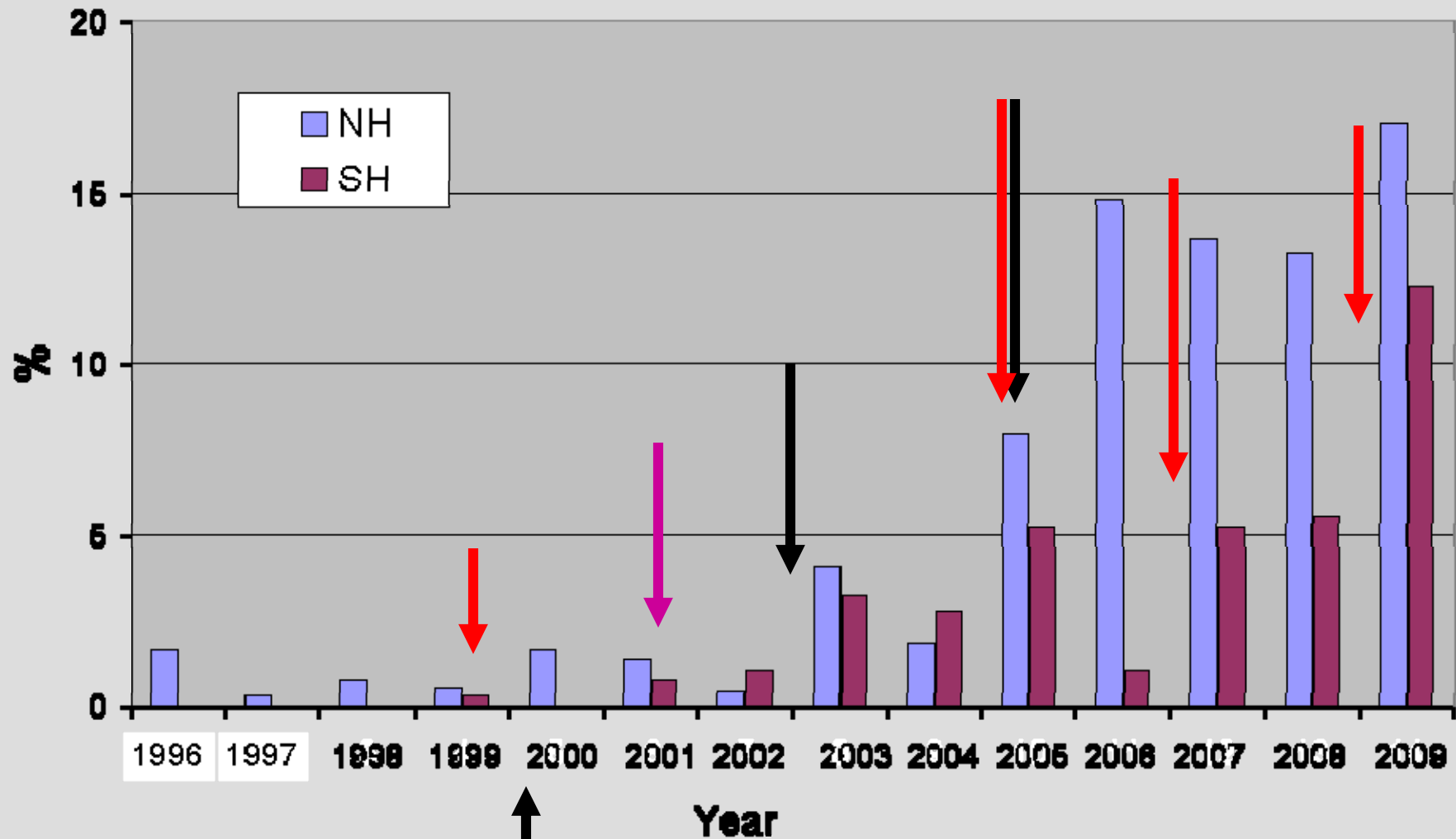


2/2000: Res. Incr. 100 → 70 km

Beware: "post hoc, ergo
proper hoc"

