Classification of Voluntary Observing Ships

Dickson Lau

Under the World Meteorological Organization (WMO) Voluntary Observing Ship (VOS) Scheme, VOS are divided into three main classes: "Selected Ships", "Supplementary Ships" and "Auxiliary Ships". Ships are recruited to various VOS classes depending on the instruments supplied, area of operation, and the parameters observed.

Starting from 2009, a new class "VOSClim" was introduced following the completion of the VOS Climate project between 2001 and 2009. This class of VOS provides a high-quality subset of VOS data in both real-time and delayed modes, with metadata, to support global climate studies and research. The major requirements of "VOSClim" are: (a) use of electronic logbooks such as the "TurboWin" software to record and report meteorological observations; (b) reports along with each observation the ship's course and ground speed as well as the ship's heading at the time of observation; and (c) records of the maximum height of deck cargo above the summer maximum load line, departure of summer maximum load line from actual sea level and uncorrected wind speed and direction.

In recent years, a few more classes of VOS with automatic weather system (AWS) installed on board have been introduced. They include "Selected AWS", "VOSClim AWS", "Supplementary AWS" and "Auxiliary AWS". Figure 1 shows the composition of the VOS classes in 2014 and Table 1 summarizes the weather elements and parameters observed by various classes of VOS. In 2014, a total of 2,261 ships worldwide contributed more than two million weather observations under the VOS Scheme (Figure 2).

In 1949, under the VOS Scheme of the International Meteorological Organization, predecessor of WMO, the Hong Kong Observatory began to recruit a fleet of locally based VOS to report weather conditions at sea. With the support of the shipping community, there are currently (up to March 2016) 63 ships in the Hong Kong VOS fleet: 45 "Selected Ships", 1 "Supplementary Ship" and 17 "VOSClim Ships". Two of the ships are even fitted with Automatic Weather Station (AWS) onboard to transmit hourly weather observation automatically. The VOS of Hong Kong (HKVOS) has contributed about 11,000 weather observations (Figure 3) to the international meteorological community in 2015, not only supporting day-to-day operation for forecasting and warning purposes, but also providing much needed data for meteorological and climatological research.

Table 1: Elements observed by various classes of VOS

Weather Elements and Parameters	Selected[1]	VOSClim[1]	Supplementary[1]	Auxiliary[1]
Present and past weather	x	x	x	x
Wind direction and speed	x	x	x	x
Cloud amount	x	x	x	x
Cloud type and height of base	x	x	x	
Visibility	x	x	x	x
Temperature	x	x	x	x
Humidity (dew point)	x	x		
Atmospheric pressure	x	x	x	x
Pressure Tendency	x	x		
Ship's course and speed	x	x		
Sea surface temperature	x	x		
Period and heights of wind waves	x	x		
Direction, period and height of swell	x	x		
Sea ice and/or icing (if appropriate)	x	x	x	x
Special phenomena (if appropriate)	x	x		
Max height of deck cargo above the SLL		x		
Height difference from the SLL to the water line		x		
Course of ship over ground		x		
Ship's ground speed		x		
Ship's heading		x		

