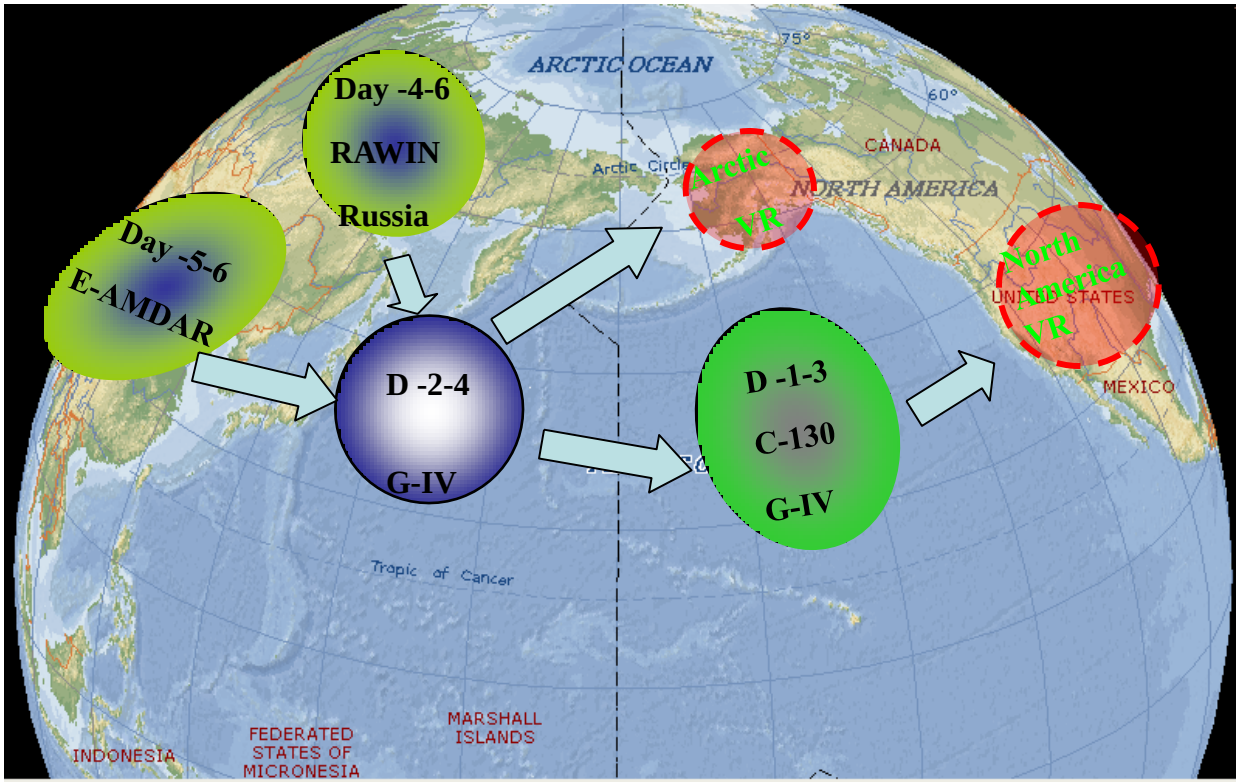
Winter T-PARC 2009 - YOTC

Zoltan Toth and Yucheng Song

(1) NOAA/NWS/NCEP/EMC, Camp Springs, MD, USA
(2) Plurality at NOAA/NWS/NCEP/EMC, Camp Springs, MD, USA



January – March 2009

http://www.emc.ncep.noaa.gov/gmb/tparc/

Winter T-PARC platform statistics

NOAA G-IV:

24 successful missions, 201hrs flown with 456 dropsondes

Out of Japan during Jan 11 to Feb 26, 2009

USAF C-130s:

14 successful missions, 142.8hrs flown with 212 dropsondes

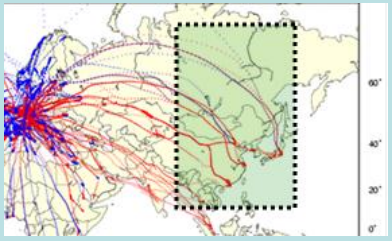
Out of Alaska during Jan 20 to Feb 13, 2009

E-AMDAR from Lufthansa airlines:

(Descents and Ascents: boxed area)

