Selecting a site for astronomy purposes

YES! It IS possible to find dew-free locations. Dew an astronomy are NOT inseperable bedfellows. And when a dew free situation is found, you also gain from an improved quality of transparency. Select your site carefully again, and you can also find locations that also give improved seeing along with being dew-free.

It is from my own niche in astronomy - sketching at the eyepiece - that has seen me on a journey of identifying those dew-free locations, and they do exist. Paper has no tolerance for dew. It sucks it up, goes all soft and mushy, and becomes impossible to sketch or write on. As for dew mitigation methods for sketch pads, these have only limited effectiveness, for if the dew is significantly heavy it will very easily overwhelm any effort you make to keep your paper dry. The only solution is to find a site where dew is minimal or even better still, non-existant.

But it takes more than just finding an open grassy field. Thing is, *that* open grassy field is actually the very worst possible astro location you can find!

So, in my efforts to keep my paper dry, I've been very conscious of the propensity of dew formation at every site I've set up my telescopes on. It was then not an accident that I've come to identify those locations, and hence those conditions, that provided me with a site that not only kept my paper dry, but also kept ALL my gear clear of the ravages of dew.

Selecting a site for Astronomy purposes

Finding an optimal site for the purposes of astronomy is not just about going bush. As astronomers, we have a set of requirements that go without question: Dark, minimal impact from light pollution, access to a good horizon and safe. But there are other factors that often go unconsidered, and go a long way to providing us with the optimal site conditions. One of these factors also goes a long way to effectively eliminating the bane of amateur astronomers – dew.

As with all things in life, many times it just comes down to compromise between the ideal with what we have available to us. But being aware of the optimal will go a long way to helping us find the best site with the locations available to us.

A clue to these site conditions can be had by examining the location of professional observatories. It is no accident the location that professional observatories select sites with very specific factors. Identifying these then forms the basis for selecting sites that best suit us, regardless of where we find ourselves. These factors are not independent of each other, but more of a combination of them.

The ideal site criteria are:

