

## Dating stone inscriptions from eclipse records

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**Abstract.** The solar and lunar eclipses have been documented as stone inscriptions in various parts of Karnataka in South India. Descriptions in Kannada are available from 9th Century A.D. onwards. The dates of these eclipses have been verified and fixed with least ambiguity from astronomical calculations and catalogues.

*Key words :* ancient eclipse records, fixing dates of eclipses

### 1. Introduction

Kannada is one of the ancient Indian languages. The earliest stone inscription record in this language dates to about 450 A.D. Thus the wealth of information from the stone inscriptions take us back to about 1500 years; however, those relevant in the context of eclipses are dated about 9th century A.D. and onwards.

This work is a continuation of the results of the preliminary efforts of M. Chidananda Murthy, who carried out a socio-cultural survey in 1980, when the path of totality passed through Karnataka. The results of this survey are published in Kannada (Chidananda Murthy, 1982). Preliminary results of this investigation appear elsewhere (Shylaja and Chidananda Murthy, 1997).

Contrary to the conclusion of the previous investigators (Srivastava, 1970; Pandey, 1972), the sunworship was very much prevalent in South India. This school had a distinct feature of self immolation during an eclipse. Records of such self immolation acts on stones have become very important documentation of eclipses. The dates in the Indian calendar are also usually mentioned and that helps us to establish the date of the record with little effort.

Eclipses were treated as special events and it was strongly believed that charities offered on that day would lead an individual to salvation. Because of this faith, many charities were not only

made but have been recorded on stones as well. These, eventually, have served as very important documentation on eclipses.

The martyrdom of war heroes was inscribed on stone and the time selected for this event also was an eclipse. Many stone inscriptions of this category have been found and can be used as documents, whenever the dates are also recorded.

## 2. The stone inscriptions

The details on the stone inscriptions are compiled in Tables 1 and 2, as solar and lunar inscription records.

The tables list eclipses chronologically, with the name of the place where the inscription was found, the date of the eclipse as inferred from the original references to the record, the details of the record and finally the date as can be verified from the work of Oppolzer (Oppolzer, 1885).

The exercise of converting the dates into the Gregorian system has been done almost 150 years ago by a team of British and Indian experts, (Cunningham, 1971), with the simplest method of transforming the Indian calendar to the Gregorian. The Saka year, if available, is incremented by 78 years to get the corresponding AD. This can be verified with the names of the *Samvatsaras*.

In the Indian system of calendars, the *Samvatsara* - is a cycle of 60 years, usually beginning from the newmoon in *Chaitra*, March/April, close to the equinox; the fortnight beginning from newmoon is defined as *Shuddha*, while the one that follows it is called *Bahula*. Table 3 gives some samples of *Samvatsaras* of today and extrapolation to previous years. A complete list of the 60 *Samvatsaras* is provided in the appendix.

In one inscription (no. 3 in Table 1) the annular eclipse is explicitly indicated by the use of the word "*Valaya*". There is no ambiguity in fixing the date of this eclipse. Therefore, this has been taken as the reference point for fixing the dates of other eclipses.

### 2.1 Documents of solar eclipses

The inscriptions are now analysed in detail.

1. The earliest inscription is from the place Mantralaya, Kurnool District (now in Andhra Pradesh). The details of donation etc. are not clear. The saka year is given as 815 and the name of *Samvatsara* is *Pramadhi*. The *Saka* year corresponds to 893 AD which is suggested in the original record with a question mark. The question mark signifies the doubt because there were no eclipses in 893 AD. But, if we choose the name of *Samvatsara* as the deciding criterion, for which the Saka year happens to be 781, we arrive at a date of 859 May 6th.

