**Universal Nomenclature of the Equinoxes and Solstices**

Explanation

Computer software must adjust for the hemisphere it is being used in. The historic use of nomenclature for the solstices and equinoxes originated in the northern hemisphere. An example of information presented in a computer program available worldwide is as follows:

Summer solstice 22 Dec 2021 02:00 AEST Ballarat

Autumnal equinox 21 Mar 2022 01:34

Winter solstice 21 Jun 2022 19:14

Spring equinox 23 Sep 2022 11:04

The Equinox Point is determined when the Sun’s path crosses the Celestial Equator at 00.00hr travelling into the Northern or Southern Hemisphere.

Right ascension (RA) {Proposed CLong see below}is measured from the vernal or (northern) spring

 equinox, at the point where the ecliptic and celestial equator intersect.

These move over time due to the Earth’s precession.

When giving an RA/Dec, you need to give the time for which it is valid - the epoch.

The epoch determines positions of the stars for a given 50-year interval, currently epoch

2000.

A more user-friendly term for the public would be Celestial Longitude (CLong), which can be measured in

hours, minutes, and seconds, total 24hrs,

or

degrees, minutes and seconds, circle 360 degrees.

Declination (Dec ) (Celestial Latitude (CLat) gives the Star or planets altitude and is measured in degrees,

+ for the Northern Hemisphere,

 – for the Southern Hemisphere.

Each object having CLong and CLat coordinates to locate its’ position in the heavens.

The person on the street wants to understand more, some of the finer details of the astronomers' world. We should endeavour to keep astronomical terms clear and relevant to the times. Many students

and public, have no background in science in general or specifically mathematics and physics at a higher level.

The current terms are suited to temperate climates with four seasons.

Near the equator - terms such as dry, wet, cool, monsoon are used.

A universal nomenclature is required that satisfies any position on the earth and is useful

at the “coal face” of astronomy education:

**Northward Equinox Sun crossing the Celestial Equator moving into the Northern Hemisphere**

**North Solstice Sun reaching furthest point North of the Celestial Equator**

**Southward equinox Sun Crossing the Celestial Equator moving into the Southern Hemisphere**

**South Solstice Sun reaching furthest point South of the Celestial Equator**

Three pieces of universal information are contained in these terms:

1. The direction of seasonal change of the position of the Sun due to the angle of the

 Earth’s axis of rotation, ~ 23.5 degrees.

1. The direction of the Earth's poles to the Sun.
2. Solstices indicating the extent of the north & south points of the Sun’s movements

 overhead.

These terms are much easier for the student to assimilate and there are key facts

imbedded in the terms that make learning easier.

**The First Point of Aries**.

This term needs a history lesson before the student can understand it. It is not accurate science.

 Instead:

**The Point of Northward Precession -** The point the Sun crosses the Celestial Equator (Northward Equinox) travelling into the Northern Hemisphere.

**Tropical Year** – Time for the Sun to travel from one Northward Equinox point to the

following Northward Equinox point, 365 days, 5 hours, 48 minutes 46 seconds.

**Sidereal Year –** Time taken for the Earth to complete one orbit relative to the fixed stars, 365 days 6 hours 9 minutes, 10 seconds.

**Epoch Point of Precession**. ie Current Epoch is 2000. For printed maps this point is fixed. The point is actually moving 1/7 sec/day. Currently in Pisces, next constellation it will drift into is Aquarius, in ~2600yrs.

 The point is linked to Celestial Longitude as the point slowly drifts along the Celestial Equator. Printed star maps are good for about 50 years, then the next epoch data is required for astronomers, ie next epoch will be 2050.

**Current Point of Precession** – the current position of the intersection of the Ecliptic and the Celestial Equator at the Northward Equinox.

I have presented these ideas to an audience of seasoned and new amateur astronomers.

Several new amateur astronomers have stated that this helped them to understand

terms which previously had confused them. Some who had been around for a little longer

 said they would have preferred the new terms than the old, when they were first learning

about the subject. Several seasoned amateur astronomers suggested the new terms worthy of

introducing in regular education courses.

It would be appropriate to change the older terms to reflect the "Global Village" that now prevails.

The revolution of software packages for the study of astronomy and the availability of a

wealth of data for the public, suggests that it is time for the nomenclature of the

 equinoxes and solstices to also become global terms.

Judith Bailey

First presented 2010 Updated 2022 Ballarat Municipal Observatory and Museum info@ballaratobservatory.org.au 0429 199 312