Whole Number 33

April 2011

The New CartoPhilatelist©

COLLECTORS OF MAPS ON STAMPS

Climate Maps in Philately, by Garry Toth and Don Hillger.

Depicting the Earth's Climate.

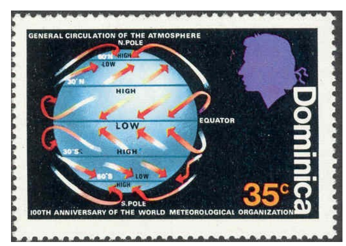
Climate is what you expect; weather is what you get. This dictum, possibly coined by Mark Twain, is one way of expressing the common definition that climate is the average of weather conditions over a long period of time. In a previous article[1], the authors concentrated on weather-related maps, with only a few examples from climatology. This article presents a wide variety of climate-related maps in a philatelic context.

Climatologists need their own maps for spatial displays of average values of weather variables such as temperature, wind, and precipitation. They also need to examine geophysical fields at the Earth's surface such as Sea Surface Temperature (SST), snow and ice cover, and vegetation. Such fields interact with the atmosphere and affect the weather, but also change gradually in time and space, with the result that they contribute to climate variability. Of course, the relationship is complicated because it moves in both directions: geophysical fields affect the climate, and vice-versa. Like weather maps, climate maps summarize large amounts of information and allow patterns to be identified. Furthermore, a series of such maps in time can reveal temporal changes in the patterns.

The general circulation of the Earth is a term that refers to planetary-scale wind patterns. It is depicted on a 1973 stamp from Grenada (*Scott* 495). For the Northern Hemisphere, the stamp shows the mean winds blowing from the southwest in the mid-latitudes. However, the pattern is different in the subtropical and polar regions. The well-known trade

Grenada Sc 495

winds of the subtropics are northeasterly (i.e. blowing from the northeast), as are the mean Arctic winds. A similar (but mirror-image) pattern is found in the Southern Hemisphere. Climatologists and meteorologists have established the physical basis for these patterns. It is partially related to the latitudinal distribution of mean high and low pressures as shown in Dominica *Scott* 358 (which also depicts the general circulation, and was discussed in the previous article[1]).



Dominica *Sc* 358

Many scientists have worked to create climate classifications, in which various climate types are identified and located on maps. The German, Alexander von Humboldt (1769 – 1859) was one of the first. He realized that mean atmospheric currents flow in certain directions (a pre-

(continued on page 2.

Inside this issue:

Special points of interest:

Continued from page 1.

cursor to the idea of the general circulation) and drew a map in which locations with the same mean annual temperature were joined. This could be considered the first climate map. No known stamp shows it, but Mexico *Scott* 2176, issued in 1999, depicts von Humboldt and a map of the Americas, which he visited in an epic scientific voyage from 1799 to 1804.

Mexico Sc 2176

Wladimir Köppen (1846 – 1940), born in Russia, was a meteorologist and climatologist who spent most of his working life in Germany. He was the first to develop a formal climate classification system, based on average temperature and precipitation on vegetation. It was published in 1900. His basic principles still contribute to modern classifications. A Russian stamp from 2003 (*Scott* 6788) shows a typical climate classification over most of the world, similar to that of Köppen. In it we see hot dry desert areas in yellow tones, hot humid tropical forest areas in red tones, and the colder mid-latitude and polar climates in green and blue tones. A similar climate classification map, only for Africa, is found in the margin of Comoro Islands *Scott* 387a, from 1978.

Russia Sc 6788

Other climate variables have also been depicted on stamps. The previous article[1] referred to Grenada *Scott* 497 (showing worldwide mean annual rainfall) and Upper Volta *Scott* 107 (with a regional mean rainfall map). In another example, a 1995 stamp from Hungary (*Scott* 3490) shows what may be a map of average precipitation over the country, though the details are not specified in the stamp.

