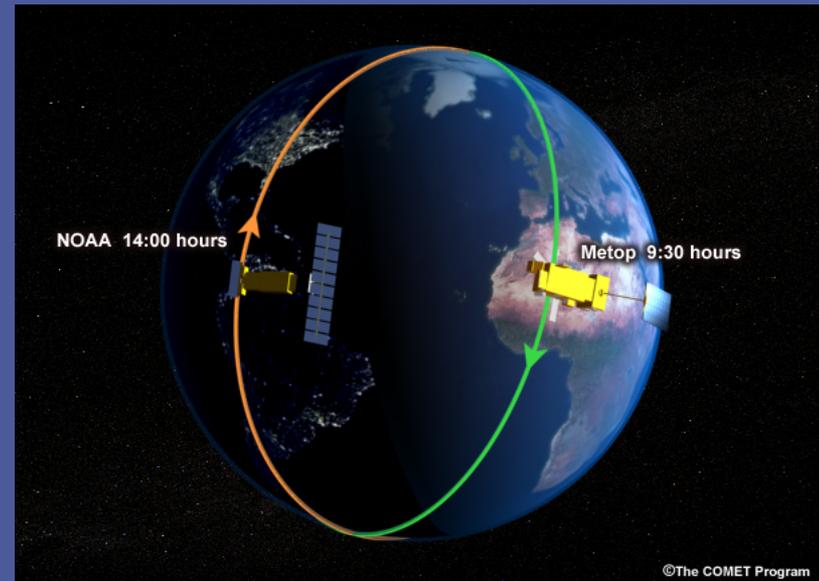


# The International Project Concordiasi

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# The Concordiasi Experiment

## A joint French-US initiative

NCAR, U. Wyoming, Purdue U., UMBC/GMAO

Submitted as a NSF proposal

CNES, IPEV, LGGE, LMD, Météo-France

ENEA, PNRA, CNR

ECMWF

Bureau of Meteorology Research Centre

USA

France

Italy

International

Australia

- Belongs to the THORPEX-IPY cluster (N°121 in IPY)
- « Improved numerical weather forecasting and climate simulations by exploitation of in-situ, airborne remote-sensing and satellite data, advanced modelling systems and basic research into polar processes and into polar-global interactions. »



## Main goal

Validate the assimilation of advanced sounders (AIRS, IASI) over Antarctica

Using both models and additional observations (RS in Concordia, driftsondes)