Table 1. Inscriptions of Solar Eclipses

No.	Place	Date on inscription records	Reference	Date from Oppolzer
1.	Mantralaya, Karnool	893? Saka 815 Pramadhi (13)	Kar. Ins. V No. 3	May 6, 859
2.	Bijapur	Aug. 28, 862 Chitrabhanu (16)	S. Ind. Ins. XI, Part I	Aug. 28, 862
3.	Otur, Sorab, Shimoga	939 Saka 861, Vilambi (32), Chaitra	Ep. Car. (Rice) VIII Sorb 71	Feb 3, 938
4.	Karnadi, Ron, Dharwad	1059, Saka 981, Vilambi (32) Magha	S. Ind. Ins. Vol. XV No.1	Feb. 15, 1059
5.	Lakkundi, Gadag	1076, Saka 998, Nala (50), Bhadrpad	S. Ind. Ins. XI, 119	Sept. 1, 1076
6.	Soundatti, Belgaum	Aug. 1, 1087, Saka 1009, Prabhava (1), Sravana	Kar. Ins. V. No.52, p.270	Aug. 1, 1087
7.	Nagavanda, Hirekerur, Dharwad	Oct. 21, 1120, Sarvari (34), Karthika	Kar. Ins. VI, No.19, p.246	Oct. 24, 1120
8.	Chinna Mulugunda, Hirekerur	March 10, 1122 Shubjakrit (36), Chaitra	Kar. Ins. Vol. VI, No.20	Mar. 10, 1122
9.	Tilavalli, Hanagal, Dharwad	1129, Soumya (43), Ashwayuja	Kar. Ins. Vol. XV, No.23	Oct. 15, 1129
10.	Mugur, Sorab, Shimoga	1129? Soumya (43), Magha	Ep. Car VIII(Rice) Sorab, 310	Apr. 20, 1129 or Feb. 17, 1189
11.	Balur, Hanagal, Dharwad	Oct 4, 1130 Saka 1053, Sadharana (44), Ashwayuja	Kar. Ins. V, No.96	Oct.4, 1130
12.	Madanabhavi, Dharwad	1134? Pramadhi (13), Magha	S. Ind. Ins. No.16	Jan.27, 1134
13.	Siddapur, Dharwad	Jan 16, 1135 Saka 1056, Ananda (48), Pushya	S. Ind. Ins. Vol. XV, No.14	Jan.16, 1135
14.	Tilavalli, Dharwad	March 10, 1141 Roudra (54), 'talir'	Kar. Ins. V No.97	March 10, 1141
15.	Mugulugare, Shikaripur	1141? Durmathi (55)? Chaitra	Ep. Car.VII (Rice), Shikaripur, 290	March 10, 1141
16.	Chinna Mulugunda, Hirekerur	Jan.1, 1142 Durmathi (55), Magha	Kar. Ins., Vol. VI, No.27	Jan. 1, 1142
17.	Kodikop, Ron, Dharwad	Dec. 25, 1144 Raktakshi (58), Pushya	S. Ind. Ins. Vol XV, No.28	Dec. 25, 1144
18.	Annigeri, Navalgund, Bijapur	Jan.17, 1162, Visha (15), Pushya	S. Ind. Ins. Vol. XV, No.102	Jan 16, 1162
19.	Gadag, Gadag Tq.	Jul. 14, 1162, Chitrabhanu (16), Ashadha	S. Ind. Ins. XV, No.103	July 14, 1162
20.	Lakkundi, Gadag, Dharwad	Nov. 26, 1174 Jaya (28), Margasira	S. Ind. Ins. Vol. XV, No.125	Nov. 26, 1174
21.	Manajji, Muddebihal, Bijapur	Nov. 5, 1184 Saka 1106, Karthika	S. Ind. Ins. Vol. XV, No. 58	Nov. 5, 1184
22.	Annigeri, Navalgund, Bijapur	Nov. 5, 1184	S. Ind. Ins. Vol. XV No.59	Nov. 5, 1184
23.	Gadag, Dharwad	Nov. 5, 1184 Krodhin (38) Karthika	S. Ind. Ins. Vol XV No.140	Nov. 5, 1184
24.	Gadag	Jun. 23, 1191 Saka 1113, Virodhikrit (45), Jyeshtha	S. Ind. Ins. XV. 150	Jun. 23, 1191
25.	Lakkundi, Gadag	1195? Ananda (48), Chaitra	S. Ind. Ins. Vol. XV No.209	Apr. 12, 1195
26.	Mankani, Bagalkot	1206? Saka 1128, Krodhana (59)	S. Ind. Ins. Vol. XV, No.155	March 11, 1206
27.	Kandgal, Hanagal	Aug 25, 1207 Prabhava (1), Ashadha	S. Ind. Ins. Vol. XV, No.156	Aug. 25, 1207
28.	Khedpur	1213, Srimukha (7), Chaitra	Kar. Ins. VI No.39	April 22, 1213

