

The Challenges of Marine Weather Forecasting in Hong Kong

Lui Wing Hong

Marine weather forecasting is an important part of the daily forecasting routine at the Observatory's Central Forecasting Office (Figure 1). The forecasters issue the marine weather forecast bulletins twice daily for the South China Sea and the western North Pacific (left panel in Figure 2) and the forecasts for Global Maritime Distress and Safety System (GMDSS) four times a day for ships on the high seas. They also provide forecasts for the fishing community as well as other vessels operating in the local and south China coastal waters. Whenever a tropical cyclone is affecting the region bounded by 10-30°N and 105-125°E, Tropical Cyclone Warning for Shipping (right panel in Figure 2) will be issued every three hours with information on the current situation as well as tropical cyclone forecast positions and intensities over the next five days.

Nowadays, sophisticated numerical weather prediction (NWP) models operated by major weather centres around the world (Figure 3) can deliver reliable forecasts up to ten days ahead and make life a lot easier in the formulation of marine forecasts. However, one must not forget that reliable forecasts, including those generated by NWP models, would not be possible in the absence of an accurate analysis of the current weather conditions. The challenge then remains as to how good-quality observation data can be gathered over the data-sparse oceans (Figure 4). Such data are also invaluable in the monitoring of the movement and intensity change of tropical cyclones that pose a threat to Hong Kong every year. Even though the situation has improved somewhat using remote sensing data from radars and satellites (Figure 5), such data still require in-situ measurement results for calibration and validation.

As such, the fleet of Voluntary Observing Ships (VOS) recruited by the Observatory over the years continues to play an important role in the monitoring and analysis of current weather conditions. Port Meteorological Officers will conduct regular checking of the meteorological instruments on board VOS to ensure the quality of measurement and observation, in particular pressure readings from the barometers, whenever the ships are in port. Apart from recruiting more ships to join the VOS fleet, the Observatory with the support of the shipping community is also deploying automatic weather stations on board VOS (Figure 6) and drifting weather buoy over the South China Sea (Figure 7). The Observatory has also experimented with the launching of radiosondes on board a VOS during one of its voyage from Hong Kong to Singapore in June 2015 (Figure 8). It is hoped that such technical development initiatives will eventually lead to a further enhancement of marine weather observations at seas.



Figure 1 Weather forecasters at work at the Central Forecasting Office of the Hong Kong Observatory.

<p>ZCZC LE21 270100 UTC HONG KONG OBSERVATORY</p> <p>NO WARNING.</p> <p>GENERAL SITUATION AT 262100 UTC: FOR DETAILS ON TROPICAL DEPRESSION OVER THE NORTHERN PART OF THE SOUTH CHINA SEA, PLEASE REFER TO THE 3-HRLY SHIPPING WARNINGS.</p> <p>MARINE FORECAST FOR 24 HOURS FROM 270100 UTC:</p> <p>HONG KONG= E TO SE 5-6, BEC S 5-6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA 2-3 M. TEMP 28-26 C.= KWANGTUNG= E TO SE 5-6, BEC S 5-6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA 2-3 M. SWELL S 2 M.= TAIWAN STRAIT= S TO SE 4-5. ISOL SHOWERS. SEA UP TO 2 M.= BASHI= S TO SW 4-5, OCNL 6. ISOL SHOWERS. SEA 2 M. SWELL S 2 M.= PRATAS= E TO SE 5-6, BEC S 5-6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA 2-3 M. SWELL S UP TO 2 M.= BALINTANG= S TO SW 4-5, OCNL 6. ISOL SHOWERS AND TS. SEA 2 M. SWELL S 2 M.= SCARBOROUGH= S 5-6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA 2-3 M. SWELL S TO SW 2 M.= PARACEL= S TO SW 5-6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA 2-3 M. SWELL S TO SW 2 M.= TONKIN= S TO SE 4-5, OCNL 6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA UP TO 2 M.= DANANG= S 4-5, OCNL 6. DOWN TO 2000 M IN SCT SQUALLY SHOWERS AND TS. SEA 2 M. SWELL S 2 M.=</p> <p>REQUEST FOR OBS: SHIPS IN THE AREA 15 DEG N TO 30 DEG N BETWEEN 105 DEG E AND 120 DEG E ARE REQUESTED TO TRANSMIT WEATHER REPORTS TO HONG KONG OBSERVATORY AT 260300 UTC AND THREE-HOURLY THEREAFTER. NNNN</p>	<p>ZCZC LB95 270130 UTC MAY 2016 HONG KONG OBSERVATORY</p> <p>TC WARNING VALID AT 270000UTC TD 1002HPA TWO ZERO POINT SIX DEG N (20.6N) ONE ONE TWO POINT FIVE DEG E (112.5E) FCST 24 HRS MOVEMENT N OR NNW 10KT ACCURACY IN POSN 60NM</p> <p>MAX WIND 25KT RAD OF 2M WAVES 90NM</p> <p>FCST POSN/INTENSITY AT 280000UTC DISSIPATED OVER LAND NNNN</p>
--	--