Hungary Sc 3490

Philatelic climate-related map items often require interpretation of the displayed fields. For example, Grenada *Scott* 1156, from 1983, is presented as a "satellite weather map" with no further explanation. It most likely shows either mean annual cloudiness or mean annual precipitation over the world.

The authors are unaware of any stamps that depict climatological air temperatures. However, the cachet of the FDC of Namibia *Scott* 690-693 (1991) nicely shows Namibia's average annual air temperatures.

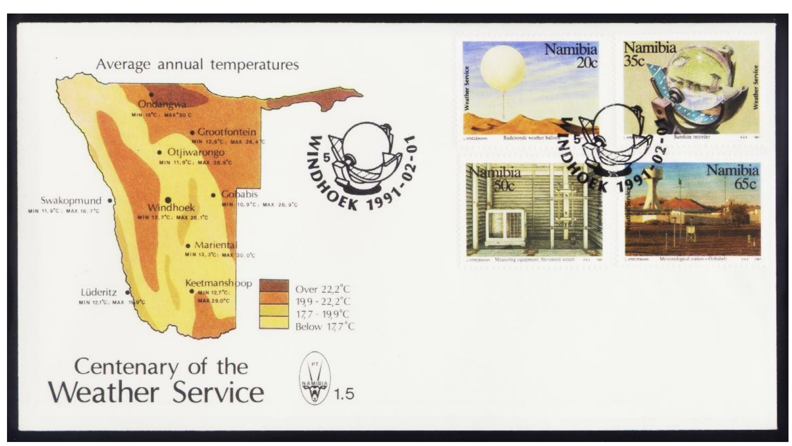
Grenada Sc 1156

Cuba issued an interesting climate-related stamp in 1971 (*Scott* 1590). In it are the historical tracks of major hurricanes. Such storms in this area have two mean tracks: toward the northwest and into the Gulf of Mexico, or recurring near Florida to end up heading northeastward over the Atlantic Ocean off the southeastern U.S. coast. Almost all the tracks shown in this stamp fall in one or the other of those two major groupings.

Cuba Sc 1590.

Arid areas form one major climate category. The label attached to Russia *Scott* 5749 (1989) provides a general worldwide view of arid regions. In some areas, drought and desertification may act to change the climate. Two stamps (Iraq *Scott* 826 and 827) issued in 1977 for the Nairobi UN Conference on Desertification depict areas of North Africa and the Middle East that are

Comoro Islands *Sc* 387a



Namibia Scott 690-693

Continued on page 3.

Continued from page 2.

Russia Sc 5749.

Iraq Sc 826.

prone to desertification. As part of the International Year on Deserts and Desertification, Ethiopia *Scott* 1711 (2006) presents a more detailed map including three categories of arid areas, with the apparent goal of focusing attention on vulnerability to desertification in various parts of the world, and in particular in North Africa.

Ethiopia Scott 1711 .

Drought and desertification had major impacts on some areas of Africa in the 1980s. The FDC for UN-Geneva *Scott* 140 (1986) has a cachet and cancel that highlight those areas.

As mentioned above, geophysical surface fields are important for weather and climate. For example, SSTs undergo slow changes (the El Niño and La Niña phenomena are examples of such changes) which are linked to climatic extremes. During El Niño years, the northwestern coast of South America can suffer devastating floods and mudslides as a result of abnormally high precipitation. The SST measured by the NOAA-19 weather satellite is shown in the cachet of a launch cover from 6 February 2009. The warm equatorial waters are in warm colours, while the colder colours represent the colder waters of both polar regions.

Peru Sc 1423.

