

# Today: Operational Forecast Tools

- NCEP
- Meteo – France
- Jamstec
- ONR - NRL

## Tomorrow: Products tailored for DYNAMO

- Accomplishments (so far),
- to do list and
- requests for specific products from the Pls

**(Pending funding)**

# Real Time Interaction Between **NCEP** and **DYNAMO**



**NOAA/NWS/NCEP – UMCP/ESSIC**

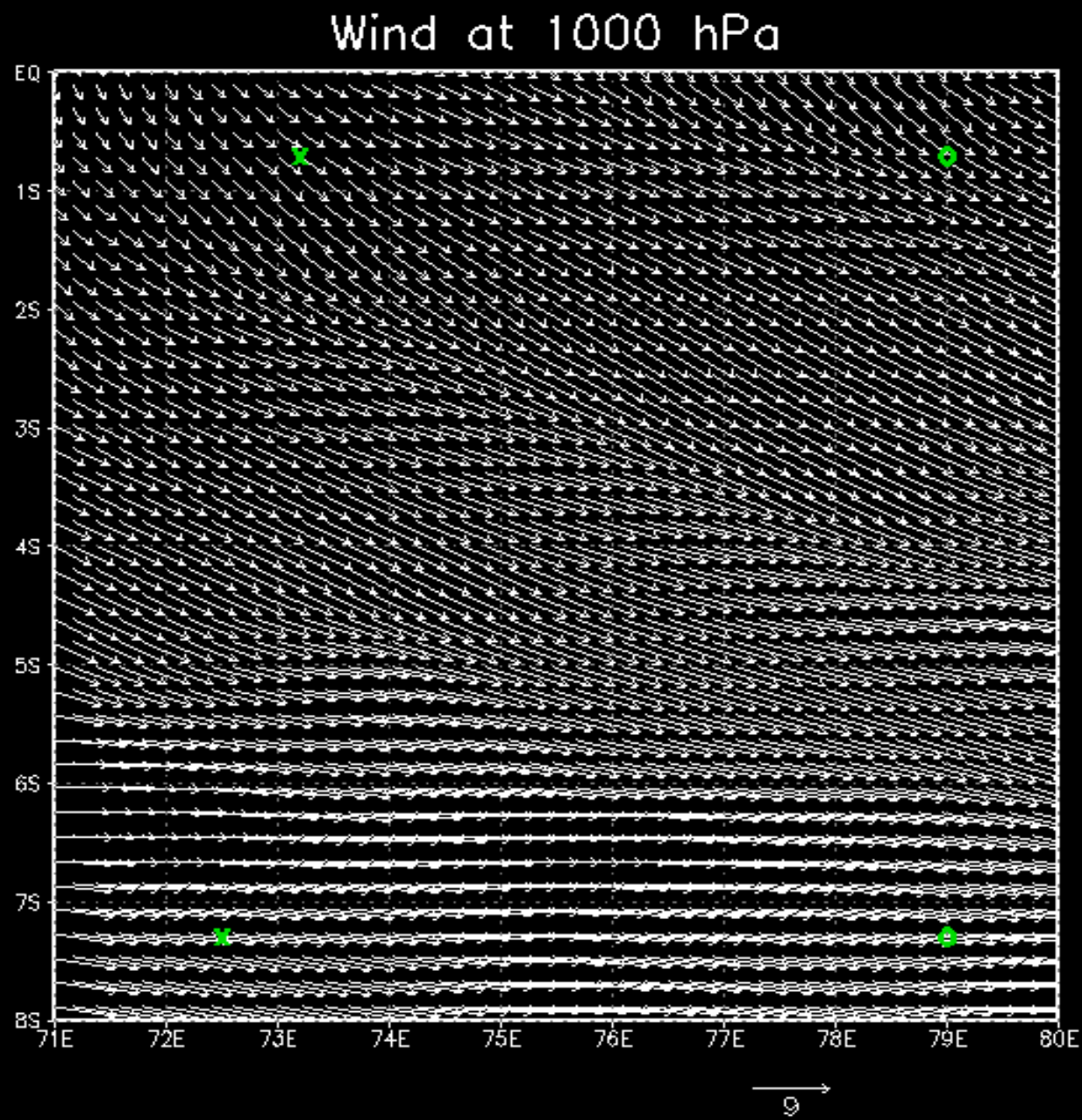
Augustin Vintzileos and Jon Gottschalck



# Existing Tools at NCEP

- GFS: runs at T574L64 (day 0 to day 7) initialized 4 times daily 00Z, 06Z, 12Z, 18Z (this can have benefits for decision making at GMT+5). Hourly output at ~ 27km x 27km is possible. **Verification of analysis and forecasts over the DYNAMO area a major task to accomplish.**
- GEFS: 20 perturbed forecasts each run out to 16 days at T190L28. The initial perturbations are generated using Ensemble Transform with Rescaling (ETR) method. **Research work to be done prior to the campaign on usefulness of ensemble spread over the tropics.**
- CFS: is the coupled forecast system. Current operational version is GFS-T62L64 and MOM3. Next implementation ~May 2011 with GFS at T126L64 and MOM4. **The CFSv2 hindcasts may help establish forecast skill over the DYNAMO area and provide possibility for oceanographic forecasts.**
- GTH: Global Tropics Hazards Outlooks for week 1 and 2. Synthesis of monitoring products, dynamical model forecasts, statistical tools
- Multi-model operational forecast of the MJO Wheeler – Hendon index (CLIVAR MJO Task Force)
- Monitoring products: Daily OLR. CDAS. Operational analysis GDAS is at T574L64 since summer 2010, CFS-Reanalysis is at T382L64

Forecast from Saturday February 26<sup>th</sup> 12Z valid Sunday February 27 at 09Z

