# Ocean observing and information systems in the Philippines

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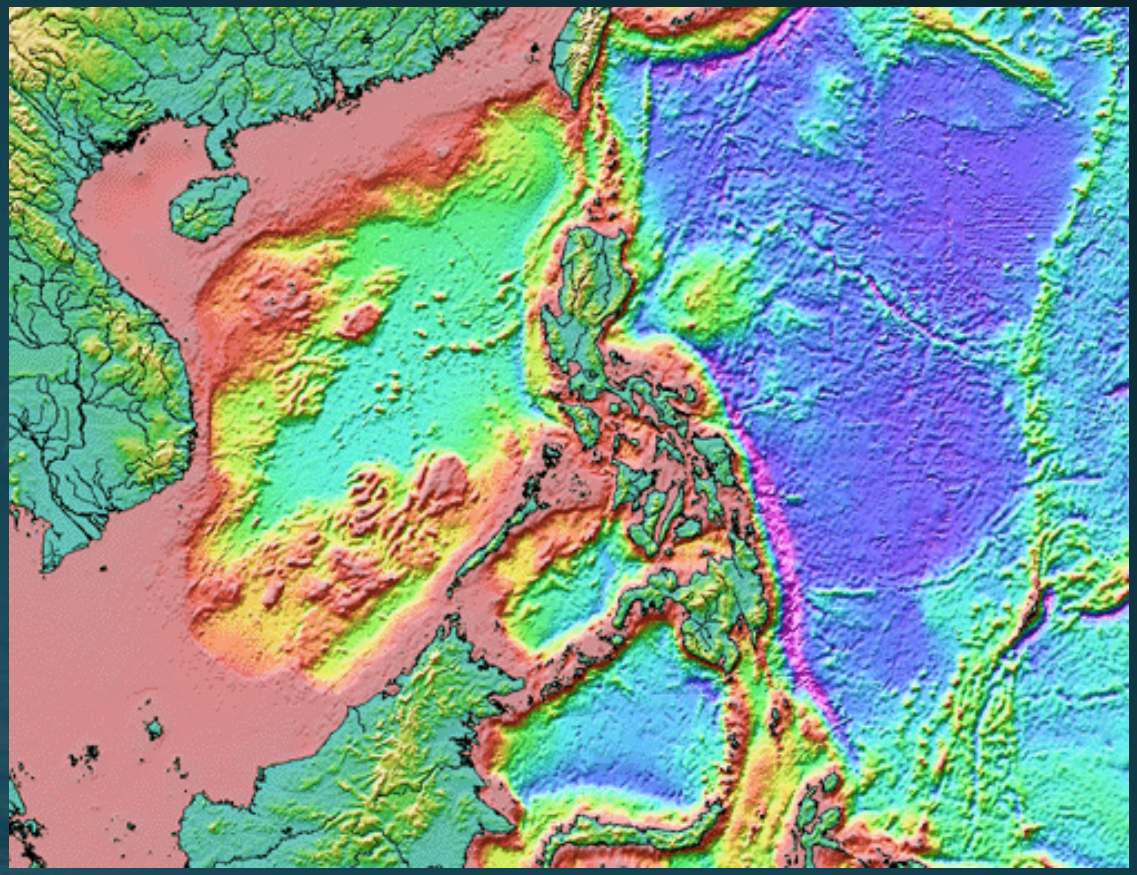
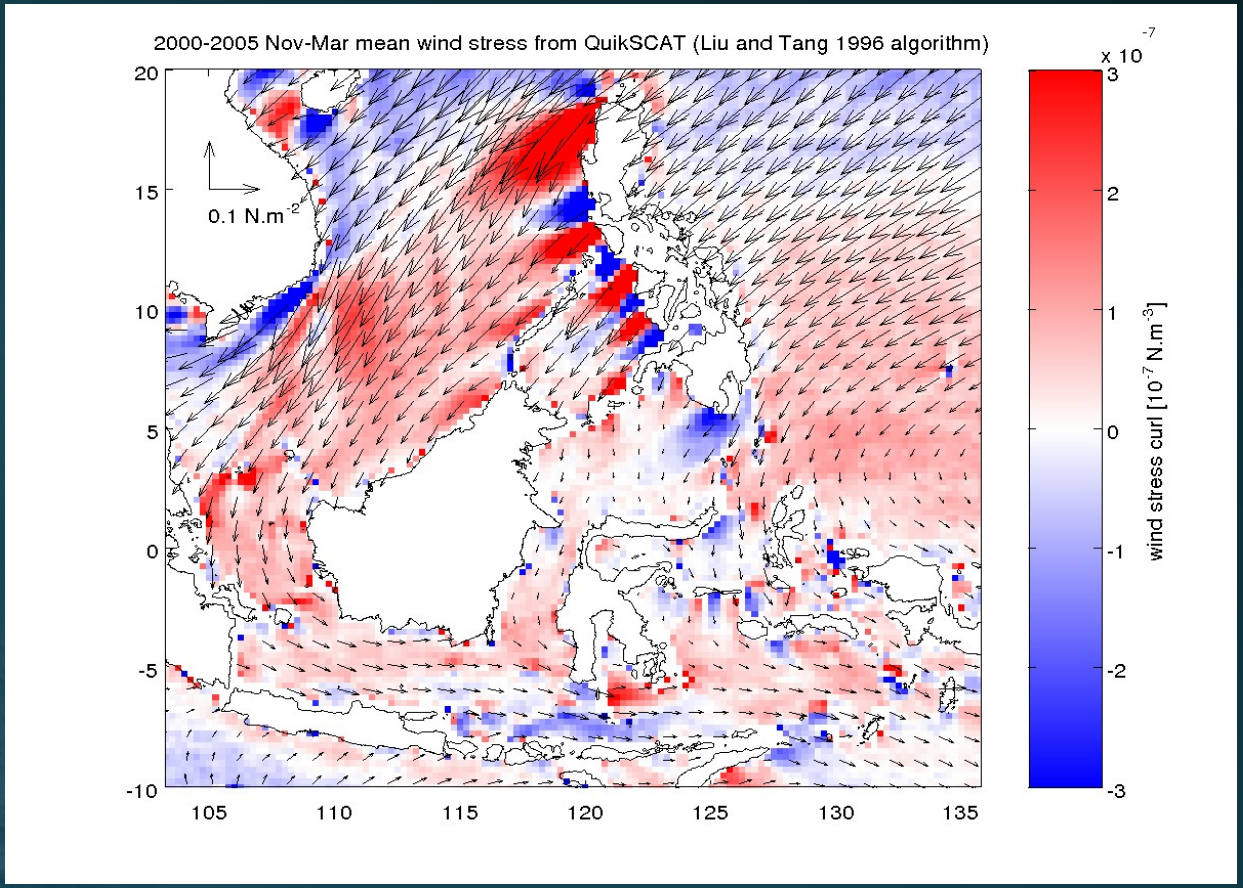
Philippine archipelago consists of complex system of islands, sea passages and basins with complicated topography



