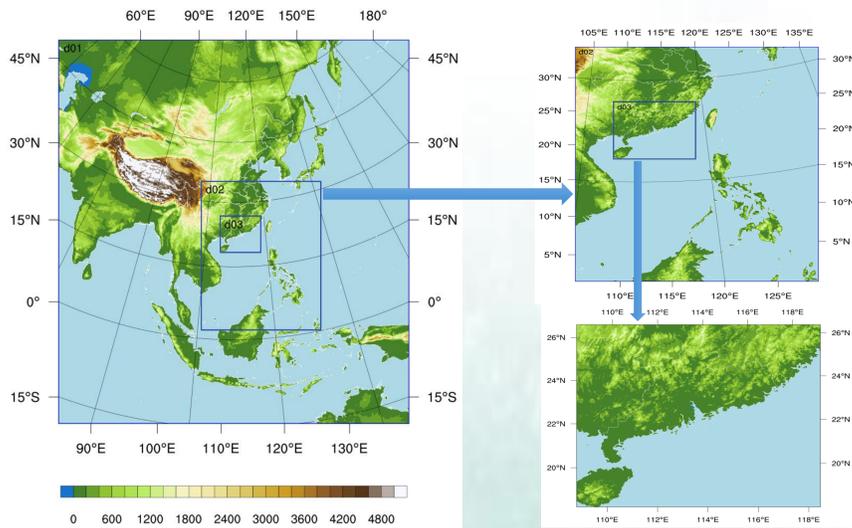


# Near real-time forecasting experiment of typhoon in the South China Sea with a high resolution regional fully-coupled model

Wang Donghai, Zhang Yu, Worachat Wanawong, Wu Zhenzhen, Liang Zhihao  
School of Atmospheric Sciences, Sun Yat-sen University, Guangzhou, China



## Domain & Model setup



### Model Configuration

<b>Initial Condition</b>	GFS (background) + observation
<b>Boundary Condition</b>	GFS
<b>Horizontal Resolution</b>	12 km - 4 km - 800 m
<b>Vertical Resolution</b>	51 eta levels
<b>Model Top</b>	50 hPa
<b>Forecast Length</b>	84 hours
<b>Forecast Frequency</b>	Twice a day

### Parameterizations

<b>Microphysics</b>	WSM 6-class graupel scheme
<b>Longwave Radiation</b>	RRTMG scheme
<b>Shortwave Radiation</b>	Dudhia scheme
<b>Land Surface</b>	Noah Land Surface Model
<b>Planetary Boundary Layer</b>	YSU scheme
<b>Cumulus Parameterization</b>	Kain-Fritsch (new Eta) scheme

## Results

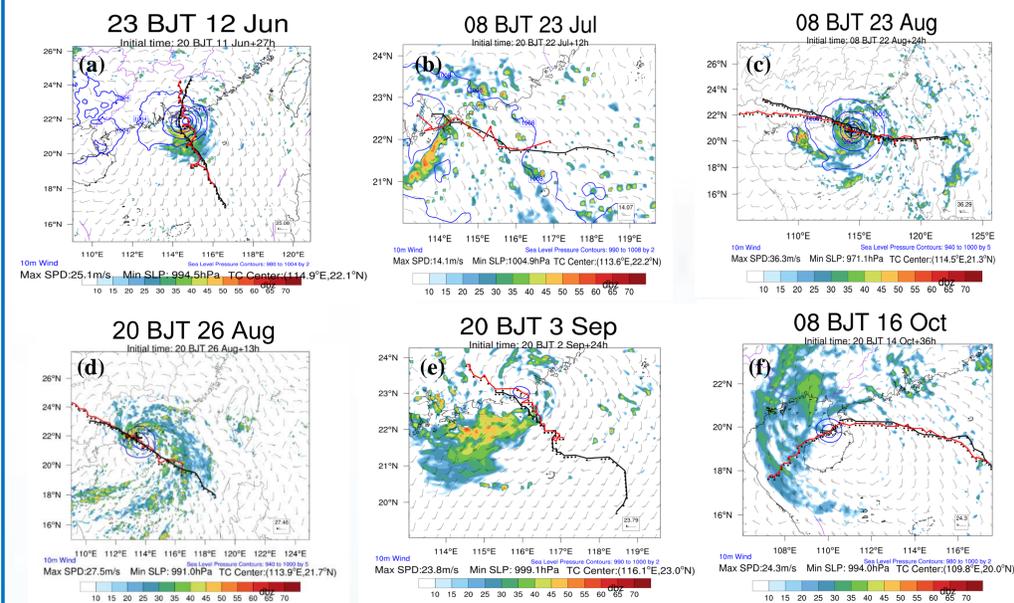


Figure 1. The near real-time typhoon forecast during the typhoon season in the South China Sea since 2017. Black lines are the observation trajectory, red lines are the forecast trajectory. (a) Merbok, (b) Roke, (c) Hato, (d) Pakhar, (e) Mawar, (f) Khanun

