6 Benefits of doing Amateur Astronomy in the Caribbean

By Isa Mohammed

Astronomy is usually seen as the domain of the developed world. However, many people would be surprised to know that, for the purposes of amateur astronomy, the Caribbean region has several distinct advantages over Europe and North America. In fact, noted astrophotographer Damian Peach has said that *"The Caribbean is probably the finest site at sea level I have ever observed from with regard to the Astronomical seeing conditions, and I've been able to obtain many very detailed images of the Planets that otherwise would not have been possible."*

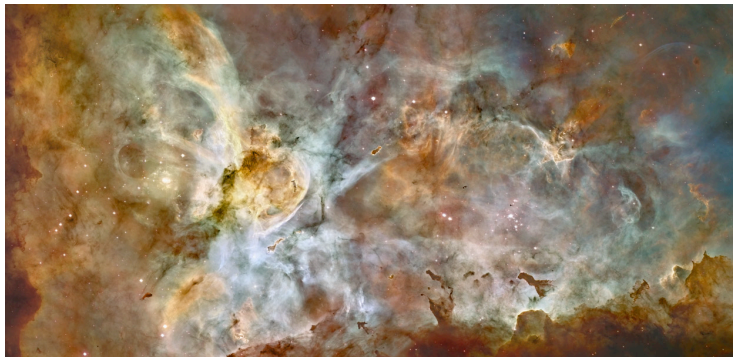
In this article, I would like to outline 6 benefits that amateur astronomers in the Caribbean enjoy, on average, in comparison to their counterparts in North America and Europe.

By understanding and leveraging these advantages, the nations of the Caribbean can not only increase astronomical awareness, boost their educational systems and elevate their people, but can also attract tourism from the millions of amateur astronomers around the world looking for a vacation destination that caters to their needs.

1) Low Latitudes allow for viewing the southern sky

A little known fact is that the night sky does not look the same from every location on the Earth. In fact, the closer you are to the Poles, the less of the sky you can see. A person standing at the North Pole will only be able to see stars in the Northern Hemisphere of the Celestial Sphere, while a person standing at the South Pole will only be able to see stars in the Southern Hemisphere. A person standing at the equator, however, will be able to see all the stars from both hemispheres.

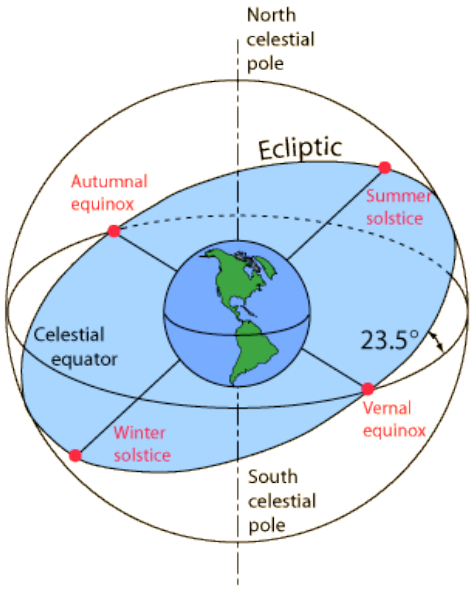
For astronomers living at temperate northern latitudes, there are many stars and deep sky objects located in the Southern sky that they will never be able to see. However, the Caribbean, and especially the Southern Caribbean, is located close to the equator, and the full night sky is available, including all of the northern sky and the vast majority of the southern sky. Constellations such as Crux, Carina and Centaurus, and objects such as the Carina Nebula and the Jewel Box cluster are coveted astronomical targets that can easily be viewed from the Caribbean but cannot be seen from North America or Europe.



Carina Nebula
Credit: The Hubble Heritage Team

2) Planets are always high in the sky

Most solar system objects, such as the sun, the moon and the planets, orbit on the same plane. From earth, we see all these objects moving along a single imaginary line in the sky, called the ecliptic. The ecliptic is tilted about 23 1/2 degrees from the equator. For locations on the earth close to the poles, the ecliptic lies close to the horizon. However, for locations in earth close to the equator, the ecliptic passes almost directly overhead.



The end result, for the amateur astronomer in the Caribbean, is that the moon and planets almost always pass overhead, as opposed to being close to the horizon. This is advantageous because light from these objects passes through the thinnest part of the atmosphere when they are directly overhead, resulting in brighter, sharper, clearer views of these objects.