Total: 802+1102=1905 profiles

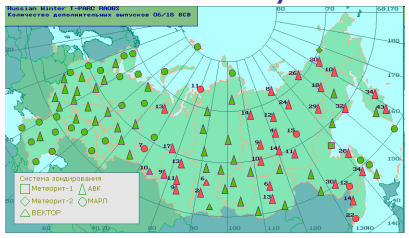
From Jan 11 – Feb 28, 2009



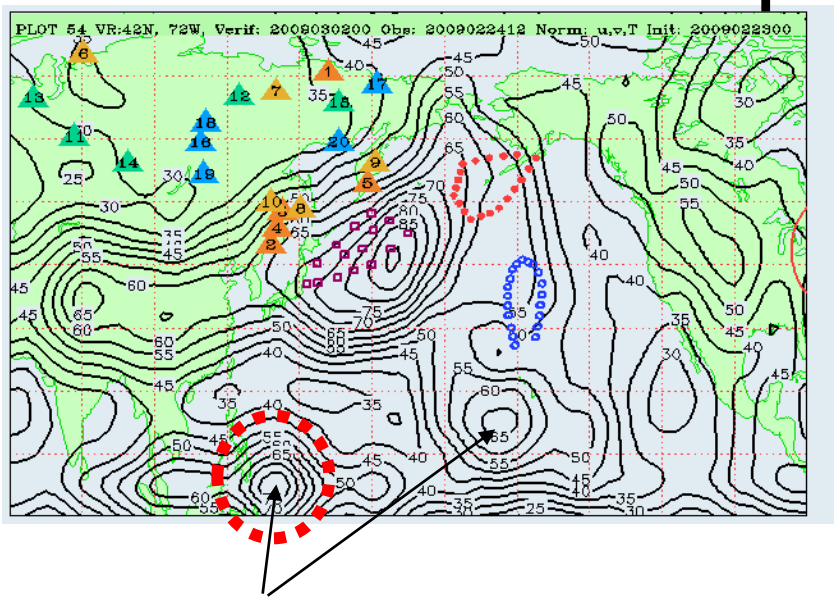
Enhanced Russia RAOBS:

Total 602 radiosondes released from 37 selected stations for 33 cases

From Jan 12 to Feb 28, 2009



WHY T-PARC? An example

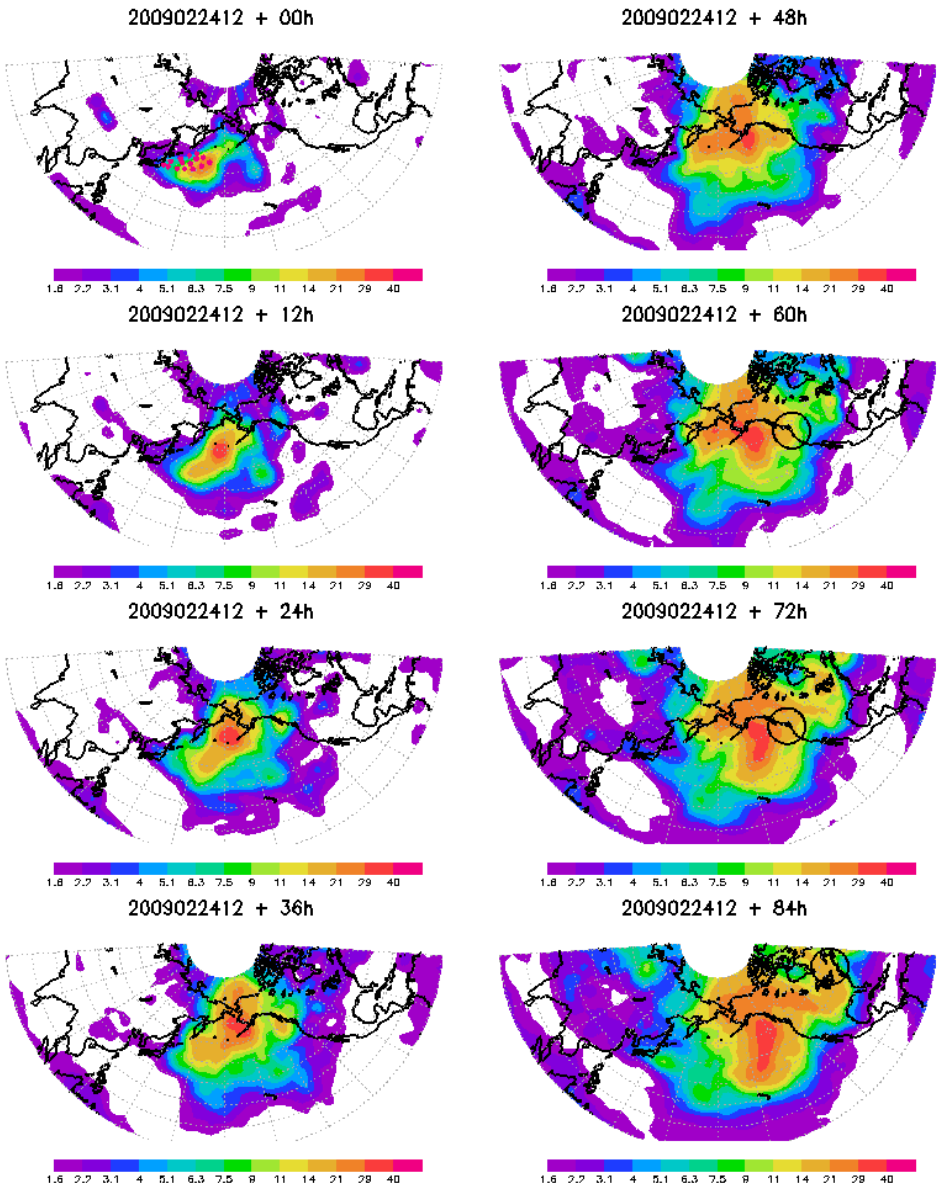


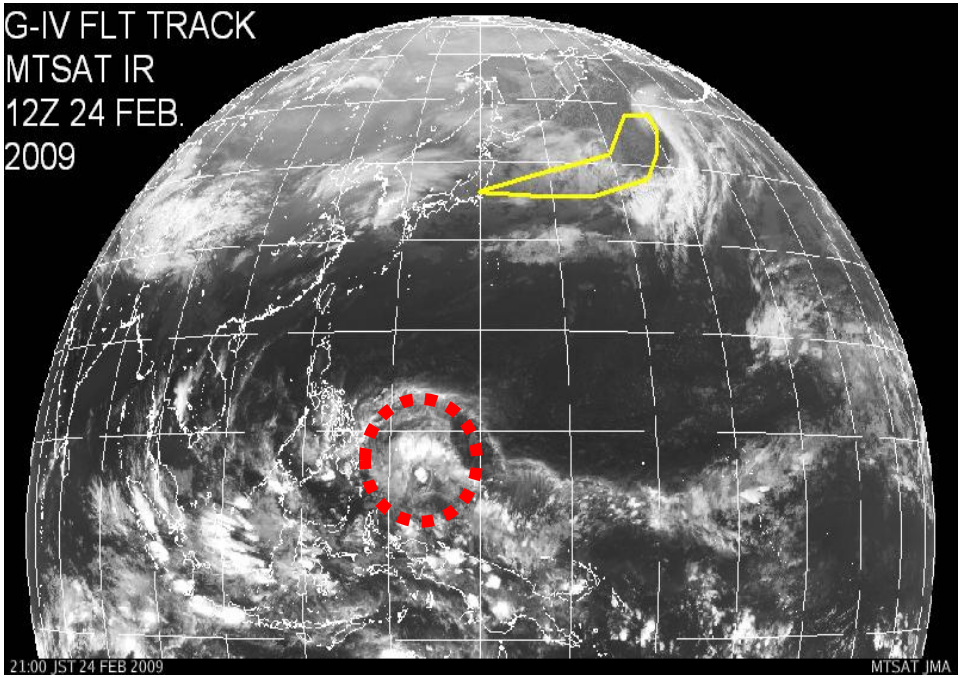