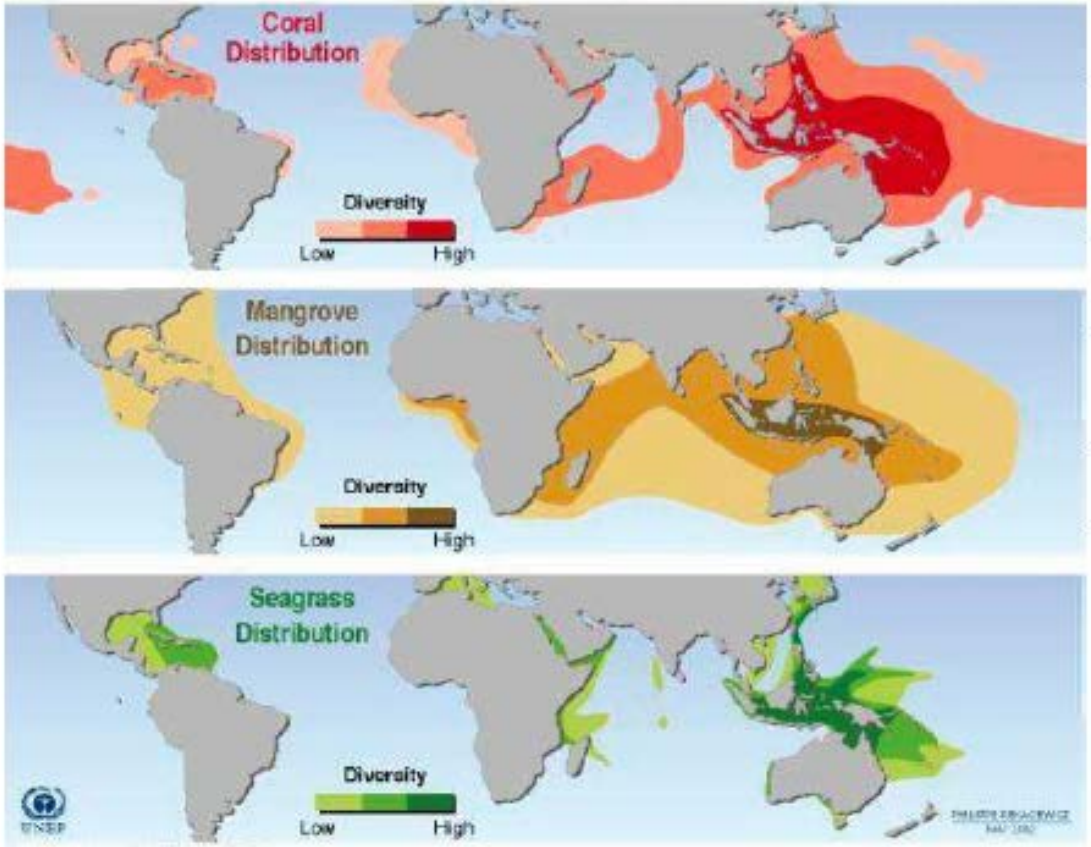
# Orographic effects important making it also challenging to conduct ocean and atmosphere observations




Spatial variable wind stress produces sub-meso-scale ocean features. From Flament, Chavanne

# Philippines at the Center of Marine Biodiversity in the World

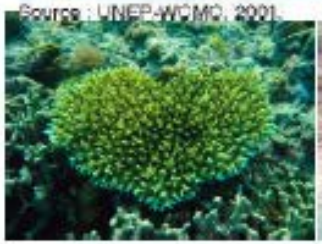
## Global Distribution of Coral, Mangrove and Seagrass Diversity




Source : UNEP-WCMC, 2001

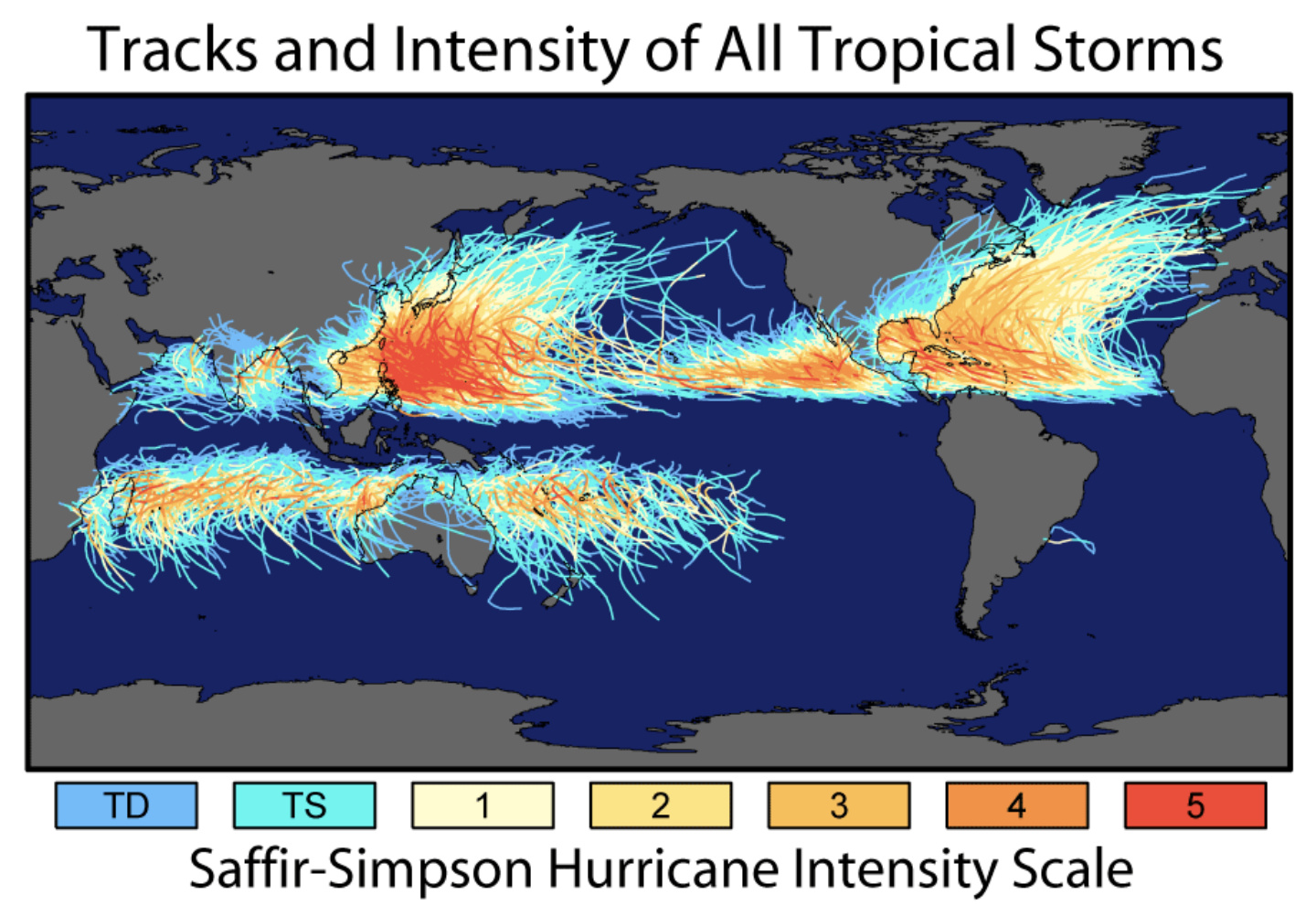
| | Marine Fish Species Diversity | Hard Coral Species Diversity |
|---|---|---|
| Southeast Asia | 2,500 | 400-500 |
| Great Barrier Reef | 1,500 | 395 |
| Caribbean | 500-600 | 100-200 |

Sources: Chou 1997; Veron, 2001; and Williams, 2001.