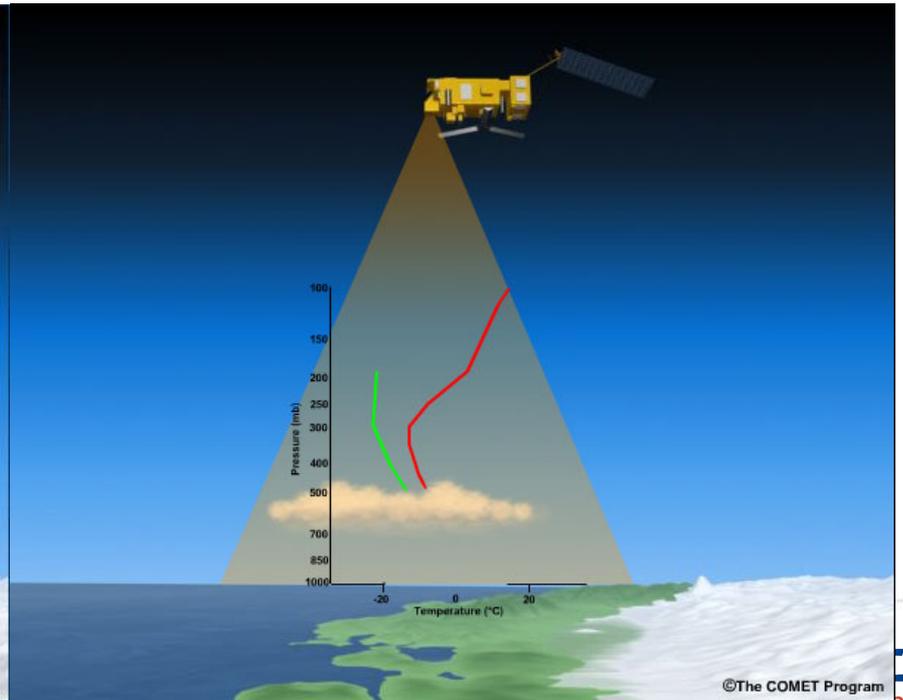
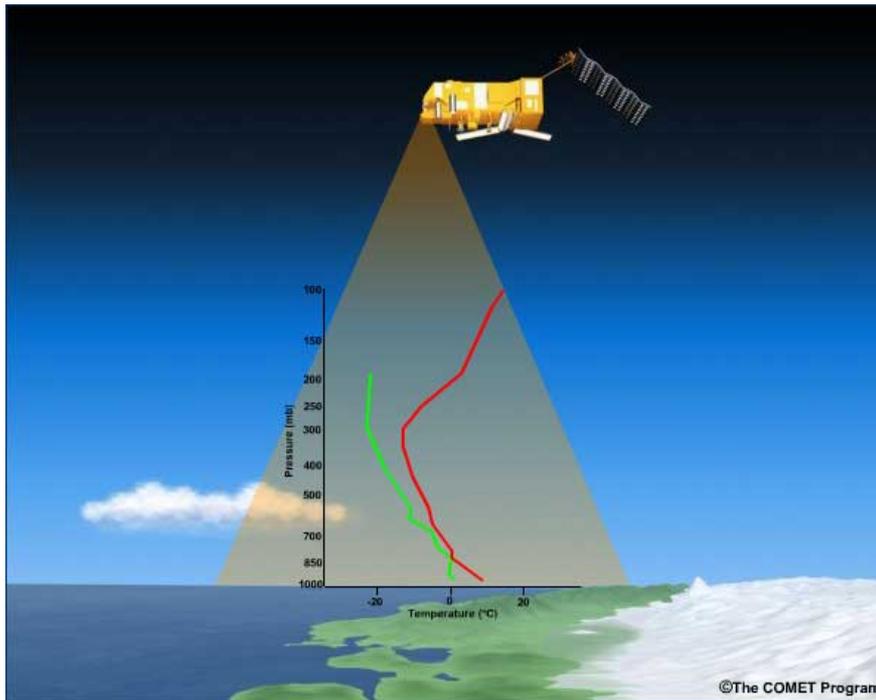
In Sept-Oct 2008.



# Products from satellites

Sounders provide radiances

These can be converted by profiles by retrievals or data assimilation

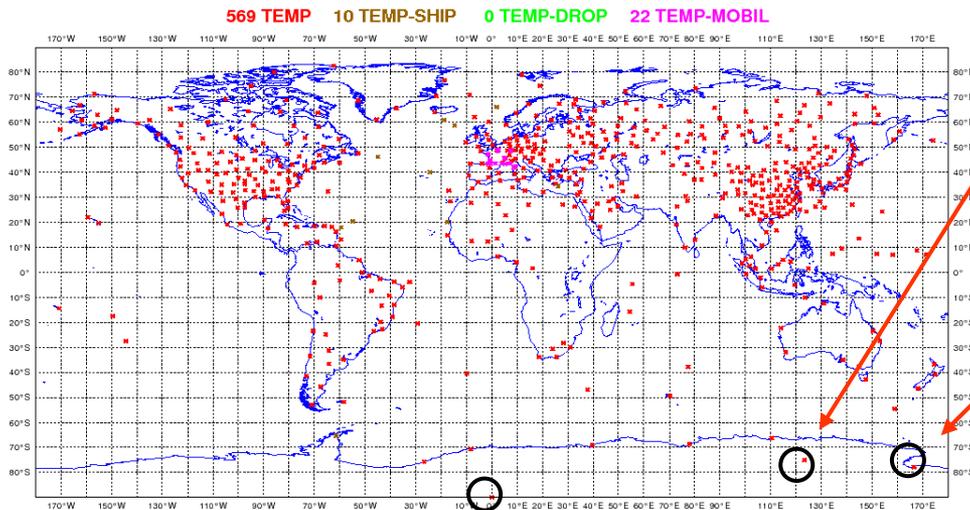


# Scarcity of conventional data coverage partly compensated by satellite data

- Validation and improvement of the assimilation of IASI data in NWP systems.