Strong tropical connection

Major snowstorm roars up coast

Atlantic coast braces for biggest snowstorm

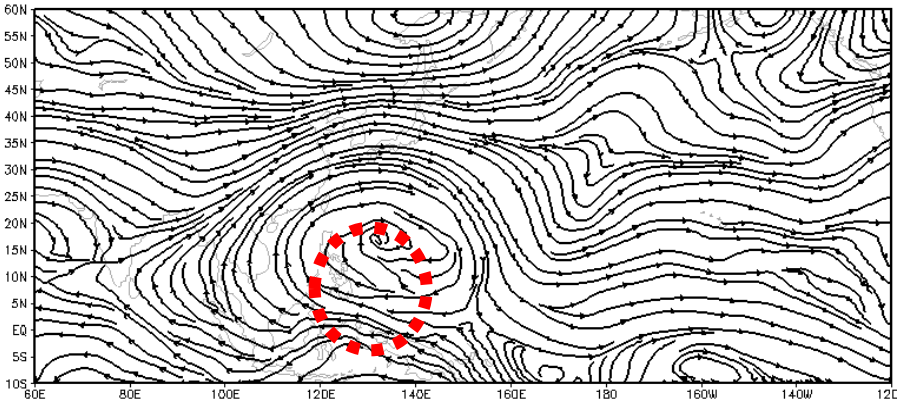
of the season March 2, 2009

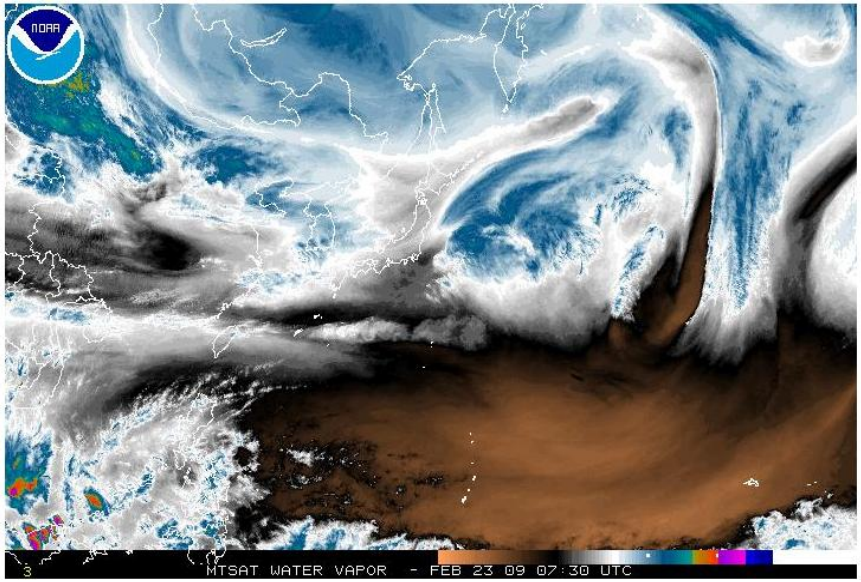