## Ocean-atmosphere coupled model

### Model Coupler:

The Model Coupling Toolkit (MCT)

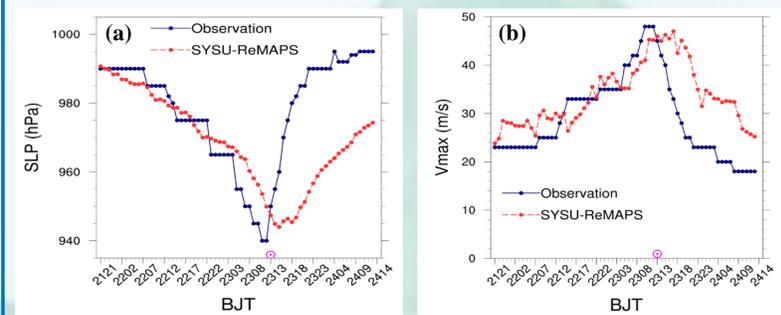
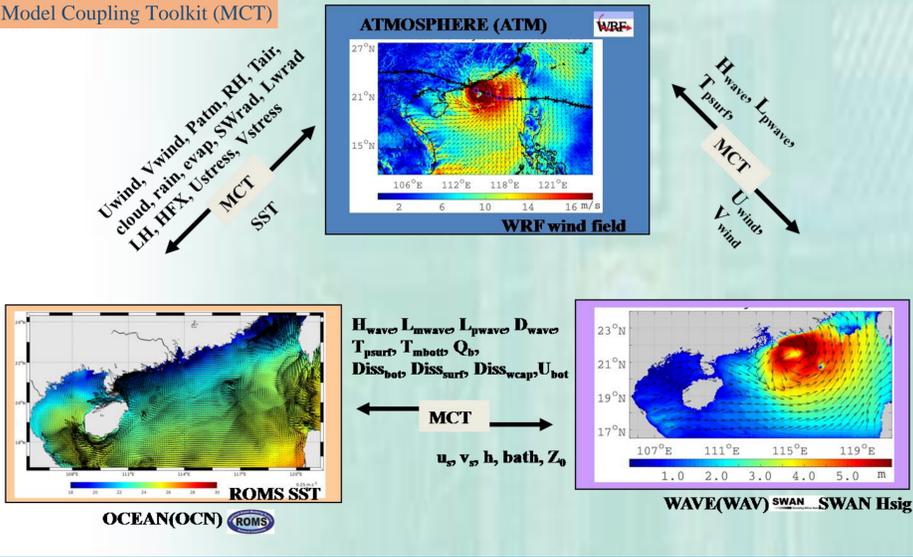


Figure 2. The near real-time pressure(a) and surface wind(b) forecasts for typhoon Hato

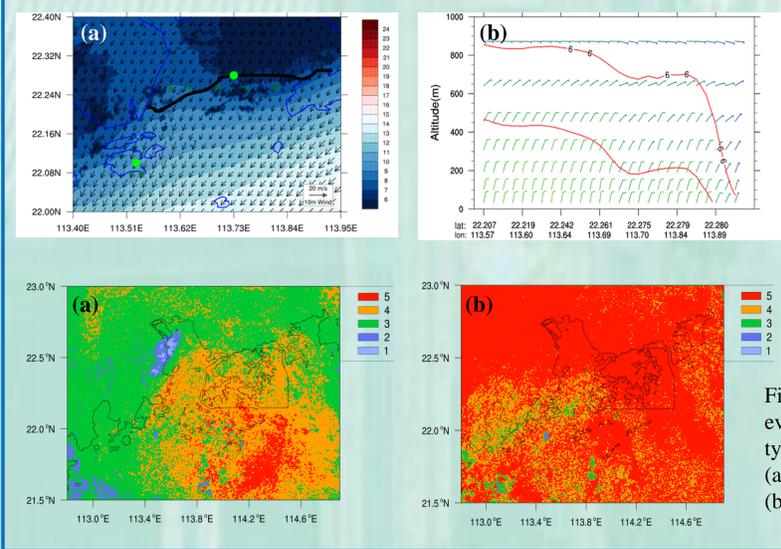


Figure 3. The wind forecast over the Hongkong-Macau-Zhuhai Bridge. (a) Surface wind, (b) Ground layer wind across the bridge.