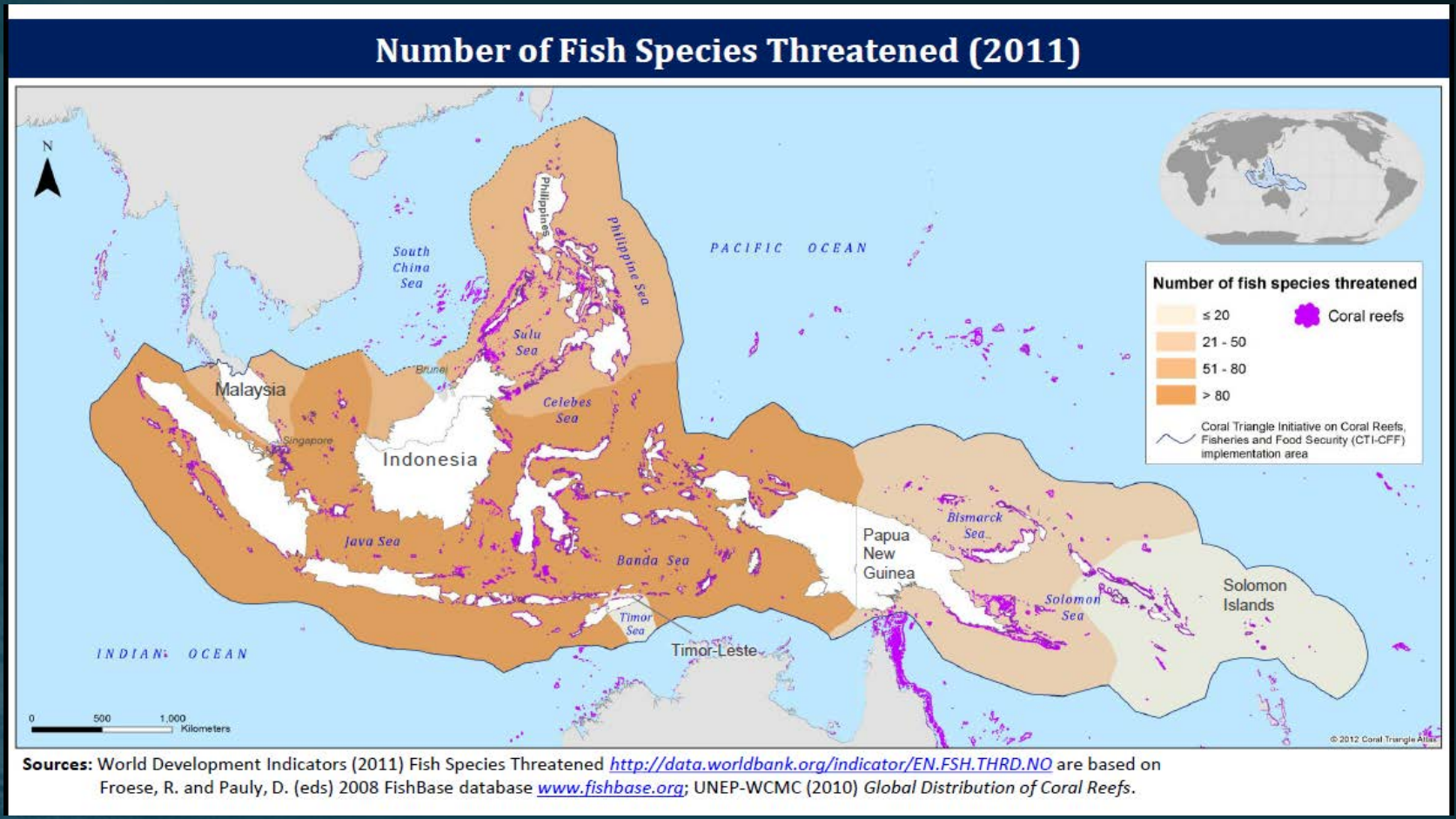


# Tracks and intensity of all tropical cyclones

http://eoimages.gsfc.nasa.gov/images/imagerecords/7000/7079/tropical_cyclone_map_lrg.gif