Visible image

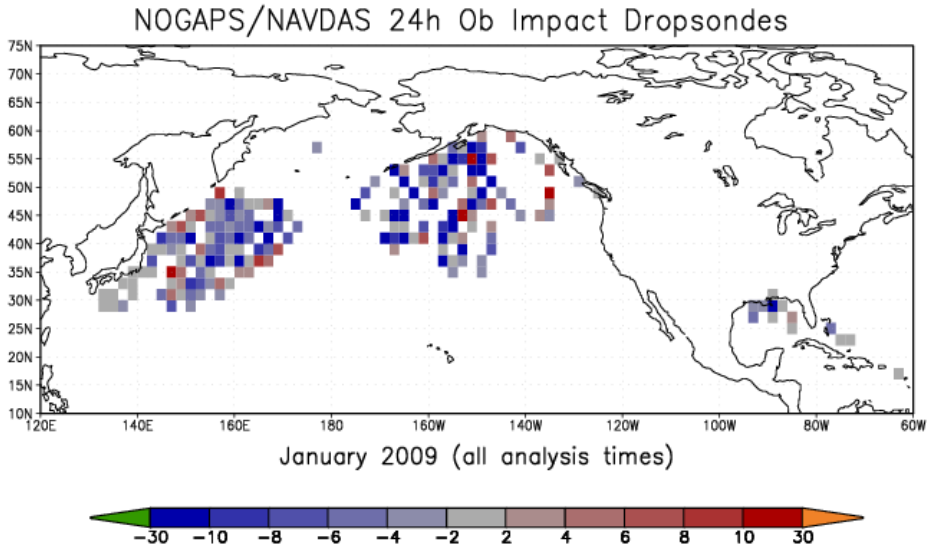
200 hPa Streamfunction

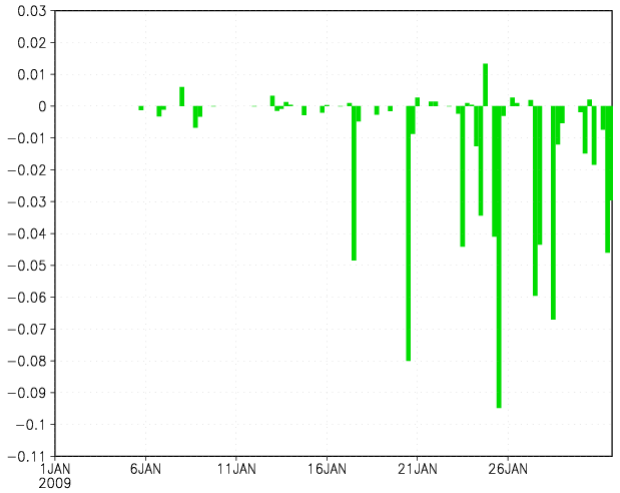




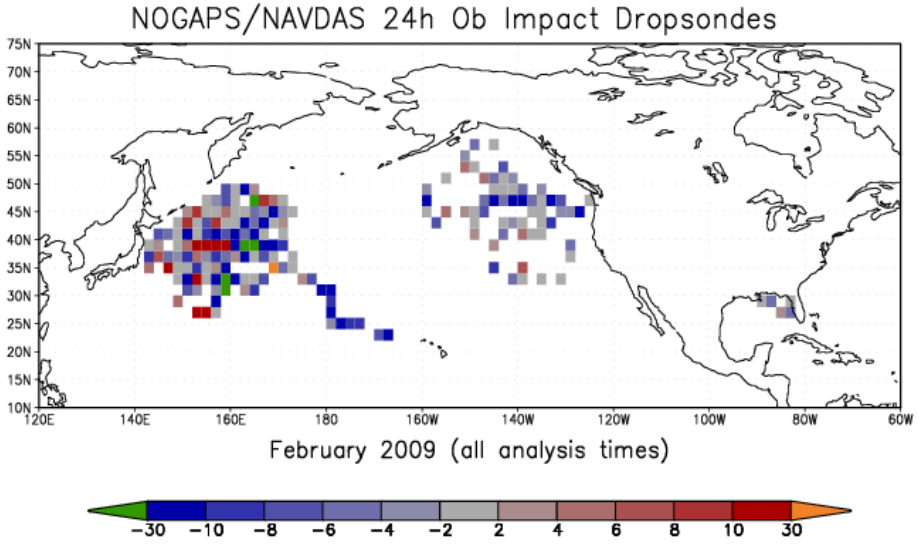
Water vapor
a day earlier

