

Planetary Conjunctions and Occultation records in Stone Inscriptions in India

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1. Introduction

Almost every small village or town in India has its history documented as a tiny write-up in some corner. These are stone inscriptions which have been of great help in constructing the history of the land, tradition and culture and are considered as valuable as the literary records, coins and travelogues.

Stone inscriptions are engraved on some special occasions, for example, eclipses are treated as special occasions to gift, donate or offer charity. Thus about 50% of the inscriptions cite charities made on the event of the eclipses(Shylaja,1997). Certain occasions like planetary conjunctions are mentioned in many of these cases.

The analysis of the details in these inscriptions requires knowledge of history, literature and linguistics. Thus the study was limited to South India for inscriptions in Kannada; Sanskrit inscriptions written in Kannaḍa script also have been included.

Here we will discuss some of the planetary configurations recorded; the eclipse records have been already been described in an earlier work (Shylaja and Geetha, 2011). Most of the eclipses match with other records. A speciality is the mention of the word *Vyatīpāta*, which refers to the instant of declinations of the sun and moon of equal magnitude (Shylaja and Geetha, 2014a). *Vyatīpāta* mentioned, but not the eclipse, implies that the eclipse was visible on the other side of the globe.

2. Records of planetary configurations

Other than the lunar and solar eclipse many planetary conjunctions and occultations are recorded in the stone inscriptions; a couple of them hint at comets also (Shylaja and Geetha, 2014b). However they are not spelt out explicitly. The geographical extent of the study is shown in the figure (Figure 1). It includes the records of *Vyatīpāta* and many other events, which will be discussed in detail later. It should be remembered that recording the astronomical event was not the objective of writing the inscription.