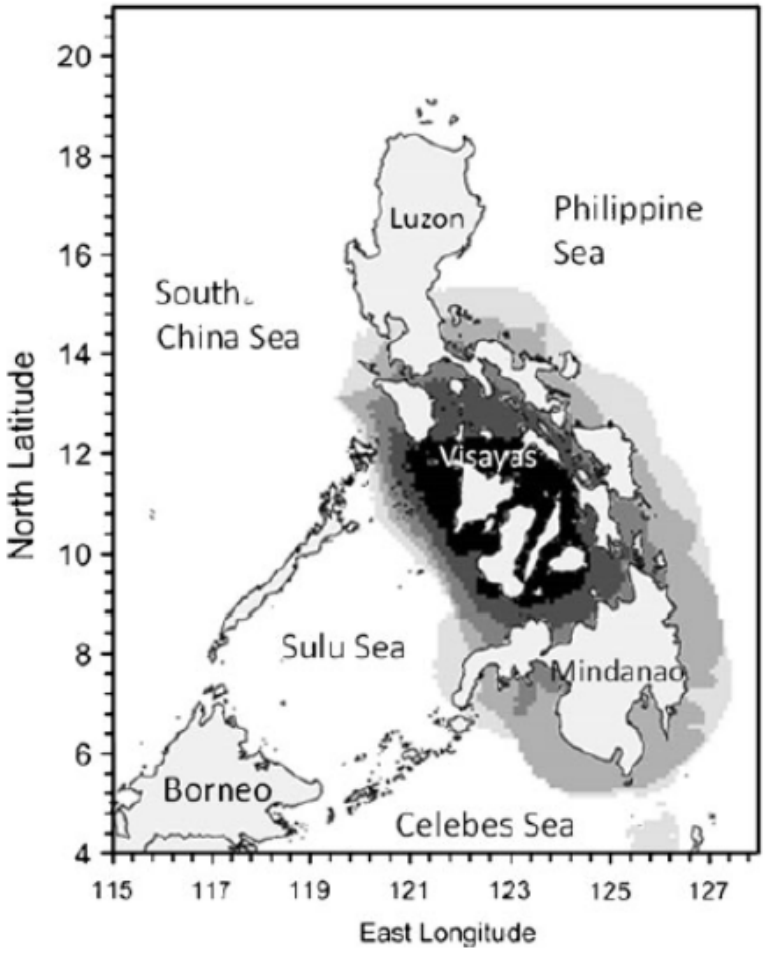


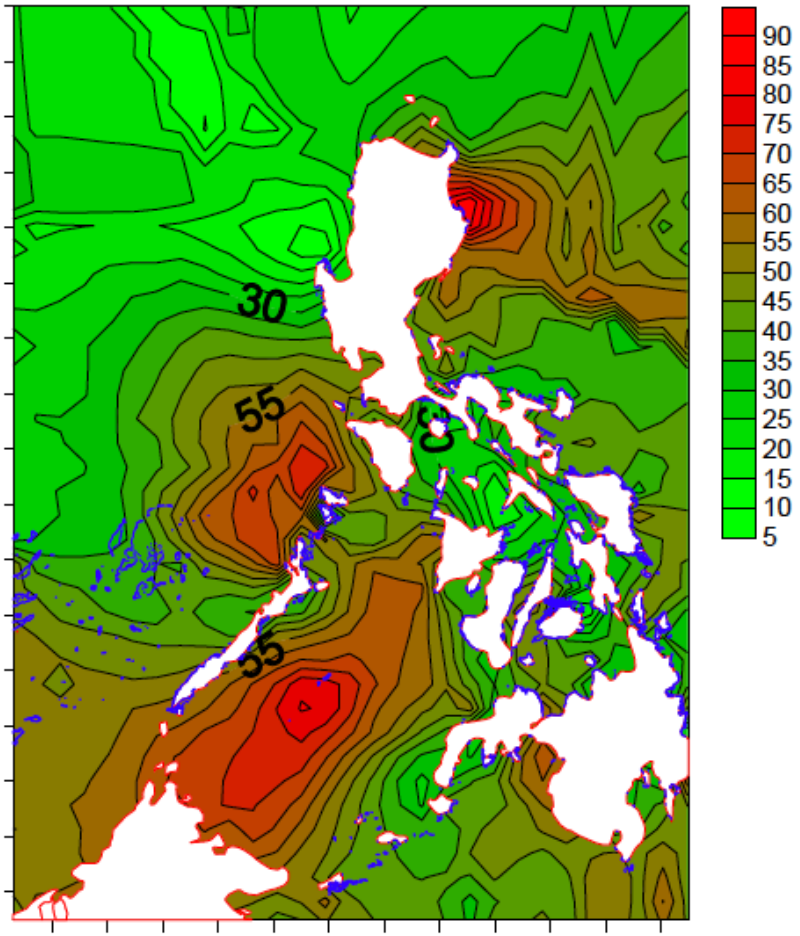
# Hottest of the Hotspots




**Sources:** World Development Indicators (2011) Fish Species Threatened http://data.worldbank.org/indicator/EN.FSH.THRD.NO are based on Froese, R. and Pauly, D. (eds) 2008 FishBase database www.fishbase.org; UNEP-WCMC (2010) *Global Distribution of Coral Reefs*.

# Hottest of the Hotspots




Interpolated species diversity map of fish species in the Philippines from fish visual census data (1990s to 2008)

(Nañola et al. 2011)

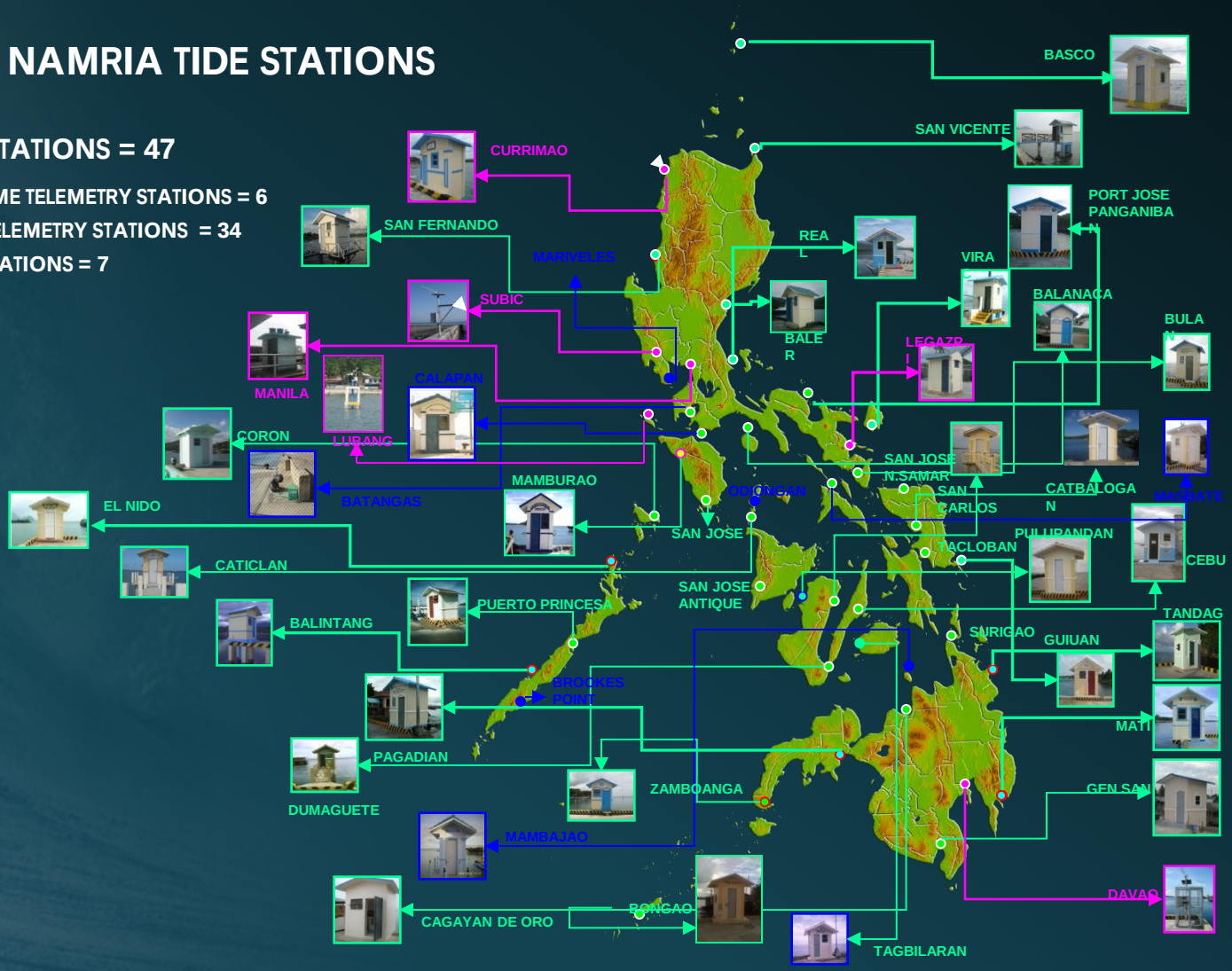
# Observation programs

- National Mapping and Resource Information Authority (operational agency for oceanograpy-also designated as the national oceanographic data center)
- Philippine Atmospheric, Geophysical, Astronomical Services Administration (operational meteorological agency)
- Bureau of Fisheries and Aquatic Resources
- Research-based observations (e.g. academic institutions)
  - coral monitoring, water quality in aquaculture areas
  - Meteorology/Oceanography
  - Project NOAH

