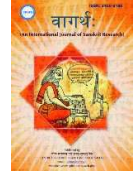




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Earthquakes: References from Sanskrit Literature

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Abstract: The present paper aims to elaborate earthquakes as described in Sanskrit literature. It is a natural disaster which is mainly caused because of natural phenomena, generally occurs due to the movement of earth's crust. The main focus of this paper is to present definitions of earthquake, types, specific astronomical period mentioned for earthquakes and also a brief survey of past earthquakes. It is noteworthy that Sanskrit texts highlight mainly the specific time and also an excellent effort has been made to identify the exact places those suffered from earthquakes. It may be useful for further scientific researches.

Keywords: Earthquakes, natural disaster, Sanskrit.

I. INTRODUCTION

Since ancient times disturbance in the life of animate creatures and abundant loss of resources is being caused due to natural disasters. Among these disasters earthquakes, famine, drought, diseases and floods are chiefly discussed in ancient Sanskrit literature. Disasters are termed as *nirṛti* in the *Rgveda* [1], *mahābhaya* in the *Arthaśāstra* (*Devānyaṣṭau mahābhayāni. Agnirudakam vyādhirdurbhikṣam mūṣikā vyālāḥ sarpāḥ rakṣānsiti*) [2] and *īti* in the *Śabdakalpadruma - Atiṽṛṣṭiranāvṛṣṭiḥ śalabhā mūṣikā khagāḥ. Pratyāsannāśca rājānaḥ śadetā itayaḥ smṛtāḥ.* [3]

In Oxford dictionary an earthquake is defined as “A sudden violent shaking of the ground, typically causing great destruction, as a result of movements within the earth's crust or volcanic action.” [4]

An enormous number of works in Sanskrit on natural phenomena have been done such as *Brhatsamhitā* of Varahamihira (5-6th century AD) and *Adbhutasagara* of Ballala Sena (10-11th century AD) etc.

India had a number of the world's extremely hazardous earthquakes in the last century. In fact, more than 50% area in the country is considered prone to damaging earthquakes. An earthquake can be defined through various delineations as follows-

II. EARTHQUAKES IN SANSKRIT LITERATURE

A brief indication of earthquake (*bhūkampa*) has also been indicated in *Kāṭhaka Gṛhyasūtra* of *Yajurveda* in the section of ‘*anadhyāya*’ in the explanations of the *sūtra* as follows-

Bhūkampacandrārkoparaganṛpatimahāpuruṣapramayap rabhṛtayā anumantavyāḥ. [5]

i.e., one should not study during earthquakes, moon and solar eclipses also as per the orders of the kings and scholars.

Vālmiki also describes earthquake in *Rāmāyaṇa* as follows-

Tasya śabdamaḥānāsinnirghātasamasvinaḥ bhūmikampaśca sumahān parvatasyeva dīryataḥ. [6]

i.e., mighty was the sound that was heard on the occasion, like unto the bursting of a thunder-clap: and the earth trembled terribly, as it doth in the vicinity of a mountain splitting.

Mahābhārata [7] also presents some explanations on earthquakes-

- *Cacāla cāpi pṛthivī saśailavanakānanā.* -(Droṇa Parva, 77.4)
- *Cacāla śabdamaḥ kurvāṇā saparvatavanā mahī.* -(Śalya Parva, 11.14)
- *Cacāla cā mahākampaḥ pṛthivī savanadrūmāḥ.* -(Śalya Parva, 56.10)
- *Cacāla pṛthivī cāpi savṛkṣakṣupaparvatā.* -(Śalya Parva, 58.49)

The definition of *bhūkampa* (earthquake) is also stated in *Brhaddaivajñārañjanam*-

*Pāṣāṇāḥ kaṭhinā bhūmiryatra tatra kuto balāt.
vāṣpaṇiḥsaraṇātkamphaḥ śabdo 'pi satatam bhuvī.
Ata evānyabhūmau tu vināyāsātkutaḥ kila.
vāṣpaṇiḥsaraṇe tatra kadācid riṣṭado 'pi saḥ.
bhūmikamphaḥ parvatāḍau sarvadaiveṭi nirṇayaḥ. [8]*

i.e., when hard surface of earth starts producing steam and that particular area of earth starts shaking with sound.

