

# Summer Star Gazing Challenges

By Paul O'Neil, Education Support Officer

If you enjoy a challenge and stargazing, and have access to a reasonably dark sky then here are three astronomical phenomena to keep you busy over the coming months:



Image Credit: NASA

**Noctilucent Clouds** photographed by astronaut Ed Lu from the International Space Station (ISS) in 2003.

Challenge one: Noctilucent Clouds

These are also known as Polar Mesospheric Clouds (PMCs). If you live between latitudes 50°N and 60°N then June provides the best chance of seeing these elusive clouds. Little is known about them except that they form at very high altitudes (about 80km) and are made of water ice. This spring a satellite called AIM (Aeronomy of Ice in the Mesosphere) was launched by NASA to study PMCs. The mission will take two years, after which we should know more about how these clouds can form so high in the Earth's atmosphere. In recent years PMCs have become more noticeable: some scientists believe this may be due to Global Warming, though there is inconclusive evidence for this claim. Scientists studying the Martian atmosphere have also discovered very high level clouds over

Mars; although those clouds are probably CO<sub>2</sub> ice rather than water ice.

Where and what should you look for? Well look towards the northern sky after sunset, as the sky becomes darker you'll have a better chance of seeing them. They appear to glow white or bluish white and often appear to resemble cirrus clouds. (Note: PMCs are not the same as aurorae; they are quite different phenomena.)

Challenge Two: Meteor Trains

When a dust particle enters the atmosphere at high speed it burns up producing a streak of light called a meteor (shooting star). The heat generated by friction can ionise molecules in the atmosphere resulting in a nebulous glow along part of the meteor's path which persists for some time after the meteor is gone; this is called a meteor train. They can be visible for up to 45 minutes or more, though usually it is only a few seconds.

“sporadic meteors can appear at any time and from any direction”

Where and when to look: sporadic meteors can appear at any time from any direction. Shower meteors are more predictable and reliable. The best meteor shower – the Perseids – is in August (on the 13th) and this year the moon will not interfere. So around the 13th, if the skies are clear, go outside (before dawn is best) and look towards the constellation of Perseus (see sky map included in every issue of Astronotes). (If you've never watched a meteor shower before then the word shower may be misleading, you'll probably only see about seven or eight meteors every hour.)

Remember if you do see any meteor trains they

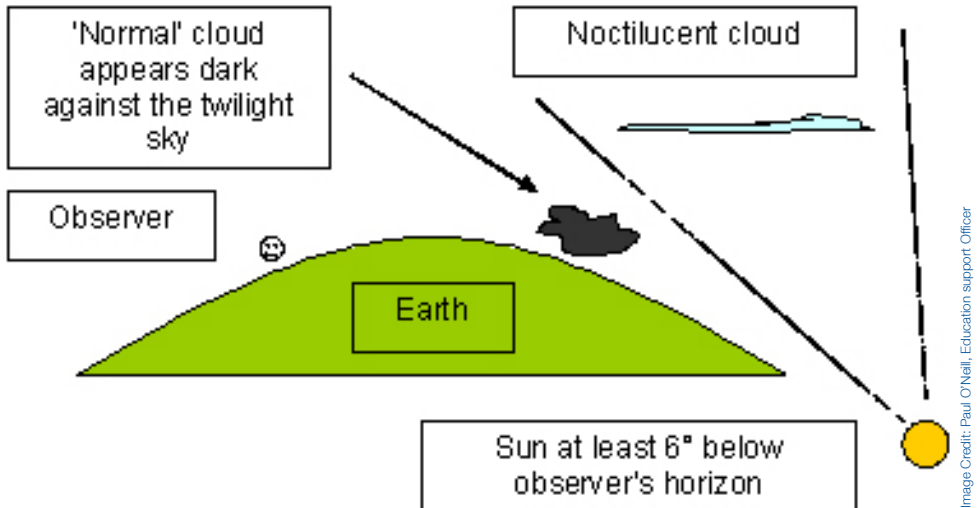


Image Credit: Paul O'Neill, Education support Officer

**Why Noctilucent clouds seem to glow** The Sun is under the horizon but it can still illuminate the clouds.

will probably only last a few seconds and will not have time to contort into the twisted shapes shown in the NASA image below

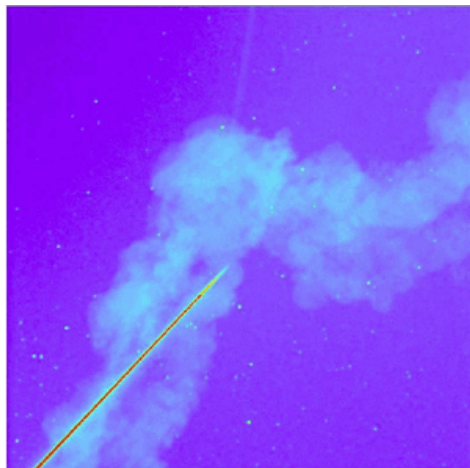


Image Credit: NASA

**Meteor train** imaged in false colour by the USAF's Starfire Optical tracking laboratory in New Mexico.

Challenge three: The inner planets

Mercury and Venus are known as the inner planets because their orbits are closer to the

Sun than the Earth's. Both planets will become visible in the morning sky in late August. Venus is one of the brightest objects in the sky and is usually quite easy to find. Mercury is visible to the naked eye but because it is so close to the sun it only appears low in the dawn sky a short time before sunrise (or in the evening sky after sunset); you will need a clear eastern horizon to stand a chance of seeing Mercury (I've only seen it four or five times in my life). The only close-up views we have of the planet were obtained by the NASA Mariner probe which succeeded in imaging part of the surface back in the 1970s. But a new probe – MESSENGER (MErcury Surface, Space ENvironment, GEochemistry and Ranging) will arrive in orbit around the planet in 2011. However, we will hopefully get glimpses of 'new' parts of Mercury when MESSENGER flies past the planet in January and October 2008 and September 2009. These flypasts are a series of gravity assist manoeuvres needed to ease the vehicle into orbit about the planet.

One of the reasons Venus is so bright is that it is perpetually covered in thick reflective clouds. This makes it impossible to see the surface of the planet using visual imaging. The NASA probe Magellan used radar to map the surface down to features just 100km long. The planet has many

volcanoes scattered across a surface which contains large flat planes (about 65% of the total surface area) and mountainous regions.

## “Venus is one of the brightest objects in the sky”

When Venus appears in the morning sky it is often called the morning star (and the evening star in the evening sky). It looks beautiful and it's the closest planet to the Earth but it's probably one of the last planets humans would ever want to visit – the heavy poisonous atmosphere (mainly CO<sub>2</sub>) produces crushing pressures and traps so much heat that surface temperatures are hot enough to melt lead.

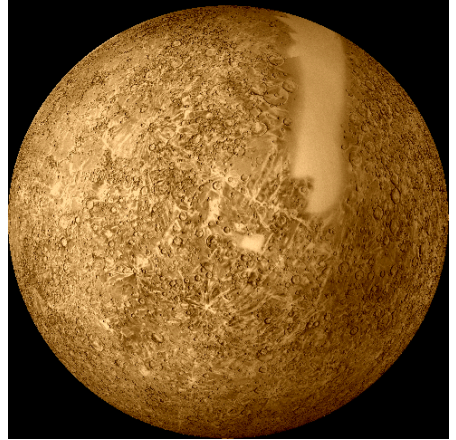


Image Credit: NASA

**Mercury revealed** A map based on Mariner probe images. note the smooth blank areas which were not imaged by the spacecraft.