# NAMRIA TIDE STATIONS

## EXISTING TIDE STATIONS = 47

- IOC NEAR-REAL-TIME TELEMETRY STATIONS = 6
- NEAR-REAL-TIME TELEMETRY STATIONS = 34
- NON-TELEMETRY STATIONS = 7

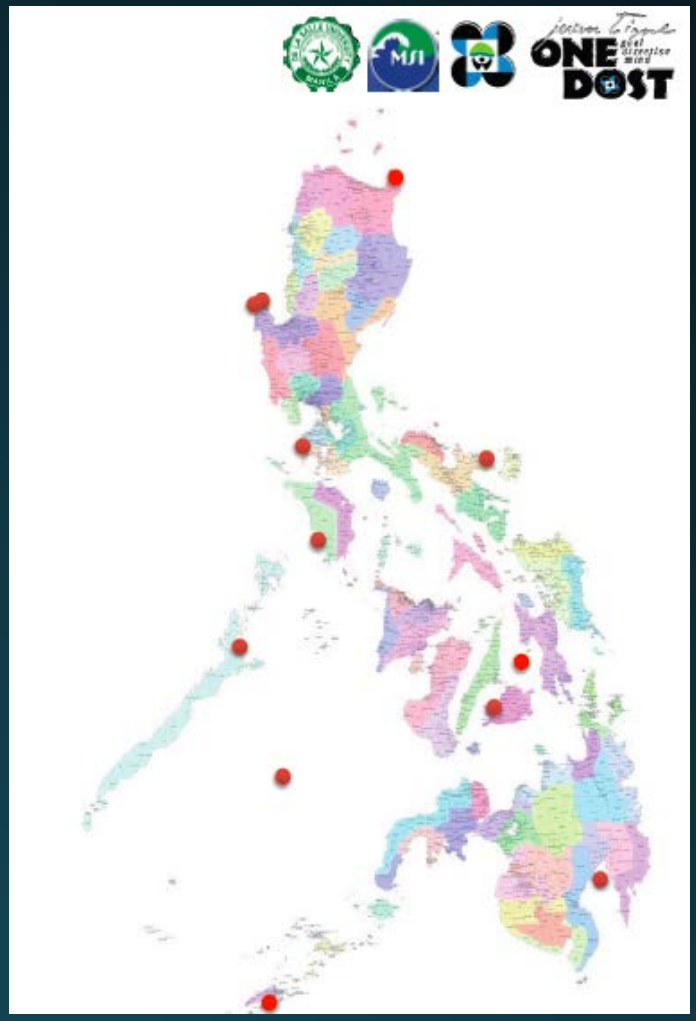


# Observation Platforms

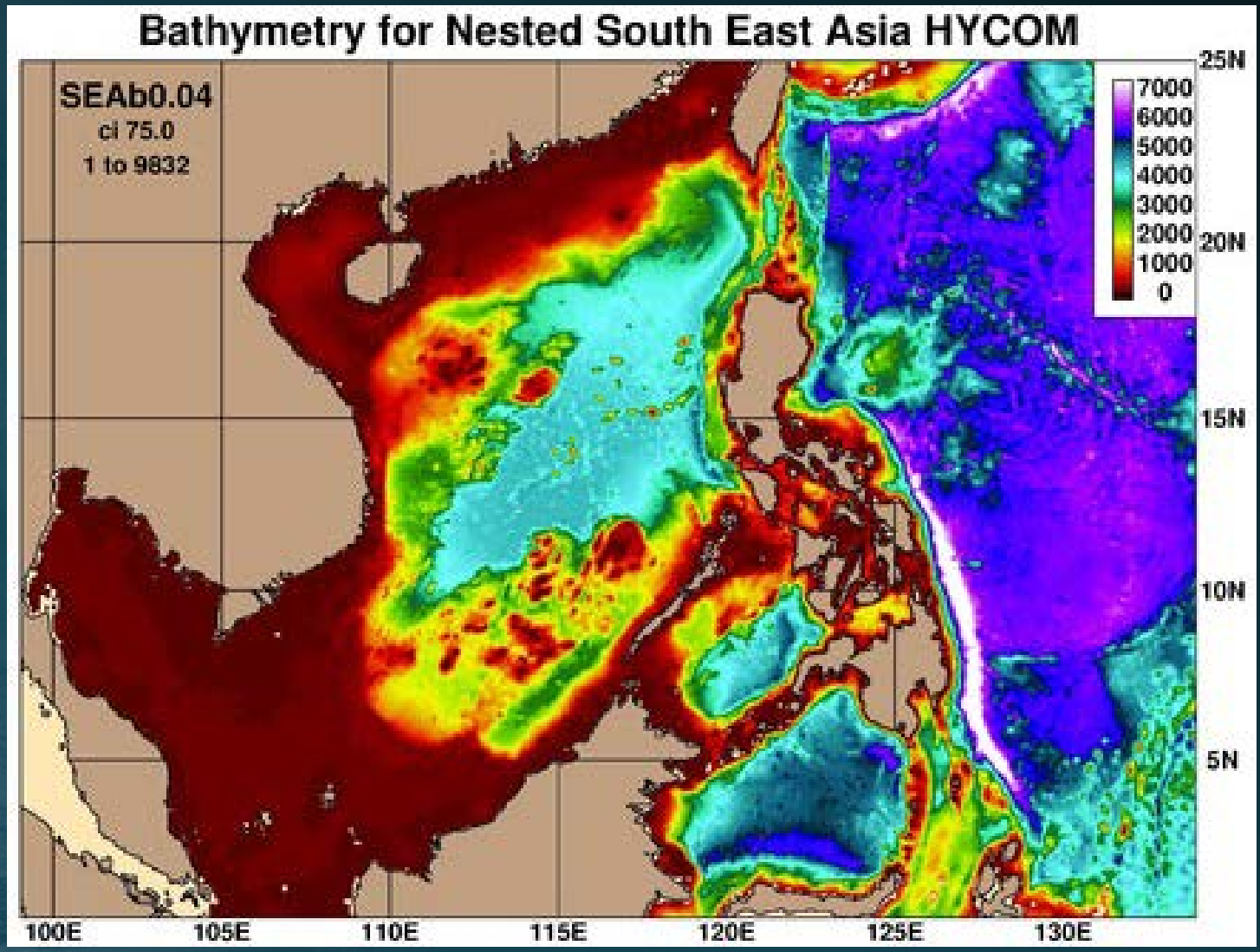
## research vessels, met buoys, coastal hf radars

# Coral Reef Monitoring Sites

Sta. Ana, Cagayan
Bolinao and Anda, Pangasinan
Caramoan
Lian, Batangas
Sablayan, Occidental Mindoro
Taytay, Palawan
Tubbataha
Camotes, Cebu
Loon, Bohol
Samal
Bongao, Tawi-Tawi