No.	Place	Date on inscription records	Reference	Date from Oppolzer
29.	Haveri	April 22, 1213 Saka 1136, Srimukha (7), Chaitra	Kar. Ins. VI No.75	April 22, 1213
30.	Khedpur	June 2, 1220 Vikrama (14), Jyeshtha	S. Ind. Ins. Vol. XV. 164	June 2, 1220
31.	Dharwad	1221? Vishu (15), Vaishaka	Kar. Ins. Vol. V, No.70	May 23, 1221
32.	Dharma, Soundatti	July 3, 1228 Saka 1151, Sarvadhari (22), Ashadha	Kar. Ins. VI No.73	July 3, 1228
33.	Rattihalli, Hirekerur	Dec. 8, 1238 Hevilambi (31), Margasira	Kar. Ins. Vol. VI No.44	Dec. 8, 1238
34.	Rattihalli, Hirekerur	Dec. 8, 1238 Saka 1160, Vilambi (32), Margasira	Kar. Ins. Vol. VI, No.42	Dec. 19, 1237
35.	Balgi, Hungund	Sept. 26, 1242 Subhakarit (36), Dwitiya Bhadrpada	S. Ind. Ins. Vol. XV No.177	Sept. 26, 1242
36.	Torawanda, Sorab	1252? Saka 1174, Virodhi (23), Phalguna	Ep. Car. (Rice) VII, Sorab 300	March 23, 1289
37.	Mugulugare, Shikaripur	1432? Virodhikrit (45)	Ep. Car VII (Rice) Shikaripur, 289	Aug 8, 1431
38.	Mysore	Jan 6, 1665 Saka 1586, Krodhi (38), Pushya	Ep. Car (Mys.) Mysore 100	1665 Jan 16
39.	Malavalli, Mandya	1673, Aug. 2	Ep. Car VII (Mys), Malavalli, 124	Aug 12, 1673

2. The second document refers to the charity of King Amogha Varsha Nripathunga who on Aug. 29, AD 862 gave the village named Hoovina Hippargi of Bijapur District to a great astronomer Goleya Bhatta. There are two stone inscriptions (Nos. 8 and 9) referring to the same event. The records also mention about an offer called '*Tulapurusha*', which means, gold weighing equal to that of the donor, was distributed.

- 3,4. The inscription No.3 in the Table 1, in Otur, Sorab Taluk, of AD 939 reads,

*"In the Samvatsara Vilambi, month of Chaitra, on the first day of the fortnight Shuddha, Wednesday, during a Valaya Grahana, this was offered to Veshwasayya - written by Senabovanakayya"*

In this inscription *Valaya Grahana* refers to the annular eclipse. This is easily verified from the work of Oppolzer, which fixes the date to 3rd February, 938 AD. However, in this case Saka year should be 860, instead of 861.

Similarly Saka year for No.4, which is a description of charities made by Gangeyajjiya to Lord Babbaleswara, should be 980 instead of 981.

- 5,6. There is no ambiguity in fixing the dates of these eclipses. The inscription no.6 from Soundathi in Belgaum District is dated Aug 1, 1087. This refers to the donations offered by Mahamandaleswara Kartaveerya to Lord Ankeshwara. The text reads as :

*"In the Prabhava Samvatsara, newmoon day of the month Sravana, Sunday, during a Sarvagradi solar eclipse" . . . . .*

In this the word "*Sarvagradi Grahana*" refers to a total solar eclipse. The fact that the path of totality passes through this part of India on that day is confirmed by the charts of Oppolzer.

7. This is a record of self immolation; the earliest available inscription of this category. It reads:

*"In the Sarvari Samvatsara, of Vikrama Saka, on the new moon day of Kartika, Sunday, at the time of solar eclipse, at Nagarjuna, a servant of the God, Beechiga, attained Suryaloka. His Guru Nagarasi Pandit, got this inscribed on this occasion".*

This man who committed self-immolation was Beechiga, with the consent of his teacher, Nagarasi Pandita, who got the stone inscription written to commemorate the event.

The date of this from Oppolzer's Catalog is 1120 October 24.

8. This record has only the name of *Samvatsara* and month. The name of the King has been used to fix the approximate time as March 10, 1122.
9. This record has only the name of *Samvatsara* and month. The name of the King has been used to fix the approximate time as 1129. The mention of the eclipse fixes the date precisely as October 15, 1129.

10. This self immolation record has many words incomplete. However, it has been interpreted by experts to read :

*"During the Soumya Samvatsara, in the month of Magha, at the end of the fortnight Bahula, on the new moon day, during a solar eclipse Racheya Jeeya Bhatta entered the pyre and attained Suryaloka - His brother Narasimha . . . "*

Perhaps this inscription was laid by the brother (called Narasimha) of the person, Racheyajeeya Bhatta, who jumped into the pyre.