Percent of Excellent Forecasts

Percent Count of Anomaly Correlations Above 0.9
GFS 00Z-Cycle Day-5 Forecast, 500hPa Height

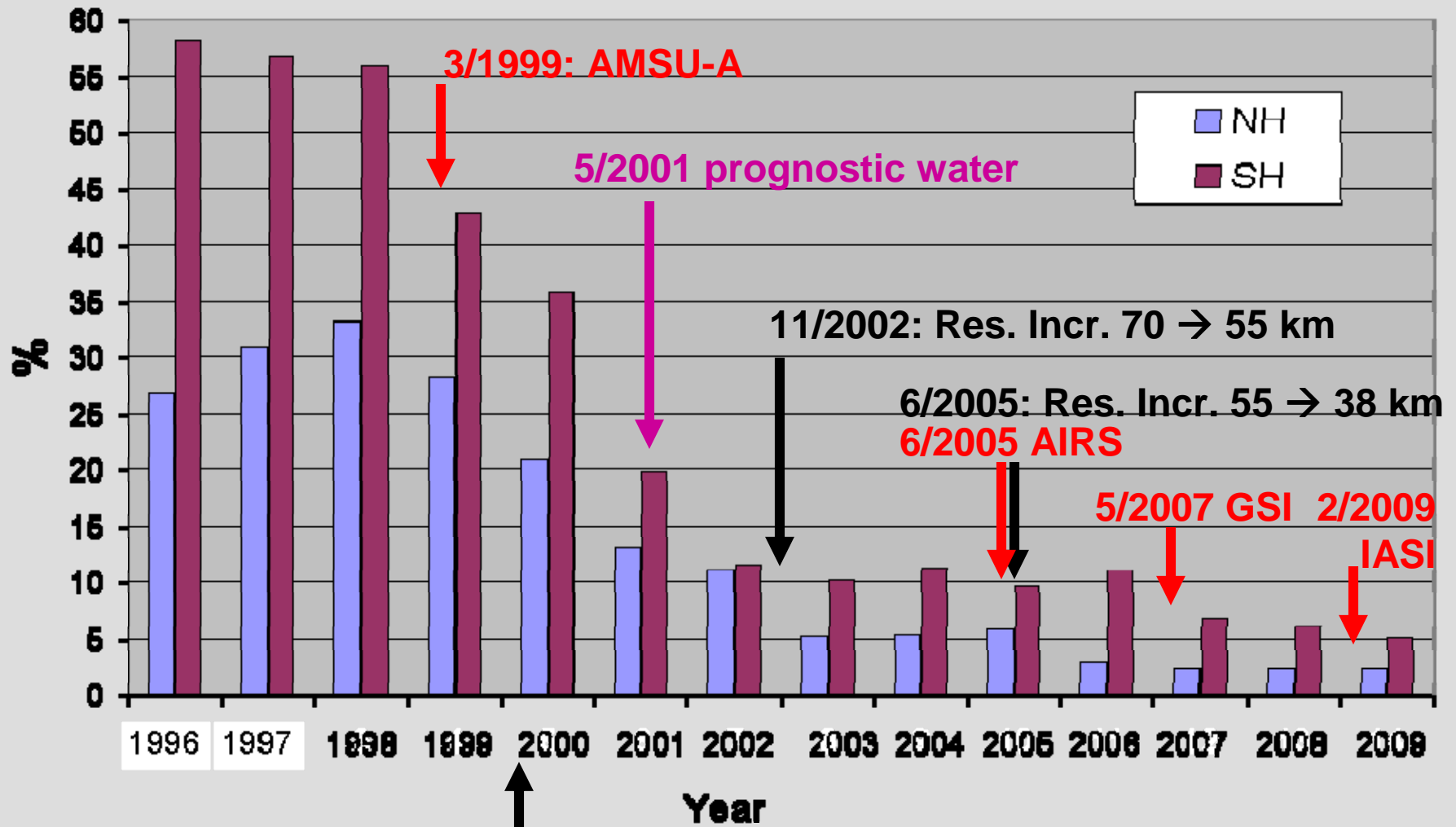


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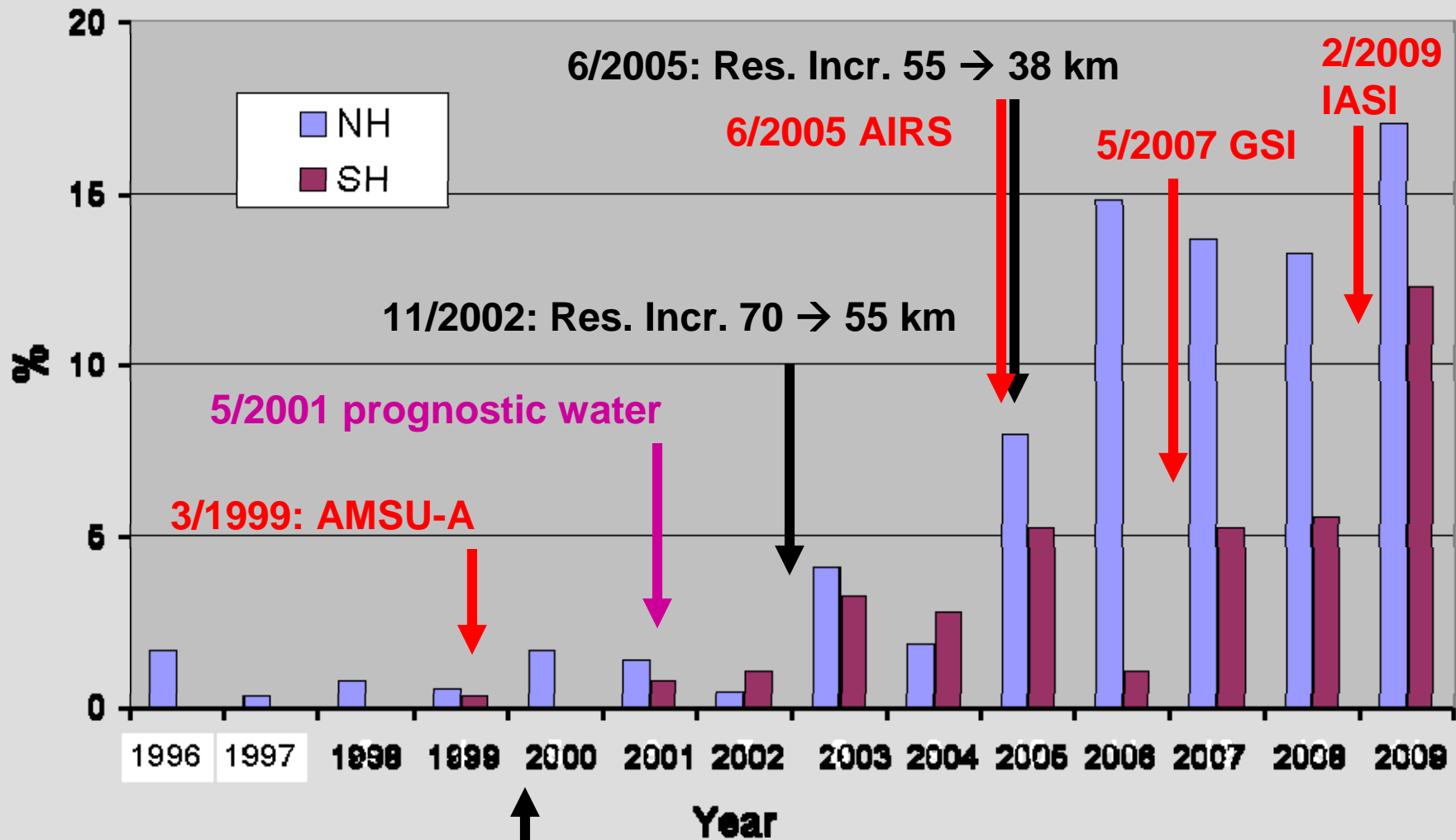