## Scarcity of conventional data coverage over Antarctica

Nombre total d'observations avant screening : 601

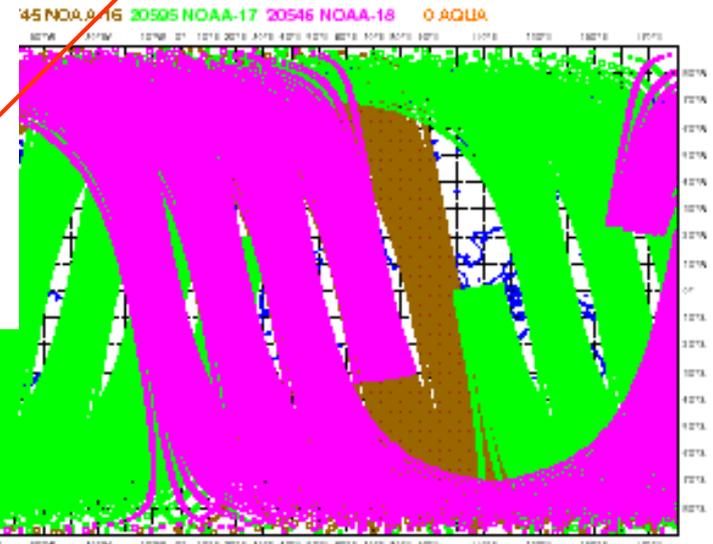


South Pole

Concordia

Mc Murdo

ouverture de donnees - ATOVS AMSU-B  
1/14 12H UTC cut-off long  
observations avant screening : 61886



## But in-situ measurements still needed

- Satellite data play a major role
- But their assimilation is complicated in polar areas
  - Cloud detection (PSC...)
  - Surface emissivity
  - Model systematic errors
- In-situ measurements can provide ground truth to validate our assumptions/methods,  
in particular over inland Antarctica