## Ocean-atmosphere coupled forecasts

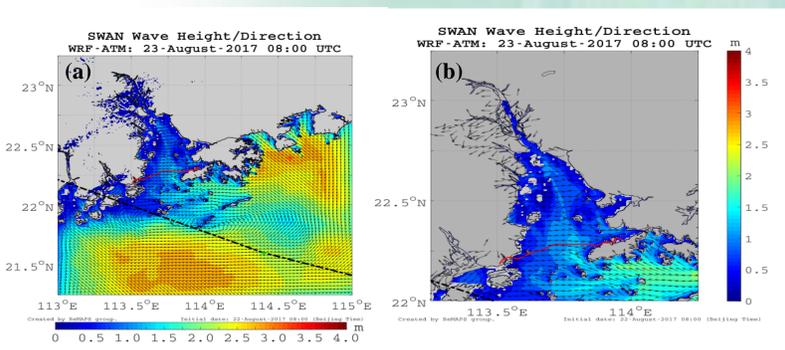


Figure 5. The high resolution (res: 43m) wave height and direction forecast over Pearl River Delta area.

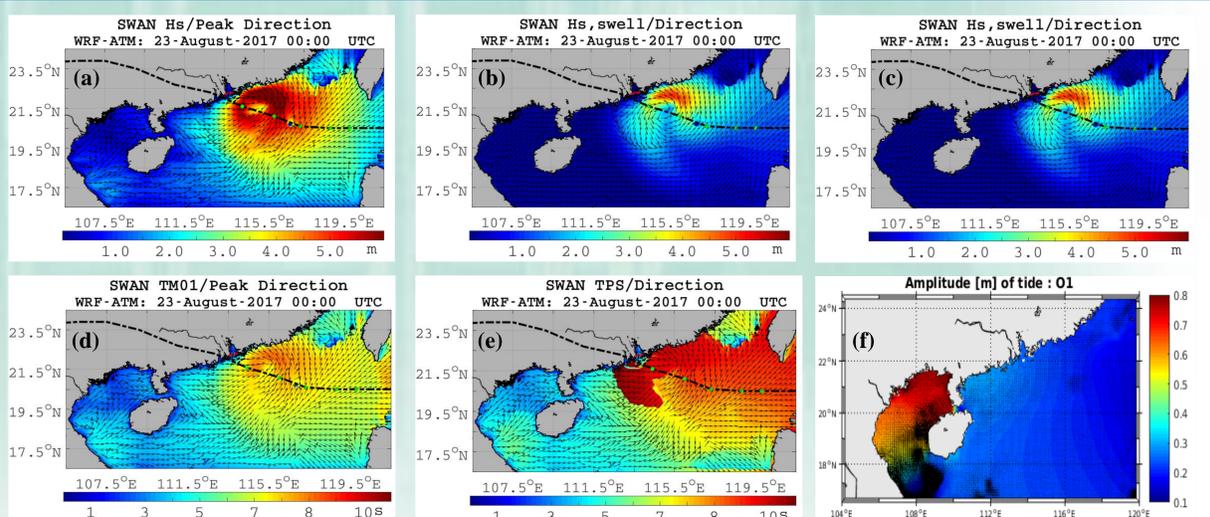


Figure 6. The ocean-atmosphere coupled model forecast for typhoon Hato. (a) Wind direction, (b) Significant wave height & Peak Direction, (c) Hs, swell Significant wave height & swell wave direction, (d) Wave period & Peak direction, (e) Peak wave period & Peak wave direction, (f) Amplitude of tide.

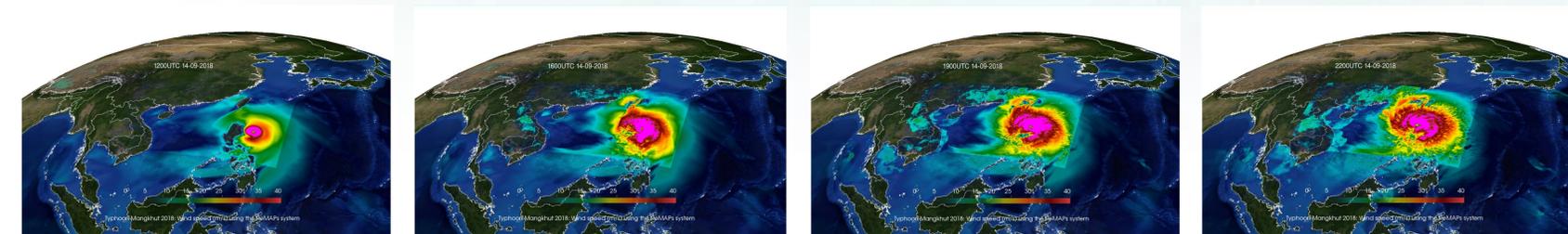


Figure 7. The near-real time forecasts for typhoon Mangkhut.