



# NCEP

# Operational Activities Relevant to DYNAMO

Augustin Vintzileos

with contributions from many people from NCEP

The background of the slide features a large, faded NOAA logo. The logo is circular and contains the text "NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION" at the top and "U.S. DEPARTMENT OF COMMERCE" at the bottom. In the center, there is a stylized wave with the word "NOAA" written across it in a bold, sans-serif font.

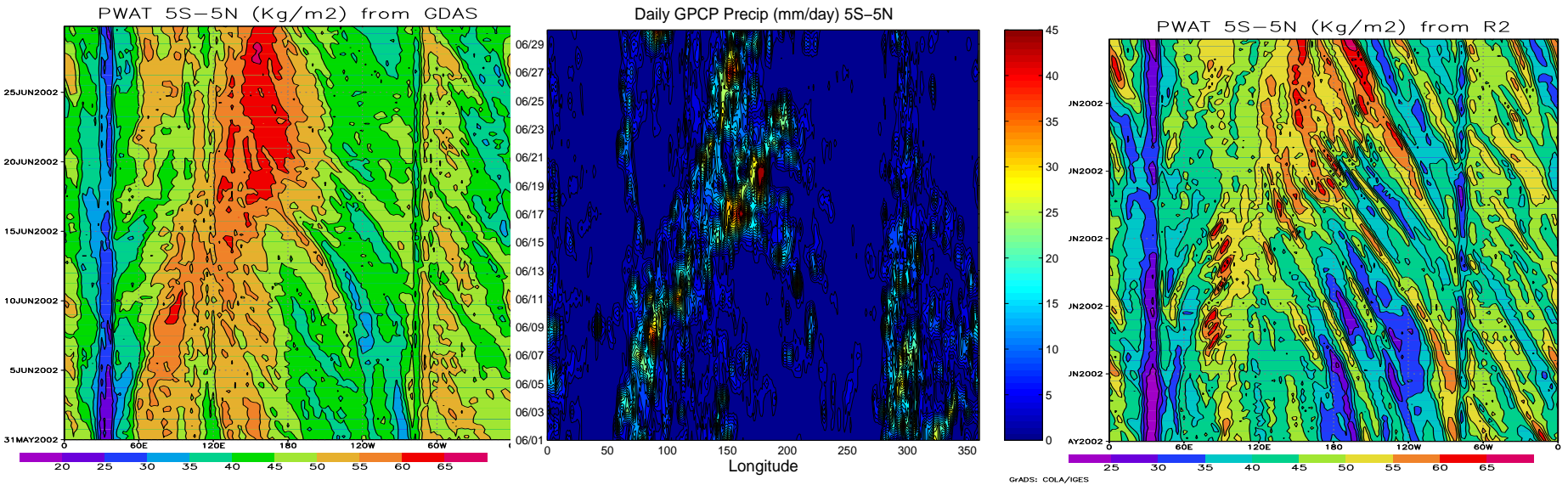
NOAA

# Status of the CFS

# The Current Operational CFS

- Operational CFS T62L64/MOM3 – initialized 4 times daily from 00Z, 06Z, 12Z and 18Z with one day delay (because of the ocean analysis delay). This design may allow for lagged ensemble forecasting at subseasonal lead times e.g., 4 times per day during 5 days = 20 ensemble members. Reforecasts from 1980 to 2006
- Forecasts are freely available as a rotating 7 day archive from the NCEP servers.
- The operational CFS is initialized by Reanalysis-2 and GODAS. These initial conditions are not optimized for MJO forecasting as shown yesterday.