Since only the name of Samvatsara and month are available, we have to resort to other means of fixing the date. The historians have recorded 1129 with a question mark. The date of eclipse in that year April 20, which is unlikely for the month of *Magha*. However, we tried out a date 60 years ahead or prior to this. We get 1189 February 17 as a better choice since *Magha* being the 11th month of year, fits into February better.

11. This is also a self immolation record. The inscription very clearly refers to the immolation of a person by name Chanda. The inscription is accompanied by a pictorial representation of sequence of events. The bottom most engraving shows a person (perhaps Chanda) pouring something into the fire (may be oil, ghee or some similar material). The picture above that shows women (supposedly the Apsaras the damsels in heaven) leading Chanda to heaven. Still above that is the third engraving of Chanda sitting with folded hands (worshiping Sun). Above that is the engraving of a snake trying to grab the sun which marks the event of an eclipse. (Such pictures of a snake attacking the sun depicting the eclipse are found in many other temples also). The inscription reads :

*"In the Saka Year 1053, Sadharana Samvatsara, in the month of Ashwayuja, on the new moon day of Deepavali, Chanda, the son of Molleya, entered the fire during solar eclipse and entered heaven. Inscription laid by Kalagowda, son of Bammagowda of Balevur".*

The date of this has been precisely fixed as 4th October, 1130, which confirms with the date of a solar eclipse. The names of the *Samvatsaras* year mentioned in this and the earlier of the two - *Soumya* and *Sadharana* can be used to testify the date of the previous one (No. 10). However, the Saka for this eclipse should be 1052 instead of 1053.

12. This inscription from Madanbhavi, Dharwad is quite damaged. The name of *Samvatsara* appears as *Pramadhi*. The historians fix the date as 1134 with a question mark, based on the name of the king and his regnal year. There was a solar eclipse in January 27, 1134. When we choose this as the date, the name of the Samvatsara turns out to be *Pramadeecha* (43) and not *Pramadhi*. It is possible that the letter '*cha*' is damaged and lost.
13. There is no ambiguity in fixing the date of this from Siddapur, Dharwad, since both Saka and the name of the month are available.
14. This inscription from Tilavalli from Dharwad district is of self immolation. It is very elaborate

and cites a verse from Mahabharatha which states "only two types of people can directly reach the domain of sun, Suryaloka. The first is a war hero, killed in action; the second is a *yogi*". The inscription is about the immolation of Boppa, the son of Ketave and brother of Devisetty. This inscription also is accompanied by drawings of Boppa jumping into the fire, the Apsaras carrying him into the heaven and finally Boppa meditating in *Suryaloka*. As usual, the sun and snake also are seen.

The date has not been fixed precisely by historians. The name of *Samvatsara* is *Roudri* which is 1141 AD. The name of the month is not explicitly mentioned but the prefix "*Talir*" is attached to "*Amavasya*" the new moon. The meaning "*Talir*" is fresh green leaves and hence the season should be spring (prof. G. Venkatasubbiah, personal communication). This helps in fixing the dates as 1141 March 10.

15. This is also a self-immolation record. The fifth of this category from the Mugulagere, in Shikaripur. It refers to the immolation of Malleya in Telugu Nadu (Andhra Pradesh) during a solar eclipse.

The historians give the date as 1141, with a question mark. This is because the Indian date mentioned is *Durmati* - which follows *Roudri*. The name of the month *Chaitra*, corresponds to March. However, the previous record had *Roudri* for *Samvatsara*. On a careful reading of the manuscript it became apparent that this has been written on "*Chaitra Suddha Padiva*" which is the first day in Chaitra or the new year day itself. Hence this also refers to the same eclipse of March 10, 1141, but written the next day in the new year with name *Durmathi*.

16. There is no ambiguity even when Saka is not available.
17. There is no ambiguity and the name of the king has been used for fixing the date.
18. This record from Annigeri has no Saka, still the date can be fixed without any ambiguity.
19. According to the revised calculations (Dr. S. Demeis, personal communication) the shadow does not touch South India.
20. There is no ambiguity in fixing the date.
- 21,22,23. Correspond to same eclipse; the Saka year is available in one of them. Therefore, there was no ambiguity in the date.
24. There is no ambiguity.
25. The name of *Samvatsara* in this case is *Ananda* which corresponds to the period April 1194 to March 1195. However, there was no eclipse in March 1194 in this period. The shadow of 1194 April 22 eclipse has not touched this part of India. The historians have also pointed out this and suggest 1195 April 12, in which case the name of the *Samvatsara* will be