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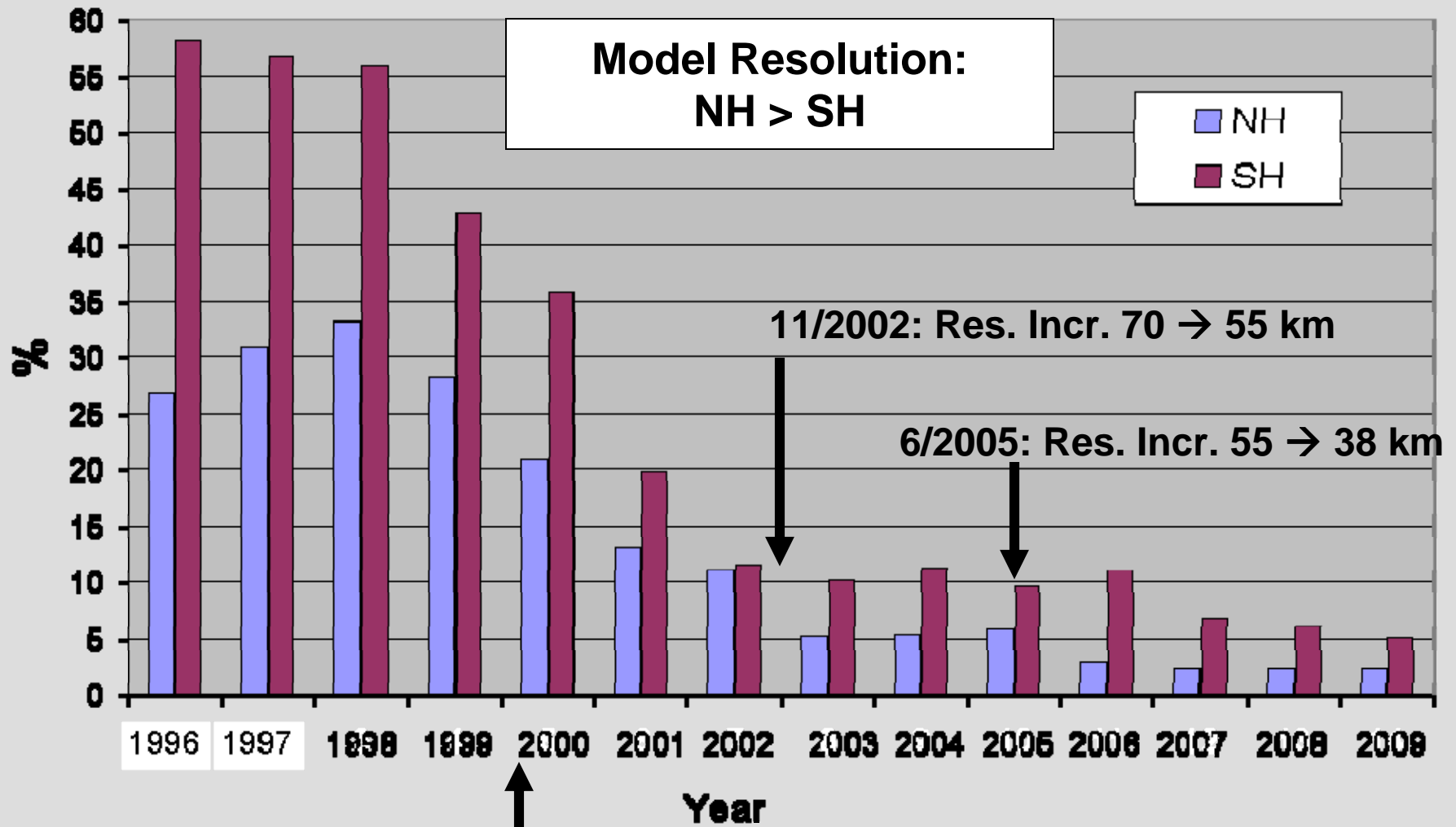