Figure 2 - An example of the Marine Weather Forecasts (left) and Tropical Cyclone Warning Bulletin (right) issued by the Hong Kong Observatory.

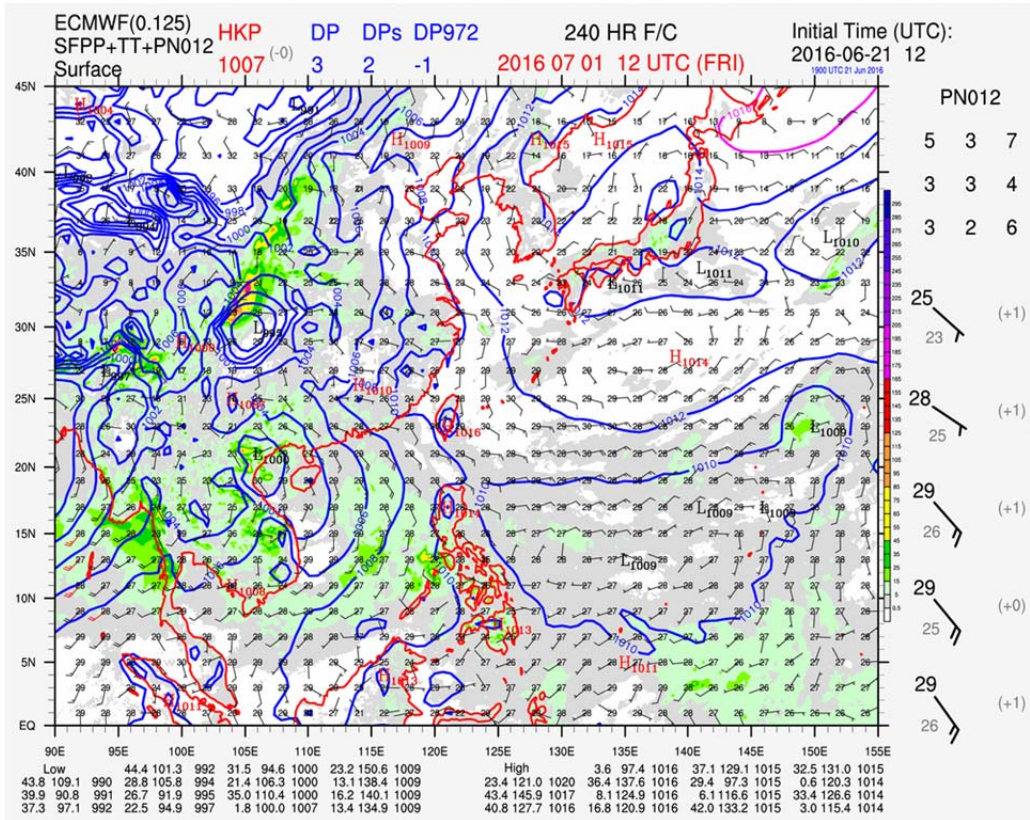


Figure 3 - An example of surface prognostic chart generated by NWP model valid 240 hours (that is 10 days) after the initial analysis time.