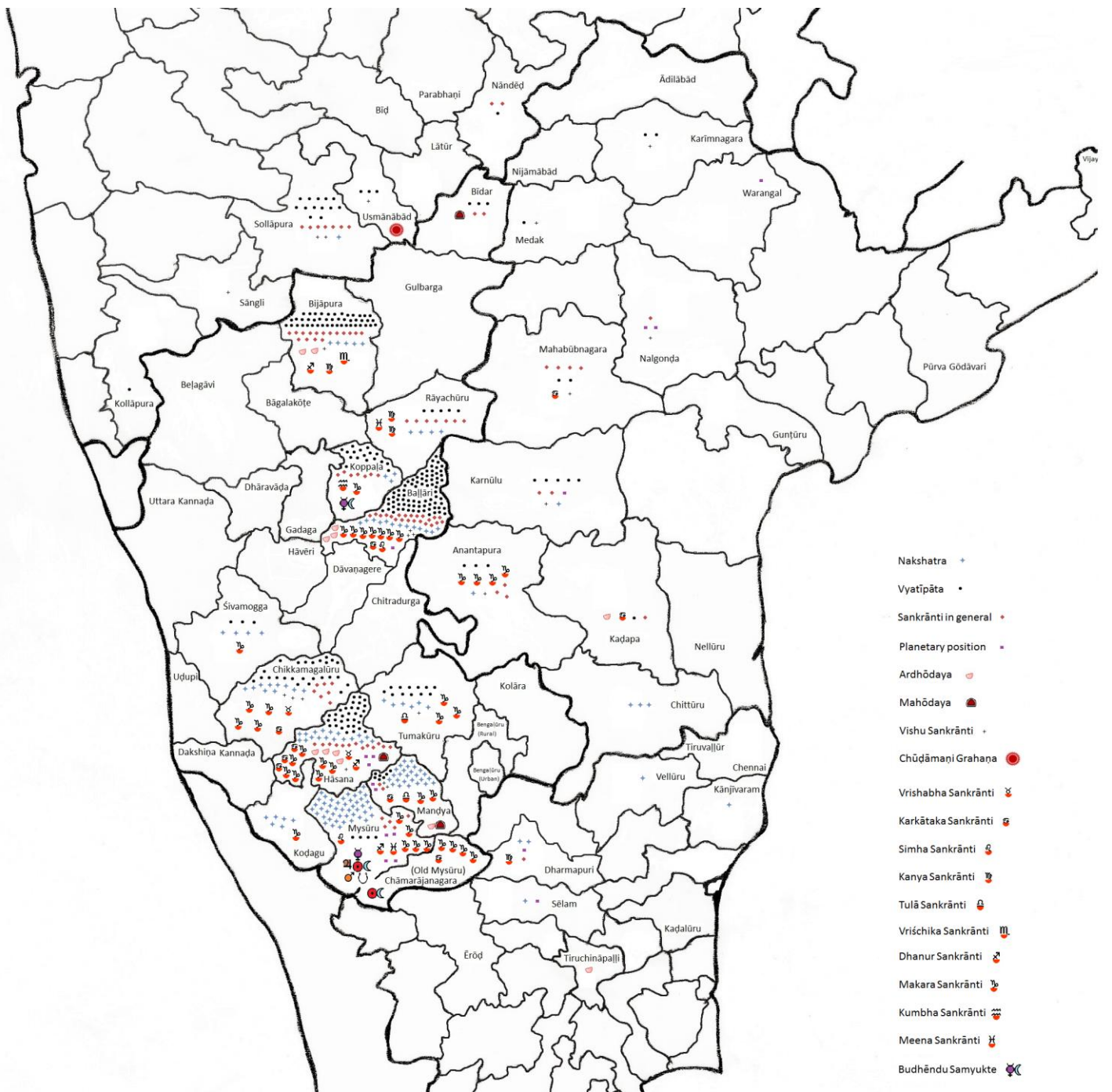


Figure 1 Geographical location, where Vyatipāta and other planetary phenomena were found in inscriptions

There are several records with a prominent mention of the planetary grouping, dated 16th January, 1665 when there was a solar eclipse. It is recorded as *śaḍgraha yóga* – grouping of six planets. They are sun, moon, descending node (*Kétu*) considered as planets and the other three planets. This occasion was used to donate special grants called “*tulāpurushadāna*”, which means gold of weight equivalent to the weight of the king was disbursed. The particular record mentioned here refers to such donation made by the King of Mysūru. (Earlier referred to as Mysore)

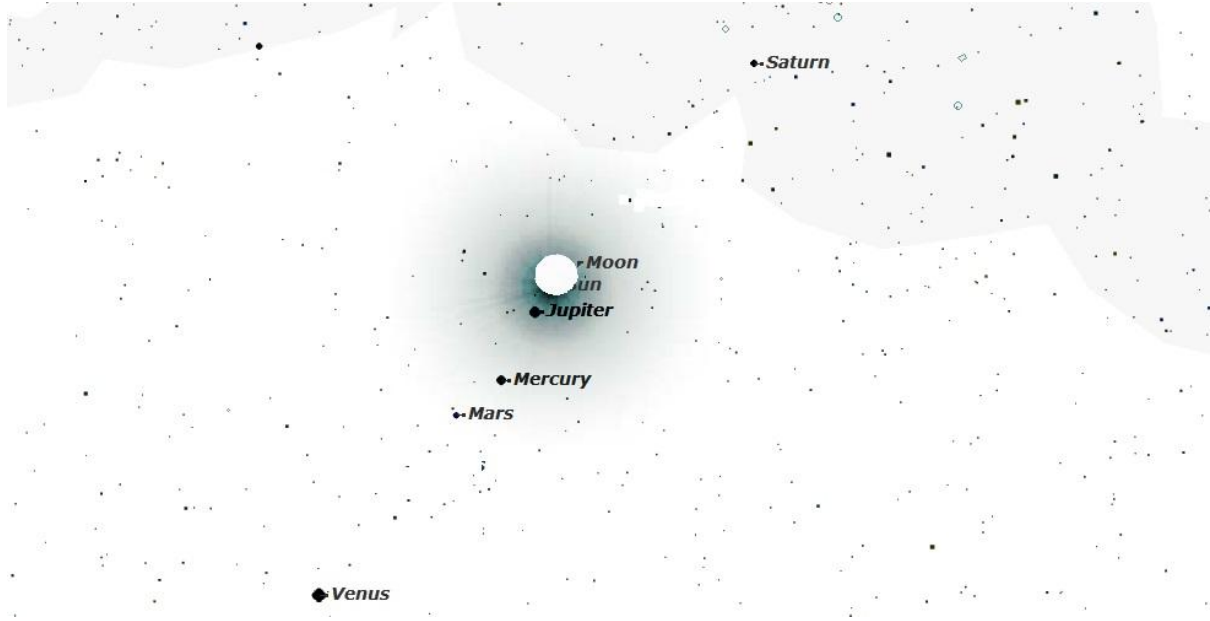


Figure 2. The planetary grouping of 16th January 1665 which attracted special grants and donations like *tulāpurushadāna*.

Here are records where the planetary conjunctions are mentioned. Since these stone inscriptions are mainly records of grant / donations, and not astronomical records, the exact timings are not available.