Remoteness

Altitude

Topography and Surrounding Land use

Horizon

Safety

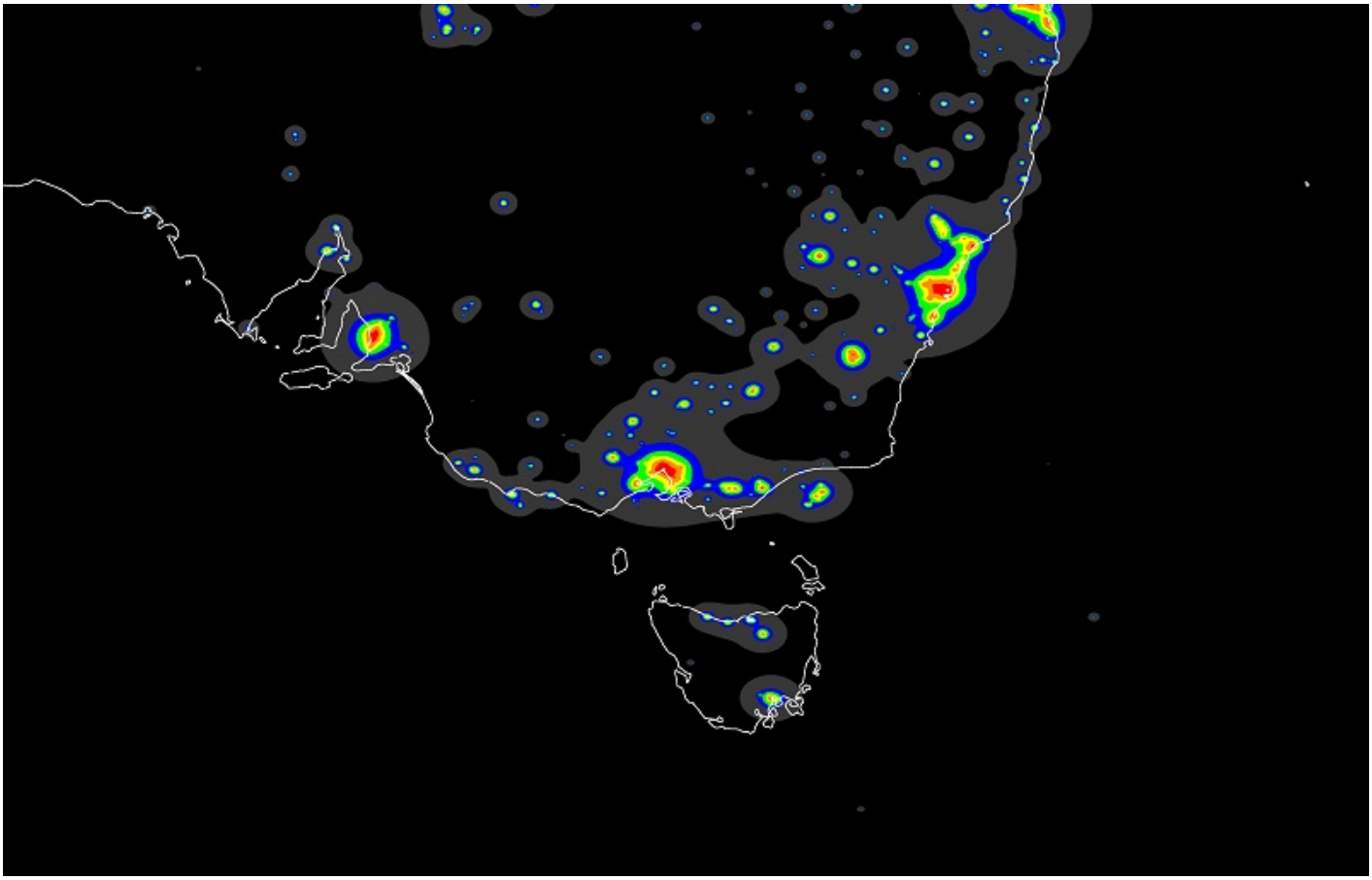
Remoteness

Remotness essentially refers to being as far away from the influence of light pollution – a dark sky site. There are many tools available to us to identify where the darkest skies are, regardless of where we are.

A simple map is a good place to start. Work out where the urban sprawl finishes, and we have an immediate guide to where the worst of the light pollution finishes. Maps also identify possible locations for astro, such as National Parks, Airfields, outlooks, and both public and private land.

Light pollution maps provide a quick guide to zonal areas surrounding urban districts. If transportation is a limiting factor, these light pollution maps can help us select compromise sites which have the least affected by light pollution.

Below is a light pollution map of South East Australia, showing the inner city being the worst affected, and conditions improving the further out from town.



Altitude

Altitude is a triple benefit factor. First, fog. We are all familiar with those fabulous photos of fog filled valleys with the ridge lines reaching up above the cloud like floating islands. Setting up in a valley is not a great idea for this reason. Best situation is to look to set up above the fog line.

Second, dew. Dew will follow the path of fog, and be drawn down from the ridgetops down into the valley below. Also as ridgetops are more exposed, rarely will there be no breeze, which is of great benefit to keeping possible dew off our equipment. On one occasion when I had set upon a ridgetop, the wind had stopped and frost started to form my gear. Then a gentle breeze started to blow, and to my surprise the frost sublimed away!

