Transient Objects Observation Program for Timau Telescope

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Background

- Seimei telescope in the Northern hemisphere and Timau Telescope in the South can cover the whole sky for celestial objects observation
- Different observing season and geography means Seimei and Timau can complement each other
- Seimei and Timau telescopes are lightweight telescope able to quickly prepared for observation of short duration phenomena such as transients.
- Okayama Observatory has ToO observation program for transient objects. If similar program can be performed in Timau, complete sky covering can be attained.
- Therefore, we propose ToO transient object program for Timau

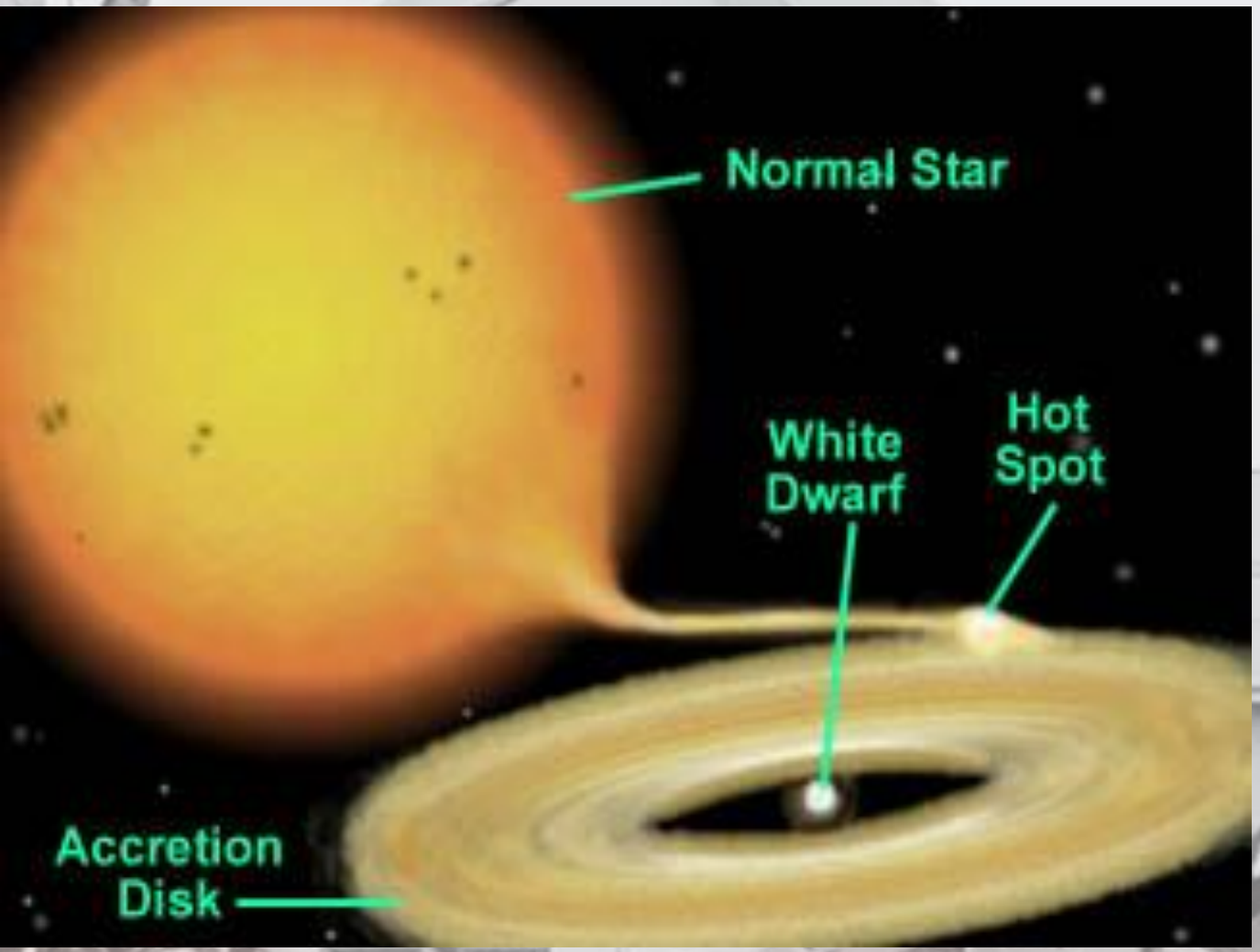
Background

- There are many types of transient objects : Dwarf Nova, Nova, Supernova, x-ray burst, Supernova impostor, CV, ΓRB, flare star, occultation, microlensing event etc.
- Most are problems in stellar physics, but some have connection with galactic physics and cosmology, such as supernova, other have connection with solar system objects such as asteroid occultation.
- Therefore all of the four research sub-group in ITB Astronomy can participate in the program
  - Our four research sub-group : Stellar physics, galactic physics, cosmology and solar system.