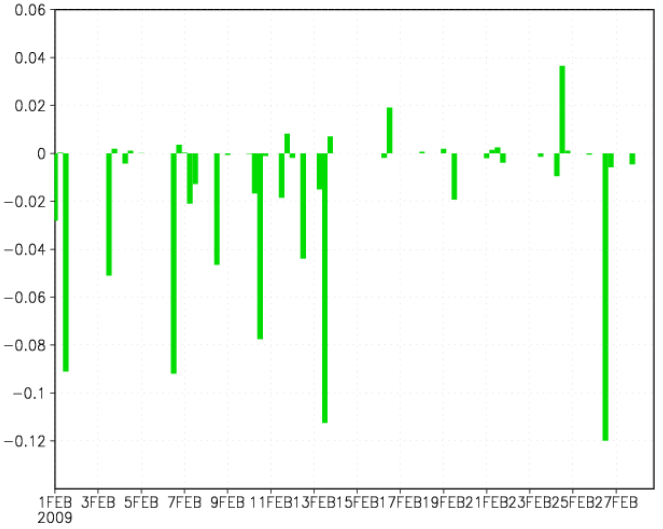
TARGETED **DROPSONDE** IMPACT ON 24H FORECAST ERROR IN **NOGAPS/NAVDAS**





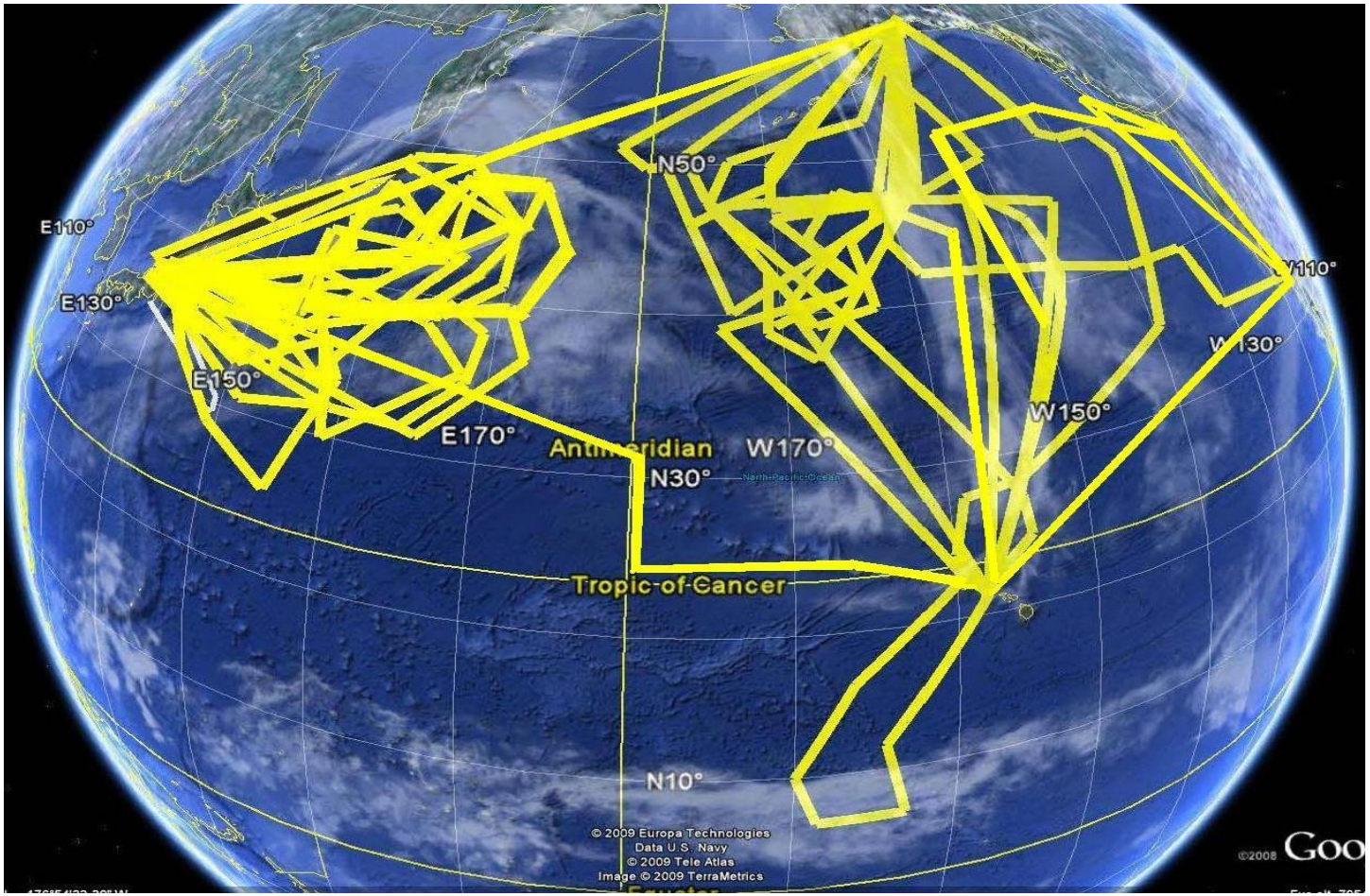
Jan 20/12UTC high impact per-observation