- Rakshasa*. There is also a mention of the third year of the king. There was a lunar eclipse corresponding to the 8th year of the king is dated 1174 November 10, (see Table 2). With this as reference the date may be April 21, 1167 then the Samvatsara would be *Virodhi*.
26. This inscription from Bagalkot has the Saka as 1128 and the name of the month is missing. The year 1206 AD (1128 + 78) had a solar eclipse on March 11 and hence the name of the month may be *Phalguna*. (*Krodhana* ends in March 1206). So, the Saka year should be 1127 instead of 1128.
  27. This has no ambiguity and helps in fixing the previous one more authentically, with the help of the name of the king.
  - 28, 29. These two correspond to the same eclipse, although from different places. The first inscription date has been fixed based on the names of the king, *Samvatsara* and month as 1213 April 22. The second confirms this with the saka year also mentioned in it.
  30. Historians have fixed the date as 1220 (with a doubt) based on the name of the King. The date does not explicitly mention about eclipse, but the word '**uparaga**' appears elsewhere in the text. Hence the date can be precisely fixed as June 2, 1220.
  31. This inscription has been dated as 1221? with the name of the king. The eclipse helps in fixing the date as May 23, 1221. The word *Dwitiya* appears as a prefix to *Vaishaka*, the name of the month. This explains the occurrence of *Adhikamasa*, the technique of introducing an extra month to balance the cumulative difference between lunar and solar calendars. The previous (no.30) eclipse occurred on the last day of *Jyeshtha* which was June 2. Extrapolating this we find that the year ends in the last week of February or first week of March, 1221. Thus the new year by name *Visha* began in the first week of March, implying *Vaishaka* beginning May 1 itself. Perhaps, in that year a second *Vaishaka* was added thus prefixing *Dwitiya* to its name.
  32. There is no ambiguity in fixing the date of this inscription.
  33. In this damaged inscription on a pillar, two dates corresponding to the months *Margasira* and *Phalguna* are available, along with the name of *Samvatsara*, *Vilambi*. One corresponds to the eclipse and the other to the date of inscription. There was only one eclipse in 1237 AD on December 19 which agrees with the name of *Margasira*. There is no Saka year mentioned however the other two inscriptions on the same pillar (no. 21 in table 2) and No.34 help in fixing the date assuming the *Samvatsara* as *Hevilambi* and the letter 'He' is damaged. It is not unlikely considering that the word *Vilambi* begins on a fresh sentence.
  34. There is no ambiguity in fixing the date of this as December 8, 1238 A.D. The year is *Vilambi* following the previous one.



35. This inscription has no Saka year, but the name of the king can be used to fix the date.
36. This inscription has the saka year and the name of *Samvatsara* as *Virodhi* which do not agree. A trial and error helps one to choose 1289 March 23, for which the Saka year is 1211 and the name of the *Samvatsara* is *Virodhi*.
37. This records a self immolation event at Mugulugere, when Bamma entered the fire and attained *Suryaloka*. The name of the *Samvatsara* only is available as *Virodhikrit*. The date fixed on the basis of this by the historians is 1432 where as the actual eclipse occurred on August 8, 1431, which is correct according to Table 3. It is possible that the inscription was etched much later.
38. This inscription shows a difference of 10 days, between the dates of record and the astronomical catalogues.
39. There is a small episode related to this inscription, which is too lengthy to be reproduced here. The king of Mysore, Chickadevaraj Wodeyar swore that if he gets back all the land which he had lost (perhaps in a war), he would arrange for special worship at Srishaila, (in Andhra Pradesh) and would depute a priest specially for this purpose. This was duly fulfilled. The details of the money released, type of grant, name of the priest are all inscribed. The date of grant was August 2, 1673 corresponding to a solar eclipse. The date is fixed with the mention of eclipse and the name of the ruler. There is no ambiguity but for a difference of 10 days.

## 2.2 Records of Lunar eclipses

Table 2 corresponds to the records of charity and donations in the context of lunar eclipses. We shall discuss only those items in which the fixing of dates is questionable.

The first entry in this category is damaged and therefore, the dates have not been mentioned. The approximate year is fixed based on the other considerations like the regnal year of the king. From the eclipse records we find that there were two lunar eclipses on 4th October and 11th April, in the year 925. Therefore the date of inscription could correspond to any of these.

There is no ambiguity in fixing the dates of the next three eclipse records.