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2/2000: Res. Incr. 100 → 70 km

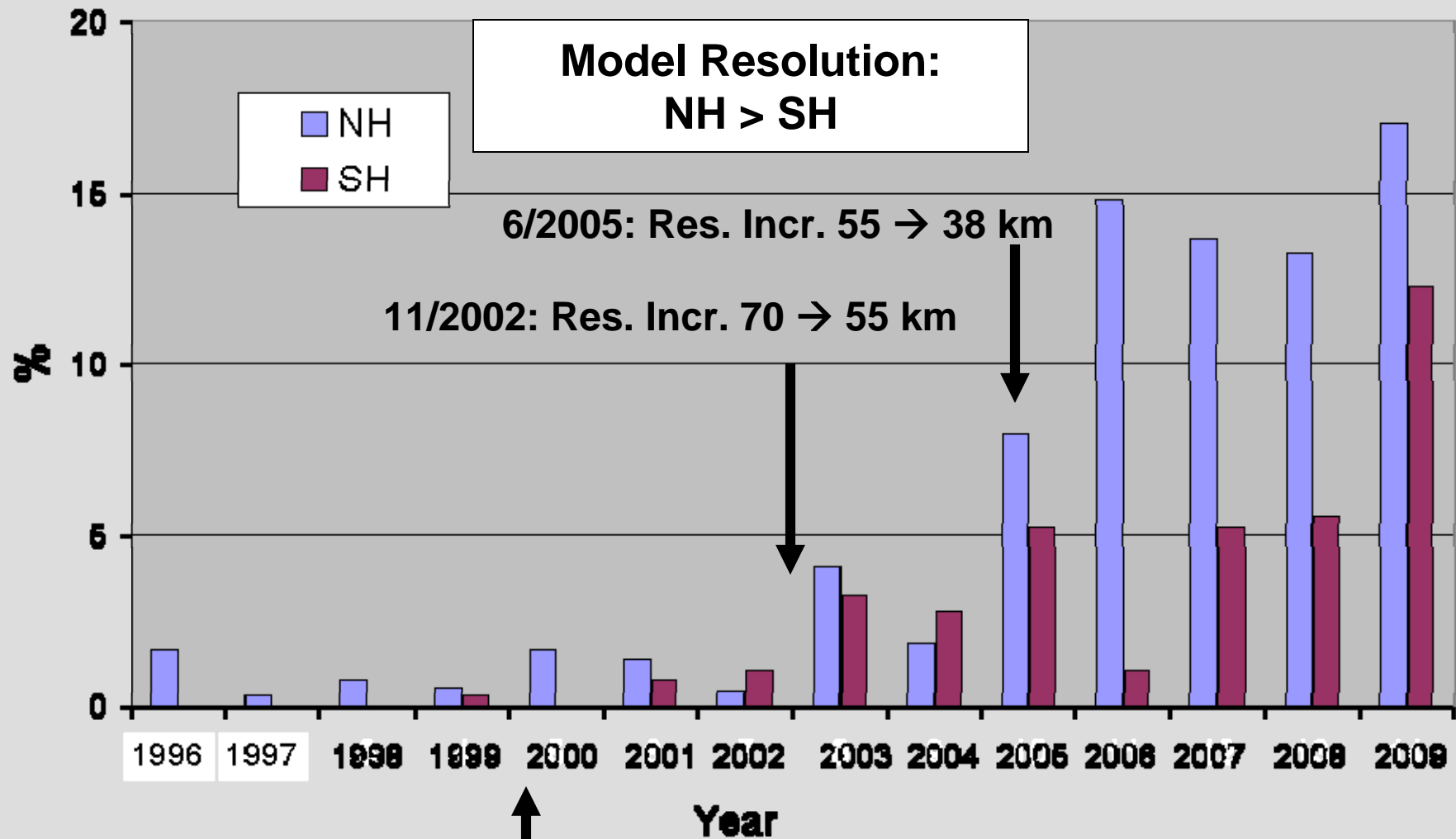
11/2002: Res. Incr. 70 → 55 km

6/2005: Res. Incr. 55 → 38 km

Beware: "post hoc, ergo proper hoc"