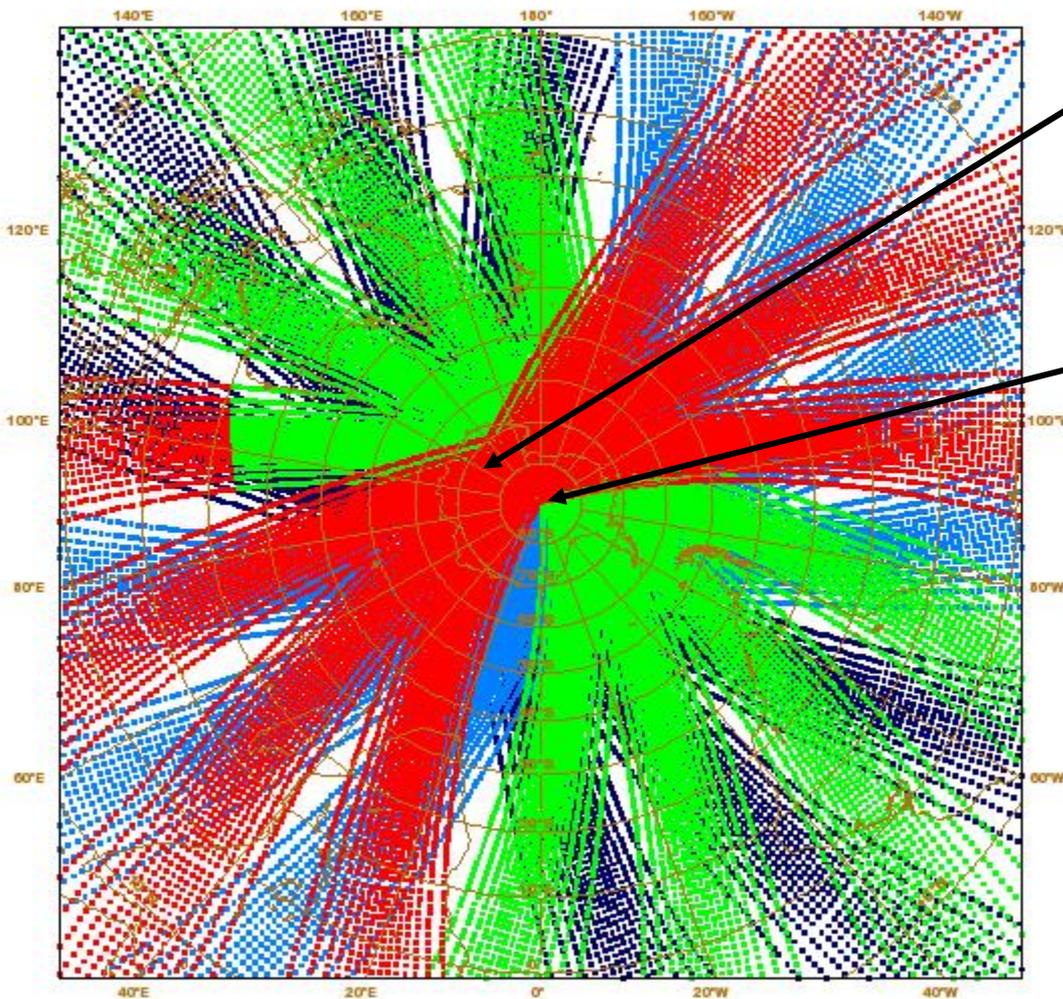
## Concordia



- Scientific base located at DOME C  
(75°06'S and 123°21'E)
- Operated by Italy (PNRA) and France (IPEV)
- A lot of technological innovation (spatial technologies)
- Great respect of the environment of the site
- Terrestrial travel from Dumont d'Urville : 10-15 days
- Programs in : astronomy, glaciology, atmosphere chemistry, earth sciences, microbiology, medicine
- **Upper Air soundings are produced and transmitted on the GTS**
- **Exceptional location to validate satellite data**