It proves that shaking of earth is the cause of cracking of the earth crust. An extensive study of earthquakes is also mentioned in 'Bhūkampalakṣaṇādhyāyaḥ' chapter of *Brhatsamhitā*. Above mentioned references explain that in particular period people were well aware of as well as they must have suffered through earthquakes, so it can be noticed in the later Sanskrit texts.

III. TYPES OF EARTHQUAKES

A detailed study of earthquakes is elucidated in *Bhūkampalakṣaṇādhyāya* of *Brhatsamhitā*. Accordingly, the chapter discusses the leading reasons of earthquakes such as atmospheric *vāyu* (air), *agni* (fire), *Indra* and *Varuṇa* circles. Explanations of the particular circles are as follows-

*Rūpāyudhamṛdvaidyāstriḥkavigāndharvapanyaśilpijanāḥ.
pīdyante saurāṣṭrākakurumagadhadaśārnamatsyāśca. [9]*

i.e., The circle presided over by the wind god consists of the seven asterisms, viz., Uttarā, Hasta, Chitra, Svāti, Punarvasu, Mṛgaśira and Aśvini (that is whenever an earthquake occurs in any of these stars, it has to be construed that it is due to the wind circle). The following symptoms of this circle will be revealed a week in advance: the quarters are covered with smoke, a wind blows lashing with the dust of the earth and breaking trees, and the Sun does not cast bright rays. During an earthquake of the wind circle the decay of crops, water, forest and herbs, the outbreak of swellings, asthma, madness, fever and trouble to the trading community will ensue.

Just like wind circle, fire, *Varuṇa* and *Indra* circles in different *nakṣatras* (asterisms) affect various diseases and different levels of damages (*Brhatsamhita*, 32/12-30). An earthquake which is whether in any of circles viz., wind, fire, *Varuṇa* and *Indra*, it limits to the extent is explained as follows-

*Calayati pavanaḥ śatadvayam śatamanalo daśayojanānvitam.
salilapatiraśītisaṅyutam kulīśadharo 'bhyadhikam ca ṣaṣṭitaḥ.
-(Brhatsamhita, 32/31) [9]*

i.e., the earthquake of the 'wind' circle shakes the earth to an extent of two hundred *yojanas*, one of 'fire' circle one hundred and ten *yojanas*, one of 'Vruṇa's' one hundred and eighty *yojanas* and one of *Indra's* one hundred sixty *yojanas*.

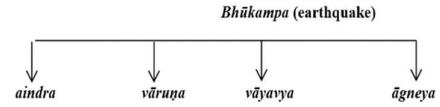
Brhatsamhitā presents a complete account of earthquake ranging from its signs and influence in various directions to its extensions has been enunciated clearly in *Bhūkampalakṣaṇādhyāyaḥ* of *Brhatsamhitā*.

A brief but clear sketch of earthquake is also available in *Kādambinī* [10] of Madhusudan Ojha. An Earthquake is illustrated in the fourth chapter titled *Nimittādhyāya* in the section *prakṛṇakādhikārah* of the text-

*Rāhavaḥ ketavastārāḥ digdāhaḥ pāmsuvarṣanam.
Bhūkampaśceti ṣaḍ bhāvā uktā vaikārikahvayāḥ.
-(Verse- 389) [10]*

Accordingly, there are four types of an earthquake (*bhūkampa*) as follows-

1. *aindra*
2. *vāruṇa*
3. *vāyavya*
4. *āgneya*



Principally, first to fourth parts of the day are called *vāyu*, *agni*, *indra* and *varuṇa*. The earthquakes during these parts of the day are known as *aindra*, *vāruṇa*, *vāyavya* and *āgneya*.

1. *Aindra*- This earthquake occurs if seventh house from *rāhu* (Neptune) is *maṅgal* (Mars). *Nakṣatras* of *aindra maṅḍala* mainly *rohini*, *jyeṣṭhā*, *vaiśva* (*uttarāṣāḍha*), *anurādhā*, *dhanīṣṭhā*, *śravavṇa*-

*Rauhmyaindre vaiśvamaitre dhanīṣṭhā śravaṇābhijit.
aindrām tu maṅḍālam tasya saptāhād rūpadarśanam.
-(Verse- 395) [10]*