Uneven covering between north and south

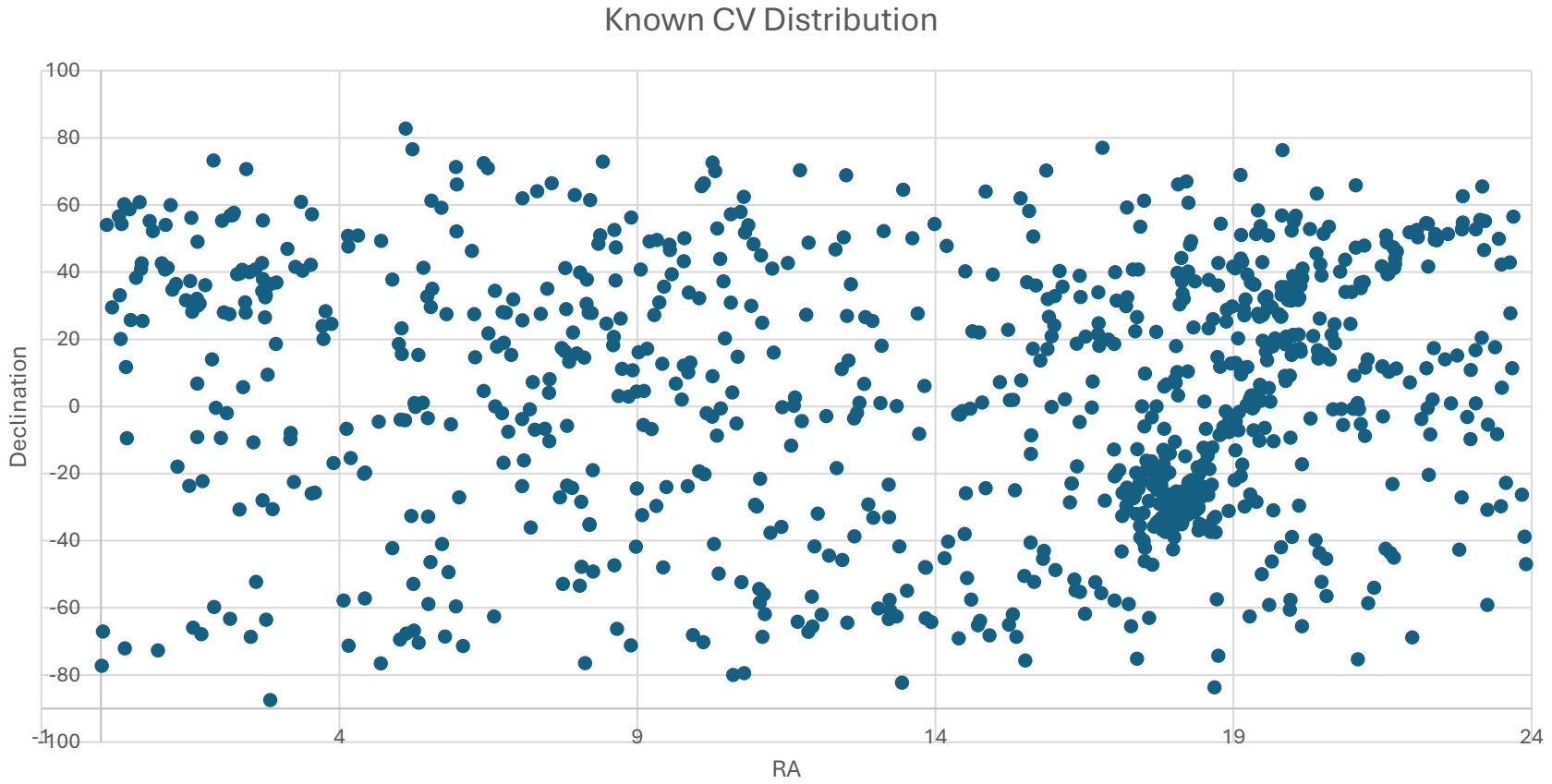
- There are more transient objects discovered in northern hemisphere than in southern
- This is because there are more astronomers and more telescopes in northern hemisphere.
- As an example, let’s see one type of transient : Cataclysmic Variables (CV)

Cataclysmic Variables



- Semi detach, close binary system containing a white dwarf and another non-compact star who transfer its mass to the WD
- Sometimes outburst or explosion can happen, resulting sudden and significant brightness increase
- Usually the outburst time are unknown, so, quick response for follow up observation is important