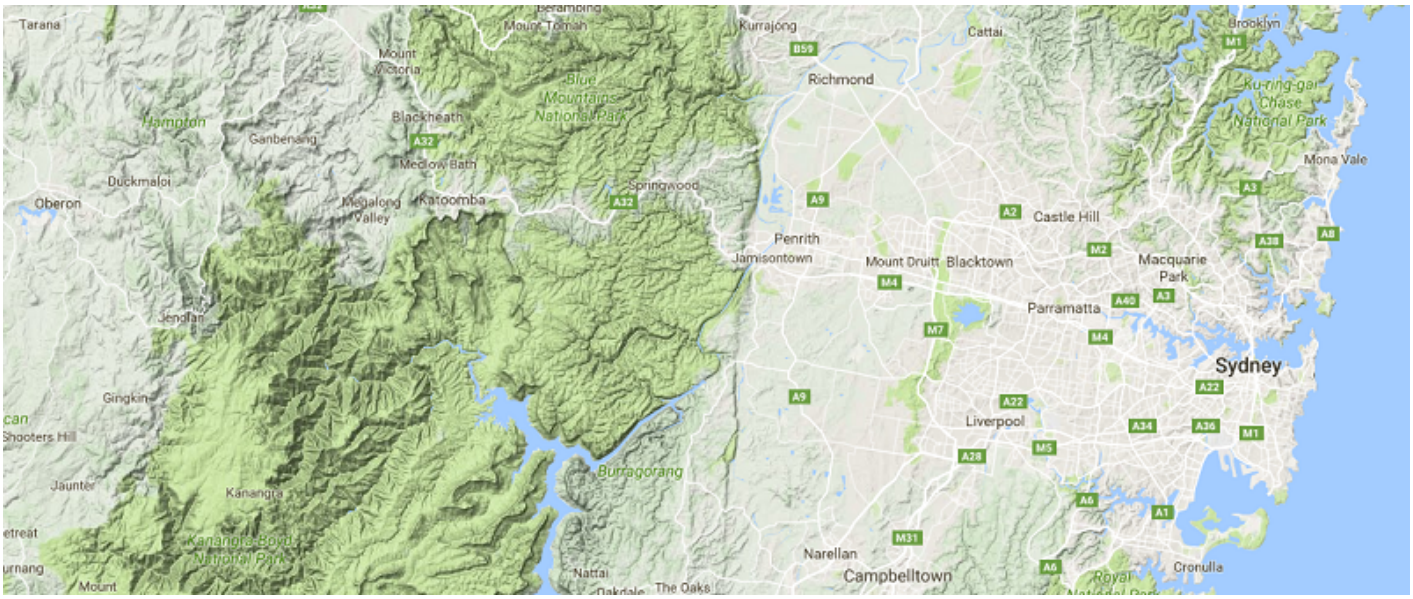
Third, reduced air density. The benefit of being high up means that we leave denser air below us. This means that moisture is also reduced, and all this helps keep any light pollution more restricted to lower altitudes. The reduced air density also means atmospheric transparency is increased when compared to lower altitudes.

Topography and Surrounding Land Use

This refers to the local geography and vegetation. Essentially this is a dew control measure. What to look for is a situation where the surrounding topography and vegetation throws up a minimum, and if possible, no moisture.

Many people would think that a lovely open grassy field would be ideal. Instead, this is the worst possible situation!!! Turf means moisture rich soil, and of an evening, this moisture is released into the air and is the major source of dew. Rolling green fields, dairy country, pastures, agricultural land, all this while seemingly ideal, is actually dew-central. This is often the situation inside valleys too. Lakes, rivers and the sea will also be major sources of moisture and hence dew.

What to look for is rocky or sandy land. Ridgetops are typically poor in rich soil, instead often being sandy or rocky. Trees surrounding a rocky or sandy clearing is favourable as trees do not expire as much moisture as turf, and help provide wind breaks to control the strength of prevailing winds.



Topographic map of Greater Sydney region. Google Maps image

Horizon

This last factor refers to how open the sky is. The more open the clearing being used, the lower the treetops, and the clearer horizon that is available. While not necessarily critical nor essential to have a totally clear horizon, some surrounding trees can be beneficial to help control any sky glow from urban centres, and act as wind breaks. Particularly on hill tops, these wind breaks can mean the difference between a site that is cold but manageable, or a site that is windy and just down right unpleasant to be in as the cold permeates through everything.

Safe sites

Site safety should a paramount over everything else. Safety includes from unsavoury people, safe access to and from the site, of any potential dangerous animals, and the site itself being free of any potential hazards in the dark. If possible, always go with a mate.

Some examples of sites that I use

Katoomba Airfield

The site that I have most frequented has been Katoomba Airfield, some 120km west of my home in Sydney. The Airfield is set on top of a sandstone plateau, 1000m above sea level. The runways are compacted sandy clay which retains very little moisture. The valley either side of the tree-lined runways are up to three hundred metres below the plateau. While surrounded by trees, the wide expanse of the runways doesn't totally stop a breeze from blowing. Dew has only ever formed once while I was there for astronomy, and it was due to a moisture rich easterly wind blowing up the mountains, which also meant I was clouded out. On another occasion frost formed as the wind had totally stopped. Curiously enough, a gentle breeze developed, and the frost sublimed way to leave everything dry again. As it is also private and enclosed property, it provides a safe environment to use.

