Polar-Orbiting Weather Satellites

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In a previous article, the author presented a synopsis of current-series geostationary weather satellites. Geostationary satellites, in order to have a 24-hour period, orbit at an altitude of about 36,000 km above the earth. This article covers another type of weather satellite, those which orbit at much lower altitudes, typically between 800 km and 1200 km above the earth. (For comparison, the Space Shuttle orbits at an altitude of between 250 km and 300 km above the earth.)

These lower-altitude weather satellites typically orbit in a plane with an angle of about 99 degrees. (The Space Shuttle for comparison, typically has an orbital plane inclined less than 57 degrees to the equator.) As a result, these satellites pass over the earth's polar regions and are thus called polar-orbiting satellites. This angle, being greater than 90 degrees, signifies that the satellite has an orbit in which the satellite moves in the opposite direction to the earth's rotation on its axis. Such an orbit allows the satellite to observe the earth's atmosphere from different angles and times of day. Such polar-orbiting satellites observe the earth's atmosphere from different angles and times of day, allowing for a more complete understanding of the earth's weather patterns.

Images and other data collected by polar-orbiting satellites are critical for weather monitoring and forecasting. These satellites provide an almost global view of the earth's surface, capturing data from different regions and altitudes. This unique perspective is essential for understanding and predicting weather patterns, especially in regions that are not easily accessible by traditional means.

In addition to the high-resolution images, these satellites also transmit other types of data, such as temperature and moisture measurements, wind speeds, and cloud cover. This information is used to improve weather models and forecasts, helping meteorologists make more accurate predictions. By providing a comprehensive view of the earth's atmosphere, polar-orbiting satellites play a crucial role in enhancing our ability to monitor and respond to weather events, from mild storms to severe hurricanes and typhoons.
Meteor satellites are featured on 18 known postage stamps, listed in the table at the end of this article. In 1983, Cuba issued one of the many stamps (Scott 2587), most of former Soviet bloc countries, featuring the extensive three generations of Meteor satellites began in 1969. A miniature sheet issued by East Germany in 1972 (Scott 1264) gives the best representation of a Meteor satellite on a stamp. All Meteor satellites have two symmetric solar panels, one on each side of the main cylindrical satellite body. A small umbrella-like antenna is also a feature on nearly every stamp showing a Meteor satellite. The basic design has changed only slightly over the years when new generations of Meteor satellites were introduced.

**NOAA (TIROS) Polar-Orbiting Satellite Republic of China (Scott 2221)**

The most recent polar-orbiting satellite belonging to the People's Republic of China is FY-1B, launched in 1990. This is China's second polar-orbiting weather satellite, a follow-on to FY-1A, launched in 1988. FY is the acronym for Feng Yun or wind-cloud. Neither satellite is providing operational weather images nor usable data at this time. China's first polar-orbiting satellite, FY-1C, is expected to be launched in 1998. It will carry a multi-channel (visible and infrared) imager, but no sounding instrument. No postage stamps are known to show any of the Chinese FY-series of weather satellites.

India has a long series of sun-synchronous polar-orbiting satellites called IRS for Indian Remote Sensing satellites. The most recent launches were of a second-generation IRS-1C in 1995 and a very similar IRS-P3 in 1996. Imaging instruments on these satellites measure in four spectral channels, mainly in the visible and near infrared portions of the electromagnetic spectrum. Ground resolution is much better than most current-series weather satellites. Only one postage stamp, issued by India in 1991 (Scott 1352), is known to show an IRS satellite.

Finally, the newest polar-orbiting weather satellite comes from Japan. Japan has long had several geostationary meteorological satellites, but with the launch of ADEOS-1 in August 1996, Japan began a series of polar-orbiting weather satellites. ADEOS is an acronym for Advanced Earth Observation Satellite. Numerous instruments provided by several countries measure at higher ground resolution than most polar-orbiting satellites. Both imagery and other data from this satellite will allow scientists to understand the conditions in their understanding of our earth's environment. No postage stamps are known to show this satellite, but keep the lookout for this satellite to appear on a stamp from any of several countries.

In conclusion, a list is provided of all known postage stamps showing current-series polar-orbiting weather satellites. The author would appreciate knowing of any additional stamps that may have been missed. This list does not include the numerous polar-orbiting satellites whose primary purpose is to view earth resources.

**Bibliography**


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