**2.3.4 ASTRO**

As the oldest product that *7Timer!* has ever provided, ASTRO product is mainly intended for astronomical purpose. The forecast range is 3-day and has included several elements that concerns astronomers most – such as cloud cover, astronomical seeing and atmospheric transparency. For details of the forecast method, see Publ. Astron. Soc. Pac., 123, 113, and references therein.

Explanation of each icon is given below.

Icon Definition

|  |  |
| --- | --- |
| Icon | Technical Definition |
| http://www.7timer.com/img/misc/about_astro_cloud.png | Octet-gram of cloud cover, blue is for clear while white is for cloud. e.g. the "cake" on the left is 0% cloud while the one on the right is 100% cloud. |
| http://www.7timer.com/img/misc/about_astro_seeing.png | Astronomical seeing. From left to right: <0.5", 0.5"-0.75", 0.75"-1", 1"-1.25", 1.25"-1.5", 1.5"-2", 2"-2.5", >2.5". In short, the smaller/bluer, the better the seeing condition is. |
| http://www.7timer.com/img/misc/about_astro_transparency.png | Atmospheric transparency. From left to right: <0.3, 0.3-0.4, 0.4-0.5, 0.5-0.6, 0.6-0.7, 0.7-0.85, 0.85-1, >1 (unit: mag per air mass). In short, the fewer bars/bluer, the better the transparency is. |
| http://www.7timer.com/img/misc/about_astro_rainsnow.png | Chances of rain/snow. |
| http://www.7timer.com/img/misc/about_astro_unstable.png | Atmospheric instability. From left to right: lifted index between 0 to -3, -3 to -5, and below -5. |
| http://www.7timer.com/img/misc/about_astro_rh.png | Humid weather warning. From left to right: relative humidity between 80%-90%, 90%-95%, and over 95%. |
| http://www.7timer.com/img/misc/about_astro_wind.png | Windy weather warning. From left to right: sustained wind speed between 8.0-10.8m/s (fresh), 10.8-17.2m/s (strong), and over 17.2m/s (gale or above). |

Definition of API Output Value

|  |  |  |
| --- | --- | --- |
| Variable | Value | Meaning |
| Cloud Cover | 1 | 0%-6% |
| 2 | 6%-19% |
| 3 | 19%-31% |
| 4 | 31%-44% |
| 5 | 44%-56% |
| 6 | 56%-69% |
| 7 | 69%-81% |
| 8 | 81%-94% |
| 9 | 94%-100% |
| Lifted Index | -10 | Below -7 |
| -6 | -7 to -5 |
| -4 | -5 to -3 |
| -1 | -3 to 0 |
| 2 | 0 to 4 |
| 6 | 4 to 8 |
| 10 | 8 to 11 |
| 15 | Over 11 |
| 2m Temperature | -76 to 60 | -76C to +60C |
| 2m Relative Humidity | -4 | 0%-5% |
| -3 | 5%-10% |
| -2 | 10%-15% |
| -1 | 15%-20% |
| 0 | 20%-25% |
| 1 | 25%-30% |
| 2 | 30%-35% |
| 3 | 35%-40% |
| 4 | 40%-45% |
| 5 | 45%-50% |
| 6 | 50%-55% |
| 7 | 55%-60% |
| 8 | 60%-65% |
| 9 | 65%-70% |
| 10 | 70%-75% |
| 11 | 75%-80% |
| 12 | 80%-85% |
| 13 | 85%-90% |
| 14 | 90%-95% |
| 15 | 95%-99% |
| 16 | 100% |
| 10m Wind Speed | 1 | Below 0.3m/s (calm) |
| 2 | 0.3-3.4m/s (light) |
| 3 | 3.4-8.0m/s (moderate) |
| 4 | 8.0-10.8m/s (fresh) |
| 5 | 10.8-17.2m/s (strong) |
| 6 | 17.2-24.5m/s (gale) |
| 7 | 24.5-32.6m/s (storm) |
| 8 | Over 32.6m/s (hurricane) |
| Precipitation Type | snow, rain, none | |
| Undefined | -9999 | Undefined |

The "Altitude Correction" function in older version is now restored. You may consider to set this function if your location is significantly higher than its adjacent areas (for example, when the location is on a mountain top). A good trick to check the necessarity of this function is to compare the forecasted and the actual temperature. When there is a large difference (say, over 5-10 degrees), you may consider to active this function. The Altitude Correction can be set to 2km or 7km.