The record no.4 from Bijapur and the record no.5 from Nagavanda, Hirekerur have the same name of the *Samvatsara*; however, the names of the months are *Margasira* and *Karthika* respectively. The *Saka* mentioned in entry no.4 fixes the date to 1128 AD and in that year there was only one lunar eclipse on November, 8th. On careful reading of the latter it is brought out that the inscription is in the context of the eclipse of a *Punnami* (full moon) and written on the following *Amase* (Newmoon). This implies that both these records pertain to the same eclipse.

Table 2. Inscriptions with references to lunar eclipses.

No.	Place	Date on Inscription	Reference	Date from Oppolzer
1.	* Nidgundi, Ron, Dharwad	925 1074, Oct. 7 Saka 996, Ananda (48), Anaswayuja	Ep. In. XIII p.329	Oct 4 or Apr. 11, 925
2.	Naragundi, Dharwad	Nov. 29, 1080 Roudra (54), Margasira	S. Ind. Ins. XV No.2	Oct. 7, 1074
3.	Ingaleswar, Bagewadi, Bijapur	Nov. 8, 1128 Saka 1050, Keelaka (42), Karthika	Kar. Ins. V, No.12	Nov. 29, 1080
4.	Nagavanda, Hirekerur	1128 Keelaka (42), Margasira	S. Ind. Ins. XV No.12	Nov. 8, 1128
5.	Naragundi, Dharwad	Apr. 26, 1138 Kalayukti (52), Vaishaka	Kar. Ins. VI, No.25	Nov. 8, 1128
6.	Kurtakoti, Gadag	Apr. 26, 1138 Kalayukti (52)	Kar. Ins. V, No.24	Apr. 26, 1138
7.	Kurahatti, Navalgund, Dharwad	Feb. 12, 1142 Dhundubhi (56), Phalguna	S. Ind. Ins. XV, No.17	Apr. 26, 1138
8.	Chikkakonati, Hirekerur	Feb. 1, 1143 Phalguna	S. Ind. Ins. XV, No.22	Feb 12, 1142
9.	Hosur, Gadag, Dharwad	June 16, 1155 Yuva(9), Ashadha	Kar. Ins. VI, No.28	Feb 1, 1142
10.	Yali-sirur, Gadag, Dharwad	Sept 30, 1167 Sarvajit (21), Ashwayuja	South Ind. Ins. XV, Nos.51 and 52	June 16, 1155
11.	Mutiagi, Bagewadi, Bijapur	Jul 18, 1171 Khara (25), Shrivana	S. Ind. Ins. XV, No. 107	Sept. 30, 1167
12.	Lakkundi, Gadag, Dharwad	Jan. 1, 1173 Nandana (26), Pausha	S. Ind. Ins. XV, No.116	Jul. 18, 1171
13.	Nidgundi, Ron, Dharwad	Nov 10, 1174 Jaya (28), Margasira	S. Ins. Ins. XV, No.119	Jan 1, 1173
14.	Annigeri, Dharwad	1175? Karthika	S. Ind. Ins. XV, no.241	Nov. 10, 1174
15.	Lakkundi, Dharwad	Feb. 23, 1179 Saka 1100, Vilambi (32) Phalguna	S. Ind. Ins. XV, no.127	Oct. 10, 1175
16.	Muttagi, Bagewadi, Bijapur	Apr 14, 1158 Saka 1080, Vaishaka	S. Ind. Ins., XV, no.135	Feb 23 1179
17.	Gadag, Dharwad	Nov. 21, 1192 Saka 1114, Paridhavi (46), Margashira	S. Ind. Ins. XV, no.97	Apr 14, 1158
18.	Satihai, Bagewadi, Bijapur	May 17, 1193 Pramadeecha (47), Jyeshtha	S. Ind. Ins., XV, no.208	Nov. 21, 1192
19.	Rattihalli, Hirekerur	Jun. 28, 1238 Saka 1160, Vilambi (32), Ashadha	S. Ind. Ins. XV, no.549	May 17, 1193
20.	Hubli, Dharwad	Aug 19, 1244 Saka 1166, Krodhin(38), Bhadrpadada	Kar. Ins. VI, No.44	Jun 28, 1238
21.	Salavadig, Bagewadi, Bijapur	Oct 1, 1251 Saka 1174 Virodhikrit(45), Sravana	S. Ind. Ins. XV, No.179	Aug 19, 1244
22.	Abbigeri, Ron	May 31, 1379 Saka 1301, Jyeshtha	S. Ind. Ins., XV, No.188	Oct. 1, 1251
23.	Belambur, Ankola, N. Kanara	Apr. 29, 1390 Saka 1312, Pramoda(4), Chaitra	S. Ind. Ins., XV, No.244	May 31, 1379
24.	Nilgunda, Gadag	1524 Saka 1445, Swabhanu(17), Magha	Kar. Ins., VI, No.61	Apr. 29, 1390
25.	Huyilgol, Gadag	Jan 9, 1563 Saka 1484, Dhundubhi(56), Pushya	S. Ind. Ins. XV No.685	Feb.24, 1524
26.	Koivad, Hubli	Dec 29, 1563 Saka 1485, Rudhiredgari(57), Pushya	S. Ind. Ins. XV No.692	Jan 9, 1563
27.	Soundatti	Jan 19, 1581 Saka 1501, Vikrama (14), Magha	Kar Ins. V, No. 123	Dec 29, 1563
28.			Kar. Ins. VI No.72	Jan 19, 1581