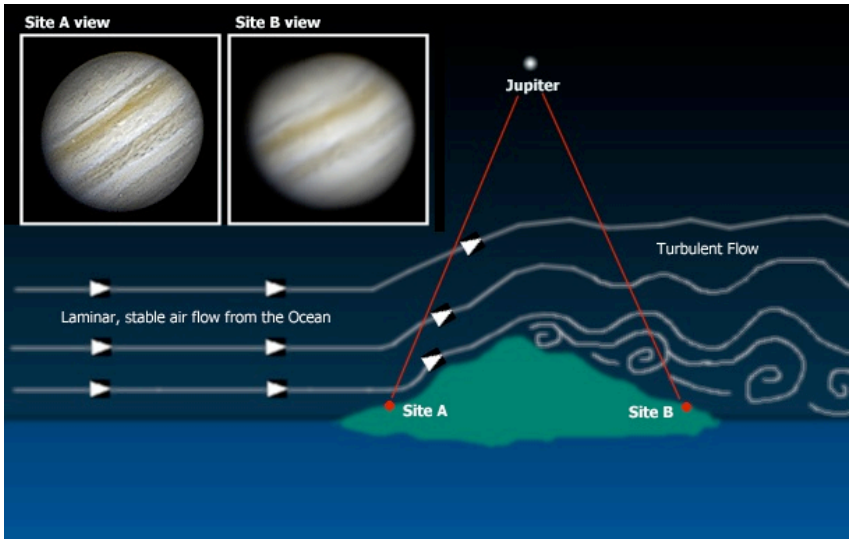
3) Excellent Astronomical Seeing

The greatest limitation to high power telescope observation from earth is the atmosphere. Light from stellar objects has to travel through miles of atmosphere before reaching our telescopes, and the result is distortion of the light rays. We observe this phenomenon every time we see stars 'twinkling'. Astronomers refer to the effects of this distortion as 'seeing'.

The amount of distortion that takes place depends on the turbulence of the air that the light has to pass through. The Caribbean region has two features that greatly reduces the distortion caused by the atmosphere. The first is the Northeast Trade Winds, which blow in from over the ocean and result in a smooth, laminar flow of air. The other factor is the lack of overhead Jet Streams.

Because of these factors, the Caribbean has excellent seeing. In fact, at sea level, this region possess some of the best seeing available anywhere in the world.

Care should be taken, however, to avoid mountainous areas, and especially the leeward slopes of mountains, which usually suffer from having very turbulent air overhead.



Credit: Damian Peach

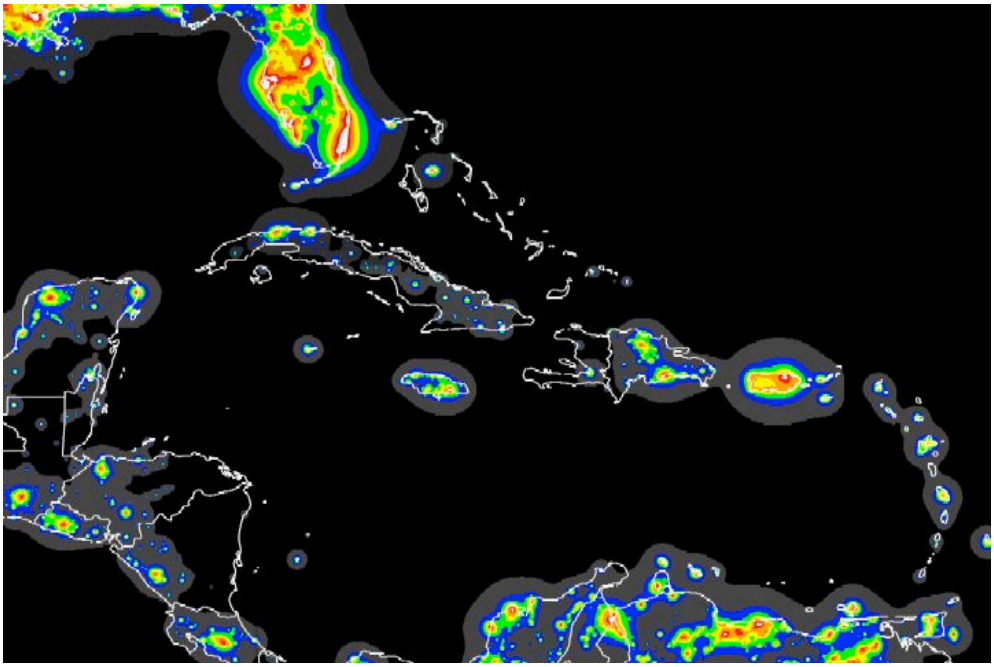
4) Excellent atmospheric transparency
For astronomers, transparency refers to the presence of particles in the atmosphere that impede the passage of light. Dust, water droplets or aerosols, when present in the atmosphere, lead to very low levels of transparency. Reduced transparency hampers astronomical observations, reducing contrast and making all stellar objects more difficult to see.

The Caribbean region is once again blessed in that fog and mist seldom occurs due to the warm tropical climate and there are no large sources of dust (such as deserts) nearby. Industrialization is also lower than in developed countries, reducing haze. The constant Trade Winds also tend to prevent stagnant masses of air from settling over the islands. Because of these factors, most nights in the Caribbean have excellent transparency, allowing astronomical observations to take place far more often than in many other regions.