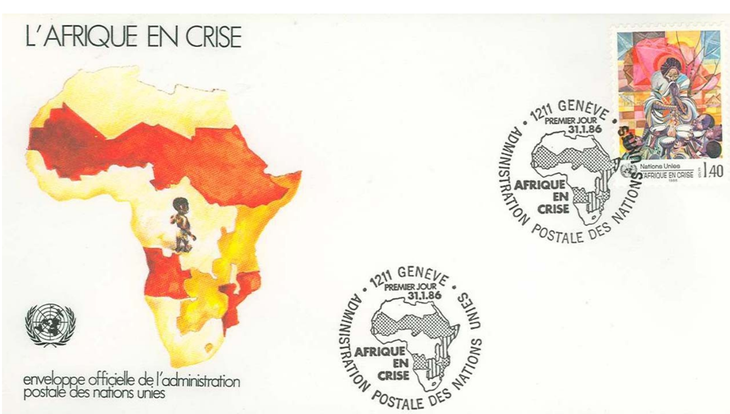
However, climatologists find it more useful to examine the SST anomalies (i.e. the differences between current SST values and long-term average SST values), since they can highlight areas where the oceans are significantly colder or warmer than normal. A stamp issued in 2004 by Peru (*Scott* 1423) shows SST anomalies over much of the world. The red shading extending westward from the Peruvian coast is a warm SST anomaly in an El Niño year.

The albedo is another example of a geophysical surface field that affects climate and weather. It is the fraction of incoming solar radiation that is reflected by the surface. Ice and vegetation-free snow-covered areas have a high albedo, as do deserts. In general, water and forested areas have a lower albedo (although if the water is fairly calm and the sun angle is low, then there will be a lot of reflection and the albedo is high). Bahrain *Scott* 405, issued in 1993, contains a map that probably shows worldwide albedo, possibly as measured by satellite. This is another example of a stamp for which interpretation is required, since no details are provided. In that stamp, the Greenland icecap (in white) has the highest albedo. Reddish tones show a somewhat lower albedo for the north polar area and for desert areas. Progressively lower values proceed through blue and black and finally to purple (except the blocky nature of the black boundary around Antarctica probably means that no data are available there).

Bahrain Sc 405.

Vegetation is also related to climate. The label attached to Russia *Scott* 5747, issued in 1989, has a world map with hatching that represents the major tropical and mid-latitude forests.

A comparison of this map with the climate classification map in Russia *Scott* 6788 reveals some similarities. This should of course be the case since vegetation in general (and forests in particular) is one of the elements that contribute to the definition of those climatic regions.

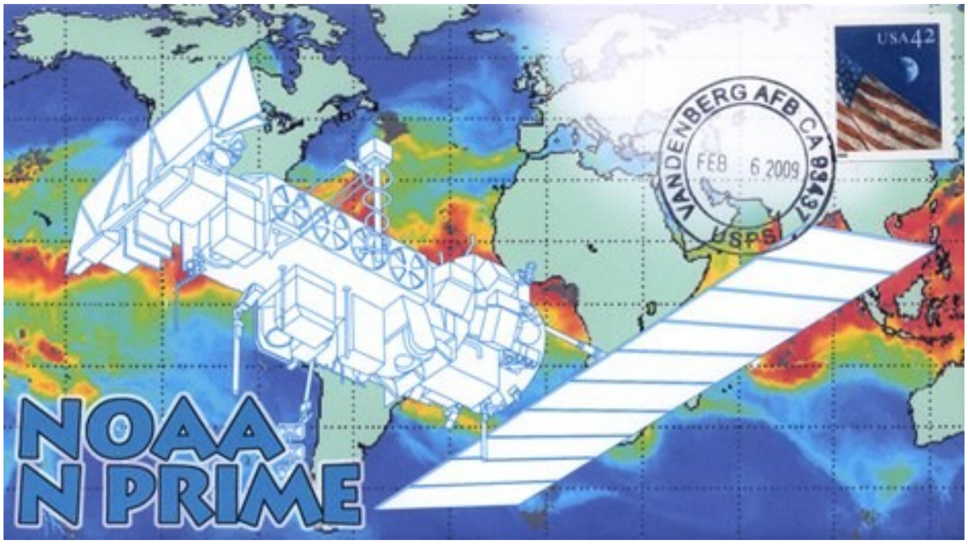


UN-Geneva Sc 140.