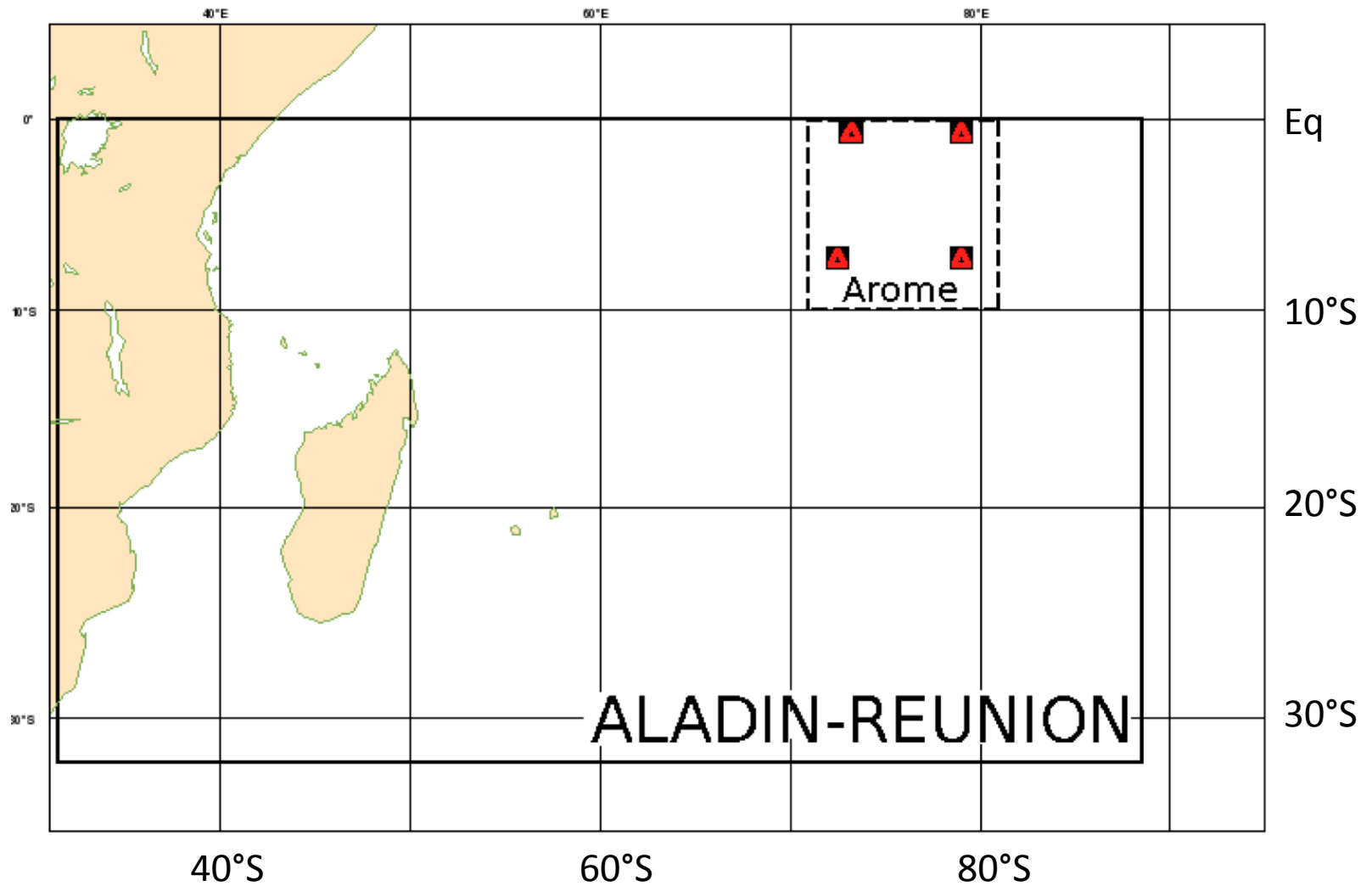


**Météo-France  
&  
ECMWF**

# Forecasts Météo-France La réunion

- Arpege : global operational model, T798C2.4L70 (~35 km in the Indian Ocean)
  - Assimilation 4D-Var.
  - from 0h to 84h every 6h, starting every day at 00UTC and 12UTC
- Aladin-Réunion : limited area operational model over the South-West Indian Ocean, 8km, L70:
  - Assimilation 3D-Var,
  - Coupled with Arpege (or IFS ECMWF)
  - From 0h to 54h every 3h, starting every day at 00UTC and 12UTC
- Arome : research model, 2.5 km resolution:
  - Initial and boundary conditions from Aladin-Réunion
  - From 0h to 30h every 3h, starting every day at 00UTC and 12UTC

# Aladin and Arome areas





# ECMWF model products

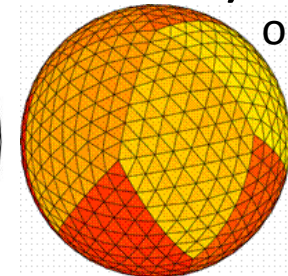
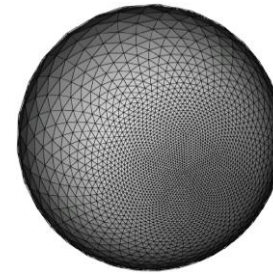
- Some products are already on the ECMWF webpage :
  - monthly MJO forecasts
  - EPSgrams
  - ... (examples tomorrow)
- For more detailed diagnoses specific to Cindy-Dynamo, an access to the Mars server is required.
- Outputs from the ECMWF global model may be interesting for operations
  - Similar fields as for Arpege may be produced.
- An access to these products for CD Pis will be demanded to ECMWF.