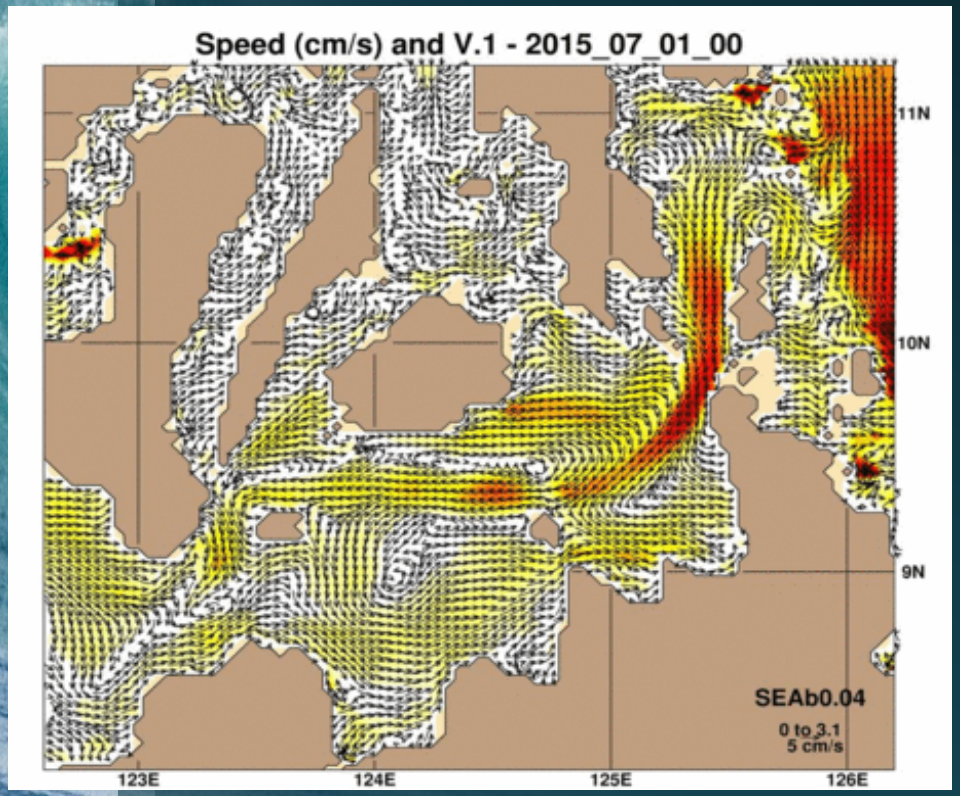
# Ocean and Atmosphere Modeling

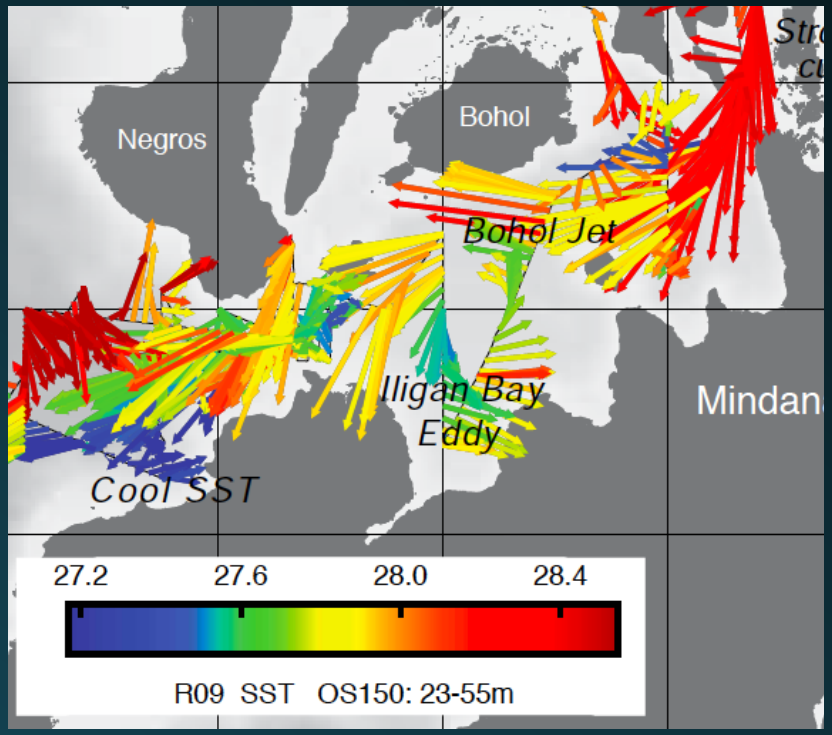


# Regional 1/25° HYCOM

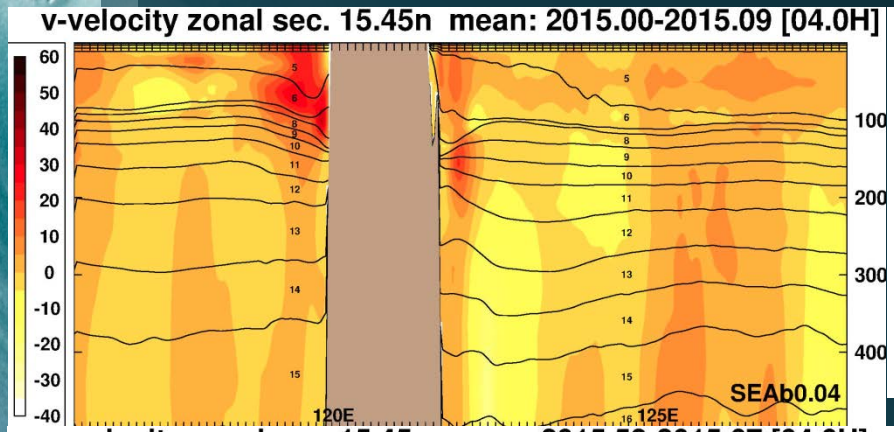
| | |
|---|---|
| **Domain** | 99.04° E to 130° E, 0.32° N to 25.0061° N |
| **Grid** | 1/25° (~4.4 km) ; hybrid 32 layers; 875 by 639 grid cells |
| **Boundary Condition** | Open Boundary – Nested Boundary |
| **Bathymetry** | ETOPO2v2 |
| **Forcing** | NAVy Global Environmental Model (NAVGEM 1.2) |
| **Initial Condition** | Polar science center Hydrographic Climatology (PHC) |
| **Implementation** | Open MPI using DOST-ASTI's and PGC's HPCs |
| **Output** | Native *[ab] files |
| **Temporal Span (target)** | Sept 2013 - Dec 2016 |
| **Status** | Successfully run until May 2016, waiting for the release of NAVGEM 1.3 for 2016 |

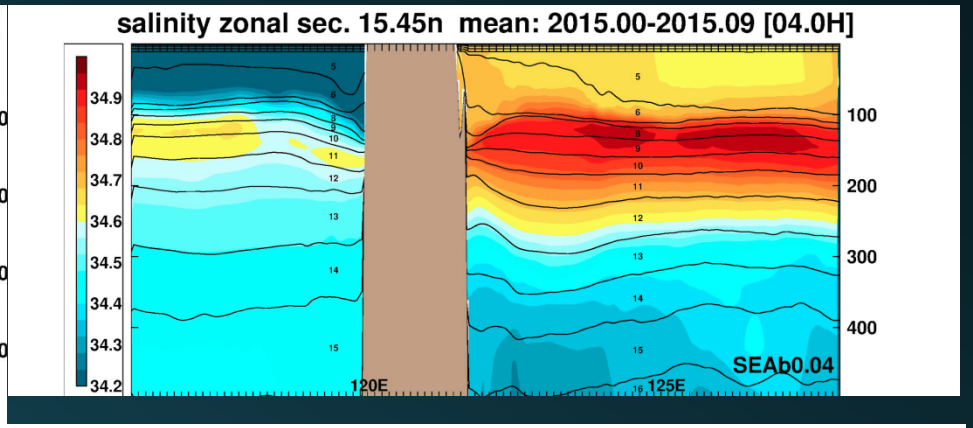
# 1/25° Regional HYCOM results (left) vs Shipboard ADCP data