# Operational GDAS versus Reanalysis-2 initial conditions: June 2002

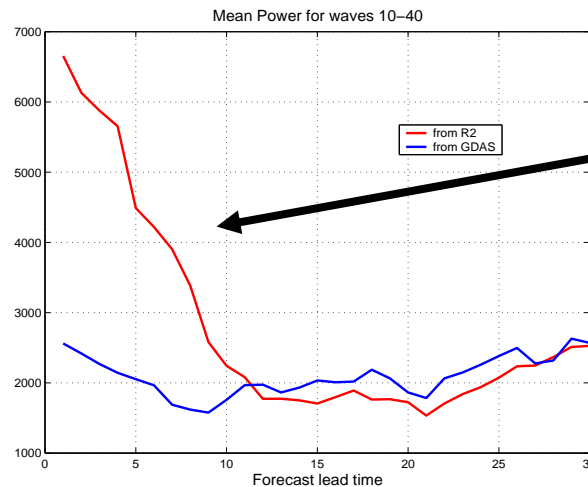


**GDAS Precipitable Water**

**GPCP Precipitation**

**Reanalysis 2 Precipitable Water**

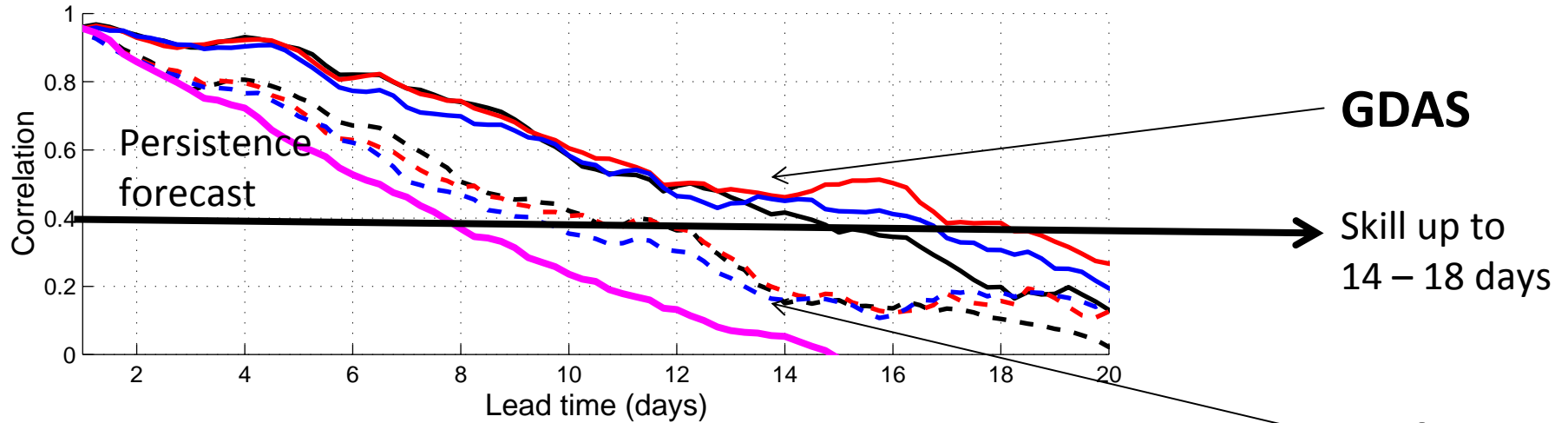
Time evolution of mean energy at wave numbers 10-40 when CFS is initialized by R-2 (red) or by GDAS (blue).