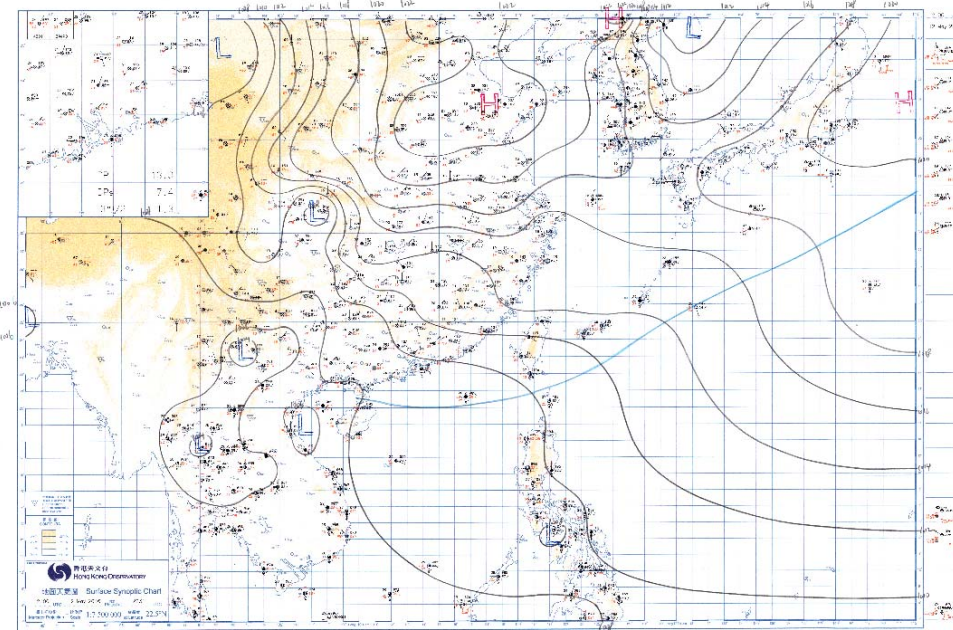


Figure 4 - Example of a typical surface weather chart with more weather reports over land than at seas.

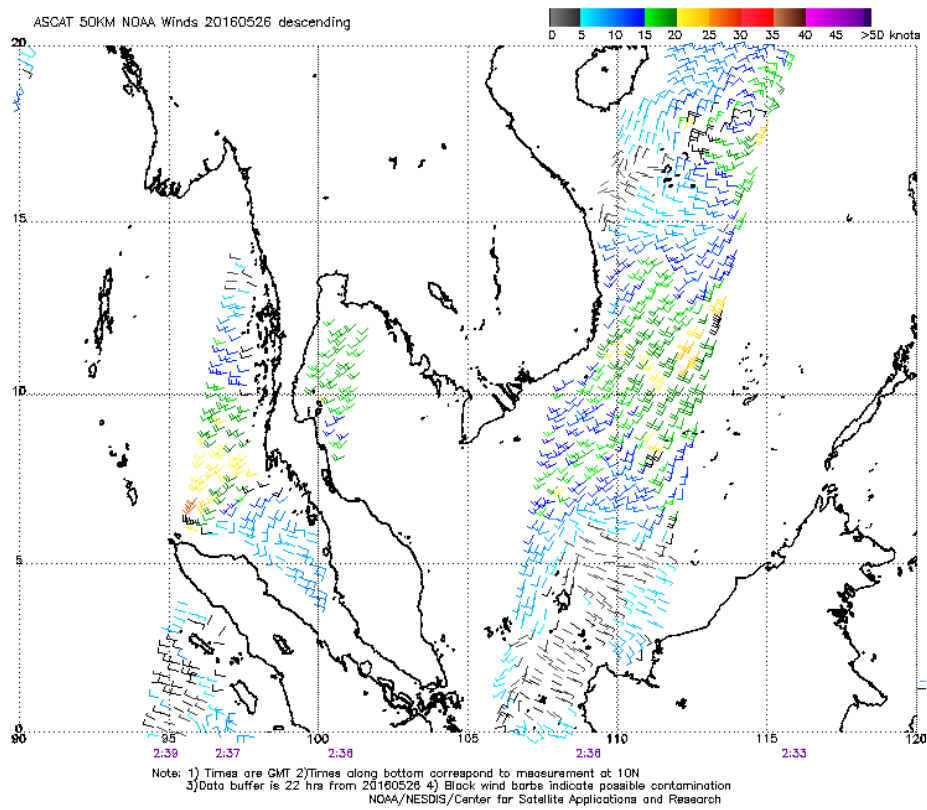


Figure 5 - Winds over the sea surface as derived from satellite remote sensing data.