1095 AD, August 7, 5:00pm and July 10 *gurūdaya*, *makara lagna*, Venus and Spica (rise of Jupiter in Capricorn on both these dates Spica was occulted by moon).

1117 AD, October 2, conjunction of Mars and moon, Saturn's position is mentioned as being very close to (Aldebaran) *Róhini*. Two months later another inscription also mentions of Saturn being close to *Róhini*.

Dec 5, 1117 or Jan 5, 1118 Moon with *Róhini* and Saturn. The word used is *dvitipatasankrānthi*.

1145 AD, September 27, Conjunction of Venus with Antares the time as 6 *galige* after sunrise.

1160 AD, June 12, possible occultation of Mars by moon

1214 AD, July 10th opposition of Jupiter *mahāthithi*

1223 AD November 5, conjunction of Jupiter *Brihaspathi Sankaramana*;

1233 AD, December 13, Occultation of Saturn by moon; the time is given in terms of *Anurādhā lagna*, *Prīti yóga* and *bhava karana* which corresponds to about 5:00 am.

1467 AD, August 22, conjunction of Saturn with *Róhini* (Aldebaran).

1517 September 11, Spica and Mars were in conjunction with sun “*Guroubhé Adynaghroukanyakayam*”. Jupiter (*Guru*) was in opposition near Aquila (*Śravana*).

1634 AD, July 5, conjunction of Jupiter *briha yoga*

1629 AD, January 4, conjunction of Jupiter

In some inscriptions the entry of the planet in to a rasi (zodiacal constellation) is recorded. For example AD 907 Jupiter entering *Kumbha* (Aquarius) and AD 972 Jupiter entering *Kanyā* (Virgo).

On 16th October 1298, conjunction of Jupiter with moon is written as “*Uttara nandabriguvinalu*” However the word Uttara here cannot mean the star *Uttarābhadrā* (Alpha Andromeda); the moon and Jupiter are closer to Lambda Aquarii (which is closer to *Śatabhishaj* or Gamma Aquarii).

On 3rd April 1234 AD, conjunction of Aldebaran with moon “*Sarōhininakshatraprītiyoga...*” is recorded. Here the word *ekādashasthanavagraha* is used implying that all the nine planets were in the 11th position. This is not true. (This is never true but is generally cited to highlight the auspicious occasion by astrologers (Balachandra Rao, 2014)).

There are two records of an event called “*Bhide yōga*” (may be *Bheda yuti* – planetary conjunction) on January 17th, 956AD, the day after new moon. There was no solar eclipse and is not recorded. But the conjunction of either Mercury which happened on 16th or moon with Mars which happened on the 17th may be intended in this record. The word *Bhide yōga* is used in 1874 AD in the context of transit of Venus by Ragoonatha Charry (Shylaja, 2012) in 19th century.

3. Records mentioned as *Vyatīpāta* but referring to planetary conjunctions

In many inscriptions the word *Vyatīpāta* is used to describe the planetary conjunctions with the sun or moon as detailed below.

In Indian Astronomical texts we come across the term *Vyatīpāta* whose equivalent does not exist in European texts. The term implies the instant at which the magnitude of the declination of the Sun and Moon are equal. *Siddhānta Śirōmani* and many other texts give an elaborate description of the method of determining *Vyatīpāta*.

The instant, *Vyatīpāta*, when the declinations of the moon and sun are of equal magnitude, was considered extremely important by astronomers. This term appears very often in stone inscriptions, which record eclipses all over India covering a span of about 2000 years. (Shylaja and Geetha, 2013) The word *Vyatīpāta* itself should not be mistaken with the *yoga* (one of the five elements of calendar, *panchānga*) with an identical name. As given in the chapter on *pathādhyāya*, of *Siddhāntatha Śekhara* of Śripaṭhi, it reads:

When the sum of the longitudes of the Sun and the Moon is six rāsis (180°), they are in opposite ayana, but in the same gōla and their krāntis (declinations) are equal, the moment is Vyatīpāta. When the sum of the longitudes of the Sun and of the Moon is equal to 180° it is quite natural that both are being in the opposite ayanās. But why Śripaṭhi here mentioned both conditions is not clear. (Sripada Bhat, 2013)

There is another conjunction defined as *Vaidhṛti*, when the sum of longitudes of the sun and moon is 12 rāsis (360°), they are in the same *ayana* but opposite *gōla* and the *krānthi*s are equal. In the stone inscriptions we have not found any record of *Vaidhṛti*.