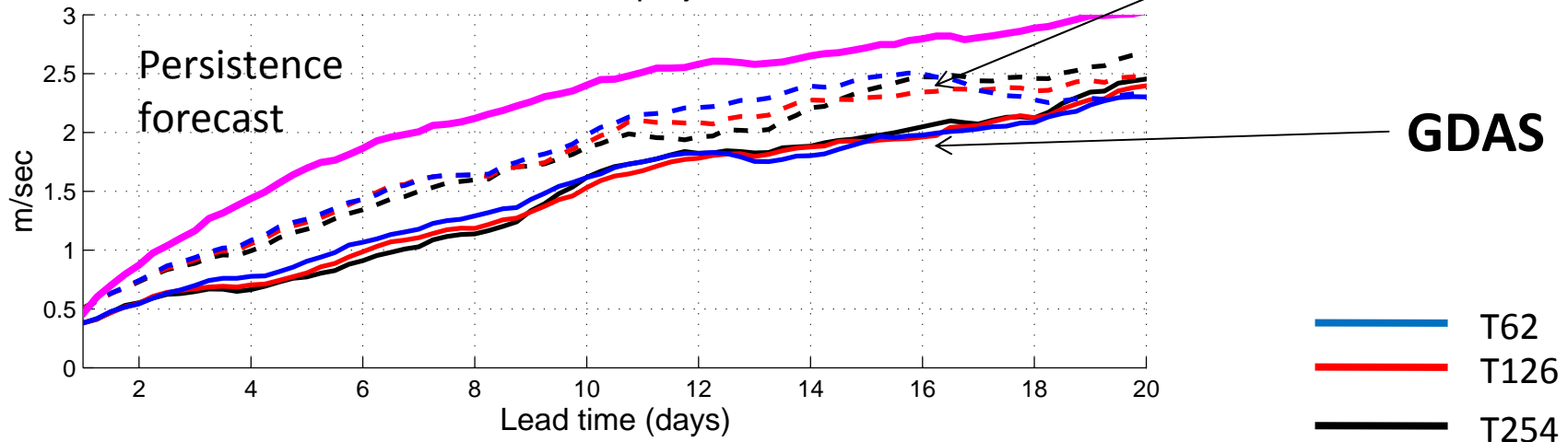
drift

# Skill for the MJO mode (verification CDAS2)

## Pattern Correlation for the projected mode



## RMS Error for the projected mode



# The Next Operational CFS

Hua-Lu Pan and Suranjana Saha

- The new CFS T126L64/MOM4 will be initialized by the CFS-Reanalysis.
- This new NCEP reanalysis is based on a T382 version of the GFS coupled to MOM4. This is an improved product when compared to Reanalysis-2 and is expected to be available to the public in summer 2010.
- The new series of reforecasts is expected to be finished in Autumn 2010 and after positive evaluation of the reforecast a new implementation of the CFS should be expected sometime in the first quarter of 2011.
- It is possible that the next-CFS could be implemented in time period for the campaign.

# New experiments with the CFS

- We have proposed to NOAA CTB a new series of reforecasts with CFS T126L64/MOM3 . This configuration is the closest possible to the new CFS.
- These 35-day reforecasts will be initialized daily by GDAS (the operational NCEP analysis) and GODAS. This is the initialization strategy that was so far shown the best.
- The reforecasts will cover the winter period (November, December, January) from 2002 to 2006.
- This series of experiments could eventually be used for preparing aspects of the campaign
- Further, if necessary, computer time could be asked from the CTB in order to execute real time forecasts with this model during the campaign.

Other operational (non-coupled) numerical tools at NCEP

Despite being uncoupled these tools can provide guidance for at least week 1

GFS = T382L64 → T190L64 up to 15 days, initialized by operational NCEP analysis (GDAS) four times per day, SSTs are dumped to mean seasonal values.

GEFS = Ensemble forecast with GFS at T190L28 up to 15 days.



# THE NORTH AMERICAN ENSEMBLE FORECAST SYSTEM: AN OPERATIONAL MULTI-CENTER FORECAST SYSTEM



**Zoltan Toth (NWS), Andre Methot (MSC), Michel Rosengaus (NMSM)**

Acknowledgements: Yuejian Zhu, Bo Cui, Philippe Bougeault, David Parsons, Lawrence Wilson

# TIGGE

## THORPEX Interactive Grand Global Ensemble



Zoltan Toth & Philippe Bougeault  
NCEP & ECMWF

(Co-chairs of the GIFS-TIGGE WG)

# THORPEX INTERACTIVE GRAND GLOBAL ENSEMBLE (TIGGE)

- Goal
  - Provide access to archived operational global ensemble forecast data
    - Research applications (not real time data access)
- Contributions from ten global NWP centers
  - BOM, CMA, CPTEC, ECMWF, JMA, KMA, MeteoFrance, MSC, NCEP, UKMetOffice
- Archiving at three centers
  - CMA, ECMWF, NCAR
    - Data access is center specific