2. *Vāruṇa*- This *maṅḍala* is associated with *aśleṣā*, *ādrā*, *pūrvāṣāḍha*, *revatī*, *mūla*, *uttara bhādrapada nakṣatras*-
*Śleṣārdhe āpyarevatyau mūlāhīrbudhnyavāruṇam.
vāruṇam maṅḍalam tasya saptāhād rūpadarśanam.
-(Verse- 397) [10]*

This earthquake creates tribulations in *Kāśī* (Varanasi), *Suvāsu*, *Ābū* (Rajasthan), and *Paurava*-

*Yatheṣṭe jāyate vṛṣṭīrbhūkampe tvaindramāṅḍale.
pīḍā kāśyām suvāstau ca mālāvārbudapaurave.
-(Verse- 401) [10]*

3. *Vāyavya*- *Svāti*, *citrā*, *uttarāphālgunī*, *hasta*, *mṛgaśira*, *aśvini*, and *punarvasu* are found in *vāyavya maṅḍala*-

*Svāticitre uphāstau mṛgāśvinyau punarvasu.
vāyavyam maṅḍalam tasya saptāhād rūpadarśanam.
-(Verse- 401) [10]*

During this earthquake plenteously, demolition of crops and water etc. is seen. The affected areas are *Matsya*, *Daśārṇa*, *Saurāṣṭra*, *Magadha* and *Kuru*-

*Vāyavye bhūmikampe tu jalasasyauśadhikṣayaḥ.
pīḍā matsye daśārṇe ca saurāṣṭre magadhe kurau.
-(Verse- 399) [10]*

4. *Āgneya*- This earthquake befalls in *puṣya*, *kr̥tikā*, *viśākhā*, *pūrvābhādra*, *bharanī*, *pūrvāphālgunī* and *maghā nakṣatras*-

*Puṣyāgneyaviśākhājabharanī bhāgyapitryabham.
Āgneyam maṅḍalam tasya saptāhādrūpadarśanam.
-(Verse- 393) [10]*

The effect of this earthquake is that heated air blows, fall of *ulkā* (asteroid), sky and all directions seem burning-

*Atyuṣṇavāyusamcārastārōllāpatanam divaḥ.
digdāhaḥ sandhyayonirniyamādiptamiva kham bhavet.
-(Verse- 394) [10]*

Earthquakes damages at different levels depending its sum speed and time. Such as an earthquake of air circle damages water, harvest and medicines. It effects basically at *Matsya*, *Daśārṇa*, *Saurāṣṭra*, *Magadha* and *Kuru* areas. The earthquake of fire circle damages mainly clouds and water resources and *Aṅga*, *Baṅga*, *Kalinga* and *Draviḍa* parts etc. *Aindra* circle causes tribulations in *Kāśī*, *Suvāsu*, *Mālavā*, *Ābu* and *Paurava*. *Vāruṇa* circle disturbs *Cedi*, *Gonada*, *Vaideha* and *Kirāta*.

Basically, earthquake is purely a natural disaster. On the basis of above analysis, it is clear that a comprehensive study of earthquakes is available in Sanskrit texts. It highlights on the predictions about exact time and places where it is about to occur. Thus, it can be said that by examining and following those instructions carefully ample efforts can be made to save the life of creatures as well as tribulations of earthquake can be reduced a bit at least.

IV. MAJOR EARTHQUAKES

In present scientific era frequency of an earthquake can be understood through its *magnitude* and *intensity*. Both these terms are different can be implicit through following quote-

“*Earthquake magnitude* is a measure of the size of the earthquake reflecting the elastic energy released by the earthquake. It is referred by a certain real number on the Richter scale (e.g., magnitude 6.5 earthquake). On the other hand, *earthquake intensity* indicates the extent of shaking experienced at a given location due to a particular earthquake. It is referred by a Roman numeral (e.g., VIII on MSK scale). To draw a parallel, consider a 100W light bulb used for illumination purposes. It dissipates energy of 100 *Watts*. However, the brightness of light at different distances from it, referred in *candlelights*, is different.....The concept of earthquake magnitude was first developed by Richter (e.g., Richter 1958), and hence, the term “Richter scale. The value of magnitude is obtained on the basis of recordings of earthquake ground motion on seismographs.” [11]

Past Major Earthquakes-

Some Great Indian Earthquakes	
1.	Cutch earthquake, 1819
2.	Assam earthquake, 1897
3.	Bihar - Nepal earthquake, 1934