---

1 : Indicated in blue are the elements required by both automated (i.e. AWS sub-class) and non-automated systems; otherwise the element is only required for non-automated systems.
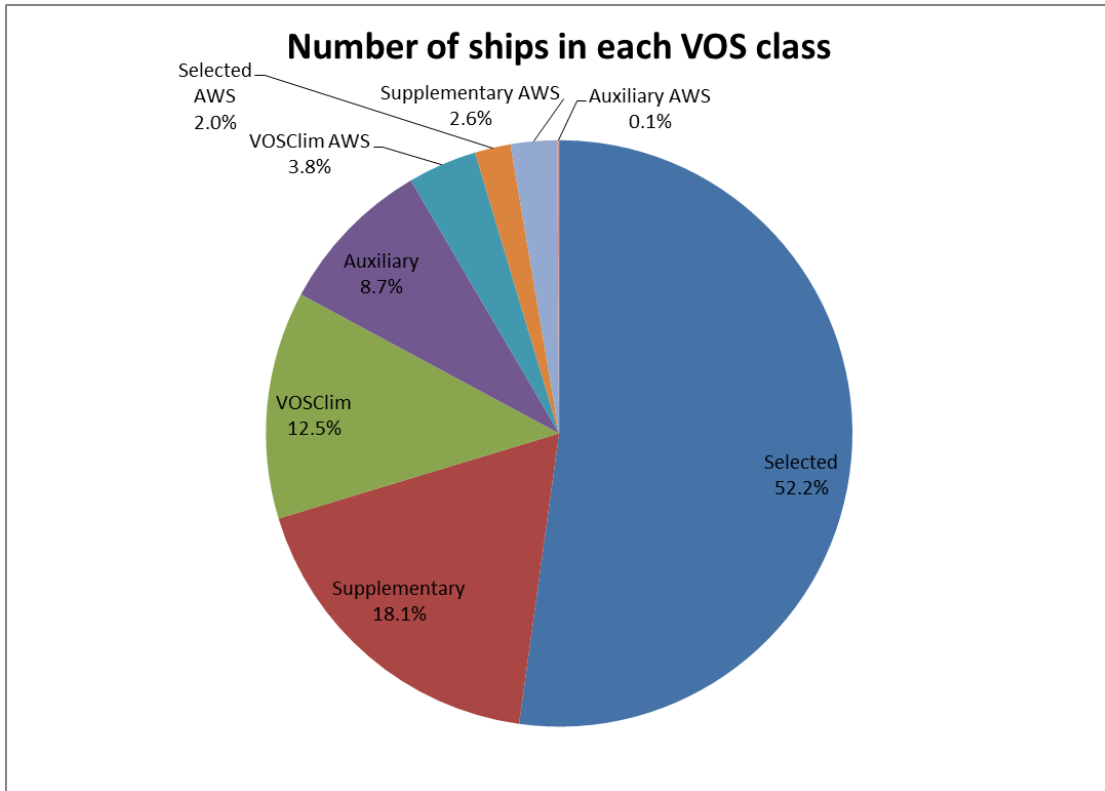
Figure 1:   Composition of VOS classes in 2014 (extracted from the Ship Observations Team Eighth Session report)
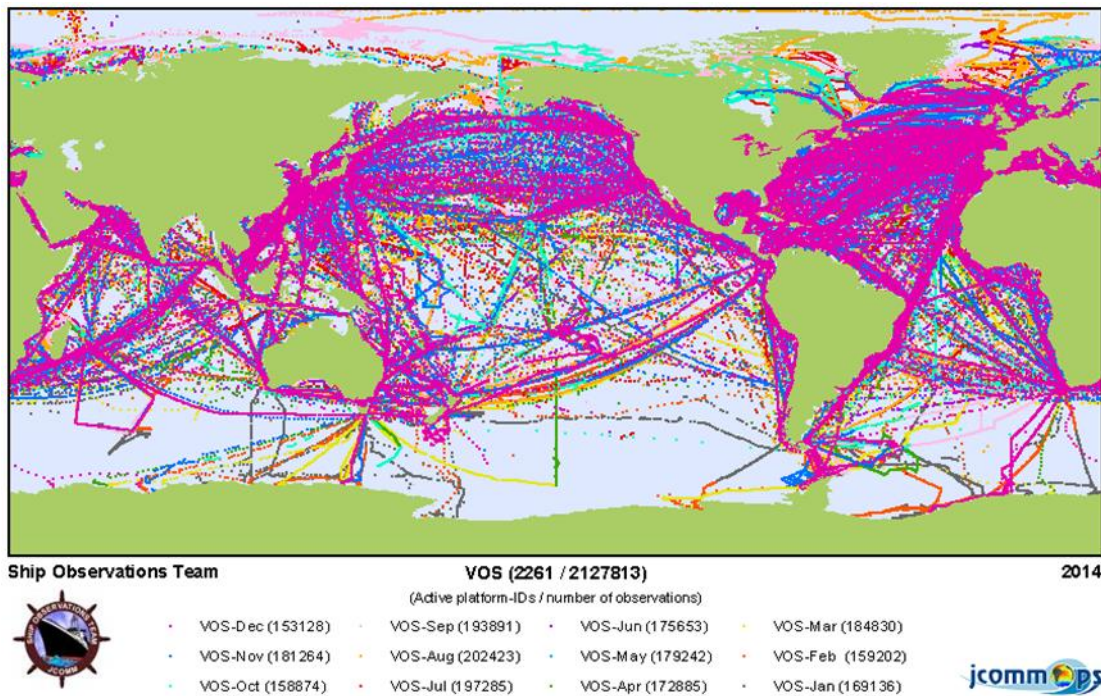