\* original document not accessible; only cross reference is available

The record of no.8 in Kurahatti is also damaged, so that the type of eclipse is not legible. However the date clearly corresponds to a lunar eclipse. This refers to offers made to the Sun God on Feb. 12, 1142.

Inscription No.13 refers to an offer made by Tavanidhi Keshava to Sushena Pandita at Lakkundi in 1173 during a lunar eclipse on a Monday. The Saka year is not mentioned; however, the name of *Samvatsara* as *Nandana* is available. The name of the month puts it to the December-January period. The precise date of this eclipse from the work of Oppolzer is 1st January, 1173.

The item no. 15 is damaged so that the name of the *Samvatsara* cannot be read out. The Saka is not available; however there is a mention of the regnal year of the King as 7. The previous entry in the Table corresponding to the 8th regnal year of the same King and the date is 10th November, 1174. The name of the month as *Karthika* for this eclipse fixes the date very precisely to 21st November, 1173.

The entry no. 17 also has the name of *Samvatsara* missing. Based on the name of the month and the Saka year the date has been fixed.

There is no ambiguity in no.20; the saka should, however, be 1160 instead of 1161.

Similarly the saka year for no.22 should be 1173 instead of 1174.

The entry no. 23 also has the name of *Samvatsara* missing. Based on the name of the month and the Saka year the date has been fixed.

The inscription no.27 is from Kolivad, which mentions the offer of a girl as court dancer, *Devadasi*, on the lunar eclipse of December 29, 1563.

Entry no. 28 has the saka as 1501; however from the name of *Samvatsara* and eclipse match it should be 1502.

**Table 3.** Conversion of names of *Samvatsaras*

No.	Name	Saka	Period (Gregorian) <sup>1</sup>
10	Dhatri	1918	April 1996 to March 1997
10	Dhatri	1018	April 1096 to March 1097
32	Vilambi	1040	April 1118 to March 1119
32	Vilambi	860	April 938 to March 939
33	Vikari	1041	April 1119 to March 1120
34	Sharvari	1042	April 1120 to March 1121
43	Soumya	1051	April 1129 to March 1130
44	Sadharana	1052	April 1130 to March 1131
45	Virodhikrit	1053	April 1131 to March 1132
45	Virodhikrit	1353	April 1431 to March 1432
54	Roudra	1062	April 1140 to March 1141
55	Durmati	1063	April 1141 to March 1142

<sup>1</sup>To be adjusted according to precession and difference between Julian and Gregorian calendars

### 3. Discussion

The names of the *Samvatsaras* used in these inscriptions can be used to countercheck the dates in all cases.

The Saka year mentioned can sometimes be misleading since all of them do not correspond to the same king, e.g. *Vikrama Saka* and *Shalivahana Saka*.

The names of the kings cannot be used as a reference because, generally a number of adjectives are used to describe the king. Many of these names thus sound similar and appear common to all the kings (e.g. Jagadekamalla, Bhulokamalla etc.)

The systematic difference of 10 days in dates after the 16th century probably reflect the correction incorporated into the calendar. The systematic study of these stone inscriptions, like classification, numbering etc., was started during the British era and hence the difference is carried through. The calculations of Oppolzer is based on the Julian day number, which is free of the calendar correction.

One of the important things to remember while reading the lengthy inscriptions is that generally half the description is devoted to praise the person (the king or the local land lord or the representative of the king, as the case may be) who is getting the inscription written down. Sometimes this runs to pages testing the patience of the reader. On some occasions the date is written down correctly but without the mention of the eclipse. The eclipse will get a special mention in one of the sentences further. Therefore, one has to read through the entire text very carefully, before drawing any conclusions.