Figure 6 - Automatic weather station installed on board Hong Kong VOS, providing hourly measurement of atmospheric pressure and temperature over the seas.

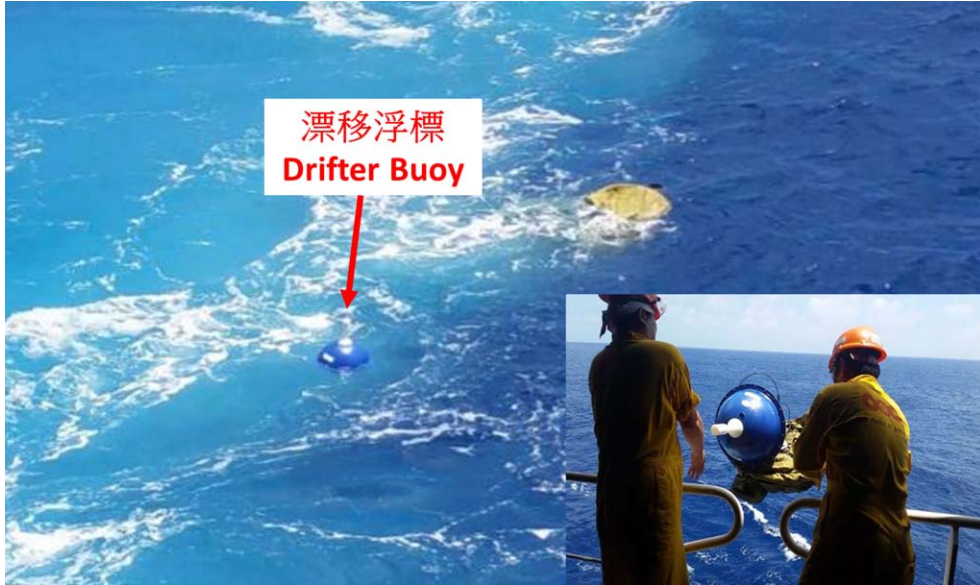


Figure 7 - With the support of a Hong Kong VOS, OOCL Atlanta, the Hong Kong Observatory deployed a drifting buoy over the central part of the South China Sea in June 2015.

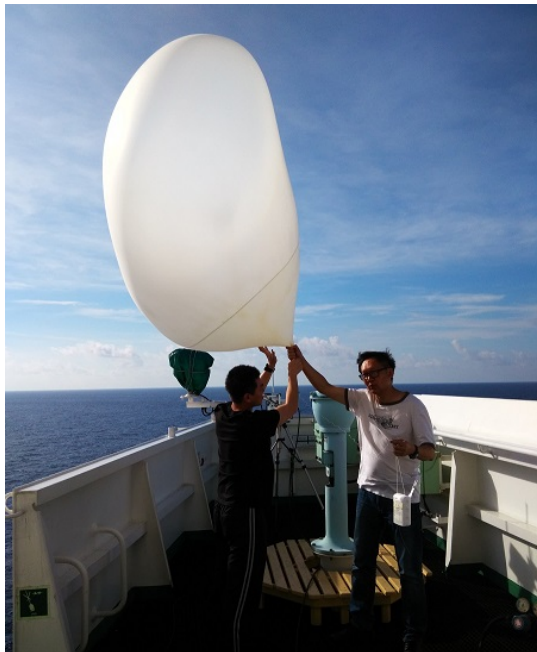


Figure 8 - With the support of a Hong Kong VOS, OOCL Busan, the Hong Kong Observatory conducted trial launching of radiosondes over the South China Sea in June 2015.