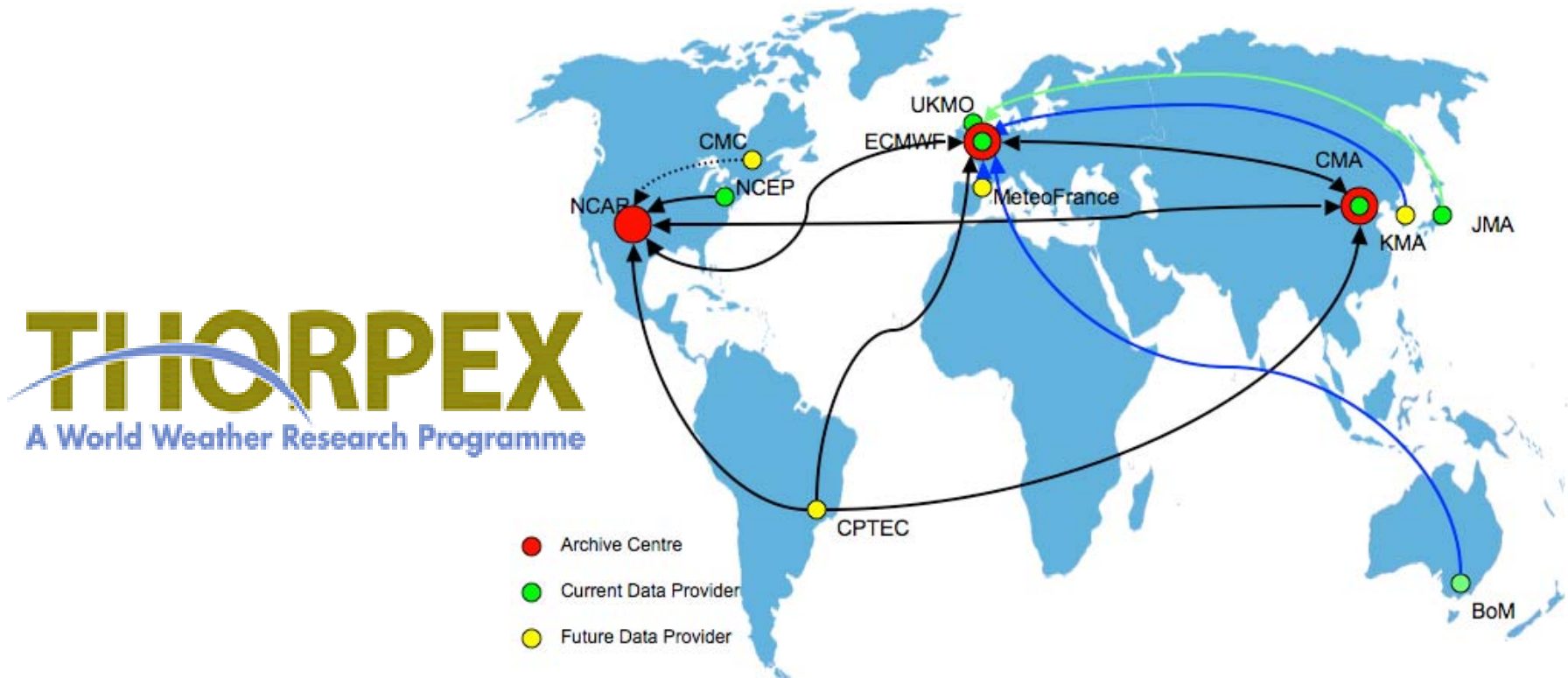


Figure courtesy of S. Worley, NCAR

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NOAA

# CPC Operational Global Tropics Hazards Product

# GTH Example

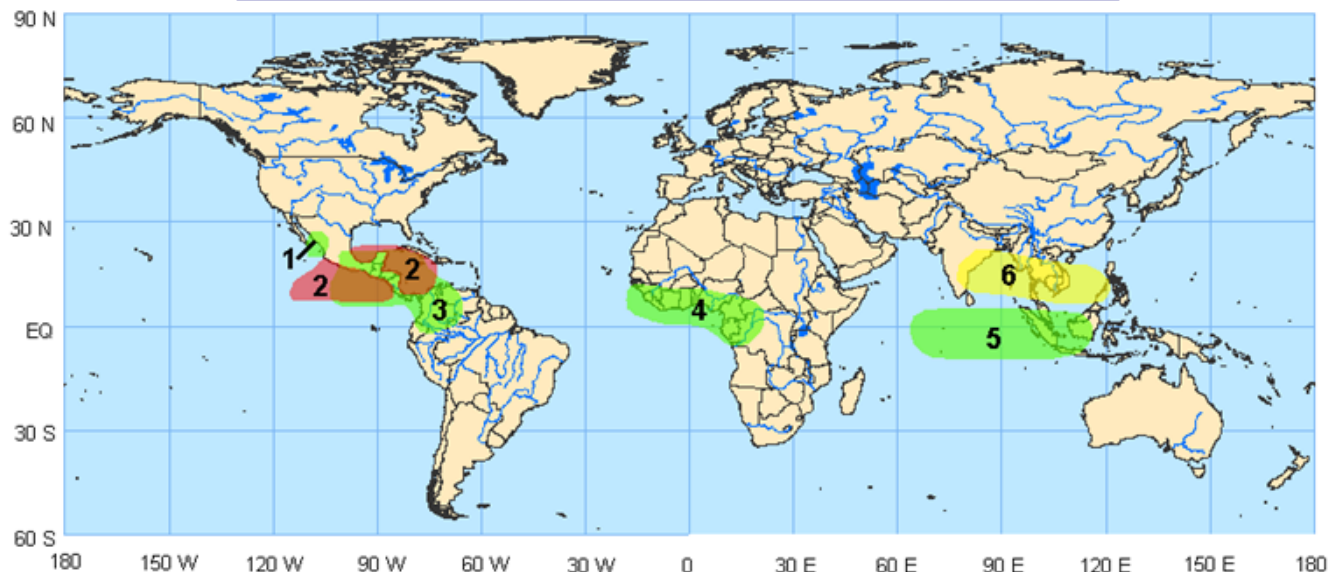
Global Tropics Hazards/Benefits Assessment - Climate Prediction Center - Issued: 10/6/2008



Product issued once per week with no updates. Conditions are subject to change after issuance time and before next outlook.

Product targets broad scale conditions integrated over a 7 day period for US interests only. Please also consult your local responsible forecast agency.

## Week 1 Outlook – Valid: October 7 - 13, 2008



- 1. An increased chance for above-average rainfall for parts of Baja California and northwest Mexico.** Tropical Storm Norbert is expected to approach and impact this region later during the period with areas of heavy rainfall. **Confidence: Moderate**
- 2. An increased chance for tropical cyclogenesis for the eastern Pacific, southern Gulf of Mexico and western Caribbean.** The enhanced phase of the MJO continues to increase the threat for tropical development and model guidance supports development in this region. **Confidence: Moderate**
- 3. An increased chance for above-average rainfall for parts of the eastern Pacific, Mexico, Central America, and South America.** The enhanced phase of the MJO and current and potential tropical cyclone activity is expected to result in wet conditions. **Confidence: High**
- 4. An increased chance for above-average rainfall for the Gulf of Guinea and western Congo Basin areas of Africa.** The enhanced phase of the MJO and favorable low-level winds are expected to result in wet conditions in this region. **Confidence: Moderate**
- 5. An increased chance for above-average rainfall for the equatorial Indian Ocean.** The enhanced phase of the MJO along with warmer than normal SSTs are expected to result in wet conditions in this region. **Confidence: High**
- 6. An increased chance for below-average rainfall stretching from eastern India to the South China Sea.** The exiting suppressed phase of the MJO and continuation of activity associated with the boreal intraseasonal oscillation (BISO) are expected to result in dry conditions in this region. **Confidence: Moderate**

### **\*\* ACTIVE TROPICAL CYCLONES:**

**Eastern Pacific:** Tropical Storm Norbert (14.3N, 104.7W) → Consult updates from the US National Hurricane Center

**Gulf of Mexico:** Tropical Depression 13 (19.2N, 94.4W) → Consult updates from the US National Hurricane Center

**Please note:** Confidence estimates are subjective in nature and are not based on an objective scheme. The estimates are given to provide additional information to the user.