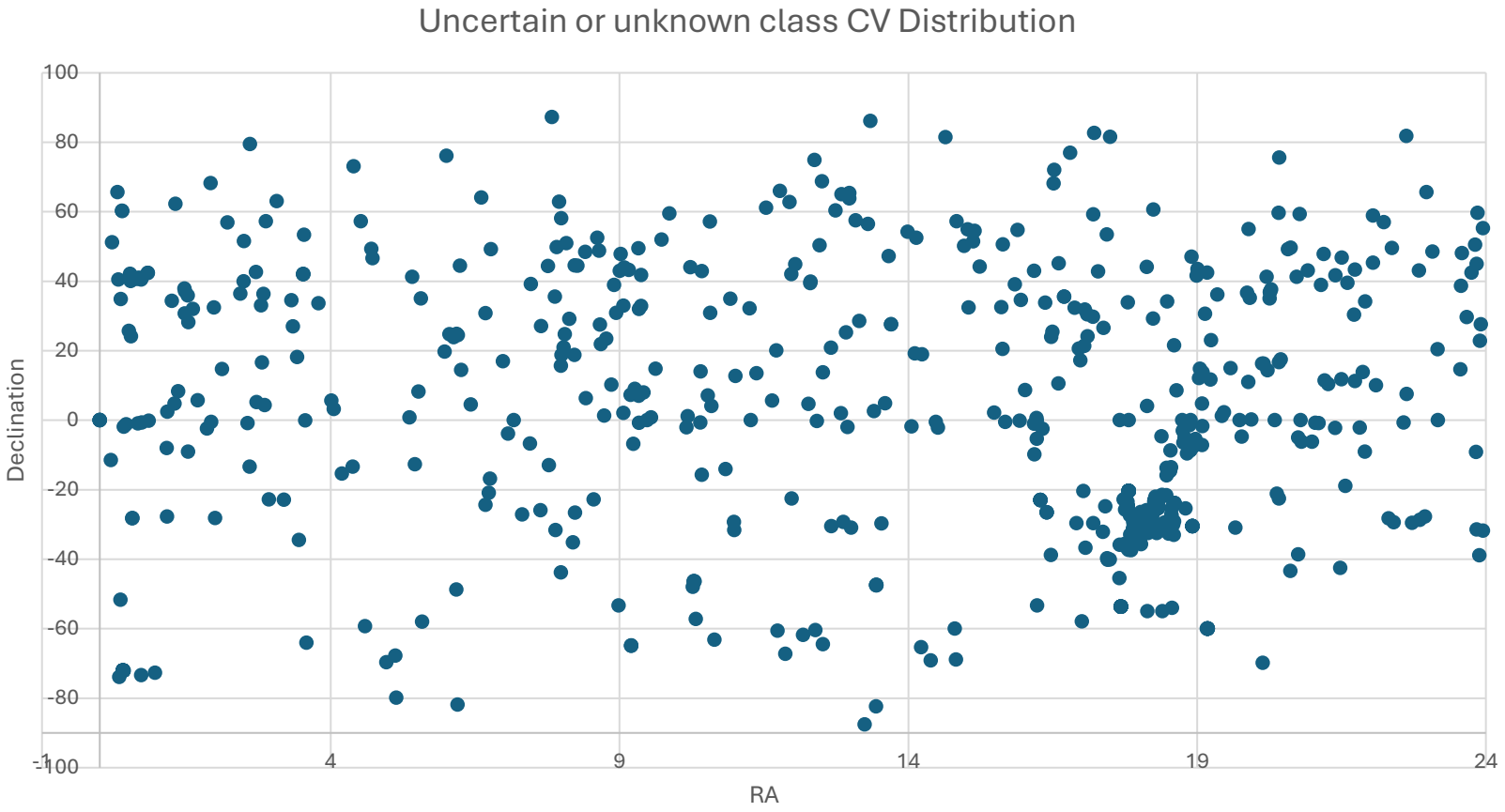
Spatial distribution of Known CVs



Outside the galactic bulge, the spatial number density of the southern known CVs is lower

- It seems the graph indicates more northern objects than southern ones
- However, if we count the data, we can find that the number of objects are almost the same in North and South.
- Known southern CVs are concentrated around the galactic bulge.