Percent of Excellent Forecasts

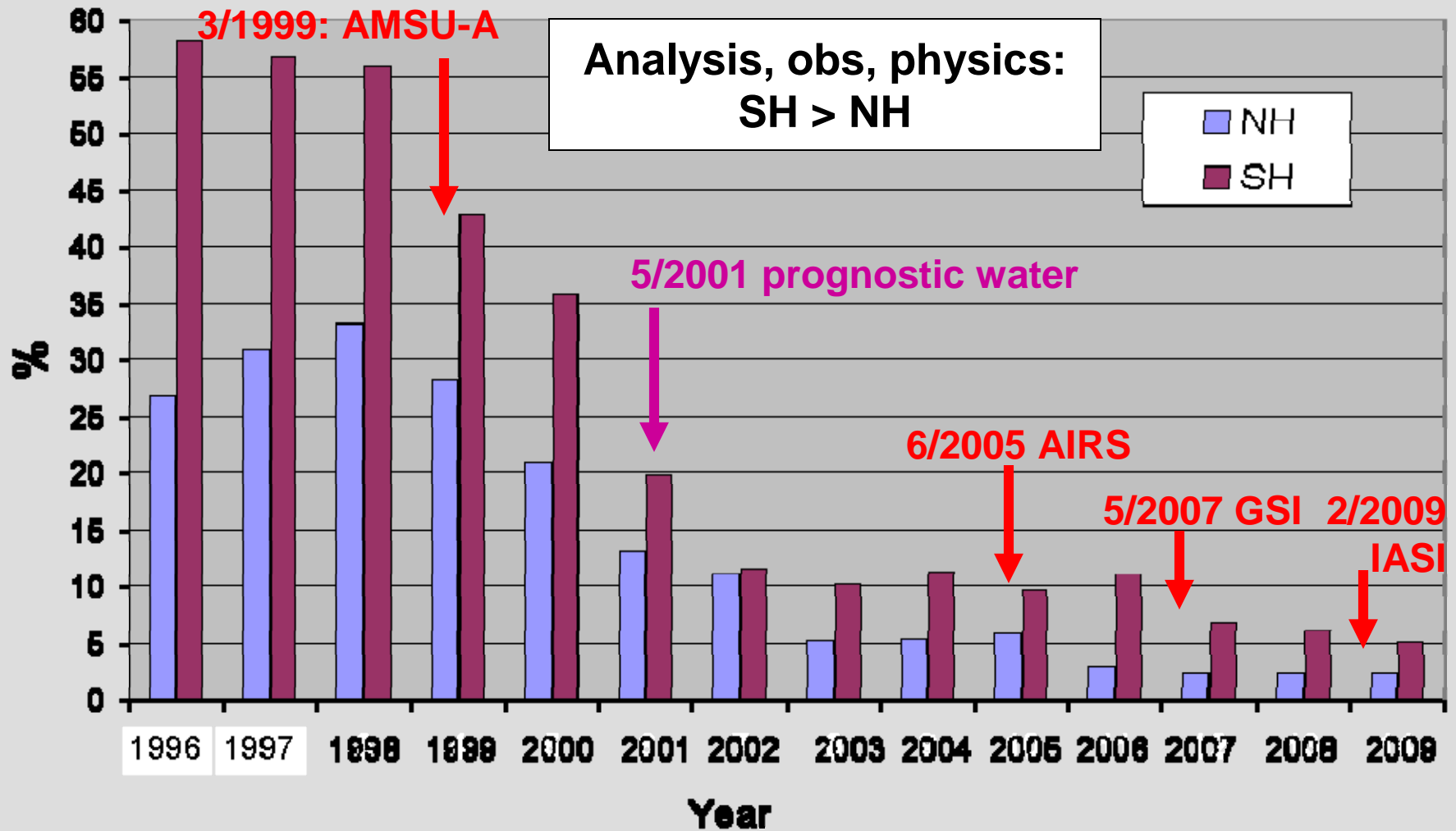
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