**Jamstec**

# NICAM simulation plan (real-time forecasts)

Nonhydrostatic ICosahedral Atmospheric Model

stretched grid



original grid

Model: regionally stretched NICAM

Resolution: 14~28km mesh 90deg x 90 deg domain (center: 80E, 8S)

Length of forecasts: 7-days (5-days prediction)

Period: Oct. – Nov. 2011 → Mirai (e-mail)

(+ Sep., Dec. 2011, Jan.-Feb. 2012)

Frequency: 3 (or 6) times / week

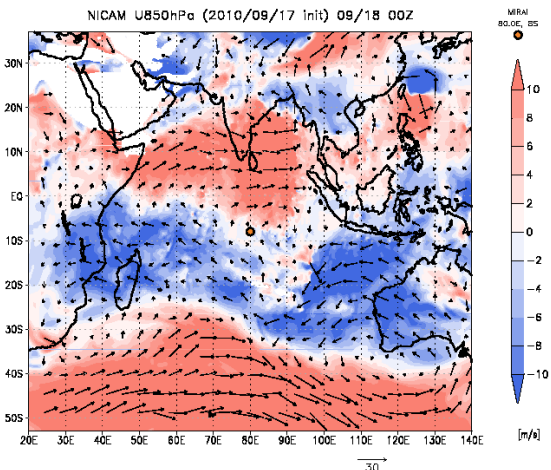
initialization: NCEP\_FNL, interpolation

SST: slab ocean model (1-layer)

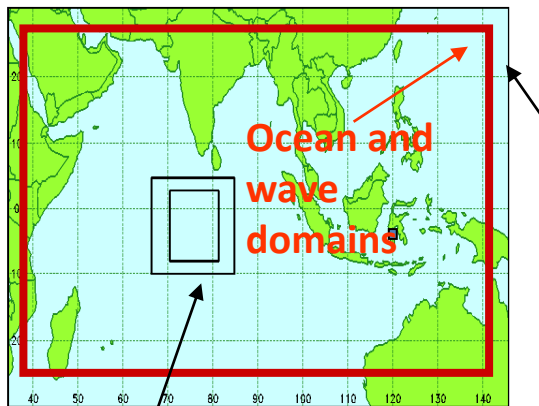
Data access:

realtime images: web access permission to CINDY/DYNAMO  
members during IOP (CINDY web server).

binary data: available within a year from CINDY web server.



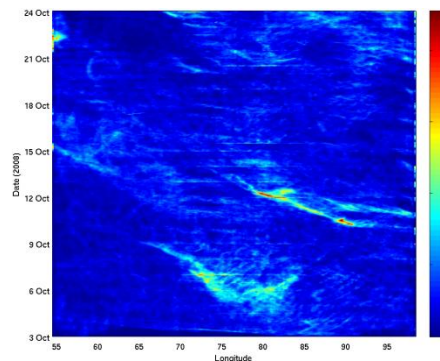
NRL - ONR



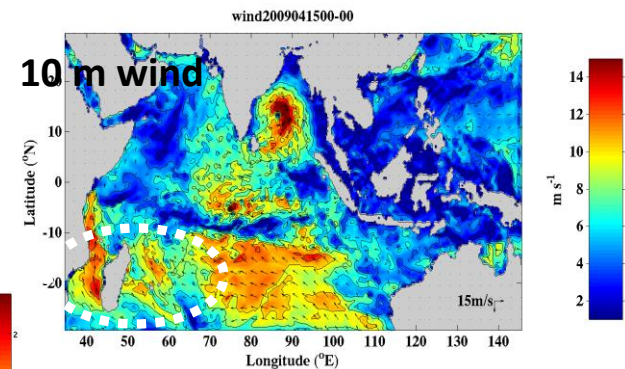
27 km  
resolution  
atmospheric  
domain

High resolution (9/3km) and explicit  
clouds covering DYNAMO area (10S-  
10N, 68-84E)