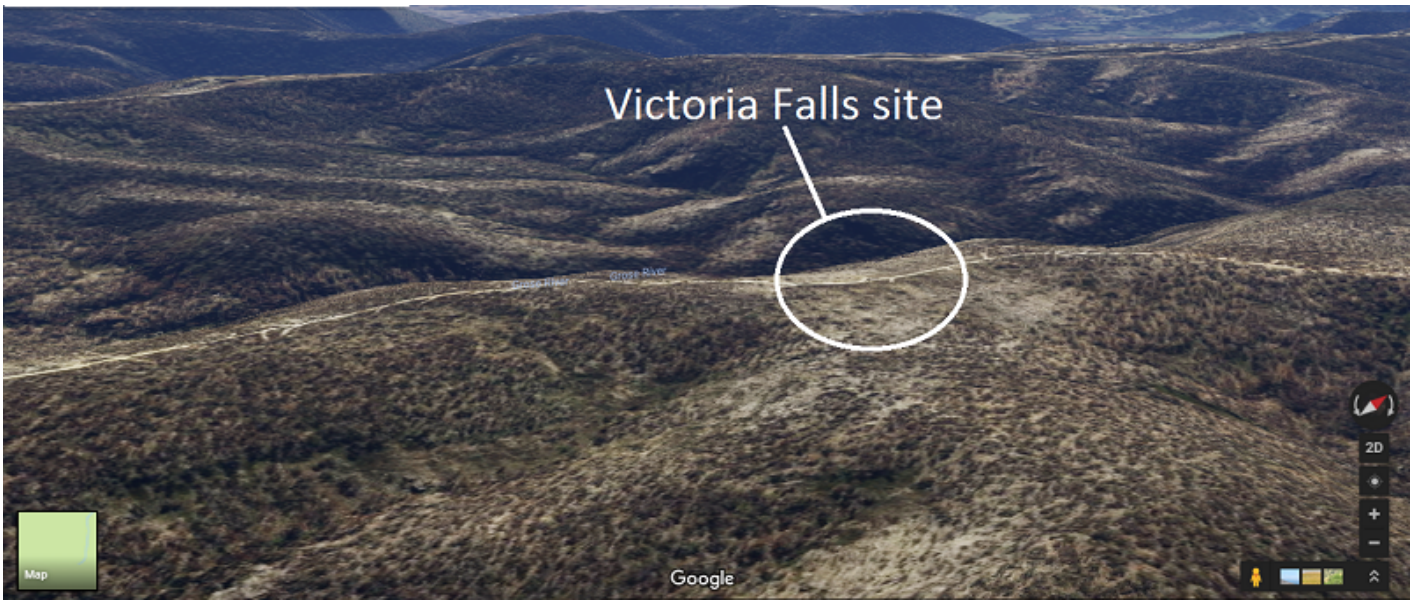
3D map of Katoomba Airfield. Google Maps image

Katoomba Airfield looking East.

Katoomba Airfield looking West.

Victoria Falls Road

On the occasions when the Airfield is not available to us (which happens if there are military exercises or other community groups are using the Airfield), our standby site is a ridgetop about 10km further west. This ridgetop also has deep valleys on either side of it, and the surrounding vegetation is dry native shrubbery, typical of this area. The horizon is spectacular, clear for all of 360°. The main drawback of the site is that it is totally exposed with no trees to provide a wind good windbreak – the shrubbery provides some relief, which is better than nothing. This site however is in a National Park, so while nocturnal visitors are rare, it is still open public land.



3D map of Victoria Falls site. Google Maps image.

Victoria Falls site looking East.

Identifying Sites

As mentioned earlier, light pollution maps are a good way to identify areas less affected by light pollution. Now armed with the above set of site criteria, topographic maps will help identify those areas of higher elevation. Google Maps also has a topography function for most regions. It is then a process of identifying potential areas, and then doing the appropriate research of the actual feasibility of the potential sites, if these sites are on public or private land, and approaching the necessary people about gaining access for using the site for astronomical purposes.

Asking local councils about suitable sites is also a good way of finding sites. Many times council people will know of not only other potential sites that you may not have been aware of, be able to suggest other folks to talk to, and sometimes they may also know of other astronomers in the area.

Sometimes even approaching private properties can render not only fantastic sites, but great relationships. This is how I came to gain access to Katoomba Airfield, just by explaining my intentions and asking the Airfield manager would welcome a few amateur astronomers, and the result has been not only access to a great site, but also a very close friendship.

Remember, site selection is usually a process of compromise. Often few of those ideal conditions are readily available, nor within easy reach, so we need to make use of sites that give us the best possible situation. Our passion for astronomy demands unique conditions. By knowing what site criteria provide the most ideal conditions, we can then make better decisions on site selection.

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