Spatial Uncertain or unknown class of CVs

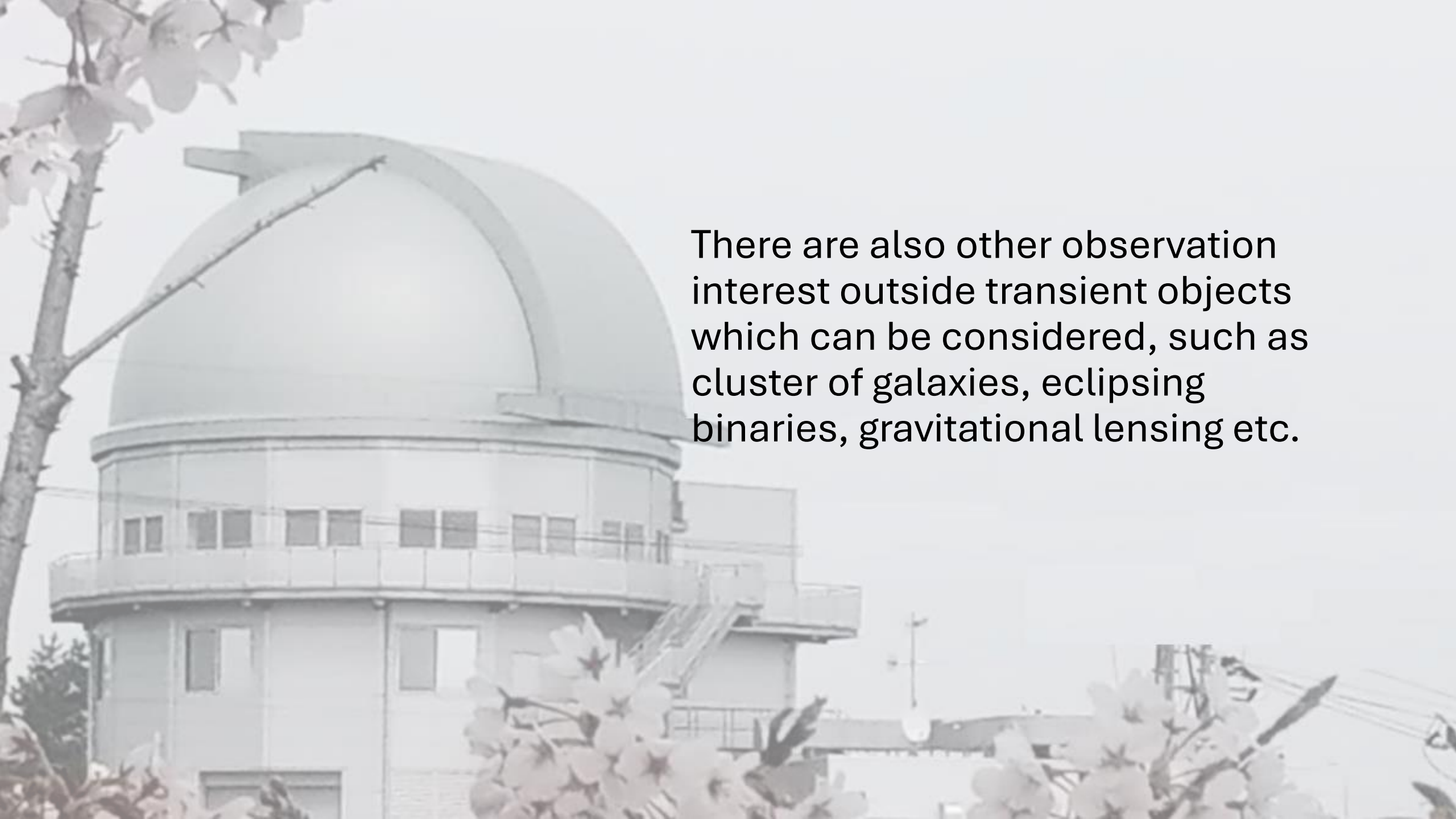


- Spatial density is lower in the south
- It seems more objects are in the northern hemisphere
- But, data counting reveals that southern objects are 30% more than their northern counterpart
- There are clustering of many candidate objects in few small area

The graphs and data counting indicate that there are more discovery opportunity in southern sky.

Work list

- Make a set of rule for anybody who are interested to participate in the program
- Make a list of some prospective objects to be observed
- Set up standard data reduction and analysis, so that observer can quickly look at the observation result
- Patrol observation using smaller telescope to search new transient objects or new outburst.
- Observation of certain unclassified CVs to gain deeper understanding of them
- Switch to intensive observation mode when outburst alert are received from some alert notice provider such as AAVSO, VSNET, Astronomical Telegram etc.



There are also other observation interest outside transient objects which can be considered, such as cluster of galaxies, eclipsing binaries, gravitational lensing etc.