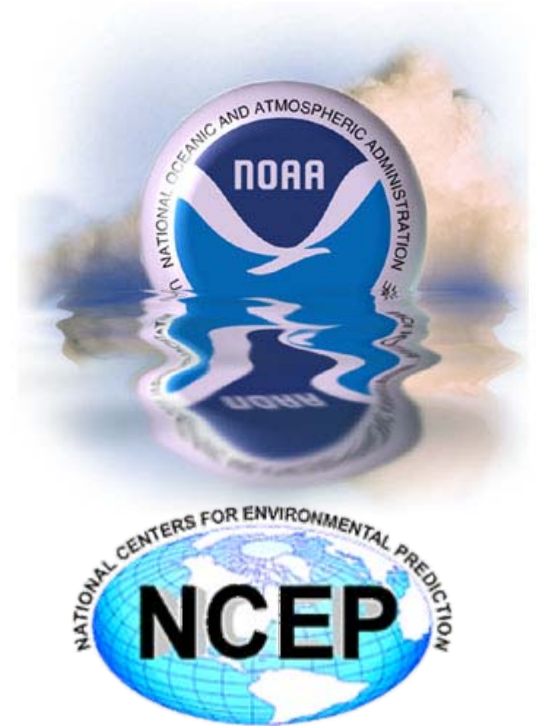
**Possible connections to other campaigns....**

# Wintertime component of T-PARC

Jan 2009 – March 2009

**Yucheng Song & Zoltan Toth**

**Environmental Modeling Center  
NOAA/NWS/NCEP  
USA**



Acknowledgements: Rick Rosen, Louis Uccellini, John Gaynor

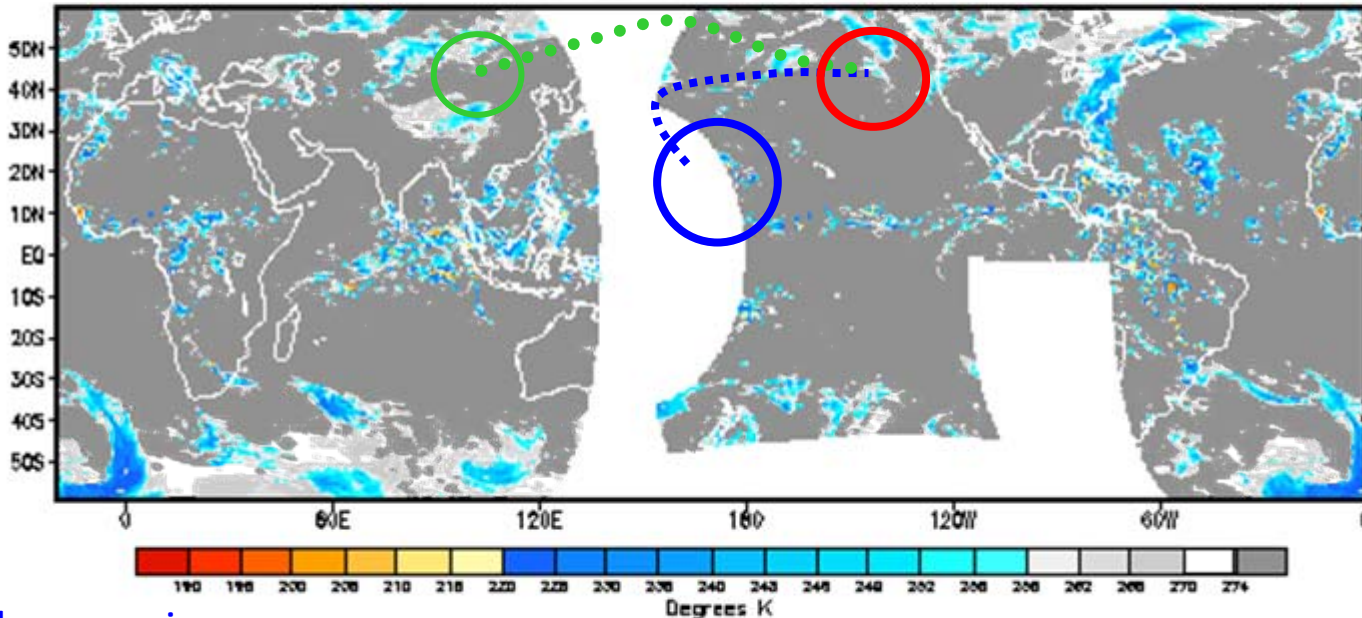
[http://www.emc.ncep.noaa.gov/gmb/ens/THORPEX/TPARC\\_adaptive\\_proposal.doc](http://www.emc.ncep.noaa.gov/gmb/ens/THORPEX/TPARC_adaptive_proposal.doc)