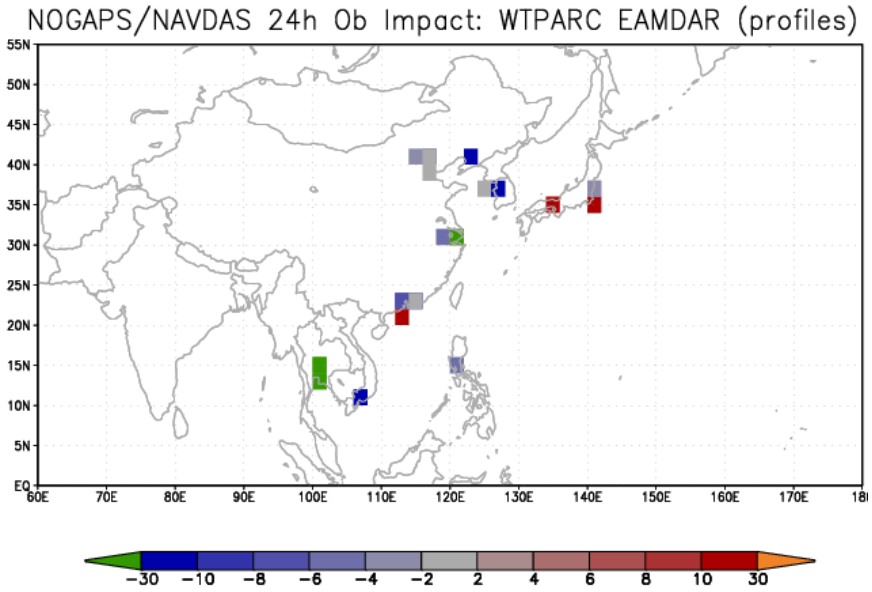
Summed impact of dropsonde observations (**error reduction** is **NEGATIVE,** units are J kg^{-1})

Courtesy of Rolf Langland



NOAA G-IV T-PARC/WSR 2009 Flight Tracks

JANUARY 2009



$1x10^{-3}$ J kg^{-1} (Moist Total Energy Norm)

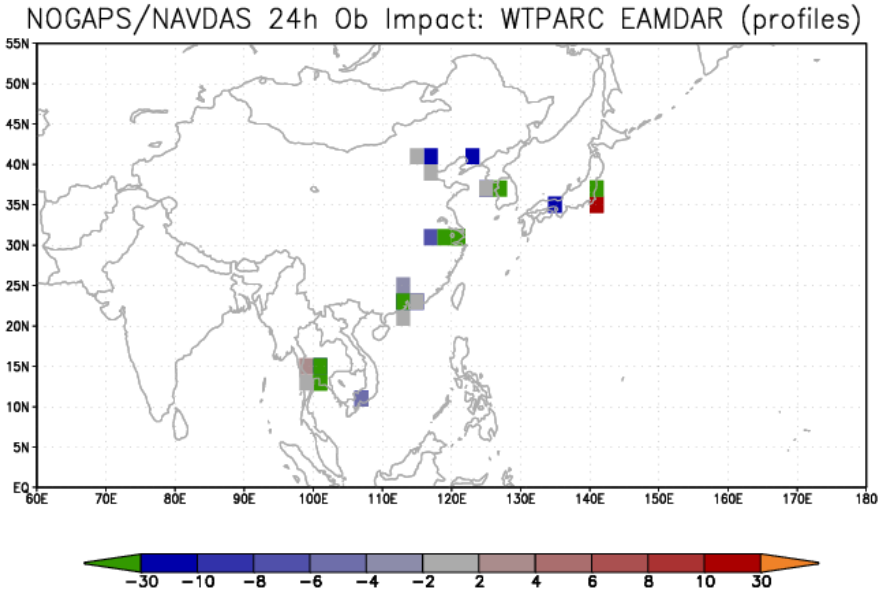
Error Reduction Error Increase

Total # targeted LH-EAMDAR ascent/descent data = **17,444** (12-31 January 2009)

Total targeted LH-EAMDAR impact = **-0.583 J kg^{-1}**

GLOBAL Lufthansa AMDAR ascent/descent impact = -2.89 J kg^{-1} and 113,151 data during all of January 2009

FEBRUARY 2009



Total # targeted LH-EAMDAR ascent/descent data = **24,423** (1-28 February 2009)

Total targeted LH-EAMDAR impact = **-0.7663 J kg^{-1}**

Courtesy of Rolf Langland

Several scientific hypotheses/questions related to YOTC:

- Rossby-wave propagation plays a major role in the development of high impact weather events over North America and the Arctic on the 3-6 days forecast time scale
- Connection between strong tropical convective activity & extratropical storms?
- Forecast busts are often related to our inability to resolve the vertical structure of the storms in their early stages
- How important moist processes are in early stages of storm development?