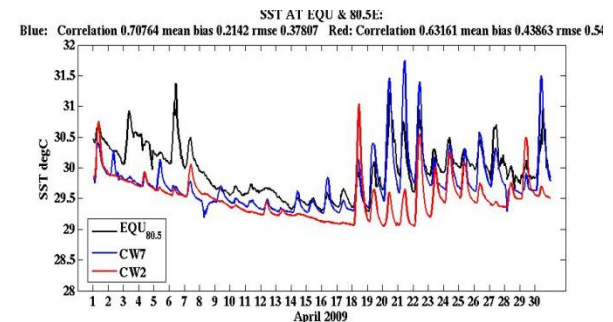
## Hovmöller



## X-Y plot

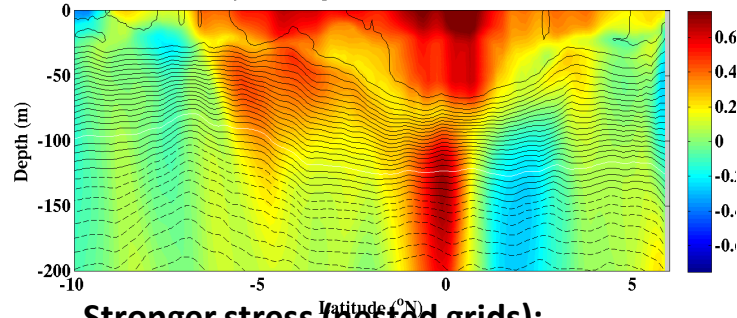


## Time series plot



## Cross section plot

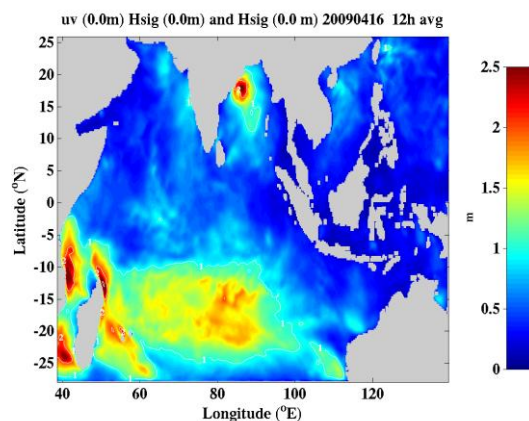
Zonal velocity and Temperature 80.5E 2009041500 12 hours



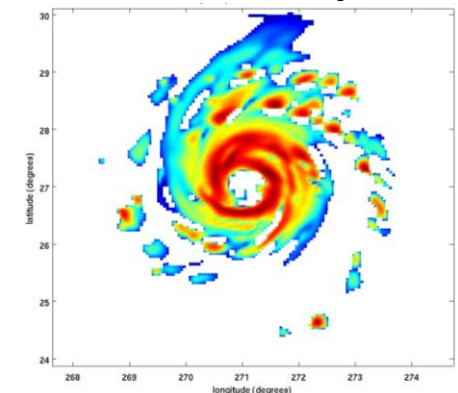
Stronger stress (nested grids):

- Stronger surface current
- Deeper and warmer mixed layer

## Significant Wave Height



## Radar reflectivity



# Available ocean fields (NetCDF)

## Hourly Forcing:

Wind stress vector  
Sea level pressure  
Solar flux  
Net heat flux  
Net precipitation

## 3-hourly 3D:

Current vector  
Temperature  
Salinity  
Stokes drift current vector  
Bottom wave current amplitude  
Bottom wave current frequency  
Bottom wave current direction

## Hourly 2D:

Surface current vector  
Surface sea height  
Surface Temperature  
Surface Salinity  
Wave radiation stress gradient vector  
Bottom wave current amplitude  
Bottom wave current frequency  
Bottom wave current direction

Many other atmospheric fields and additional  
wave field properties are available

# Conclusions

There is a variety of operational forecasts that may available to DYNAMO .

Dry runs as the ones already in execution at NCEP and communicated daily to NCAR (in experimental so far form) are essential for establishing a reliable flow of information.

Dry runs are also important for allowing decisions makers on the field to be accustomed to these tools and feedback to the forecasters.

Major milestones may be still reached: (i) making sure that part of the DYNAMO data are assimilated in the forecast cycles, (ii) verification of forecast and analysis, (iii) evaluation of probabilistic forecast information value over the DYNAMO area and (iv) evaluation of oceanographic forecasts bellow the DYNAMO area.