

Advancement of Chinese Meteorological Feng-Yun (FY) and Oceanic Hai-Yang (HY) Satellite Remote Sensing

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Abstract

Development of China's meteorological satellites, i.e. FY series (FY, Feng Yun, means wind cloud), was initiated since 1970's. During almost 40 years total 9 meteorological satellites, including 5 polar-orbit satellites and 4 geostationary satellites, have been successfully launched. First experimental FY-1A was launched in September 7, 1988, and second FY-1B was launched in September 3, 1990. Then, two operational satellites, FY-1C and FY-1D, with 10 channels VIS/IR scanning radiometers were sequentially launched in May 10, 1999 and May 5, 2002.

To improve regional and short-term weather forecast, China is developing the geostationary meteorological satellites. First experimental geostationary satellite, FY-2A, was launched in June 10, 1997. Second FY-2B was sequentially launched in June 25, 2000. Operational FY-2C loading 5 channels VISSR (VIS scanning radiometer) was launched in October 19, 2004. In December 8, 2006, FY-2D was launched. It indicates that China has achieved "two satellites in observation and alternative duplicate" in geostationary orbits.

As a second generation of China's polar meteorological satellite, the first satellite of FY-3A was launched in May 27, 2008, which is in sun-synchronous orbit located at the altitude 831 km. FY-3A loads totally 11 sensors, including microwave sensors, such microwave temperature sounder, microwave humidity sounder, microwave radiometer imager, etc. Its spectrum covers ultraviolet, visible light, near infrared, infrared and microwave. FY-3A is currently in operation with FY-1D and FY-2C. China will continue to maintain long term stable operations of both polar and stationary meteorological satellites^[1-3].

Development of China's oceanic satellites, i.e. HY series (HY, Hai Yang, means ocean), was initiated in 1997. First oceanic satellite of HY-1 series was launched in May 15, 2002, which is an oceanic color satellite. The second satellites, HY-1B, is now on orbit well for operational service^[4-6].

HY-2 satellite with four microwave sensors, including a ku band scatterometer, double altimeter and two radiometers, for monitoring dynamic oceanic environment is on schedule to launch around 2010.

HY-3 satellite with high resolution polarized SAR are also on schedule to launch around 2013.

By 2020, these three HY satellites will compose the operational system for Chinese overall oceanic observation. This system can greatly improve the capabilities of monitoring oceanic environment and ocean disasters, managing and utilizing the oceanic resources, etc.

To meet growing demands of China's development, it is expected to establish a long-term stable and overall satellite-borne observation system, including meteorological satellites, oceanic satellites, resource satellites, and disaster monitoring satellites etc. Basic research, data validation and application, and operational service of satellite-borne remote sensing and Earth observation are well in progress. This development would greatly improve China's capability of the earth observation, and significantly contribute to international communities for science collaboration and global study. Basic innovative research for multi-sources satellite-borne remote sensing is greatly promoted in China supported by several state major basic programs^[7-10].

This paper makes a short overview of Chinese meteorological satellites, FY series, and oceanic satellites, HY series, and main features and some applications.