5) Low light pollution
Light pollution is one the the single largest obstacles to amateur astronomy in the developed world. Nighttime light from streetlights, houses, buildings, signs etc gets bounced up in to the atmosphere, causing the sky to appear brighter and reducing the number of stars visible. Light pollution is at its worst in large cities, but is also severe in the suburbs.

The loss of contrast caused by light pollution is crippling to astronomical observations of dim objects, such as nebulae and galaxies. But perhaps the worst effect of light pollution is that it prevents people from seeing the night sky as it truly is, and as a consequence many people have lost their sense of wonder and connection with the night sky.

The low level of industrial development found in most Caribbean countries ensures that a true dark site is never far away. While there is light pollution in the major cities, there are vast swaths of countryside in most Caribbean territories that are perfectly suitable for astronomy.

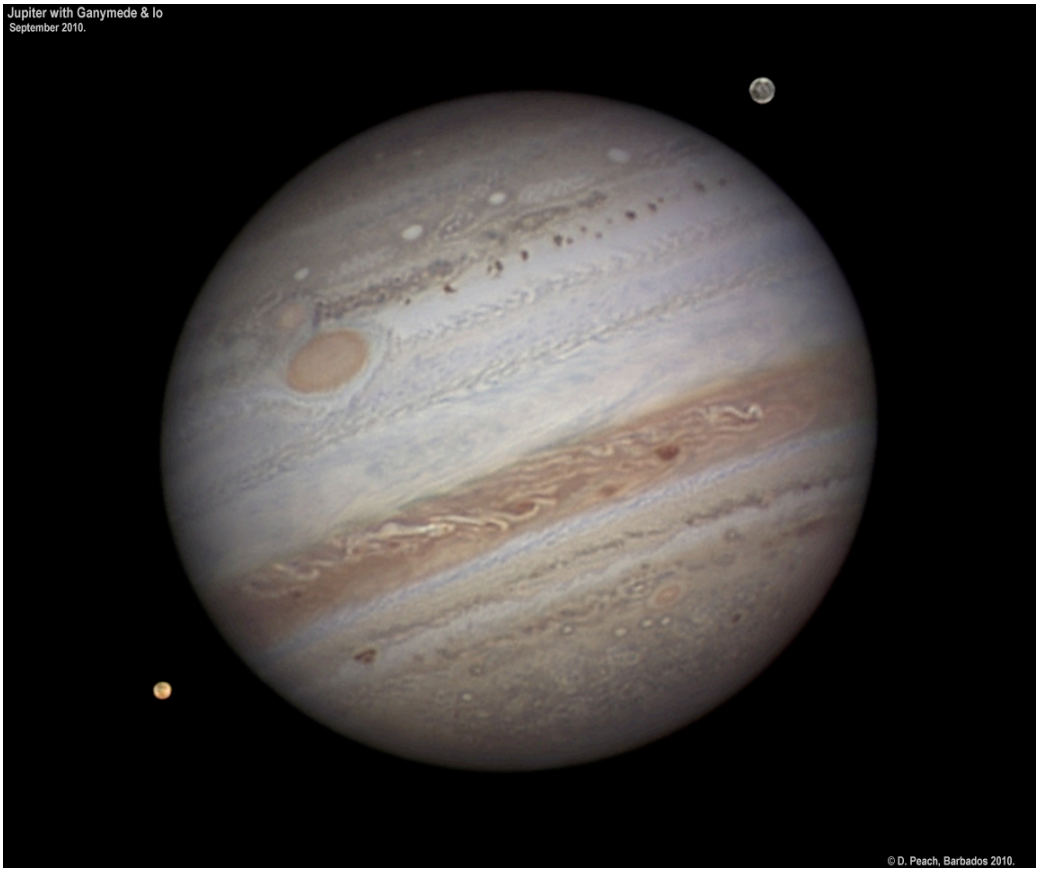


Light Pollution in the Caribbean
Credit: World Atlas of Artificial Sky Brightness

6) High nighttime temperatures

A major problem with using large telescopes in temperate regions stems from the fact the the nighttime temperature drops rapidly after sunset. Not only is this uncomfortable for the observer, but, perhaps more importantly, the difference between the temperature of the telescope and the ambient temperature introduces air currents around the telescope optics that causes severe distortion to the images. Astronomers in regions that experience rapid nighttime cooling usually have to wait for their telescopes to 'cool down' before they can be used. This is a process that can take several hours, and the larger the telescope, the more severe the effect.

A feature of the tropical climate found in the Caribbean is a low diurnal temperature range, meaning that nighttime temperatures do not plummet as much as in most other climate types. Astronomers in a tropical climate hardly ever have to worry about thermal problems in their telescopes, and are free to use large telescopes that would be difficult or impractical to use in certain climates because of thermal issues. They also have a more comfortable observing environment.



High Resolution Photograph of Jupiter taken from Barbados
Credit: Damian Peach