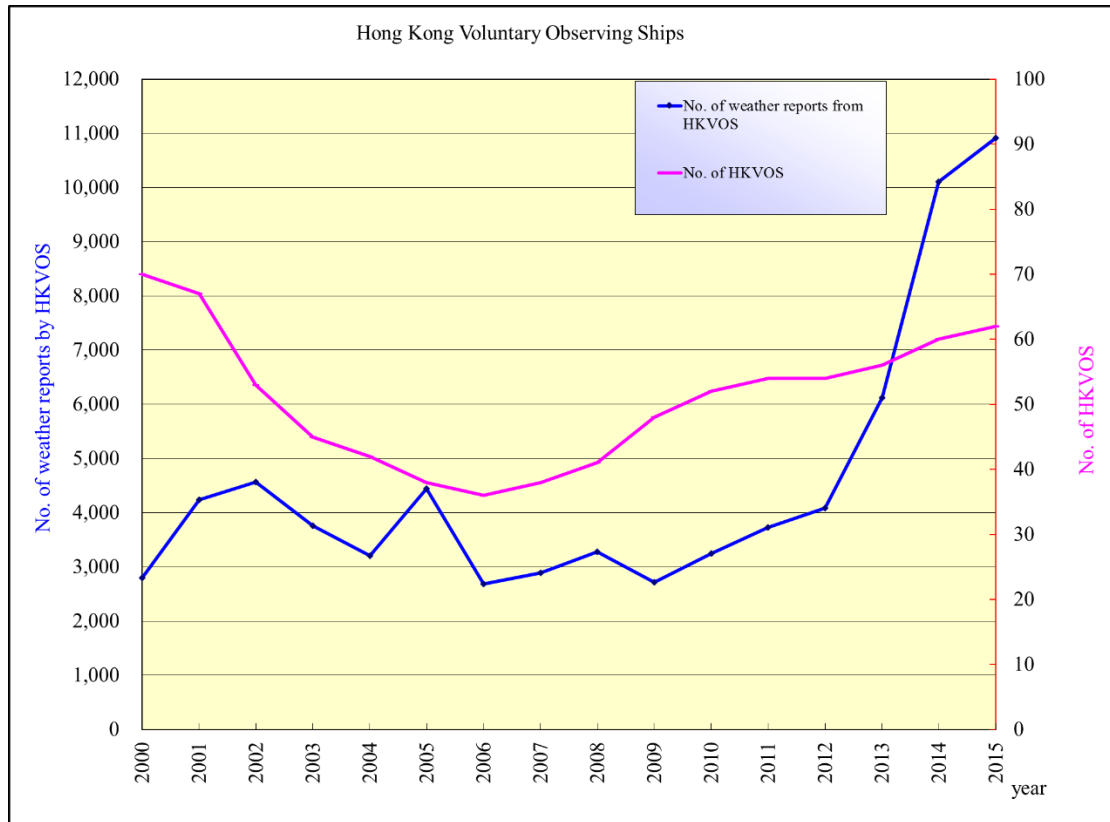Figure 2:   Data coverage of weather observations contributed by VOS in 2014

Figure 3:   Number of weather observations contributed by HKVOS and number of ships in the fleet of HKVOS from 2000 to 2015