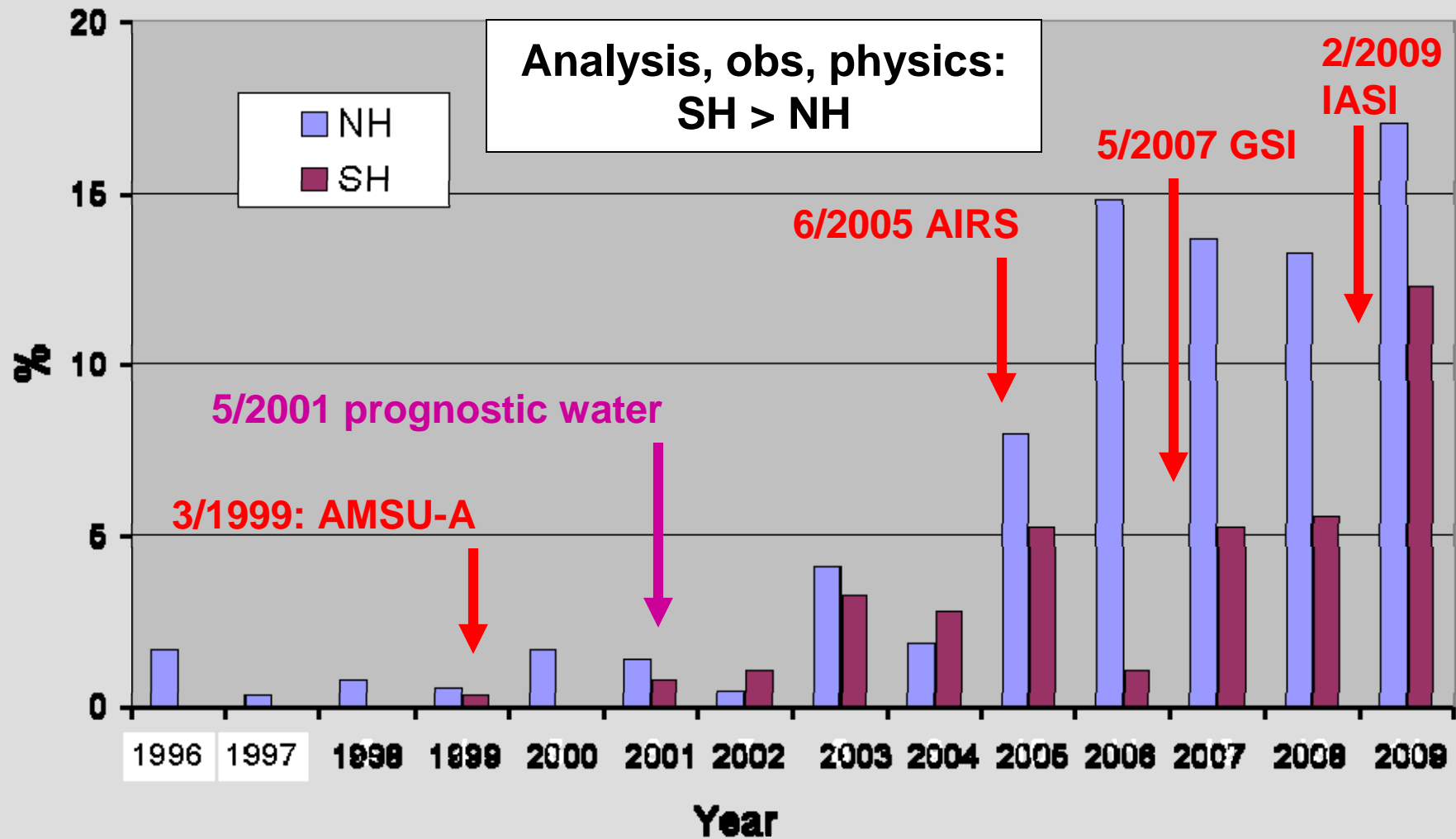
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