# MetOp daily Coverage



Concordia

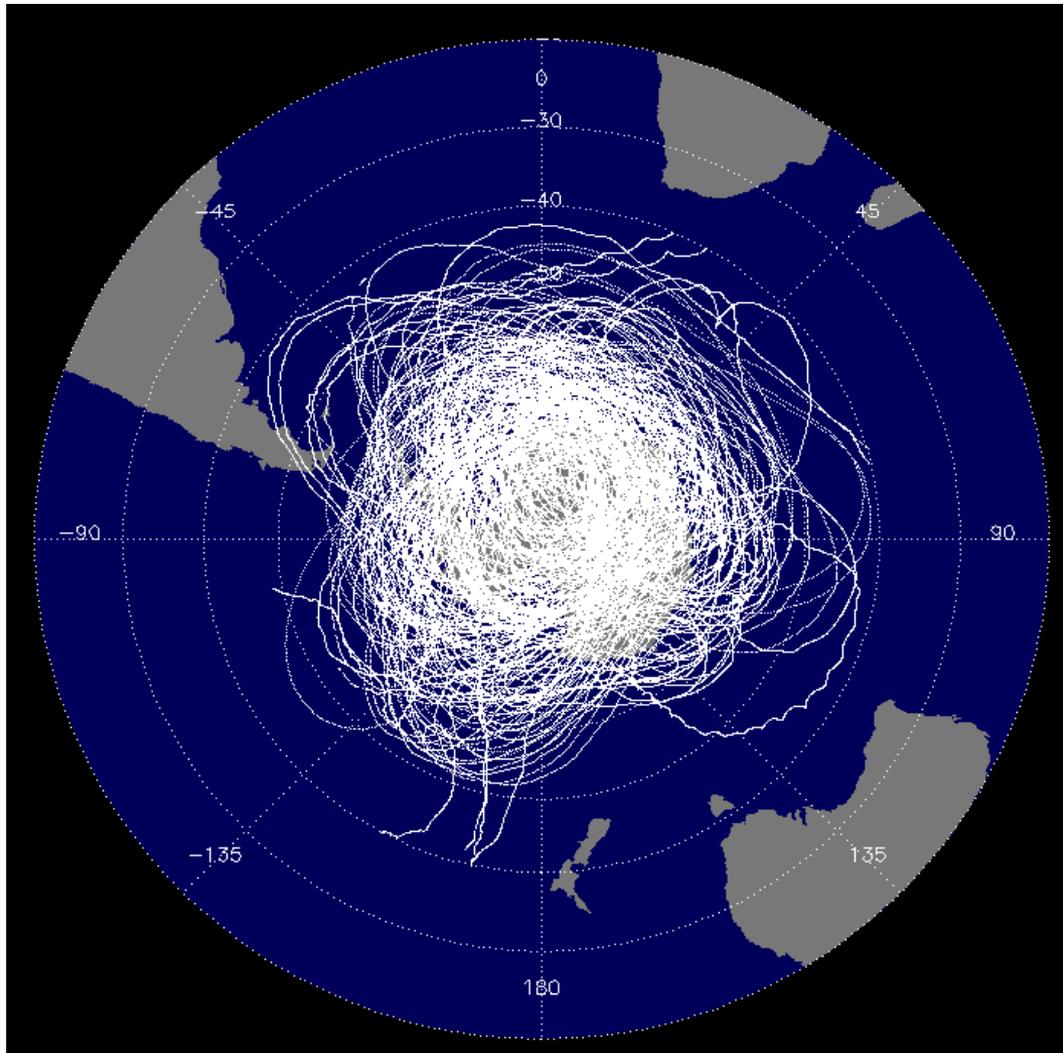
South Pole

is on the  
edge of the  
swath

# CNES high-altitude balloons (as in Vorcore) possibly with NCAR driftsonde system