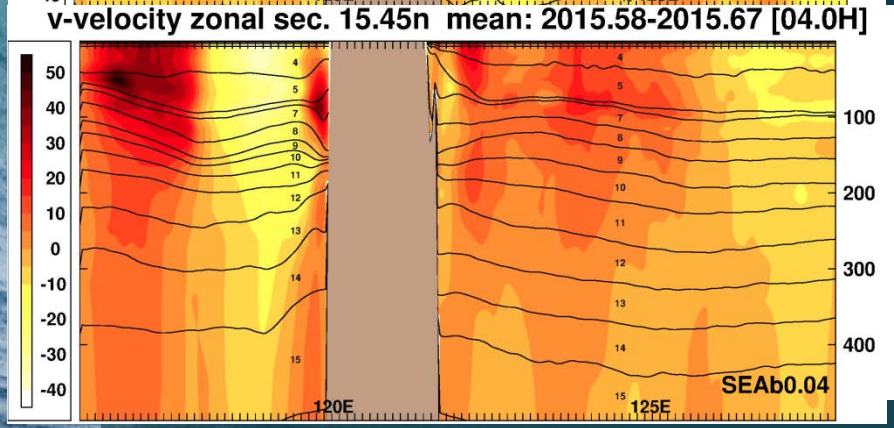


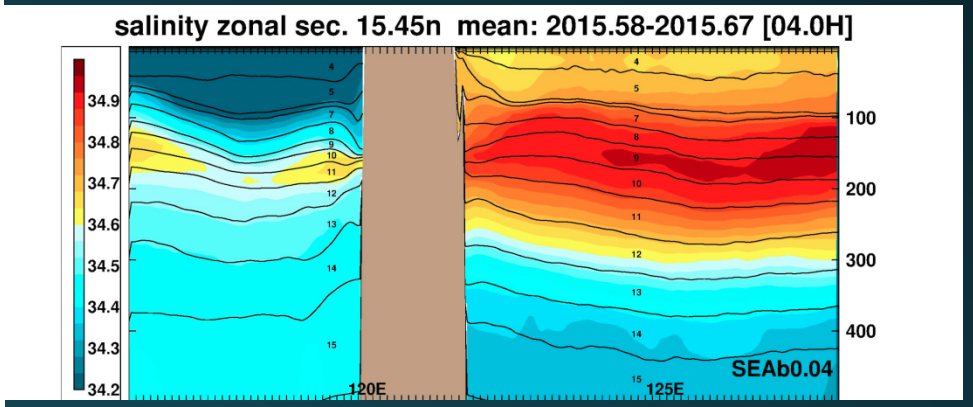




# Zonal sections across Luzon

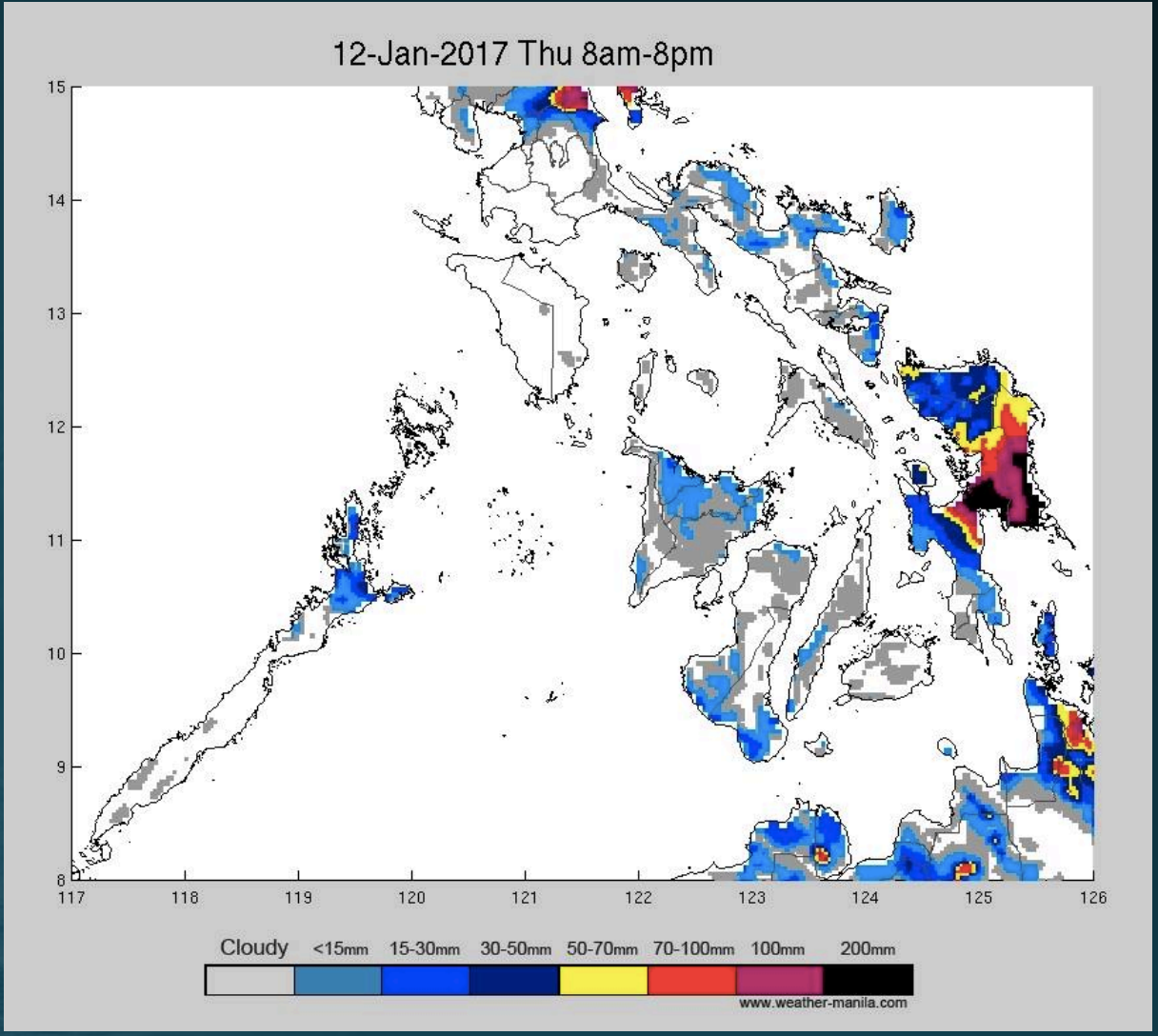



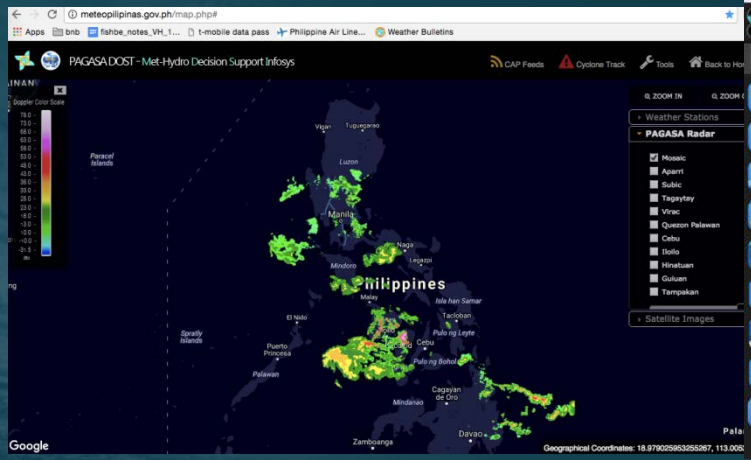
# Atmospheric Modeling using WRF

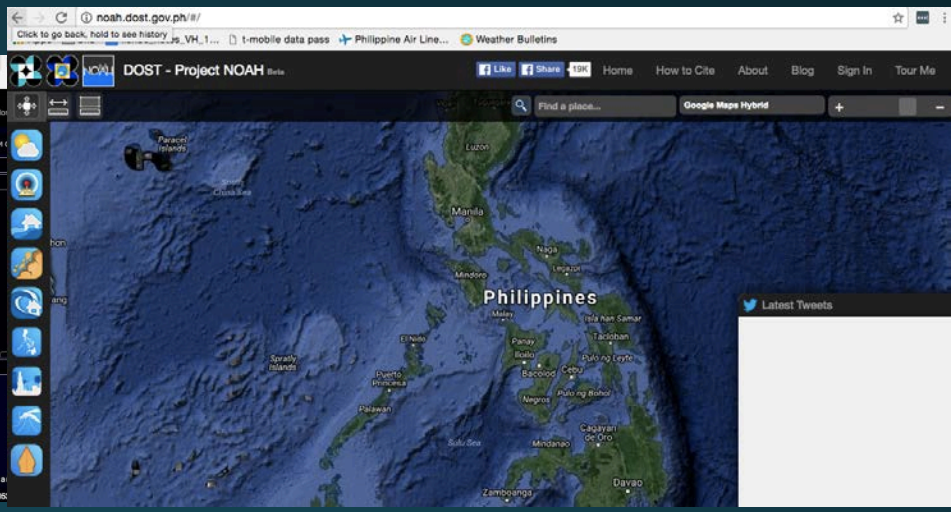


# Need for access to observations, data, information, analysis, predictions to manage disaster risk and resource utilization


http://www.geoportal.gov.ph/

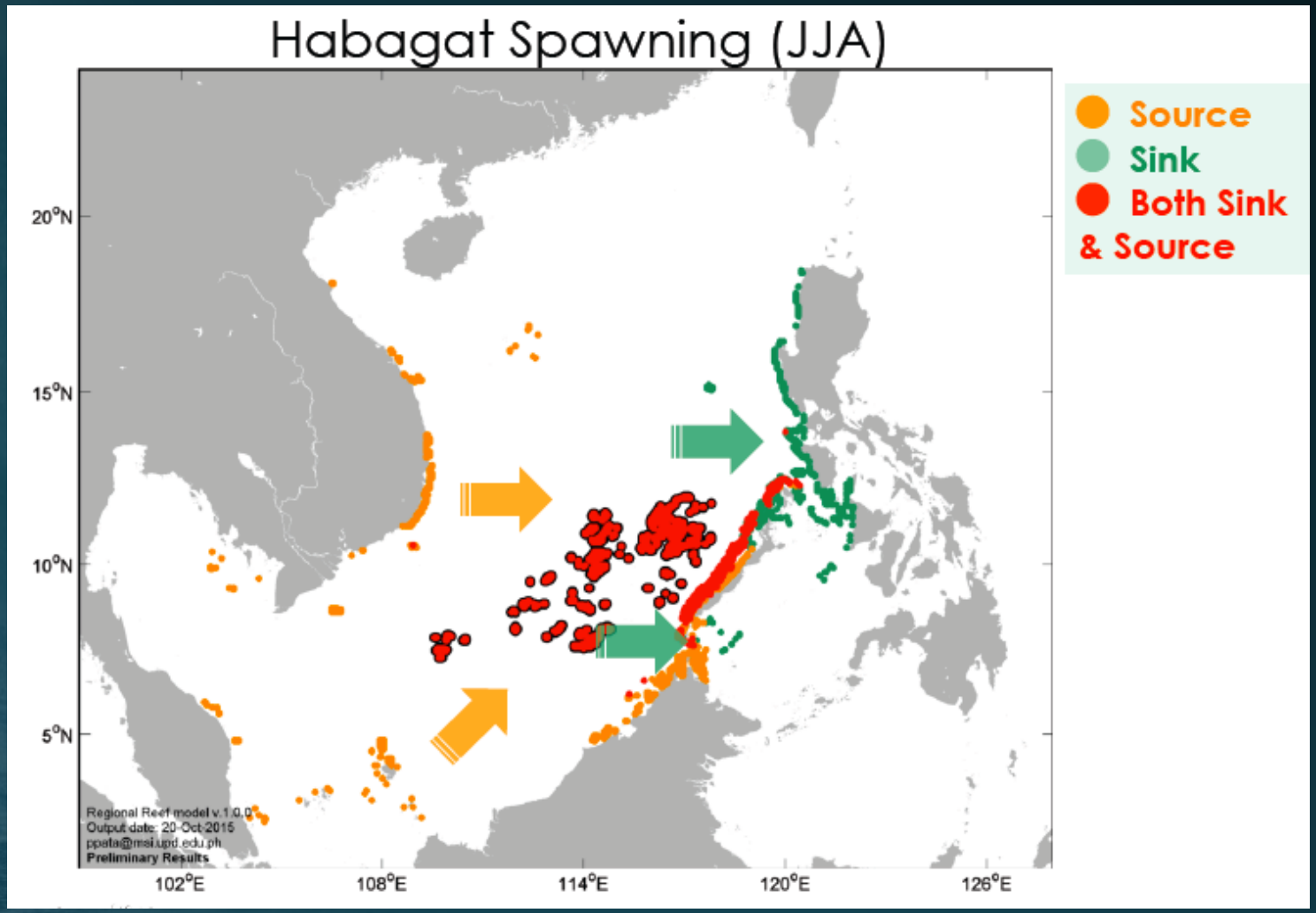