The astronomy texts like *Siddhānta Śekhara*, *Tantra Sangraha* and even *Siddhānta Śirōmani* describe the method of calculation of eclipses in one chapter and the *Vyatīpāta* in another chapter, although the

two are inter-related. For the eclipses calculation, it is important to know the time of conjunction and the longitudinal difference from sunrise or to sunset. It is also very important to know the maximum latitude of the moon, which in turn decides the visibility of eclipses.

Vyatīpāta calculation deals with the *krān̄thi* or declination. It is easy to measure the declination of the moon on days near to full moon rather than the days near the new moon. *Vyatīpāta* provides the position of *Rāhu*, (the ascending node), which in turn will decide the maximum declination and the latitude of the moon at conjunctions.

The basic observational tool that was available for the astronomers was a gnomon and they measured only two quantities angle and time quite precisely. The rest of the quantities were estimated by calculations. (Detailed discussion in Shylaja and Geetha, 2014a)

Here we give some examples of planetary conjunctions that are recorded as *Vyatīpāta*.

981 AD April 12, occultation of Mars

1071 AD March 26, occultation of Jupiter by moon

1112 AD, December 12, Occultation of Mars *indudharayōrvihithelagne* – meaning at the time when moon was rising.

1132 AD, December 14, Occultation of Mars on is recorded as *samkramana*

1134 AD, June 5, conjunction of Mercury with Aldeberan *Budha – Rōhini Sangama*

1136 AD, March 8, the occultation of Venus by moon occurred during the daytime 1149AD, April 9 occultation of Mercury by moon.

1158 AD, June 24, moon was within 2 degrees from Jupiter and *Rōhini*

1169 AD, March 2, moon, Jupiter and Mercury were seen within 3 degrees at dusk.

1187 AD, December 17, conjunction of Mars and moon

1239 AD, February 6, *Śravananakshtra* and *Vyatīpāta*. conjunction of Jupiter

1671 AD, Feb 10, moon, Mercury and Saturn were seen within 3 degrees. (Later during the day there was an occultation too.)

4. Debatable records

There are two *uttarāyana* (Winter solstice) entries available for the year 1122AD in two different locations. One tallies with December 25 while the other takes it December 7th with a mention of *Vyatīpāta*. The maximum declination of the moon that year (as deduced from the mention of solar eclipse in the same year in September) is 18.5 degrees. Thus it is impossible to have *Vyatīpāta* in December. On careful examination we find that this refers to inferior conjunction of Mercury within an error of one day.

Jan 11, 1079 recorded as *Vyatīpāta*; Saturn was in conjunction and Mars was in opposition. Therefore this word may convey any of these planetary aspects. In the same pillar there is another mention of the conjunction of Mercury and Saturn - this is on January 9thAD 1137, – derived from *Māgha shu* 10 (10th day after new moon in the month, which corresponds to the full moon being near *Māgha* (Regulus)).

The new moon day at the end of *Puṣya* has attracted attention by the special term “*Ardhodaya*” ; we find several records mentioning this.

March 6, 1397 Grazing occultation of Jupiter *Guru sūryagrahana* time is recorded as 14 *galige* after sunrise. Here the word *Sūrya* referring to the sun is confusing.

In another record, (December / January) on the 11th 1286 AD, saturn along with moon being with *Róhini* (Aldebaran) in *Thai* month day after new moon. However, the planet was close to the sun rather than moon. Therefore it is possible that this may refer to conjunction or heliacal setting.

There is confusion in fixing the date of no 306 EKV Vol V; it reads saka 1457, *Jaya, Pushya shu 3*, the epigraphers have given the date as December 3, 1534. However there is a word *sankramana*, which seems to be a general term. Allowing for a margin of + / - one year we find two events matching with this – occultation of Jupiter in day time on 7th December 1534 and inferior conjunction of Venus on Dec 27, 1535.

Between October 30 and November 1 of 1571, the planets Venus and Saturn were seen within an angular separation of 1 degree. There are two records during this period - EC VIII no 55 from Soraba and EC XII no 1 copper plate from Tumakūru.

5. Conclusions

We find a wealth of information on planetary positions in a limited geographical region. The words that are used to describe vary from place to place and from time to time. It must be possible to find many more records all over India and in countries bordering India by a detailed scrutiny.

Acknowledgements:

The Project was funded by INSA for the years 2009 – 2012. Discussions with Prof S Balachandra Rao were very helpful. One of the authors (BSS) gratefully acknowledges the travel support from NOAJ, which resulted in this paper with many valuable comments from Mitsuru Soma, Kiyotaka Tanikawa, K Ramasubramanian, Mayank Vahia and Ma Li-Ping.

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