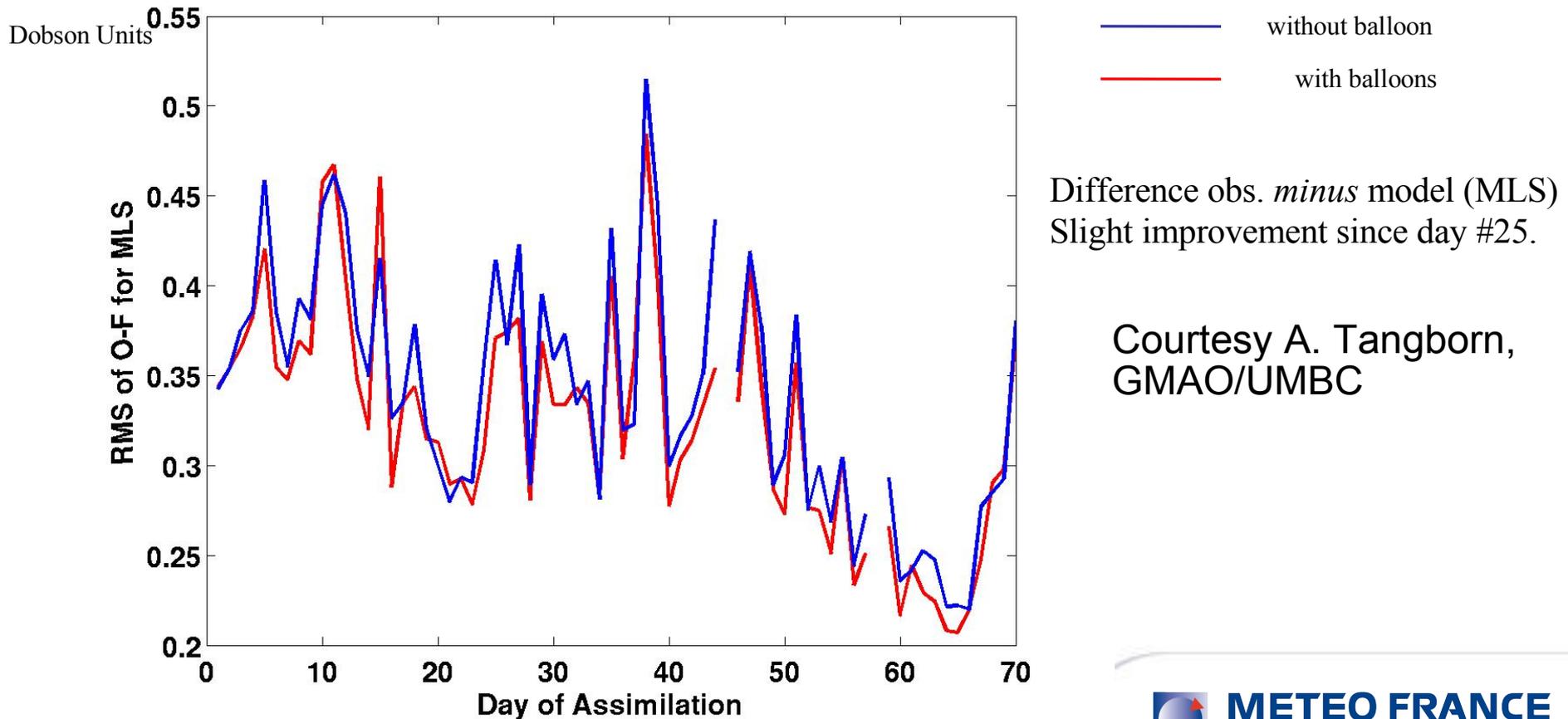


# Balloon trajectories during Vorcore



# Scientific Goals

- To evaluate the impact on ozone profile simulations in chemical transport models (Météo-France – CNRM/GMGEC)