Russia 5747.

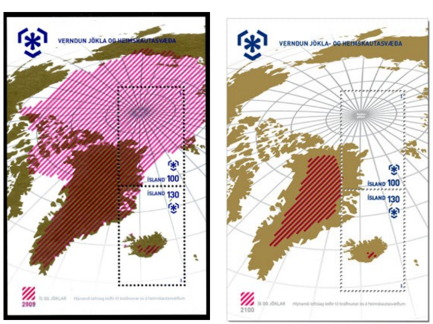
Continued on page 4.

Continued from page 3.



NOAA-19.

The Earth's ice, on water and on land, is another surface field that affects the weather and the climate and has come into more attention with increasing worries about melting due to global warming. A large number of countries have recently issued stamps with the common theme Protect the Polar Regions and Glaciers (PPRG). Several of these include maps of ice cover. One interesting example is a minisheet of two stamps issued in 2009 by Iceland (*Scott* 1162). Thermal ink was used in this item, so that the depiction changes with temperature.

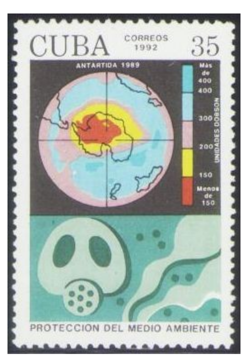


Iceland Sc1162.

When viewed "cold", the sheet shows red hatching that represents ice cover over a large portion of the Arctic in 2009. When viewed "hot", a much smaller area of hatching remains over part of Greenland and Iceland. It represents a forecast of ice cover in the year 2100 under continued global warming. An ice-free Arctic ocean would have major impacts on the climate, not only of the Nordic countries, but also on other parts of the world, through atmospheric interconnections.

British Antarctic Territory Sc 283.

Stratospheric ozone in the atmosphere has been measured for several decades. It has significant variations in both space and time. While not a traditional climate variable, ozone is important because it protects animals and plants from harmful solar ultraviolet radiation. However, in the latter part of the 20th century stratospheric ozone was being destroyed by man-made chemicals known as CFCs (chlorofluorocarbons).



Cuba Sc 3391.

The problem came into sharp focus when a strong negative anomaly (a "hole") in the ozone over Antarctica was detected in the early 1980s by the British Antarctic Survey. British Antarctic Territory *Scott* 283 (issued in 1999) commemorates this discovery.

The "climatology" of ozone had changed from its normal values, and it would take significant international cooperation to slow (and eventually halt) the destruction of ozone. Several stamps show the ozone hole over Antarctica, including a 1992 issue from Cuba (*Scott* 3391).

Climate-related maps and weather maps on stamps are a rather specialized part of cartophilately. The authors, both meteorologists, hope that readers have found our two articles to be both interesting and informative. The authors' website on Weather and Climate Philately (http://rammb.cira.colostate.edu/dev/hillger/weather.htm) contains a wide variety of philatelic material related to all aspects of weather and climate. Most of the climate-related items discussed in this article can be found at http://rammb.cira.colostate.edu/dev/hillger/climate-maps.htm. The ozone and PPRG items are also found in the pages in the authors' website that treat those two categories.

Reference

[1] Hillger, D. and G. Toth, 2008: Philatelic Weather Maps, *The New Cartophilatelist*, #23, October, 2008. A table of stamps to accompany the article is found at http://rammb.cira.colostate.edu/dev/hillger/wx-maps.htm

Biographical Notes

Garry Toth, MSc is a research meteorologist with Environment Canada at the Prairie and Arctic Storm Prediction Centre in Edmonton. Send correspondence to: garry_toth@hotmail.com

Don Hillger, PhD is a research meteorologist with the National Oceanic and Atmospheric Administration (NOAA) and holds a cooperative position at Colorado State University. Send correspondence to: hillger@cira.colostate.edu

■