BASC Meeting, Woods Hole, 5-6 June 2008

# MAIN THEME OF WINTER T-PARC

*Study the lifecycle of perturbations as they originate from the tropics, Asia, and/or the polar front, travel through the Pacific waveguide, and affect high impact wintertime weather events over North America and the Arctic*

20:30Z 07 OCT 2005



Expected forecast error reduction in verification region (VR) due to adaptive observations around any grid point.  
Case 1 Obs. time: 2005101100 Verif. time: 2005101412 VR: 42N, 140W, 1000km radius Verif. var.: s,v,T  
PSU-NCEP ETKF based on 19-member 2005101000 NCEP ensemble.

Captured by Ensemble Transform KF targeting method

○ Sensitive area 1, 00UTC 11 Oct

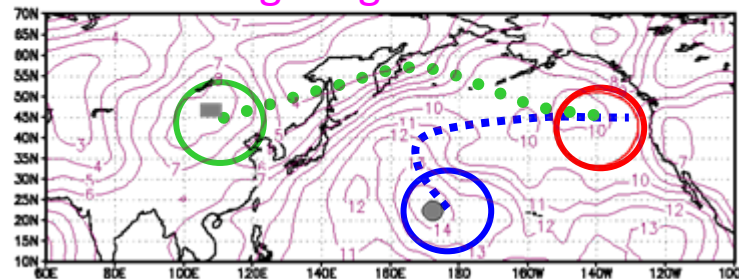
○ Sensitive area 2, 00UTC 11 Oct

○ Verification region, 12UTC 14 Oct

Tropical flare-ups in western Pacific (IR) merge with

Waves on westerly flow to influence

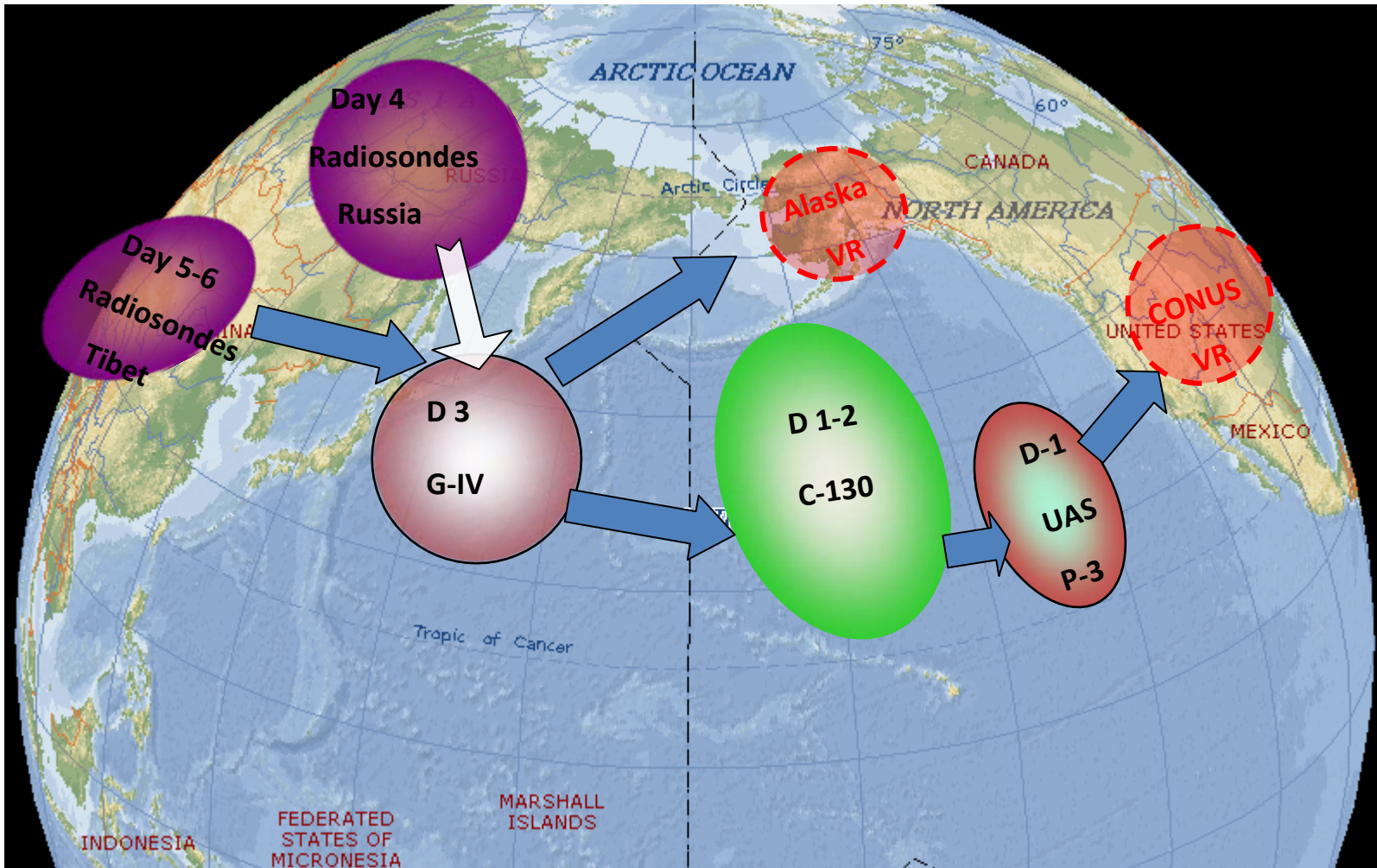
Deep cyclogenesis in northeast Pacific





# PROPOSED OBSERVING PLATFORMS

Extensive observational network for tracking disturbances potentially leading to downstream propagating winter storms affecting the Arctic and NA continent



# Summary: Available tools

- GFS, GEFS, CFS operational, CFS experimental, CFS-next (if ready)
- NAEFS
- TIGGE for which we could ask for real time access to data (problems with the time that it takes for processing and submitting at the different centers) BUT real time tropical cyclone forecast available.
- CPC's Global Tropics Hazards tool. Variables most relevant to the campaign could be tailored and introduced to the operational suite.
- Possible interesting connections to other campaigns: Winter T-PARK

# Examples of possible interactions

## **DYNAMO to Modeling**

Data on the GTS

Provide a very well documented case study to compare with forecasts of it at different lead times. In combination with data denial experiments this would allow to eventually improve the models.

## **Modeling to DYNAMO**

Provide numerical guidance on how to optimally re-arrange the observing array during the campaign.

Tailor products of relevance to the campaign and provide outlooks for incoming MJO events