Some Major Recent Indian Earthquakes	
1.	Koyna earthquake, 1967
2.	Bihar - Nepal earthquake, 1988
3.	Uttarkashi earthquake, 1991
4.	Killari (Latur) earthquake, 1993
5.	Jabalpur earthquake, 1997

In this way, natural disasters cause a great deal of impairment to the environment so it is required to pay attention in advance to protect lives. To quote:

“India has relatively high frequency of great earthquakes and relatively low frequency of moderate earthquakes. Moderate earthquakes create awareness and lead to

improvements in constructions at relatively low human costs, which could be very effective in the long run. Due to rather infrequent moderate earthquakes, the Indian earthquake problem does not receive the attention of the country that it deserves considering our overall seismic potential, and this is a tragedy. For a poor country, the focus of political priorities anyway remains on day-to-day problems of poverty, shelter, law and order, health, sanitation, and it is as such difficult to seek priorities to once-in-a-while problems of natural disasters. Nevertheless, just like one takes a life insurance policy for unexpected disasters, the country needs to invest a small fraction of priorities towards earthquake disaster mitigation; the consequences otherwise could be truly unimaginable should a major earthquake cause severe shaking in highly populated areas of the country.” [12]

CONCLUSION

Above description of earthquake shows that past earthquakes hazardously effected environment whether it is in India or any other part of the world. Basically, earthquakes are purely natural calamity and it cannot be blocked through any device or any other source. But a noteworthy outlook towards earthquakes is reflected in the ancient writings wherein predictions on earthquakes are pointed out. By watchfully noticing specific time (*nakṣatras*) and place, loss due to earthquakes can be reduced.

To sum up, it may be said that the universe consists of five basic elements such as *prthivi*, *jala*, *tejas*, *vāyu* and *ākāśa*- *imāni pañcabhūtāni prthivī, vāyu ākāśa, āpa jyotiṃṣi*. [13]

The nature has maintained a balanced status between above elements and living creatures. A disturbance in any of these elements of the environment beyond certain limits causes problems to living creatures. So, it should be our foremost effort to protect the environment and ancient writings would be beneficial for this mission.

REFERENCES

- [1]. Svami Satya Prakash Sarasvati and Satyakam Vidyalankara, *Rgveda* (English translation), Veda Pratishthana, Arya Samaj Mandir Marg, New Delhi, 1996, 10.59.1-4
- [2]. R.P. Kangle, *Kauṭilya Arthaśāstra* Part I: A critical edition and Glossary (Ed.), Second Edition, University of Bombay, 1969, 3.78
- [3]. Raja Radhakant Dev, *Śabdakalpadruma*, Vol. I, Rashtriya Sanskrit Santhan, New Delhi, 2006, (Reprint) p.216
- [4]. Oxford dictionary: <https://en.oxforddictionaries.com/definition/earthquake>
- [5]. W. Calend, *Kāṭhaka Gṛhyasūtra*, (ed.), Lahore: Vidya Prakash Press, (V. Samvat) 1981, 1.9.8
- [6]. *Vālmiki, Rāmāyaṇa* with Sanskrit text and English translation (Two Parts), Geeta Press, Gorakhpur, 2006, 67.18
- [7]. *Mahabhārata* (6 Vols.), Geeta Press, Gorakhpur, Droṇa Parva, 77.4

- [8]. Motilal Chaturvedi, *Brhadadaivajñarañjanam (Śrīdharī Hindi vyākhyā sahitam)*, First Edition, Motilal Banarasidass, Delhi, 1984, 12.34-37
- [9]. Varahamihira, *Brhatsamhita*, (Ed. and English translation) Subrahmanya Sastri, V.B. Soobbiah and Sons, Bangalore, 1946,
- [10]. Madhusudan Ojha, *Kādambinī*, Jaya Narayana Vyas Vishvavidyalaya, Jodhpur: 2003 (Reprint), verse- 389
- [11]. – [12]. Sudheer K. Jain, Indian Earthquakes: An Overview, *The Indian Concrete Journal*, Vol. 72, No. 11, November, 1998, pp.1-2
- [13]. *Aitareya Upaniṣad* Eight Upaniṣads with the Commentary of Śaṅkarācārya Vol. II, (Translated) Swāmi Gambhīrānanda, Advaita Ashram Publication Department, (Twelfth impression), Delhi, 2000, 3.3