

# *Accelerating GPM Data Use by NCEP Assimilation*

- Use NCEP analysis/forecast NWP systems and products to develop and test GPM data
- Recognize operational requirements
  - timeliness
  - specific formats
  - changes to operational data product need testing by NCEP in advance
- COMMUNICATION
  - provide EMC insight on other work with GPM data
  - understand NCEP requirements
  - work with NCEP well in advance of data availability
- Recognize implementation process at NCEP
  - EMC/NCO
  - thorough testing by EMC, NCO, HPC, NHC, CPC, AWC, SPC
  - many uses of NCEP products, determine effect of changes on each one
  - effect on downstream systems—HWRF, MOS
  - Does it improve forecasts?*

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# *Accelerating GPM Data Use by NCEP Assimilation*

- Recognize NCEP as resource for improving satellite products**
  - Prompt detection of problems**
  - Tested against other observations in analysis**
  - potential of NCEP analyses to improve satellite products**
  - demonstrate impact of satellite product**
- recognize holistic nature of data assimilation**
  - observations**
  - observation processing**
  - high performance computing**
  - assimilation techniques**
    - Tangent linear and adjoint of cloud/precipitation physics**
    - Inclusion of clouds and precipitation in radiative transfer**
    - Inclusion of diabatic balance in analysis**
    - working with GMAO on cloudy radiances**
  - role of atmospheric model in assimilation**
  - Model physics needs to improve as observations improve. If model physics not compatible with analyses, particularly moisture, forecasts will “spin up” fields from observations to model physics.**
  - downstream systems—HWRF, MOS, CFS**
  - coupled data assimilation—atmosphere, ocean, land, ice, aerosol, biogeochemistry**

# *Accelerating GPM Data Use by NCEP Validation*

**EMC needs more complete verification and validation of model physics and moisture**

**--Look for partners**

**Magnitude and uncertainty of precipitation, precipitable water over globe**

**--Wide range in global mean precipitation estimates**

**Vertical distribution of moisture, cloud liquid water, latent heating over globe**

**--Need estimates not derived via particular model**

**Physics difficult to improve because of uncertainties**

**One improvement can expose offsetting errors that need to be corrected**

**Real time delivery not so essential for validation, monthly means useful**

**Diurnal cycle in GFS not adequately examined—monthly mean diurnal cycle**

**Reanalysis—more thorough examination of physical fields over much longer period**

**GPM effect on climate record**