Interestingly, in some cases the script used will correspond to a different language as in the case of item 23 in Table 2; here the script used is Devnagari, while the language is Kannada.

None of the inscriptions, quite interestingly, imply ideas of fear or awe towards the eclipses. They are treated as natural phenomena and awaited to avail the opportunity for releasing grants and donations, which are straight roads to salvation.

The grants and donations refer to offerings called '*Tulapurusha*' (distributing gold equivalent of one's weight), '*Kalpavriksha*' and many more donations after the ritual of a bath in the holy rivers, during a solar eclipse. The donation by name '*Kalpavriksha*', consists of the carving of a tree, surrounded by four more trees, Lord Kamadeva (Cupid) at the central tree, his four wives under the four trees - all etched in gold - These were worshipped and offered as a donation. The details of such charities, called '*Mahadana*' are widely known (Chidananda Murthy, 1970).

The inscription no. 25 in Table 2 refers to the conjunction of 8 planets named *astagrahayoga*, remembering that the Rahu and Ketu (the ascending and the descending nodes of moon) are also considered as planets.

The conjunction of six planets (*Shadgraha Yoga*) on a solar eclipse day was considered very auspicious for release of grants and making donations. Therefore, on January 6, 1665 when the six planets - Sun (considered as a planet) Moon, Mars, Jupiter, Mercury and Ketu (considered as a planet) were in conjunction, Devaraja Wodeyar, King of Mysore, granted a village by name Lakkur to one Lakkappa Jois. (Inscription No.38, in Table 1). Also distributed gold, equal to his weight.

It should be noted that generally all stone inscriptions contain a picture of the sun and the moon. Experts have interpreted the implication that the inscription is a valid record as long as the sun and moon survive.

The self-immolation records are restricted to a very small region at the central part of Karnataka. (This may be a selection effect, since the survey of inscriptions is not complete). All these Taluks, incidentally comprise of a zone which was identified as "Banavasi 12000" in those days. (This type of nomenclature namely the name of place followed by a 4-5 digit number was very widely used).

There are many other stone inscriptions referring to self-immolation events but taking place on other days like *Makara Sankranti* (entry of sun into Capricorn). A detailed investigation of such records is in progress.

The king of Mysore, Mummadi Krishnaraja Wodeyar (1794-1868) had written (or got it written) a book by name "*Grahana Darpana*", which compiles all the eclipses from 1839 to 1899. (The litho copy of the book available at the Oriental Library, Mysore, contains many colourful drawings as well). This book is a unique record of eclipses.

#### 4. Conclusion

The stone inscriptions found in various parts of Karnataka are valuable documents of the solar and lunar eclipses from 9th century onwards. The precise dates of these events have been assigned from eclipse calculations.

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#### Note added in proof

Except in two cases where the words "annular" and "total" appear, the others do not give any indication on the type or timings of the eclipse. None of the records describe the eclipse event.

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### Appendix

#### Hindu samvatsaras

No.	Name	No.	Name	No.	Name	No.	Name
1	Prabhava	16	Chitrabhanu	31	Hevilambi	46	Pareedhavi
2	Vibhava	17	Swabhanu	32	Vilambi	47	Pramadheechea
3	Shukla	18	Tarana	33	Vikari	48	Ananda
4	Pramodootha	19	Parthiva	34	Sharvari	49	Rakshasa
5	Prajothpatthi	20	Vyaya	35	Plawa	50	Nala
6	Aangeerasa	21	Sarwajit	36	Shubhakrith	51	Paingala
7	Shreemukha	22	Sarvadhari	37	Shobhakrith	52	Kalayukthi
8	Bhava	23	Virodhi	38	Krodhi	53	Siddharthi
9	Yuva	24	Vikrithi	39	Vishwavasu	54	Roudri
10	Dhathru	25	Khara	40	Parabhava	55	Durmati
11	Eshwara	26	Nandana	41	Plawanga	56	Dhundhubi
12	Bahudhanya	27	Vijaya	42	Keelaka	57	Rudhirodgari
13	Pramadhi	28	Jaya	43	Sowmya	58	Rakthakshi
14	Vikrama	29	Manmatha	44	Sadharana	59	Krodhana
15	Visha (Vishu)	30	Durmukhi	45	Virodhikrith	60	Akshaya (Kshaya)