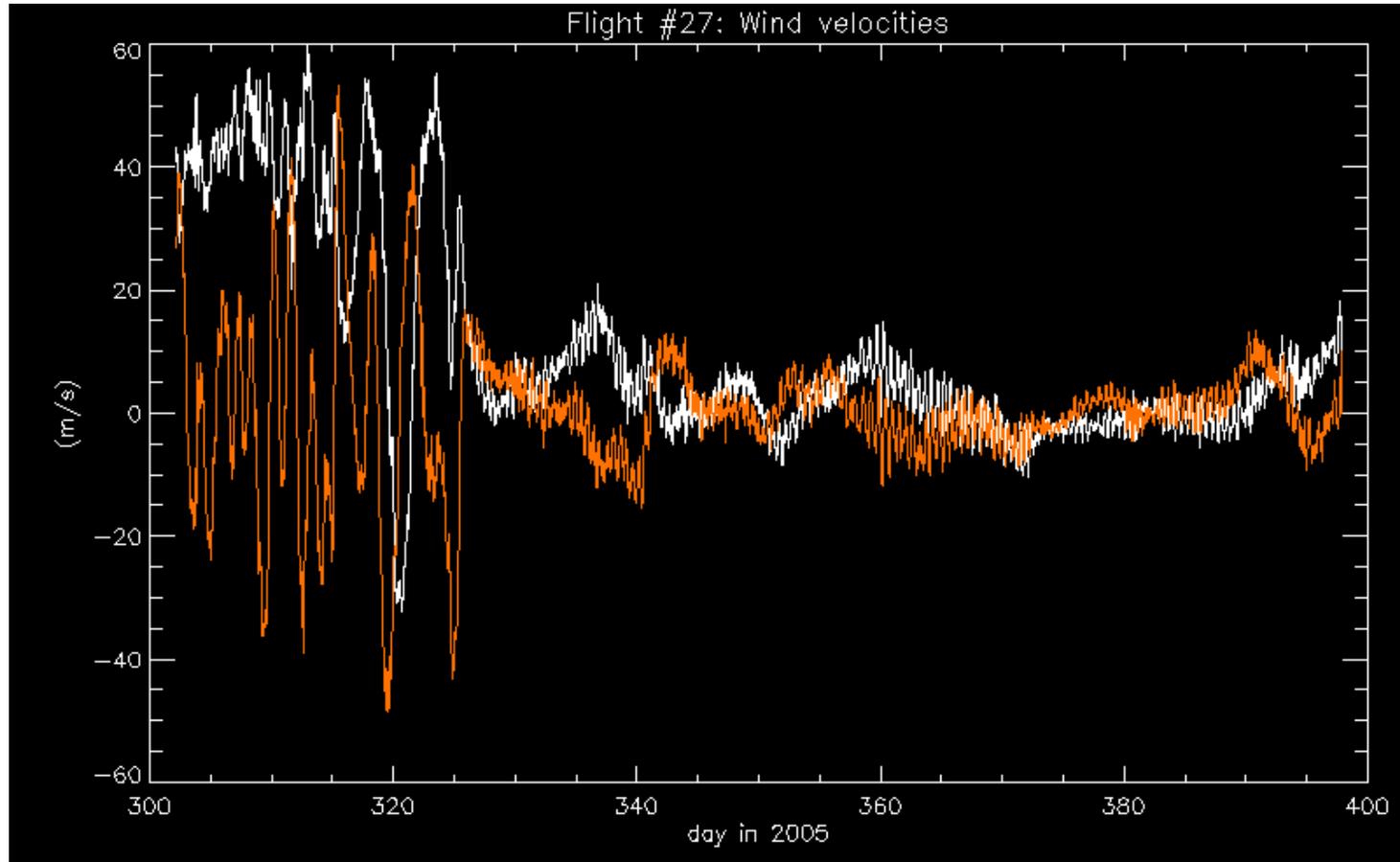


Difference obs. *minus* model (MLS)  
Slight improvement since day #25.

Courtesy A. Tangborn,  
GMAO/UMBC

# Scientific Goals

- Stratospheric measures along lagrangian trajectories to describe polar vortex. (LMD)



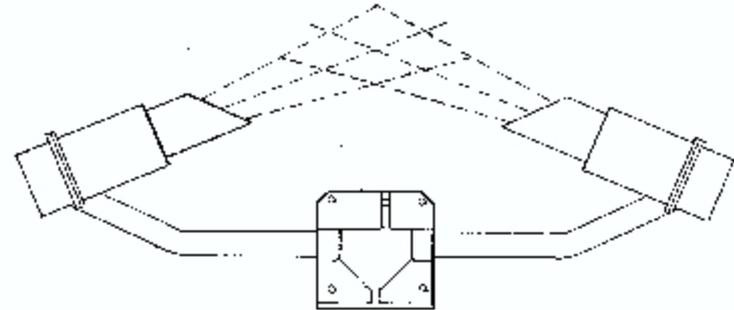
Gravity wave description (LMD/A. Hertzog)

## Hydrological aspects

- To evaluate the impact of the large scale improvements on local analyses and forecasts at Concordia.



Model VPF-730 sensor



Scattering Sensors: Amount, width and speed fo hydrometeors

+ snow depth sensor

C. Genthon, LGGE



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## Scientific Goals

- To evaluate the ability of driftsondes to improve predictability over polar regions and beyond. (CNRM/GMAP – ECMWF - BMRC)
- To provide a contribution to the design of a sustainable observing system for climate over Antarctica taking into account the potential of NWP systems using satellite data (contribution to GEOSS)



# Milestones

- 150 radiosoundings from Concordia
- Driftsonde system has been tested (AMMA, Kiruna)
- First tests of IASI data assimilation
- Payload selection
  - Enhanced meteorological sensors, ozone sensor
  - Particle counter to study stratospheric clouds
  - Lidar to describe clouds, GPS radio-occultations



# Plans

- Settings of NWP tools, post-doc training, data assimilation experiments
- End of balloon settings, payload validation, routing all the equipment to Antarctica
- Data collecting and dissemination
- <http://www.cnrm.meteo.fr/concordiasi/>