http://noah.dost.gov.ph/#/




http://meteopilipinas.gov.ph/

# Applications of ocean model data (reef connectivity)

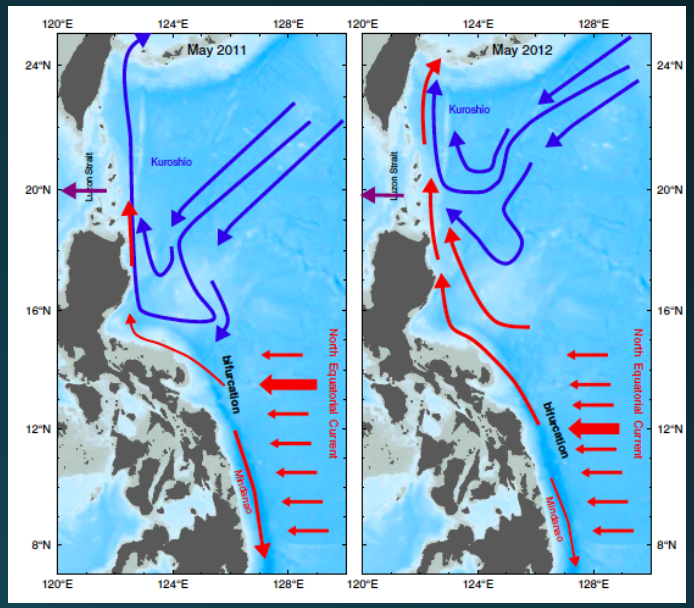


# Cooperative Programs ongoing and in the near future

- Year of the Maritime Continent – Western Luzon, SCS/Sulu Sea)
- PISTON (Propagation of Intraseasonal Tropical Oscillations) – western Luzon
- Kuroshio and

  Mindanao Currents
- Proposed JICA-SATREPS

  Ocean EWS




Gordon et al 2014

# Thank you for listening